

Impact

VIMS | WILLIAM & MARY
VIRGINIA INSTITUTE OF MARINE SCIENCE



News From VIMS

VALUE OF VIRGINIA AQUACULTURE REACHES ALL-TIME HIGH

A survey of shellfish aquaculture conducted by VIMS and Virginia Sea Grant (VASG) shows Virginia's shellfish growers sold an estimated 31 million oysters and 214.4 million clams in 2013 for a farm-gate value of \$45.1 million, an all-time high.

VIMS researchers have played a leading role in developing the disease-resistant strains and genetic techniques that underlie the recent upsurge in Virginia's oyster aquaculture industry. Research by scientists at VIMS' Eastern Shore Lab in the 1960s jumpstarted the Commonwealth's hard clam industry.

Report authors Karen Hudson and Tom Murray, VIMS extension staff affiliated with VASG, say this year's report shows the shellfish industry is healthy. Says Murray, "the 10% increase in oyster sales documents what has become a long-term growth trend, while a 25% increase in clam sales reflects more typical annual variability of a more mature agricultural industry."

Hatchery production remains critical to the continued growth of oyster aquaculture. Hudson says the industry is taking proactive steps to improve hatchery operations to supply the

demand for young oysters that can grow out into marketable adults.

"There's been a concerted effort by hatcheries and scientists to work together to ensure consistent production in the face of ever-changing environmental conditions," says Hudson. This effort comes in response to water-quality issues that hampered production in 2011. Since then, says Hudson, all indicators for continued growth of oyster aquaculture and consistent production in clams remain positive for the future.

VIMS has produced the "Virginia Shellfish Aquaculture Situation and Outlook Report" annually since 2005. The 2013 results are drawn from 80 completed surveys returned to VIMS. Respondents include 21 clam growers, 67 oyster growers, 15 clam and oyster growers, and 5 shellfish hatcheries.

SUMMER INTERNS COMPLETE MARINE RESEARCH AT EASTERN SHORE LAB

Five students from the Eastern Shore of Virginia had the opportunity to spend their summer pursuing research at VIMS' Eastern Shore Laboratory in Wachapreague.



ESL Summer Interns (L to R): Tyler Chandler (Melfa, Nandua High School); Sarah Puchalski (Wachapreague, Nandua High School); Kelsey Bisker (Franktown, Clemson University); Grace Holmes (Craddockville, Virginia Commonwealth University); and Nequa Griffin (Exmore, Virginia Commonwealth University).

The interns—three college sophomores and two high-school seniors—worked on an array of research efforts including an ongoing project that aims to record settlement of oyster spat off the coast of Wachapreague, and one that investigates the role of calcium in the hearts of dogfish, skates, and sandbar sharks, with an overall goal of better describing the physiology of these species.

The paid internship program is entirely funded by private donations. Private donors are Marsha and Rick Amory; Cynthia Bailey; Chris and Kirkie Bosworth; Barbara and Steve Johnsen; the E. Polk Kellam Foundation; E. Polk Kellam, Jr. and Roberta Kellam; Caramine Kellam; Lucius and Tata Kellam; Deborah and Peter Lator; Page and Tom Young; H.M. Terry Company, Inc.; J.C. Walker Brothers, Inc.; Mary Stoddard; and Dr. Lucy Spigel Herman.



The Colonial Sail & Power Squadron raised more than \$5,000 during its fifth annual fundraising event for VIMS on July 19th. The event, formerly known as the "Dinghy Poker Run," has been rebranded as "The Biggest Little Water Festival" and was back and better than ever after undergoing minor changes. As in past years, the event was held at Dare Marina in Yorktown with an overall goal to raise funds to support research efforts at VIMS.

ABUNDANCE OF BAY'S UNDERWATER GRASSES RISES 24%

An annual survey led by researchers at VIMS shows the abundance of underwater grasses in Chesapeake Bay increased 24% between 2012 and 2013, reversing the downward trend of the previous 4 years. The increase reflects an upsurge from 48,195 to 59,927 acres.

