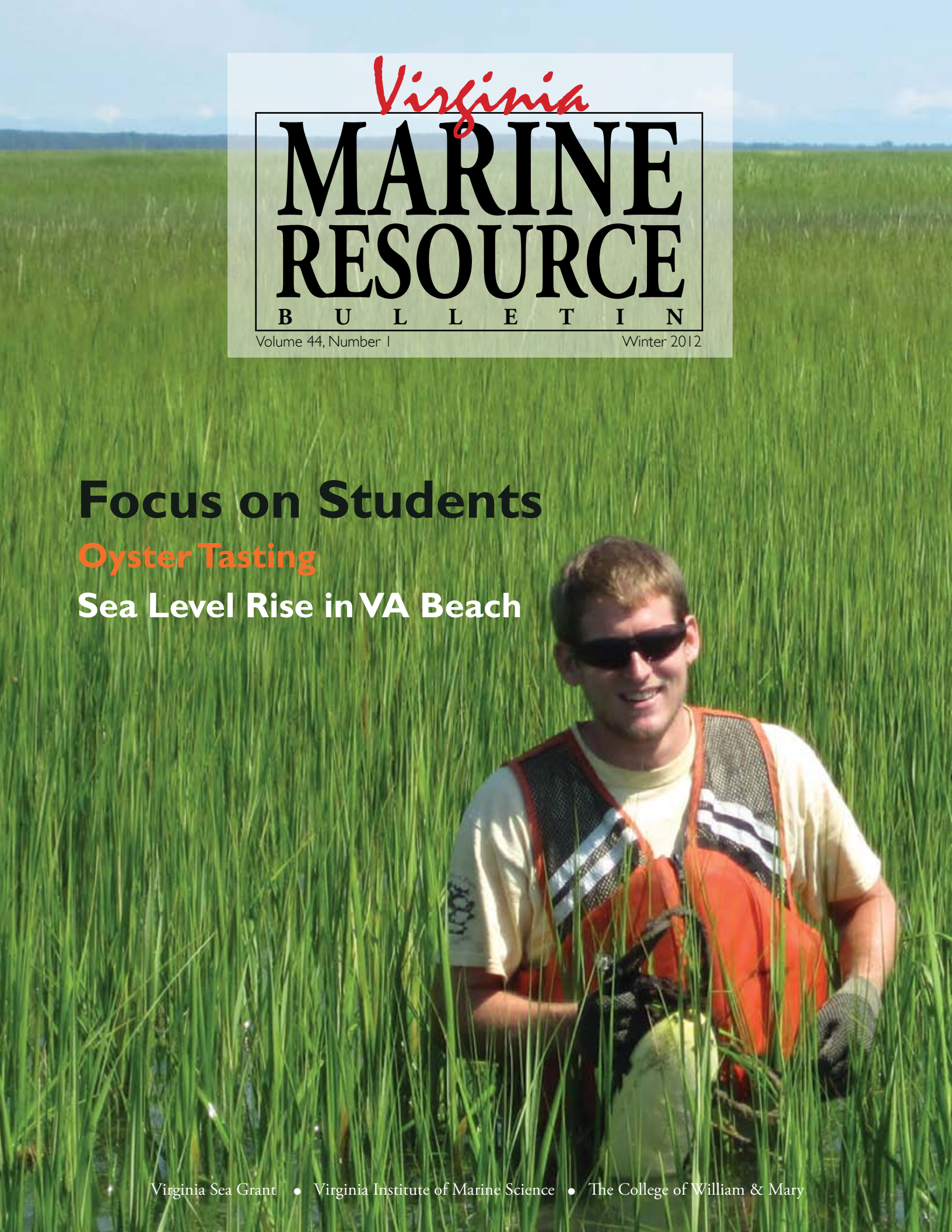
Virginia
MARINE RESOURCE BULLETIN
Volume 44, Number 1 Winter 2012

Focus on Students

Oyster Tasting

Sea Level Rise in VA Beach



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Sea Grant Virginia

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Cover: VIMS Ph.D. student and VASG Fellow Ryan Schloesser recovers a labmate's buoy while trawling for flounder on the Eastern Shore. Photo ©Janet Krenn/VASG

Join Us Online

Throughout the magazine, we've provided links to more information, photos, and videos about VASG projects. For even more great resources, check out these sites:

vaseagrant.vims.edu
Virginia Sea Grant's website, with information about our programs, funding opportunities, news, and events.

www.facebook.com/virginiaseagrant
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www.flickr.com/photos/virginiaseagrant
Photos of research, events, and all of our activities, taken by staff and photography interns.

www.youtube.com/virginiaseagrant
Videos of visiting speakers, projects, cool critters, and more.

Follow the Codes

We've added QR codes to this issue, directing your smart phone to online video, audio, and photos related to the articles. To use the codes, first download a free QR scanner app onto your phone. Then scan the codes and your phone will take you directly to VASG resources!

