Impact

SPRING 2024 NEWSLETTER VIRGINIA INSTITUTE OF MARINE SCIENCE

VIMS LAUNCHES VISITOR CENTER RENOVATION INITIATIVE

With generous support from the Robert G. Cabell III and Maude Morgan Cabell Foundation, we are pleased to announce a $400,000 fundraising challenge to modernize and update the VIMS Visitor Center, enhancing public literacy around critical issues such as coastal resilience and the health of our waters.

> Conceptual rendering of one envisioned design for the VIMS Visitor Center experience (credit to design firm 3North).

Since 1984, the VIMS Visitor Center has served as a gateway to developing a deeper appreciation for the scientific discovery that takes place each day on our dynamic Gloucester Point campus. Once complete, the renovated Visitor Center will have an expanded capacity to educate visitors of all ages.

For more information about how you can participate, contact VIMS Advancement.

> Conceptual rendering of one envisioned design for the VIMS Visitor Center experience (credit to design firm 3North).

IMPACT HIGHLIGHTS

MAJOR NEW SOURCE OF CARBON LOSS DISCOVERED ALONG VIRGINIA'S ERODING BARRIER ISLANDS

Coastal ecosystems are highly regarded for their potential to combat climate change through storage of organic carbon (carbon bound within organic matter like plant roots), which consequently reduces the carbon available to transform into planet-warming carbon dioxide. Researchers from William & Mary's Virginia Institute of Marine Science have, for the first time, assessed a more complete picture, quantifying the seaside erosion of back-barrier lagoon and peat deposits along Virginia's Atlantic Coast.

Published in *Nature Communications*, the new study counters the traditional understanding about vegetated ecosystems dominating the coastal storage of carbon. In addition, the study determines that the erosion and landward migration of the barrier islands along the Virginia Eastern Shore not only leads to an extremely rapid rate of carbon erosion—releasing 26.1 Gigagrams of organic carbon annually—but also entails potential trouble for the continued ability of the entire system (with all its salt marshes, seagrass beds, and lagoons) to function as a net sink for carbon.

"We're finding that along certain coastlines, carbon is not buried as long as we expected and thus, relying on coastal wetlands to store carbon is not a permanent solution to mitigating carbon emissions," said lead author of the study Mary Bryan Barksdale, a School of Marine Science Ph.D. student. "Coastal carbon budgets that ignore carbon storage and erosion in deeper and unvegetated sediment overestimate the strength of the coastal carbon sink."

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FIDDLER CRABS ARE MOVING NORTH AS WATERS WARM, AND SALT MARSH GRASSES ARE SUFFERING

The relationship between fiddler crabs and plants on the U.S. Atlantic coast was thought to be a positive one: fiddler crabs help plants grow. Yet in a new study, published in *Ecology*, VIMS researchers Kayla Martínez-Soto and David Johnson found that, thanks to climate change, the relationship between these thumb-sized crabs and plants can be negative.

Historically, the mud fiddler crab, *Minuca pugnax*, was found from northern Florida to Cape Cod, Massachusetts, and was observed to provide benefits to local vegetation as they burrowed into the organic-rich soils of salt marshes, oxygenating the soil and releasing nutrients. "Fiddler crabs are the earthworms of the salt marsh," says Johnson. For decades, researchers like Johnson have shown that when fiddler crabs are present, there is more grass than when the crabs are absent.

However, due to ocean warming in the Gulf of Maine, fiddler crabs are now found as far north as central Maine. In their recent research, Martínez-Soto and Johnson found that, in its expanded range north of Cape Cod, the presence of *Minuca pugnax* is associated with a 40% drop in grass biomass.

As an explanation, the authors suggest that when crabs burrow, they may damage plants' roots, which are important for water and nutrient foraging. They found that when fiddler crabs were present, the biomass of roots and rhizomes in their expanded range was 30% lower.

"Even if there is an established relationship between crabs and plants historically, it doesn't mean their interaction will be the same everywhere," says Martínez-Soto, highlighting how shifting global temperatures can change how species interact.

Plants are critical to salt marsh maintenance and preservation. By reducing plant growth and increasing burrows north of Cape Cod, says Martínez-Soto, fiddler crabs could reduce marshes' ability to store carbon in their soil and keep up with rising seas.