VIMS tracks the abundance of underwater grasses as an indicator of Bay health for the Chesapeake Bay Program, the federal-state partnership established in 1983 to monitor and restore the Bay ecosystem.

VIMS researchers estimate the annual acreage of underwater Bay grasses through aerial surveys. This year, they for the first time categorized abundance using four different salinity zones, making it easier to connect changes in grass communities with changes in growing conditions through time.

Scientists attribute this year's boost in bay-grass abundance to the rapid expansion of widgeongrass in the saltier waters of the mid-Bay. The VIMS team also saw an increase in the Susquehanna Flats, and a modest recovery of eelgrass in shallow salty



waters, where hot summers in 2005 and 2010 had led to dramatic diebacks.

Professor Robert "JJ" Orth, head of the Seagrass Monitoring and Restoration Program at VIMS, says "The expansion of widgeongrass in the mid-Bay's saltier waters was one of the factors behind the overall rise in bay-grass abundance. While widgeongrass is a boom-and-bust species—notorious for being incredibly abundant one year and entirely absent the next—its growth is nevertheless great to see."

Underwater grasses are critical to the Bay ecosystem. They provide habitat and nursery grounds for fish and blue crabs, serve as food for Bay animals, clear the water by reducing wave action, absorb nutrients, and reduce shoreline erosion. They are also an excellent measure of the Bay's overall condition because their health is closely linked to water quality.

Across the entire Chesapeake, bay-grass abundance has fluctuated between 38,958 acres (1984) and 89,659 acres (2002), averaging 65,468 acres. The 2013 value of 59,927 acres is 32% of the 185,000-acre Bay restoration goal.

STUDY PROJECTS BIG THAW FOR SEA ICE

Antarctica's Ross Sea is one of the few polar regions where summer sea-ice coverage has increased during the last few decades, bucking a global trend of drastic declines in summer sea ice across the Arctic Ocean and in two adjacent embayments of the Southern Ocean around Antarctica.

Now, a modeling study led by VIMS Professor Walker Smith suggests the Ross Sea's recent observed increase in summer sea-ice cover is likely short-lived, with the area projected to lose more than half its summer sea ice by 2050 and more than three quarters by 2100.

These changes, says Smith, will significantly impact marine life in what is one of the world's most productive and unspoiled marine ecosystems, where rich blooms of phytoplankton feed krill, fish, and higher predators such as whales, penguins, and seals.

Smith, who has been conducting ship-based fieldwork in the Ross Sea since the 1980s, collaborated on the study with colleagues at Old Dominion University. Their paper appeared in *Geophysical Research Letters*.

GSA IS NOW LINKED IN

VIMS Graduate Student Association's Professional Development Committee has a new VIMS alumni networking group that has recently been launched on LinkedIn.com. This group is intended to serve as a platform for current VIMS students to engage with alumni and learn about certain career paths, as well as for networking purposes.

To join the group please visit LinkedIn.com, enter "Virginia Institute of Marine Science Alumni and Students" into the search bar, and request to join.

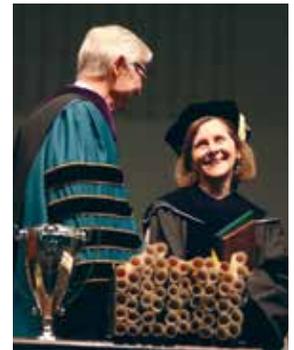
PROFESSOR RECOGNIZED WITH PRESTIGIOUS AWARD

Dr. Elizabeth Canuel was honored with the Thomas Ashley Graves, Jr. Award for Sustained Excellence in Teaching during William & Mary's 2014 commencement ceremony.

The annual award—named for W&M's 23rd President—recognizes a professor or professors who display a strong commitment to the education of students and service to W&M. Canuel was nominated by VIMS Associate Dean of Academic Studies Linda Schaffner and Professor Iris Anderson, and ultimately chosen by W&M President Taylor Reveley.