To see how it works, use your smart phone's QR scanning app to follow this code and check out a flickr slideshow featuring the work of VASG photography interns.

No smart phone? Go to bit.ly/internphotos.

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Photography intern Carly Rose documents a waterman setting up a Virginia Fisheries Resource Grant Program research project.

In This Issue

Virginia Marine Resource Bulletin

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Focus on Students

Throughout this issue, we're featuring the work of Virginia Sea Grant (VASG) fellows and interns. Here are a few more ways VASG is developing the workforce of marine and coastal experts.

Research Fellowships

VASG research projects are often used to support graduate students working with funded investigators. The 2011 research funding included $192,000 for graduate research fellows working on five projects. Ryan Schloesser (pictured on the cover) was one of those fellows. His research with VIMS associate professor Mary Fabrizio involves measuring the lipid content of young striped bass and summer flounder to help improve the methods fisheries managers use to predict future fish populations.

©Janet Krenn/VASG

Research fellow Ryan Schloesser shows a juvenile fish to communications intern Kate Schimel.

VASG also fields applications for national fellowships in population dynamics and marine resource economics sponsored by the National Marine Fisheries Service (NMFS) and in coastal management sponsored by the National Oceanic and Atmospheric Administration (NOAA). Virginia currently has three Population Dynamics Fellows: Mark Henderson, Patrick Lynch, and Matthew Smith, all of VIMS.

In 2010, VASG piloted a fellowship in collaborative fisheries research that supported students conducting research with the fishing industry and NMFS. In 2012, through an expanded partnership with the NMFS Southeast Fisheries Science Center, VASG will be continuing to fund two-year fellowships in bycatch reduction research.

For 2012, VASG has also initiated a new Graduate Research Fellowship program that will provide two years of stipend, tuition, and research support for up to four students. Each Virginia Sea Grant Graduate Research Fellow will work with an outreach or end-user mentor to ensure that their research results are used by stakeholders. Fellows will also be given professional development opportunities in science communication, the science-to-management process, and the adoption of innovation.

Internships

VASG offers a variety of internship opportunities for students to work in its offices at the Virginia Institute of Marine Science. This issue of the *Bulletin* features the work of photography interns Kim Warner and Carly Rose and communications intern Kate Schimel. In addition to those opportunities, VASG offers regular internship opportunities for law students at the College of William & Mary and summer policy internships for graduate students from institutions nationwide.

Fall law interns Mary-Carson Saunders and Alex Horning both gained valuable real-world experience by applying their legal education to answering environmental policy questions. Saunders analyzed the impact of the new Chesapeake Bay Total Maximum Daily Load (TMDL) regulations on local governments, while Horning compared climate adaptation efforts in Virginia and Maryland.

Virginia's 2012 Knauss Fellows (left to right): Charlotte Weaver from Virginia Tech will work for the U.S. House Committee on Natural Resources. Lindsey Kraatz from VIMS will work with U.S. Representative Mike Thompson of California. Stacy Beharry from Old Dominion University will work in the National Science Foundation's Division of Ocean Sciences. Chris Prosser of VIMS will work in the Environmental Protection Agency's Ecological and Health Protection Branch. Emily Susko from Virginia Tech will work in the National Sea Grant Office.

Knauss Marine Policy Fellowships

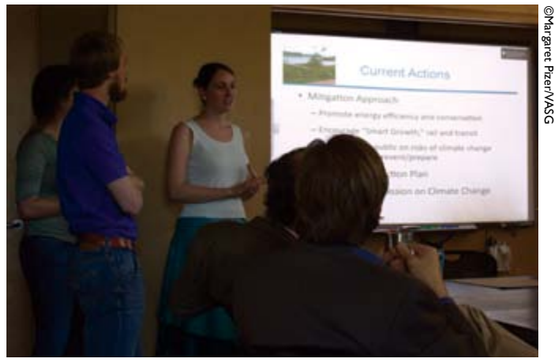
For the second year in a row, Virginia students have earned five of the coveted Knauss Marine Policy Fellowships, and no other state secured more of the fellowships. That means that 12 percent of all fellows, and 20 percent of the prestigious legislative fellows are from Virginia colleges and universities.

The Dean John A. Knauss Marine Policy Fellowship matches highly qualified graduate students with "hosts" in the legislative or executive branch of government located in the Washington, D.C. area, for a one-year paid fellowship.

Course Projects

VASG is increasingly seeking out new ways to get undergraduate and graduate courses at partner institutions involved in applying what they learn in class to addressing real-world coastal and marine issues. The work of University of Virginia (UVA) students and faculty on adaptation to sea level rise in Virginia Beach described in this issue is just one example.