Why does the fiddler crab increase grass biomass in some marshes but decrease it in others? The researchers suggest that while plants in southern marshes have adapted to co-existing with burrowing crabs over millennia, plants in northern marshes have not.

The authors do think the plants will eventually get used to their new neighbors, however, and the negative relationship between plants and crabs may disappear and even become positive. "It's like when a new neighbor moves in and you don't get along," says Johnson, "but you eventually figure out a way to get along and maybe even become friends."

"THE BEST, MOST EXCITING, MOST TRANSFORMATIONAL YEAR OF MY LIFE"

Ph.D. student Savannah Mapes' journey to the William & Mary School of Marine Science (W&M SMS) at VIMS, and her time since arriving, have been marked by unique learning experiences. "I've had opportunities that exceeded my wildest dreams," says Mapes.

After acceptance to Texas A&M University, Mapes attended a new student conference where she met Dr. Antonietta Quigg, an expert in phytoplankton. Mapes' grandfather insisted she give her contact information to Dr. Quigg. When they reconnected in Mapes' second year on campus, Dr. Quigg remembered her. "She asked me, 'Is your contact information still the same?' and she pulled out that little piece of paper."

Mapes spent the next three years studying phytoplankton, including a summer at Mote Marine Laboratory & Aquarium in Florida where she interned with Dr. Vince Lovko '08, who received his Ph.D. from the W&M SMS at VIMS. Then, at the National Harmful Algal Bloom Conference, Mapes met VIMS professor and her now-advisor, Dr. Kimberly Reece. "And [VIMS] just seemed like the right fit," says Mapes.

> *"We are all connected... to the things we can see and to what we cannot see. The things we cannot see, the tiny things, are the building blocks that provide the life force of everything else... It is my personal mission to learn from phytoplankton and gain a better understanding of how we can live in communion with them."* - Savannah Mapes

Today, Mapes' primary area of interest is harmful algal blooms (HABs) in the York River. While algae are common within all marine environments, they can become harmful when they bloom in significant numbers. By leading to oxygen depletion and generating toxic byproducts, HABs can harm marine organisms and impact human health.

Mapes specifically studies *Alexandrium monilatum*, an organism that is easily visible at night due to its production of a bioluminescent red tide. This HAB produces toxins associated with oyster and fish larvae mortality.

> Mapes uses the Planktoscope to study phytoplankton on the deck of the Hōkūle'a. © Polynesian Voyaging Society

"There's not much in the literature about it," she says. "We need to fill in some of the gaps… I call it 'my beautiful monster,' because it's sparkly and toxic."

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SECURING THE FUTURE & LEAVING A LEGACY: CAPT. HAL HARDAWAY'S PLANNED GIFT

James Hallowell "Hal" Hardaway '71, a retired U.S. Navy Captain who served for 30 years, recently committed a significant planned gift to VIMS. Hardaway says a lifelong interest in marine science and history is what inspires him to support the Institute. In fact, Hardaway had once considered attending VIMS himself.

"I grew up in inland Virginia—Nottoway County—but became fascinated by the ocean during summer vacations to Virginia Beach," says Hardaway. "People from inland areas perhaps appreciate the ocean even more than folks who grew up with it."

Following graduation from William & Mary, Hardaway attended Navy Officer Candidate School (OCS) and intended to spend three years in the Navy, with the thought that afterward he might apply to the William & Mary School of Marine Science at VIMS. However, he found remarkable success in the armed forces, and those three years turned into a 30-year naval career.

Hardaway served as a Communications Intelligence Officer and spent three years as Inspector General of the Naval Security Group Command under the Chief of Naval Operations. He has lived in six different countries, participated in multiple wars, sailed across the world's oceans and seas, and became a certified scuba diver in the Philippines in 1972. "After that," says Hardaway, "I was hooked."

> VIMS Dean & Director Derek Aday (left) presents Hal Hardaway (right) with a pin commemorating Hardaway's induction into The Honorable Robert Boyle Legacy Society.

Following a storied naval career, Hardaway retired in 2002, but was recruited back into the intelligence community due to the ongoing response to September 11th, 2001. Beyond his commitment to serve, he was personally impacted by the tragedies on 9/11. Hardaway survived that day only because he was traveling; his office at the Pentagon was destroyed and he lost shipmates, colleagues, and friends. Hardaway fully retired in 2009.