According to Anderson and Schaffner, Canuel has provided an incredibly fertile education and training ground for her students throughout her more than 25-year career in marine science. Her productivity as a researcher has allowed

her to support and nurture 10 doctoral and 5 master's students in W&M's School of Marine Science at VIMS. Canuel's students have excelled, winning prestigious awards in recognition of the quality of their scholarship and their potential to conduct transformative research.



Dr. Canuel receives her award from W&M President Taylor Reveley.

Canuel is known among her colleagues as a strong and steady force for academic excellence in the School of Marine Science and the wider college community, and her courses are sought after by students interested in a holistic, interdisciplinary interpretation of issues pertaining to marine and environmental science.

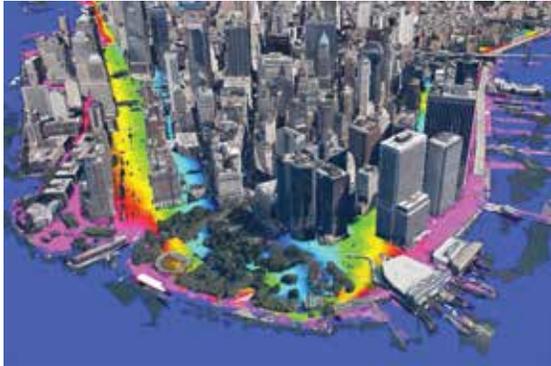
NATALE CHALLENGES ALUMNI, STAFF, AND FRIENDS

Alumnus, council member, and longtime supporter Charlie Natale, MA '82, has put forth a matching gift up to \$10,000 to encourage new and increased support for the General Graduate Student Endowment at VIMS. Natale will match the entire gift for those who have not yet supported VIMS or have not done so in the past five years; and will match any increase in gift amount from existing supporters. The GGS Endowment provides flexible funding for students based on requests for help to pay for travel to scientific conferences, tuition and stipends, and other general needs. "VIMS changed my life in so many ways," says Natale, "and I'm happy to be able to promote the superb work of our graduate students and program through my gift." To participate in this challenge please use the enclosed envelope or call Jennifer Dillon at 804-684-7226.

NEW MODEL REFINES STORM-TIDE PREDICTIONS

A team led by VIMS Professor Harry Wang has demonstrated the ability to predict a hurricane's storm tide at the level of individual neighborhoods and streets—a much finer scale than current operational methods.

The study, in the *Journal of Marine Science and Engineering*, shows that with the right input, the team's high-resolution computer model was able to simulate water levels to within 6-8 inches of those observed in New York City and surrounding areas during Hurricane Sandy's approach and landfall in late



Storm-tide flooding of New York City during Hurricane Sandy. Values are in meters above sea level. Still from animation by Dr. David Forrest.

October 2012. This includes sections of Manhattan where buildings and other infrastructure divert and channel floodwaters in exceptionally complex ways.

“Storm-surge modeling is a tough problem,” says Wang. “People are interested in the possibility of flooding on a very fine scale, on the order of their house, office, or street.” But for a forecast model to work, he says, “We have to resolve the boundary conditions—data on tides and winds—very far away, out into the open ocean. And we have to have that information far enough beforehand to provide time for people and agencies to respond.”

VIMS Dean & Director John Wells calls the results of the team's sub-grid inundation model a “breakthrough in storm-tide forecasting.”

The team is now working to add the many other processes at play during a hurricane—rainfall, filtration, storm-water drainage, and the effect of waves. “That's the goal for our future development and further improvements,” says Wang.

VIMS WELCOMES NEW FACULTY

VIMS has recently hired a number of new assistant professors to fill positions left unfilled following retirements and state budgets cuts in 2008. Dean and Director John Wells says “We're excited about the new ideas and research opportunities these talented individuals bring to the Institute.”

Dr. David Kaplan examines the effects of marine protected areas on fish populations. He came to VIMS from the Research Institute for Development in Sete, France.



David Kaplan

Dr. Christine Meynard analyzes and models biodiversity. She arrived at VIMS from the Center for Biology and Management of Populations in Montpellier, France.