VIMS graduate students now have the opportunity to complete a concentration in marine policy, and part of that concentration involves working with VASG on projects stemming from our visiting scholar seminar series. This spring, assistant professor Michael Luchs's undergraduate marketing class at the College of William & Mary (WM) will be working with a team of graduate students, faculty, and experts to help assess the market for a community supported fishery program among WM and VIMS faculty, staff, and students.



©Margaret Pizer/VASG

Students in Tim Beatley's coastal planning course at UVA present the results of their research.

"Through VASG's partnerships with academic institutions, extension programs, industry, regulatory agencies, and nonprofits, we are leveraging all elements of our network to provide students with practical experience and opportunities to solve pressing coastal and marine resource problems with state-of-the-art science.," says VASG director Troy Hartley.

For more information about VASG students and opportunities, visit vaseagrant.vims.edu/category/fellowships-internships, or contact Susan Park (spark@vims.edu).

Students in Tim Beatley's coastal planning course gather below the statue of King Neptune on the Virginia Beach oceanfront. From left to right: Sarah Bolivar, Talon Vinci, Alec Gosse (behind Talon), Emily Kilroy, Holly Hendrix, Tran Le, Christina Perez, Selena Hilton-Aragon, Adam Robinson, Kristen Ahearn, and Andrew Pompei.

©Tim Beatley/UVA

Leading Learning

Students and faculty take adaptation to sea level rise from the classroom to Virginia Beach.

by Margaret Pizer

A CENTURY FROM NOW, 18-30% of Virginia Beach's current land area could be underwater. On a shorter timescale, many residents are already seeing increased flooding, erosion, and storm damage. A group of students and faculty from the University of Virginia (UVA) are now immersed in helping the city respond and adapt to these changes.

Last spring, supported in part by a grant from the Virginia Sea Grant (VASG) Coastal Community Adaptation initiative, the UVA team kicked off projects to address sea level rise in Virginia Beach from the diverse perspectives of city planning, community engagement, and landscape architecture. The group consisted of students and faculty from two graduate courses in the School of Architecture, and was led by facilitators and graduate associates from the UVA Institute for Environmental Negotiation (IEN).

In May, professor Tim Beatley, teaching assistant Emily Kilroy, and other project partners presented the results of the project to the Virginia Beach City Council. "We feel like you have a tremendous opportunity," Beatley told the Council. "Comparing Virginia Beach to other highly vulnerable cities, there's no one further ahead than you are, and we feel like you really have the chance to push the envelope and really set the example for other cities."

Mayor Will Sessoms agreed, saying "We can sit back and do nothing, or we can try to get the best information and plan."

Learning by Example

Students in Beatley's coastal planning class began by comparing Virginia Beach to a number of other communities in the United States and around the globe that are under threat from sea level rise. In detailed comparisons to four other U.S. cities—Miami, Houston-Galveston, Sarasota, and New Orleans—the class concluded that local awareness of sea level rise in Virginia Beach

©Tanya Denckla Cobb/IEN

Listening session participants study a map of Virginia Beach.

is relatively high. A wide range of strategies are being employed in those other cities. These approaches include reducing greenhouse gas emissions, educating citizens about sea level rise, and implementing planning tools such as building codes and regulations on development.

Based on their research, the students made a number of planning recommendations that could help the city adapt to the coming changes. One major concern is the impact of hurricanes. "Areas of the city that were previously not vulnerable to hurricane damage will be with changing sea levels," explained Kilroy. The class recommended improvements to the current hurricane evacuation plans for the city to provide additional resources to tourists, older residents, and non-English speakers, among others.

The students also worked in teams focusing on urban, suburban, and rural portions of Virginia Beach and made specific recommendations for each part of the city. These included ideas about how to discourage new development in areas where flooding is likely to be most severe and mechanisms to help residents in low-lying areas prepare for the possibility of moving if water encroaches on their property.

Listening to Residents

The IEN led a complementary piece of the project, holding four listening sessions about sea level rise in Virginia Beach. A total of 128 residents attended and gave their opinions and input through surveys, group discussions, and maps on which they could pinpoint places where they had experienced the impacts of sea level rise.