In 2018, VIMS partnered with the Jamestown-Yorktown Foundation on sailing a replica of *Godspeed*—one of the three ships that founded the settlement of Jamestown. Hardaway visited the ship on her stop in Alexandria and became immediate friends with Dr. Richard Snyder, director of the VIMS Eastern Shore Laboratory (ESL), and Susan Maples, VIMS director of development. Hardaway was thrilled to reconnect with VIMS, and further connections quickly developed.

With so much of the Earth's surface covered by water, supporting VIMS is "kind of a no-brainer," according to Hardaway. "I'm interested in history, and oceans and waterways used to be the highways of the world, and in many ways still they still are. Plus, the health of the oceans and shorelines are critical to all of us. Of course, I also love the bounty of seafood. VIMS works on all these issues, to the benefit of everyone."

When VIMS needed funds to equip our flagship research vessel, the *R/V Virginia*, with the latest science technology, Hardaway stepped up as one of the essential "Outfitter" donors, for which he is honored with a named bunk. He has also hosted VIMS at various events in Alexandria and through his speaker series at Copper Fox Distillery in Williamsburg.

As someone with an eternal curiosity about the world, Hardaway's planned gift similarly helps ensure that VIMS will be able to continue our critical work into the future. "I found out late in life, all the stuff I take for granted," says Hardaway. "Now, as I've become maybe a little wiser, I don't take it for granted anymore. You have to be thankful and appreciate this kind of stuff. That's why I do what I can to support VIMS, both financially and publicly."

MAKING PLANNED GIFTS TO LEAVE A LEGACY: FREQUENTLY ASKED QUESTIONS

Q: What is a planned gift?
A: Planned gifts provide future funds to VIMS through various methods of estate planning, including wills, trusts, or retirement plans that designate the VIMS Foundation as a beneficiary.

Q: Who can make a planned gift?
A: It's never too early to start thinking about your legacy! Anyone can make a planned gift to the VIMS Foundation through a will, trust, or retirement plan.

Q: Why should I make a planned gift?
A: Planned gifts are critical to VIMS' future success, growing our ability to continue our important work while meeting new and emerging challenges. You can feel satisfied knowing your gift will make an impact for all time coming.

Q: Is it complicated to make a planned gift?
A: Making a planned gift to the VIMS Foundation is a straightforward process. We stand ready to answer questions and provide all the information you need as you consult with your family and/or professional advisors.

Q: Do I need to let VIMS know if I have listed, or plan to list, the VIMS Foundation as a beneficiary?
A: Yes, please let us know if you are providing for VIMS in your plans. We want to ensure the documentation reflects your intended impact. Once the gift is documented, you will also be inducted into the Hon. Robert Boyle Legacy Society.

Q: Where do I start?
A: Give us a call or send us an email! Once you have decided to leave a legacy to the VIMS Foundation, know that we are available to help.

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Major New Source of Carbon Loss Discovered Along Virginia's Eroding Barrier Islands, continued from page 1

The existing body of research focuses primarily on carbon storage in salt marshes, with an emphasis on the role of marsh plants. However, this study finds that the sand, silt, and clay found at the bottom of unvegetated lagoons are less carbon-dense than marshes but play an outsized role in carbon storage—as indicated by their contribution of more than 80% of the carbon eroded along the beach and shoreface of migrating barrier islands—because of their thickness and ubiquity across the landscape. These new findings counter many common assumptions about carbon burial in coastal habitats, with implications for the assessment of blue carbon for research and carbon market purposes.

Leveraging existing data on carbon accumulation rates of the backbarrier landscape (area that is landward of the barrier islands), these researchers were able to compare average annual carbon accumulation (or storage) rates to average annual carbon erosion rates through time. What they found was quite alarming: in recent decades, carbon erosion along the seaside of these islands has begun outpacing carbon accumulation in adjacent barrier and backbarrier ecosystems by about 30%. This finding suggests that the chain of islands and backbarrier mashes and lagoons along Virginia's Eastern Shore have recently flipped from a carbon sink to a carbon source—now emitting more carbon than they are capturing per year. Though, by how much depends on the (as yet unknown) ultimate fate of the carbon eroded along the beach and shoreface. Nevertheless, this comparison reveals that the carbon burial power of the Virginia Barrier system is much less powerful than previously thought.