Christine Meynard

Dr. Andrew Scheld applies economic theory and quantitative models to marine policy. He earned his Ph.D. from the Univ. of Washington's School of Aquatic and Fisheries Sciences.



Andrew Scheld

Dr. Elizabeth Shadwick focuses on ocean acidification. She was previously a postdoctoral fellow at the University of Tasmania Antarctic Climate and Ecosystems Cooperative Research Centre.



Elizabeth Shadwick

Dr. Juliette Smith studies harmful algal blooms and their toxins. She was previously a postdoctoral scholar at the Woods Hole Oceanographic Institution.



Juliette Smith

EPA GRANT WILL HELP LOCALITIES CONSERVE HEADWATER WETLANDS

VIMS to develop tools for dealing with impacts of sea-level rise

A team of VIMS researchers has received a 3-year, \$392,773 grant from the Environmental Protection Agency to identify the streams and wetlands most vulnerable to sea-level rise, and to develop tools to help local governments and citizens conserve these important ecosystems.

The project depends critically on a dataset of tidal-marsh observations first gathered by VIMS scientists in the 1970s. Only with this historical baseline can today's researchers accurately map the slow but inexorable impacts of rising seas and help local communities prepare and prioritize their responses.

Project lead Donna Marie Bilkovic, a Research Associate Professor in the Center for Coastal Resources Management at VIMS, says the funding will allow her team to “assess climate-change risks to Virginia's headwater wetlands, so we can build a more comprehensive picture of their resilience.” The funding complements ongoing efforts from a 2012 EPA grant, which was designed to identify risks to headwater resources from land use and development pressures.

The researchers will use the York River watershed—with 4,500 distinct headwater wetlands covering almost 30,000 acres—as a model ecosystem for their study, then transfer lessons learned to other coastal localities throughout Virginia and the mid-Atlantic.



Taskinas Creek represents the type of connected system the VIMS team will assess. The creek connects headwaters wetlands with brackish and tidal marshes on the York River.

DIGNITARIES VISIT GLOUCESTER POINT

Several high-ranking state and federal officials visited VIMS this summer to learn more about the Institute, its people, and its three-part mission of research, education, and advisory service: Senator Tim Kaine, Governor Terry McAuliffe, Lt. Governor Ralph Northam, Secretary of Natural Resources Molly Ward, and Education Secretary Anne Holton.



Governor McAuliffe (R) discusses Chesapeake Bay restoration while Dean and Director John Wells looks on.



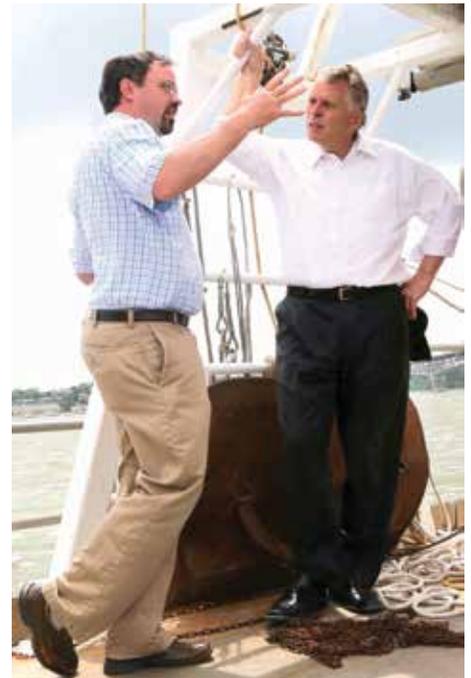
CCRM Director Carl Hershmer (2nd from R) and Molly Mitchell (R) discuss sea-level rise with Senator Kaine (L).



Senator Kaine tours VIMS with Dean and Director John Wells.



Secretary Holton and Ph.D. student Mark Stratton discuss his efforts to better understand coastal food webs.



Prof. Rob Latour discusses fish-monitoring programs with Gov. McAuliffe. © M.White/VA Governor's Office.



Lt. Governor Northam (R) discusses oyster diseases with VIMS Research Associate Professor Ryan Carnegie.