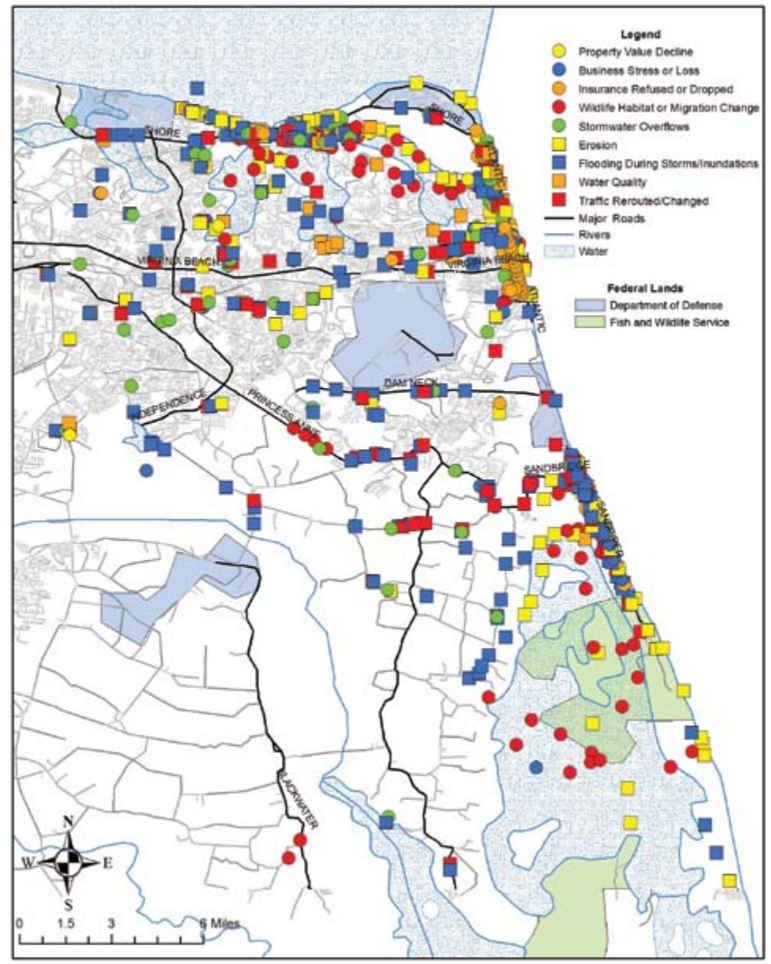
"We had two major goals for the listening sessions," said IEN Associate Director Tanya Denckla Cobb, "to help residents gain an understanding about sea level rise and what is being done by the City of Virginia Beach and the Hampton Roads Planning District Commission, but also to help them think about what they can do," Denckla Cobb noted. "Residents really appreciated being listened to."

Participants expressed a high level of concern about sea level rise and flooding, and many said they were already experiencing the impacts firsthand. For example, about 60% of participants said they had experienced frequent flooding, erosion, and storm damage, and 70% had noticed changes to wetlands and beaches. The sessions also revealed a real hunger for information on the part of residents, with 90% wanting more information on sea level rise and 88% wanting more information on solutions to problems associated with rising sea levels.

Designing for Flexibility

A third and final component of the project was led by UVA Landscape Architecture associate professor Kristina Hill, who tasked her spring semester studio class with designing sand islands or promontories that could be placed off of Willoughby Spit as a substitute for traditional beach nourishment. The approach, modeled after one used in the Netherlands, is less expensive than typical methods of replenishing beach sand, because it allows the sand to move naturally over time instead of being distributed and flattened by bulldozer.

Hill explained that many communities are facing reduced funding for beach nourishment as federal contracts expire. "We were looking for a cheaper way to do it and something that would provide significant habitat benefits [for wildlife]," says Hill. Students were also challenged to include an educational component in their designs so that residents viewing the sand structures would learn something about the dynamic nature of the coast.



Map of Virginia Beach showing where residents at listening sessions have experienced possible impacts of sea level rise. ©Tanya Denckla Cobb/IEN

Future Projects

All three projects initiated last spring have evolved into continuing collaborations between students and faculty at UVA and local officials in Virginia Beach and other coastal communities. Professors Hill and Beatley have received additional funding from VASG to follow the model developed last spring. Next fall, two student-faculty teams, in the context of courses offered in UVA's School of Architecture, will collaborate with Virginia Beach and other localities to work on adaptation to sea level rise.

The IEN team led by Denckla Cobb will receive funding from VASG to follow up on their listening sessions with focus groups in Virginia Beach, the Middle Peninsula, and the Eastern Shore. These discussions will drill deeper into public understanding, attitudes, and recommendations for shoreline protection in the face of sea level rise.

"There are clearly great opportunities for engaging students and communities in coastal adaptation research," says VASG Director Troy Hartley. "These projects are a wonderful example of addressing community flooding, beach erosion, and other challenges through collaboration of students, communities, and researchers. These students are tomorrow's workforce, and there will be tremendous economic development potential worldwide in adaptation planning and design. We want to ensure that graduates of Virginia institutions can lead the way."

Virginia Beach City Council member Bob Dyer also emphasized the importance of student contributions. "Under the mentorship of faculty, students can provide a valuable resource not only to Virginia Beach but [to] many cities," he said.

For more information, visit www.virginia.edu/ien/sealevelrise

Tasting the Bay

Even if you've tried raw oysters, you may have never really tasted one. Like wine, oysters grown in different areas taste different because they take on the characteristics of their environment. Simply slurping your oysters means you miss these delicate flavors.