> Wreck and Ship Shoal Islands. Photo courtesy of Gordon Campbell, AtAltitudeGallery.com.

The study's findings are specific to open ocean coastlines where transgression—the rapid retreat of the shoreline due to sea level rise and storms—is occurring. Study co-author Chis Hein, an expert on barrier systems, notes that "Coastal barriers are among the—if not the—most dynamic landforms on Earth. In their natural state, they are constantly undergoing reworking by waves, wind, and currents; they shape and reform in response to storm impacts; and, at any time, there are barriers undergoing long-term phases of progradation, elongation, accretion, erosion, breaching, or migration." Recognizing this constant change, carbon budgets that cross traditional ecosystem boundaries (such as marshes, lagoons, and the islands themselves)—and assess changes in carbon stocks on all sides of these islands—are crucial for establishing the degree to which coastal landscapes can mitigate climate change through carbon sequestration.

To quantify changes that have taken place over the past 150 years, the research team integrated several methods including sediment coring and geochemical and geospatial analysis, painting a comprehensive picture of the movement of carbon across this dynamic landscape. The team took new, deep sediment cores (up to 62 feet long) from the beachface of seven of the 10 Virginia barrier islands that are currently migrating or eroding. They specifically cored through backbarrier marsh and lagoon muds which formed in the island backbarriers, but had been overrun by the migrating islands and left exposed to waves along the beach and shoreface. They geochemically analyzed these new cores for carbon content and conducted stratigraphic (or geologic layering) analysis to determine the thicknesses of marsh and lagoon units. Finally, a combination of island-specific carbon densities and geospatial analysis yielded a timeseries of annualized carbon erosion rates for each island as well as rates for the entire island chain.

The study highlights a critical issue: the impermanence of carbon stored in coastal environments. While these ecosystems overall are efficient at sequestering carbon, their vulnerability to erosion and sea-level rise means that their role as long-term carbon sinks may be overestimated. This finding challenges the current understanding of coastal carbon budgets, which often focus on vegetated ecosystems and overlook non-vegetated lagoon sediments such as those that are now being eroded along Virginia's barrier beaches.

> Ground view of backbarrier marsh and lagoon sediments exposed along an eroding beachface, backed by a landward-migrating sandy beach & dune system.

"The finding that deep carbon is simply eroding away is a serious challenge to our hopes and expectations that wetlands can sequester enough carbon to help offset emissions," said study co-author Matt Kirwan. "On the other hand, if so much carbon is stored in sandy sediments, maybe this carbon isn't lost forever."

The team's findings underscore the need for integrated coastal management strategies that consider the dynamic nature of these environments. Blue-carbon markets in any rapidly changing coastal landscape, like these transgressive barrier systems, must consider the full picture by factoring in all sites of carbon accumulation and erosion, including unvegetated and deep sediments, as well as their rates of change. Only by following this approach can we determine the extent to which conservation of these carbon-rich systems poses a long-term solution to climate change.

"COOL" DISCOVERY LAB SHOWCASES ARCTIC-THEMED SCIENCE

On an appropriately frigid January night, attendees gathered to participate in Arctic-themed science activities as part of a Discovery Lab event hosted by the Chesapeake Bay National Estuarine Research Reserve in Virginia (CBNERR-VA). Hands-on learning stations included experiments related to the properties of water, sea ice formation, the role of blubber in keeping polar marine mammals warm, and climate change induced habitat loss for fishes and other marine animals.

The featured expert of the evening was VIMS School of Marine Science master's student Ellie Gellerson, who studies sea ice in the Arctic. Gellerson spoke about the logistics and challenges of sampling in a polar tundra ecosystem, how the Arctic ecosystem changes seasonally throughout the year, and long-term changes in sea ice cover due to climate change.

"The Discovery Lab was such a fun, friendly, and curious environment," says Gellerson, "and it was amazing to watch children and parents explore Arctic activities and ask questions together. The audience asked phenomenal questions, and I felt like the Discovery Lab provided such a wonderful space for individuals of all ages to explore science in a fun way."