Graduate students Nicole Marshall, Haixing Wang, and Alex Renaud deploy Dr. Donglai Gong's glider while the Governor's party watches from the RV Bay Eagle.



Secretary Ward (L) and CBNERR Director Willy Reay discuss sea-level rise.

VIMS TO HELP PROTECT KEY NATIVE AMERICAN SITE

A \$199,000 grant from the National Fish and Wildlife Foundation will allow VIMS researchers to help protect Werowocomoco—one of the most important Native American sites in the eastern U.S.—from shoreline erosion and sea-level rise.

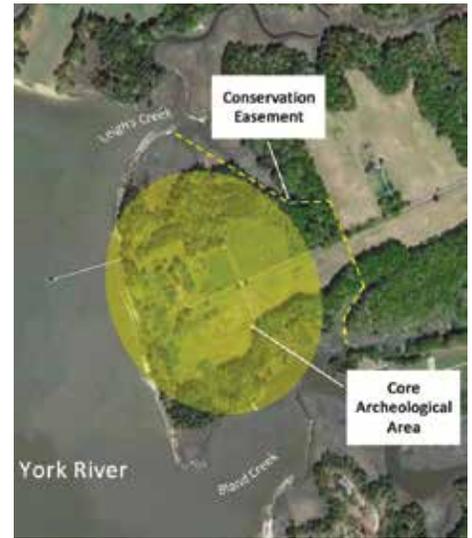
Occupied for the last 10,000 years, Werowocomoco was the seat of power for Algonquian Chief Powhatan when English colonists arrived at Jamestown in 1607. The site—where Captain John Smith was purportedly saved by Pocahontas—occupies an eroding headland about half way up the north shore of the York River. Bob and Lynn Ripley, the current landowners, have graciously allowed a conservation easement and archeological excavations on their property.

VIMS researcher Donna Milligan, who leads the project in collaboration with

colleagues at the National Park Service and the Virginia Department of Historical Resources, says “This project is about protecting a one-of-a-kind archeological site. Every day, erosion is removing artifacts from the bank, and we can fix that.”

The main feature of the restoration project will be two or more sills—long piles of rock placed just offshore and parallel to the low, sandy cliff that forms the existing shoreline. Between sill and shore, sand and marsh grasses will be added for additional habitat and protection, with the marsh grasses planted by students from Ware Academy in Gloucester. All told, the project will create about 15,000 square feet of marsh while keeping nearly 500 pounds of phosphorus and nitrogen out of the York River each year.

Milligan says VIMS’ role in the project is to figure out where to place the sills, how long and high they should be, and the distance between them. That requires careful analysis of tidal range, wave direction and height, frequency of storm surge, shoreline geometry and other factors.



The Werowocomoco pier and eroding shoreline is visible in the left center of this aerial image.

Scott Hardaway, Director of VIMS’ Shoreline Studies program, says the ultimate goal of the restoration is “a diverse coastal habitat that supports marine life, land animals, and birds, while protecting the shoreline and archaeological resources from storms and sea-level rise.”

NEW DEVELOPMENT DIRECTOR COMES ONBOARD

Following a national search, VIMS has selected Amy Fisher as its new Director of Development and Executive Director of the VIMS Foundation. Fisher comes to VIMS from Simmons College, *Amy Fisher*



where she served in multiple roles, including Director of Capital Giving, and prior to that, Director of Corporate and Foundation Relations. She also served as Associate Director of Corporate and Foundation Relations at Boston University.

Prior to entering the field of higher education, Fisher was focused on mission-driven non-profit work. She served as National Programs Director at the Center for Environmental Citizenship, and also worked at the Pew Charitable Trust’s Youth Vote Coalition as the Development and Programs Director. Additionally, she served as a development officer at St. Francis House in Boston.

In addition to actively securing private support, Fisher has partnered with faculty in the fields of health, energy, and climate change. She earned her BS in Biology and Political Science from Bates College in Maine; and her MBA with concentrations in Finance and Public/Nonprofit Management from Boston University.