At the second annual Halfshell Oyster Tasting event in November, the Tidewater Oyster Gardeners Association (TOGA) helped more than 200 people learn to really taste oysters. Attendees put their taste buds to the test trying to differentiate oysters from six growers who raise oysters at different places along the Chesapeake Bay. Virginia Sea Grant (VASG) and our extension partners were proud co-sponsors of this fun event.

VASG Photography Intern Kim Warner captured the salty festivities.

Use your smart phone's QR code scanner to see video from the 2010 TOGA Halfshell Oyster Tasting or visit bit.ly/toga2010.

Left to right, top to bottom: (1) Half-shell oysters on ice. (2) Oyster tasting participants sample and rate the salty shellfish. (3) National champion oyster shucker Deborah Pratt demonstrates her skills. (4) Oyster shells at the event were collected for recycling. (5) Representative Rob Wittman spoke at the tasting. (6) Representatives of Deltaville Oyster Company show off the wares at their booth. (7) Shucking an oyster cleanly requires skill and practice.

Light beneath the surface

Requirements for seagrass growth

Written by Kate Schimel
Photography by Scott "Carly" Rose

On a quiet day at the peak of summer, Virginia Sea Grant (VASG)-funded researcher Dick Zimmerman directs the deployment of a fleet of scientific instruments. The research vessel *Riptide* is positioned near the Goodwin Islands, where the York River meets the Chesapeake Bay. On deck, three graduate students in colorful scuba gear make last minute equipment checks.

Instruments drift behind the boat, some spouting water, others threatening to tangle with nearby crab pots. Then Zimmerman, a professor at Old Dominion University (ODU), sends his students out to collect samples of thread-thin wigeongrass and ribbon-like eelgrass—the most common species among the dwindling populations of Chesapeake Bay seagrass.

Since a wasting disease decimated seagrass in the Bay in the 1930s, decreasing water clarity and increasing temperatures have made it difficult for grasses to return. Thus far, researchers and managers have focused on improving water quality before planting seagrass. But trying to determine where to address which water quality factors has complicated efforts.

Zimmerman and Victoria Hill (ODU) and Charles Gallegos (Smithsonian Institution) are developing a model that should help restoration managers answer these questions. Managers could use the model to determine which water quality factors should be addressed and to predict where seagrass has the potential to grow if water quality does improve. The first step is building and testing the model using data on the effects of water quality and rising temperatures.

Water Quality Challenge

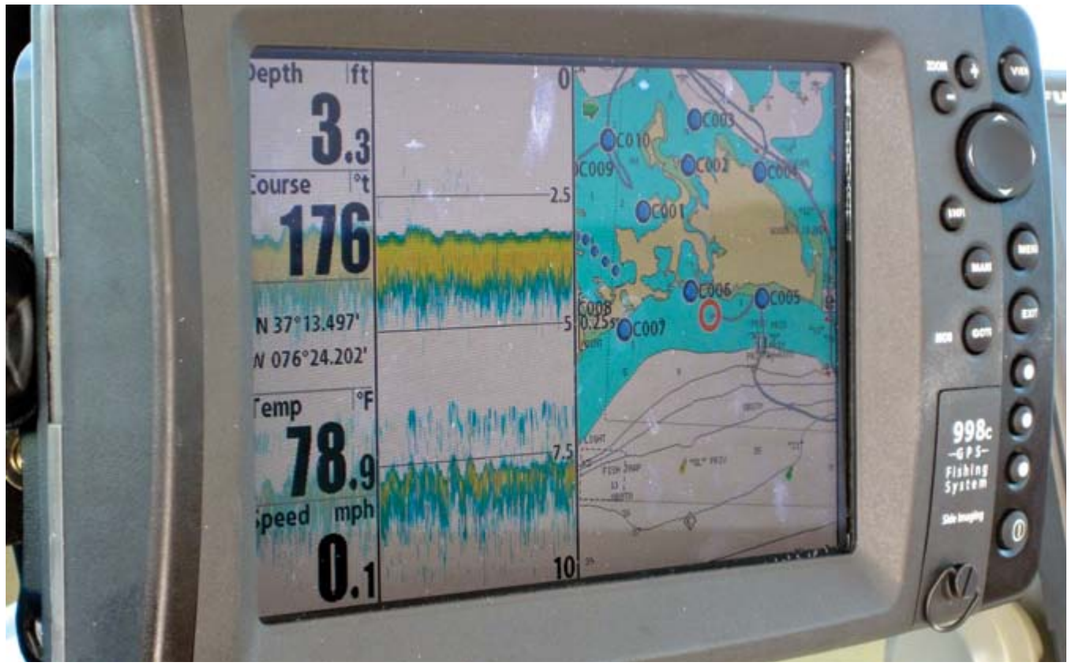
Seagrass is an essential part of the Chesapeake Bay ecosystem. Blue crabs and several species of fish live among the shoots and feed off the decaying leaves. The roots stabilize the sediment, which improves water quality and reduces storm damage.