The Discovery Lab also featured a "polar scientist" photo booth which included a variety of field gear that attendees could wear to take photos to remember their experience at VIMS.

Designed with elementary-aged youth and their parents in mind, Discovery Labs focus on topics related to the Chesapeake Bay and our local environment, as well as other research being performed by our faculty and graduate students. Each educational event includes exhibits, demonstrations, hands-on activities, and a short presentation by an expert on the topic.

"The Discovery Labs are important as they provide a key opportunity for families to come together and learn something new," says Sarah Nuss, education coordinator at CBNERR-VA. "It supports our student programs by allowing for multiple exposures to marine science throughout the year and encourages everyone to be lifelong learners. Finally, it gives our VIMS graduate students a key outreach opportunity and a chance to practice their science communication skills to the public."

> Discovery Lab attendees participate in educational activities about arctic science.

VIMS BRINGS SCIENCE TO THE LOCAL COMMUNITY

When you think of how VIMS interacts with the local Hampton Roads and lower Chesapeake Bay communities, you may think about our on-campus events and activities. However, our staff, faculty, and graduate students also spend significant time off-campus, meeting citizens where they are to educate, answer questions, and inspire.

"Community-oriented outreach not only raises awareness about VIMS, but also increases the public's understanding of issues impacting their lives and equips citizens with the information they need to make informed decisions," says Kristen Sharpe, assistant director of outreach & engagement. "It's also an opportunity for our faculty and students to engage with diverse audiences and connect with their research in meaningful ways by considering how they can clarify the impact of their work for the local public."

Often these opportunities occur at related events and partner organizations, yet sometimes you can find VIMS in unexpected places. In early November, we were at Gloucester Park's "Touch a Truck" event, then had a presence on November 18th at Hampton's "Shellabration" festival at the downtown waterfront. You also may have seen us on January 27th at the Virginia Beach Winter Wildlife Festival, or on February 1st at the Virginia Aquarium in Virginia Beach for their monthly "Sharks After Dark" event.

Our "A Scientist Walks into a Bar" series is also popular. On November 15th, VIMS was invited to Copper Fox Distillery as part of a speaker series hosted by William & Mary alumni Hal Hardaway '71 where Dr. Richard Snyder, Director of the VIMS ESL, intertwined historical accounts with modern shellfish science. Then, on December 6th, graduate students Mary Beth Armstrong, Elizabeth Davis, and Nathan Shunk each gave a five-minute research talk at the Virginia Beer Company.

> Ph.D. student Elizabeth Davis presents her research during an event at the Virginia Beer Company.

Education and outreach programs at VIMS and within the local community are made possible, in part, through philanthropic support from generous donors. To make a gift to support any of these initiatives, please reach out to VIMS Advancement and let them know you are interested in investing in these essential outreach and education programs.

These events only scratch the surface of all the ways that VIMS informs the local public and generates enthusiasm for science for solutions in the region. Says Sharpe, "Bringing our science out into the community allows us to connect with individuals in familiar places and increases the accessibility of our science and education programs for more of our citizens."

> VIMS had an active presence at Hampton's "Shellabration."

VIMS CELEBRATES 50 YEARS OF WETLAND INVENTORY IN THE COMMONWEALTH

"The Virginia Institute of Marine Science shall provide advice and assistance to the Commission in developing these guidelines and minimum standards by evaluating wetlands by type and continuously maintaining and updating an inventory of vegetated wetlands."

It was with that charge in the 1972 Tidal Wetlands Act that the General Assembly of Virginia directed VIMS to begin a regular survey of coastal marshes. Establishing a permanent connection between regulators and scientists, including VIMS researchers, made the Commonwealth's tidal wetlands management program unique for its time.

"Recognizing the importance of science in effective resource management was critical, and it made Virginia one of the leading coastal states to adopt a science-based approach to managing coastal wetlands," says Dr. Kirk Havens, director of the Center for Coastal Resources Management at VIMS.

> Scientists from The Center for Coastal Resources Management survey a living shoreline.