GRAD HONORED WITH THATCHER PRIZE

Dr. Andre Buchheister, a recent graduate of the Ph.D. program in William & Mary’s School of Marine Science at VIMS, was awarded the 2014 Thatcher Prize for Excellence in Graduate and Professional Study during W&M’s 2014 commencement ceremony.

The highest award for a graduate or professional student at the College, the Thatcher Prize was created in 2000 in honor of W&M’s 21st Chancellor, Margaret, The Lady Thatcher.

Buchheister was selected by W&M’s commencement committee on the basis of scholarship, character, leadership, and service, and has made outstanding contributions to every facet of VIMS’ three-part mission—research, education, and advisory service.

Nominated by his academic advisor, Professor Robert Latour; Chair of the VIMS Fisheries Department John Graves, and Associate Dean of Academic Studies Linda Schaffner, Buchheister has distinguished himself as an exemplary student, successful scientist, dedicated teacher, and an active member of



Dr. Andre Buchheister.

the VIMS and local communities.

VIMS Dean and Director John Wells says, “I can’t think of a more deserving recipient of the Thatcher Prize than Andre. He has skillfully pursued cutting-edge research while also excelling in the classroom as both a student and a teacher.”

The nominators for Buchheister’s award collectively say that he is highly deserving of the Thatcher prize on the basis of his strong academic performance, recognized achievements as a young investigator and marine science educator, and for the service he has given to the college and local communities.

During the commencement exercises, W&M President Taylor Reveley said that Andre has demonstrated a strong ability to combine his understanding of fish biology, solid ecological perspectives, and a highly quantitative approach to address and communicate key questions in the field of ecosystem-based fisheries management. “Andre brings the very best of W&M to the wider community,” says Reveley.

UPCOMING EVENTS

NOV. 6, 2014 : 10am -12pm

Donor Appreciation Day.

Dr. Stan Allen will speak about "The ABCs of Oyster Breeding at VIMS." Watermen's Hall, VIMS

DEC. 5, 2104: 8:30am - 5pm

VA Coastal Policy Clinic at W&M Law School. Miller Hall (Mason School of Business). "Adaptive Planning for Flooding and Coastal Change in Virginia: Next Steps for the Commonwealth."

MAY 30, 2015: 10am - 3pm

Marine Science Day. VIMS Gloucester Point campus.

Stay tuned for details of VIMS' 75th anniversary celebration in 2015!

Visit www.vims.edu/public

PARTICIPANTS ENJOY STATE-WIDE SCIENCE FESTIVAL

Outreach staff used canoes and glow sticks to highlight the fun side of science as VIMS took part in the first-ever



Beach Night participants share the official hashtag for the Virginia Science Festival using glow sticks.

Virginia Science Festival.

Thousands of families enjoyed interactive experiences during the statewide event organized by the Science Museum of Western Virginia and Virginia Tech. VIMS Outreach Director Susan Maples-Luellen served as the festival organizer for the Hampton Roads region, and coordinated events both on and off the VIMS campus. VIMS kicked off the week with a canoe trip on Taskinas Creek at York River State Park. Along with educators from the Chesapeake Bay National Research Reserve at VIMS, participants got to observe wildlife, discuss the importance of marsh habitats, test water quality, and enjoy beautiful scenery.

Up next, the "A Scientist Walks into a Bar..." event at Mike's Place in Newport News offered adults a casual atmosphere to explore topics related to Big Data with

VIMS Ph.D. student Josh Stone. Stone shared how and where ocean data are collected, VIMS' role in

these efforts, and how scientists use data to answer questions about global change.

VIMS finished the week with a special installment of its After Hours Lecture Series, a "Beach Night" for adults, and a "Bay Critters Beach Adventure" for families. Held on the VIMS campus, Beach Night gave adults the opportunity to be kids again by allowing them to collect and observe bay animals by flashlight.

Maples-Luellen says the festival was created to help foster public understanding of science and technology by providing opportunities for Virginians of all ages to interact with real-life scientists. "The festival provides a unique opportunity for families and individuals to come face-to-face with the professionals who are actually doing the research and making the discoveries."

www.vims.edu/impact

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