The list of seagrass needs starts out simply enough. Just like grasses on land, seagrass needs light and nutrients. It also need salinity—at least 50% seawater—to grow. Yet dozens of factors influence the levels of these variables in the Bay. Runoff of mud and sand from the land and resuspension of sediments by wind and wave energy can affect how much light gets through the water. Then there are more complex problems in some areas, such as excessive nutrients leading to algal growth that can shade or poison seagrass.

When it comes to addressing water quality, it's a problem of too many possibilities. "Could we reduce the chlorophyll [from microscopic algae in the water]? Reduce the nutrient loading? Improve the water clarity? And in bare patches, if we planted grass here, would it succeed?" Zimmerman muses.

In some ways, seagrass' needs have made them especially vulnerable to environmental issues in the Bay. The need for light limits seagrass to shallow near-shore areas, which are directly in the path of runoff and pollution. A large portion of the water in the Bay comes from the Susquehanna River, which flows through heavily populated areas of New York, Maryland, and Pennsylvania. The runoff from agriculture and dense cities can carry tons of nutrients, chemicals, and sediment into the Bay each year. These dissolved molecules and suspended particles promote the growth of nuisance algae and cloud the water.

These effects aren't limited to one local area. Says Zimmerman, "We are talking about the whole Chesapeake Bay watershed." Activities throughout the Mid-Atlantic region affect water



Left: Dick Zimmerman pilots a research boat to measure submarine bathymetry near the Goodwin Islands. **Right:** Graduate students Billur Celebi (left) and Meredith McPherson (right) measure optical properties of the water near Goodwin Islands using a computerized field spectrometer and floating radiometers. **Previous page:** Graduate students Malee Jinuntuya, Billur Celebi and Meredith McPherson prepare to count submerged seagrass abundance.

The screen on Zimmerman's sonar and GPS chartplotter displays the vessel's GPS location and the depth of the water. This bathymetry data will be used in generating a model of potential seagrass distribution.

quality in the Bay. Even global-scale activities affect the Bay, as warming waters threaten seagrass recovery.

Climate Change

Seagrass begins to die at water temperatures warmer than about 77 degrees Fahrenheit. This may not have been a problem during typical Chesapeake Bay summers in the past, but researchers have observed increasing summer water temperatures in the Bay. The effects on seagrass are starting to show.

A June heat wave in 2010, for example, brought water temperatures as high as 86 degrees and caused massive seagrass die-offs. According to the Chesapeake Bay Program, the heat wave caused a seven percent decrease in seagrass abundance.

The overall effect of climate change on seagrass is not simple, according to Zimmerman. Although warming waters make it hard for seagrass to survive, the increased levels of carbon dioxide resulting from fossil fuel combustion can stimulate seagrass photosynthesis, which may help the plants tolerate higher temperatures.

"Rising temperature makes life worse for seagrass, but rising carbon dioxide makes life better," Zimmerman explains, "so we will see if one offsets the other." To test how the effects of rising water temperatures and carbon dioxide levels will interact, Zimmerman and his colleagues will bring seagrass samples back to the lab where students will run experiments to find the tipping point between the harm done by high temperatures and the benefit of additional carbon dioxide.

Pulling It Together

Eventually, Zimmerman and his colleagues will combine data on water quality, seagrass needs, and even the effects of climate change. They will convert this portrait of the seagrass ecosystem into a mathematical model for use by managers throughout the Bay.

Once the model is complete, Zimmerman's team will host a series of workshops to train resource managers in how to use the tool in restoration efforts. The findings will also be incorporated into education and outreach projects at the Virginia Aquarium and Marine Science Center—helping members of the public to demystify a complex and vulnerable ecosystem.

Zimmerman is also comparing the model's results to the real-life observations he gathers from his instruments. Verification requires in-depth mapping of his research sites at the Goodwin Islands on the York River and Hog Island Bay off the Virginia coast. Existing maps of the river bottom have proven to be insufficiently detailed, so Zimmerman must use sonar imaging to build new maps from scratch. These bathymetric maps require extensive data collection in the form of hours spent motoring slowly over the same area in a boat loaded with sonar and GPS. Data on seagrass distribution and water quality will be overlaid onto the maps. For managers at his research sites, these maps are valuable tools in and of themselves.

As Zimmerman conducts his work, managers throughout the Chesapeake Bay watershed are debating what policy measures to take to improve water quality, and each summer brings uncertain temperatures and water quality conditions. Although many areas that had seagrass in the past are barren, some researchers have recently found seagrass where, in previous years, there were only wide stretches of sand. As restoration efforts move forward, Zimmerman's model will help identify areas with the potential to support such regrowth and restoration.

NEWS From the Point

Virginia Commonwealth and George Mason Join the Virginia Sea Grant Network

George Mason University (Mason) and Virginia Commonwealth University (VCU) have joined the Virginia Sea Grant (VASG) community as partner institutions. In addition to holding an advisory role with VASG, partner institutions benefit from joining a network of experts in coastal and marine science, extension, and communications in Virginia.