Our partnership with the Commonwealth to conduct an ongoing wetland inventory has continued ever since, highlighted by the recent 50-year anniversary of this collaborative research. "What VIMS has been able to accomplish in wetland research and advisory services over the past five decades is remarkable," says Havens. "This includes 15,000 visits to shoreline sites, 10,000 miles of shoreline surveyed by boat, and 195,000 acres of inventoried tidal wetlands in Virginia."

VIMS' research has revealed several important functions of tidal marshes and found them to be variable and location dependent, providing both direct and indirect benefits to local ecosystems. As VIMS continued the wetlands inventory, evidence showed that minor effects from multiple individual projects within marsh areas, such as shoreline modifications on private property, were compounding into much larger losses within coastal systems. The findings led to the development of new management guidelines that incorporated impact avoidance, minimization, and compensation in the permitting process.

> A wetlands researcher ventures into the field to sample for fish in tidal marshes.

To help determine the need for erosion control, researchers developed the Shoreline Management Model (SMM), which used observed geographic information to suggest management outcomes. Says Havens, "The SMM allows us to evaluate risks to natural resources and human development along Virginia's shorelines, and then provide guidance for managers and property owners. It's so useful that six different states now use the model."

Informed by subsequent wetlands inventory data, Virginia passed the Living Shorelines Act in 2011. This law designated "living shorelines" (consisting of native plants, oyster reefs, and other natural materials) as the preferred option for stabilizing tidal shorelines because they absorb wave energy and stabilize the landscape, helping to protect against erosion and storms while preserving important marsh functions.

"Protecting tidal wetlands while accommodating necessary economic development is a continual challenge and we have learned much over the last half century," said Havens. "Through VIMS' wetlands inventory and ongoing research, we better understand wetlands as complex and dynamic resources within evolving systems. When scientists, state and federal agencies, local communities, and private citizens work together, we can translate scientific data into practical marsh management that will help sustain our important wetland resource."

**An expanded history of the Wetlands Inventory can be found in the Center for Coastal Resources Management's newsletter, Rivers & Coast 2023 Volume 18.*

"The Best, Most Exciting, Most Transformational Year of My Life," continued from page 2

In the summer of 2023, Mapes interned at the Smithsonian Museum of Natural History with mentor Rose Gulledge as part of the "Expert Is In" program. "I dressed up like a phytoplankton," she recalls. "People seemed engaged and interested in learning more."

Then, with generous funding from donors to VIMS, Mapes traveled to California to join the Polynesian Voyaging Society (PVS) after being connected with the organization by Dr. Kirk Havens. Aboard the Hōkūle'a, a double-hulled voyaging canoe dedicated to research, education, and advocacy, Mapes trained the crew in using the PlanktoScope, a modular, open-source hardware and software for imaging plankton. At each stop on the voyage, Mapes and the crew would spend several days educating the public.

"Savannah had the crew of the Hōkūle'a and the communities they encountered excited about the importance of phytoplankton," says Havens.

Mapes is effusive that PVS represents "a vision of hope for the future of Earth's health… This year has not only been one of the best of my entire life, but also the most exciting and the most transformational."

> Mapes with Captain Lehua Kamalu, the Hōkūle'a's first female captain and navigator. © Polynesian Voyaging Society

GALLERY EVENT HIGHLIGHTS THE IMPORTANCE OF VIMS

Art enthusiasts and VIMS supporters gathered on December 7th at Nepenthe Gallery in Alexandria, Virginia for a unique "Art+Wine+Cheese" event. Carrie Owens Garland '90 and her husband, Jim Garland, hosted an evening for William & Mary alumni and friends of VIMS at their art gallery and framery, with a special debut of six wildlife sculptures by David Turner '83, along with other coastal-themed art.

Bronze sculptures showcased at the Nepenthe Gallery event portrayed a blue crab, duckling, fox, great blue heron, otter, and scallop; all native to coastal Virginia environments. The gallery also featured two pieces currently on loan from W&M President Katherine Rowe's private collection: *Along the Coast* by Alfred Thompson Bricher and *Afternoon in the Adirondacks* by John Frederick Kensett.

Derek Aday, dean and director of VIMS, was honored as a special guest for the evening, providing an opportunity to highlight essential work done by VIMS of which attendees may not have been aware. During his remarks, Aday shared how research conducted by VIMS is positively impacting the world that connects us all. He emphasized that VIMS functions as a critical partner during an age of global environmental change, offering science for solutions to preserve and protect coastal communities.