"Our partners receive great benefits from being core elements of Virginia Sea Grant," says VASG Director Troy Hartley. "We provide partners with opportunities to achieve more jointly than they could individually."

Opportunity comes from uniting the strengths of partner institutions. For example, VCU has the largest coastal research and education facility along the James River. Its Platinum LEED-certified Inger and Walter Rice Center for Environmental Life Sciences advances scientific knowledge in large river ecosystems and restoration. Mason is a leader in research and education surrounding environmental science and policy.

VCU Vice Provost for Life Sciences, Thomas Huff, is excited about joining the partnership because of the increased power that interinstitutional collaboration brings to the research enterprise and student scholarship.

Mason's Vice President for Research and Economic Development, Roger Stough, also sees benefits for collaboration by joining the Commonwealth-wide organization. "As a member of Virginia Sea Grant, Mason joins an extended and broad network of like-minded scholars in applied environmental science and policy," says Stough. "By linking with the other partners in the Virginia Sea Grant program, there is great potential to build large-scale research and education programs. We are delighted to become members of this accomplished set of partners."

By collaborating with six partner institutions (Virginia Institute of Marine Science at the College of William & Mary, Old Dominion University, Virginia Tech, University of Virginia, VCU, and Mason), VASG mobilizes world-class applied coastal and marine resource science, extension, education, and communication capacity.

"I am thrilled that Virginia Commonwealth and George Mason Universities have joined Virginia Sea Grant and what this means for our ability to respond to Virginia's most pressing coastal and marine issues," says Hartley.

VASG is a Commonwealth-wide organization dedicated to using research, extension, and communication to connect coastal and marine science to the watermen, coastal municipalities, scientists, teachers, and others who can use it.

New VASG Research Projects

The VASG research portfolio includes more than $1M in funding for coastal and marine research. Recently funded projects look at a variety of issues important to Virginia's coasts, including studies on improving shellfish aquaculture, investigating effects of climate change, and understanding the impacts of nutrient loading on the Chesapeake Bay.

Coastal and Marine Science Research

Modeling Sustainable Clam Aquaculture
Virginia's hard clam industry produces between $20 and $30 million-worth of clams annually. Iris Anderson, Mark Brush, and Mark Luckenbach of VIMS will expand upon their 2010 preliminary study of ecosystem responses to clam aquaculture and calibrate their model of how nutrient availability and transformations affect ecosystem health and clam aquaculture sustainability. The model will be made available online as a decision-support tool to aid resource managers in Virginia in predicting the sustainability of clam farms under changing environmental conditions and management practices.

Strengthening Oysters and the Bottom Line
When geneticists began breeding oysters in hatcheries more than 10 years ago, the goal was simple: cultivate oysters that could resist diseases that were devastating wild populations. Today, oyster growers may need more from their oysters to remain competitive. VIMS researchers Anu Frank-Lawale and Stan Allen are partnering with Peter Kube from Commonwealth Scientific and Industrial Research Organisation to identify other commercially important traits and establish methods for selecting multiple traits in a single generation. Frank-Lawale and his research team will identify important trait combinations and help growers calculate the costs and returns for different traits and trait combinations.

Verifying a Promising New Oyster Treatment Method
Current treatments to reduce the occurrence of the bacteria *Vibrio vulnificus* in oysters destined for the half-shell market include expensive radiation and heating processes, which may compromise the quality of the oyster meat. After positive results from a small preliminary study, VIMS Researchers Howard Kator, Kimberly Reece, and Corinne Audemard are conducting a larger follow-up study of high salinity relay. The process involves transferring oysters to higher salinity water before bringing them to market. The researchers are using a large sample of oysters collected monthly from April to October at three sites. They will also calculate the relative cost of this process to see if it has the potential to save money for oyster growers.


©Margaret Pizer/VASG

Stan Allen of VIMS examines oyster larvae under a microscope.

©Gabriella March/VASG

Volunteers install a living shoreline at Deltaville Yachting Center.

Use your smart phone's QR scanner to view a video about living shorelines or visit bit.ly/livingshoreline.

Project Development Awards

Project Development Funding is available throughout the year to seed small projects that typically do not qualify for larger funding sources.

Are Living Shorelines Good for Fish?
Living shorelines use grasses instead of rocks to control coastal erosion, but are they big enough to provide habitat for salt marsh fishes as well? Jessica Thompson of Christopher Newport University will work with a team of four undergraduate researchers to measure the effects of living shorelines on populations of mummichog, a small fish that is preyed upon by important commercial fish such as striped bass and blue crab. Through monthly sampling of mummichog in sites with and without living shorelines, Thompson will find clues as to whether the width of a living shoreline could influence population size and survival of this ecologically important fish.

Playing Through Decisions that Affect the Bay
The UVA Bay Game is a large-scale simulation that allows players to take the perspectives of watermen, farmers, ranchers, citizens, local governments, and other stakeholders and watch as their decisions affect water quality in a virtual Chesapeake Bay. During 2011's Earth Day, David Smith (UVA), with financial support from Virginia Sea Grant, coordinated seven universities representing different rivers' watersheds to play the Bay Game together from their respective campuses.

Selecting Stronger Oyster Larvae Without Weakening Adults
Oyster aquaculture production in Virginia has increased tenfold in the past four years due, for the most part, to the development and dissemination of disease-tolerant oyster stocks. Anu Frank-Lawale of VIMS is examining whether larval growth traits and survival can be improved without compromising important traits in adult oysters, such as disease tolerance, growth rate, and meat weight. This research could provide new breeding strategies for hatcheries, ultimately improving the performance of stocks.

Improving Treatment to Reduce Oyster Disease
In 2010, the U.S. Food and Drug Administration announced a regulatory change that would require treatment of all oysters harvested in the Gulf of Mexico for raw consumption for the bacteria *Vibrio vulnificus*. VIMS researchers Howard Kator and Kimberly Reece worked with oyster growers Thomas Gallivan, A.J. Erskine, and Tommy Leggett to identify whether a new, cheaper method of treatment could effectively reduce *Vibrio* in oysters. The process, called oyster relay, involves moving oysters to higher salinity water before harvest. The study results indicate that oyster relay could offer a cheap alternative to other treatment methods.

2012 Regional Sea Grant Research

Modeling Delmarva's Lagoons
Delmarva's shallow coastal lagoons are important for seagrass, fish, and human recreation, but little is known about how they will fare in a future characterized by increased nitrogen inputs. A group of regional research partners are joining forces to develop new models that will help resource managers quantify how land-use changes will alter nitrogen inputs to Delmarva's lagoons and how lagoon ecosystems will respond. The team from VIMS, University of Maryland, University of Delaware, and the U.S. Geological Survey will incorporate changing land use, increasing population, climate change, and management practices into the model for a more complete look at how human activities affect lagoons.

Regional Sea Grant Sea Level Rise and Inundation Research

Visualizing Local Impacts of Sea Level Rise for Informed Decision Making
Proposed policy responses to help communities adapt to sea level rise are often complex and difficult for the public to understand, which creates a serious barrier to informed decision making. An interdisciplinary team led by researchers at George Mason University will create a web-based tool that allows citizens to view the projected impacts of sea level rise at a parcel level. The team will then conduct a workshop for public exploration of policy options in order to evaluate the effects on public opinion in Anne Arundel County, MD. A toolkit will also be made available for reapplication in other communities.

Virginia Sea Grant Coastal Community Adaptation Fund

Focus on Protecting Shores and Property from Sea Level Rise
A research team led by the University of Virginia's Institute for Environmental Negotiation will conduct a series of focus groups on adaptation to sea level rise in Virginia Beach, the Middle Peninsula, and the Eastern Shore of Virginia. The focus groups will bring together shoreline property owners with local planners and decision makers to engage in meaningful discussion of practical planning tools to help coastal communities protect their shorelines in the face of sea level rise.

Burreson Honored for Career of Service to Bay

In October, Virginia Sea Grant awarded the Mathias Medal to Eugene Burreson, Professor Emeritus at VIMS. The Mathias Medal is presented roughly every four to six years to a scientist whose exemplary research has contributed to fundamental knowledge of and informed policy in the Chesapeake Bay.

Dr. Burreson's unique contribution to shellfish pathology, monitoring oyster diseases, and providing information critical for developing oyster-management strategies has had an enormous impact on the Chesapeake Bay. Throughout his career, Dr. Burreson proved to be as adept at scientific communication—whether through peer-reviewed manuscripts, reports, or presentations to scientists—as he was at providing cutting-edge scientific advice to regulatory agencies, review boards, and industry panels.

The Mathias Medal was established by Maryland Sea Grant, Virginia Sea Grant, and Chesapeake Research Consortium in 1990. The award is named after Senator Charles "Mac" Mathias of Maryland, who is considered to be the father of the contemporary Chesapeake Bay Restoration Program. Senator Mathias set the tone and shape of many of the programs designed to study the Chesapeake Bay. In his political career, he recognized the value of science for the public good and frequently sought advice from the scientific community. Since the prize's inception, only five other Medals have been awarded, making this award a rare achievement to be celebrated.

Dr. Burreson's former and current colleagues, students, friends, and family gathered in Richmond to honor his career of service to the Bay and to the academic and regulatory communities.

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VASG Director Troy Hartley congratulates Gene Burreson on his receipt of the Mathias Medal.

Use your smart phone's QR scanner to listen to a tribute to Gene Burreson or visit bit.ly/burresontribute

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