"At Nepenthe, we like to say that we celebrate art in all its various forms: artists and artwork of every medium, art education, art history, art collectors, and on and on," says Garland. "Our family's association with VIMS is important to us, and we saw an opportunity to celebrate it by inviting Derek and the folks at VIMS to Nepenthe alongside sculptures by famed W&M grad David Turner that depict scenes from the Eastern Shore of Virginia."

> Event attendees take in coastal-themed art at Nepenthe Gallery.

The gallery event was attended by friends of VIMS and art enthusiasts who learned about VIMS for the first time.

"What a treat to have VIMS and Dean Aday come visit alums and friends in Alexandria and Northern Virginia," said Ann Green Baise, an honorary alumna and past member of W&M's Board of Visitors, who attended the event. "The art gallery setting with serene aquatic prints and statues made for a lovely evening."

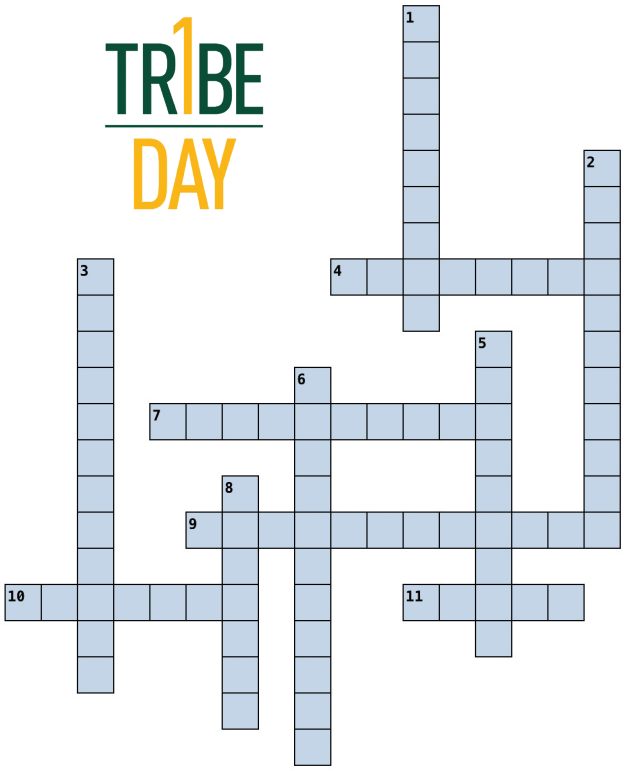
ONE TRIBE ONE DAY

Mark your calendars for March 26, our annual day of giving! William & Mary's One Tribe One Day is now in its 11th year and we need your help to make it a success! This day is all about creating an immediate impact by **making your gift** and **asking others to join you**.

Your gift matters: 511 donors will unlock $100,000 for the VIMS Impact Fund thanks to generous gifts from VIMS Foundation Board members.

Be a Champion: It is easy to become a VIMS champion on March 26. Simply make your gift and ask others to give as well. ***The champion who recruits the most donors will receive an invitation for themselves and 5 friends to dinner with VIMS Dean and Director, Dr. Derek Aday and his wife, Erica.***

Visit **VIMS.edu/OTOD** to learn more.



In honor of the upcoming One Tribe One Day event, we're challenging you with our own VIMS crossword puzzle.

DOWN

1. ____ Labs are free, family-friendly programs provided at VIMS each month by CBNERR-VA
2. The Acuff Center for ____ is home to VIMS' shellfish hatchery
3. The School of Marine Science at VIMS serves as a graduate school for this university
5. Dean & Director of VIMS
6. The study of fish
8. VIMS has a legal ____ from the state to provide research, education, and advisory services

ACROSS

4. The name of the flagship research vessel in the VIMS fleet
7. The location of VIMS' main campus
9. The location of VIMS' Eastern Shore Lab
10. ____ gifts are future contributions made to VIMS via estate planning
11. VIMS is celebrating the 50th anniversary of the annual survey of this predator

Answers: 1. Discovery, 2. Aquaculture, 3. William&Mary, 4. Virginia, 5. DerekAday, 6. Ichthyology, 7. Gloucester, 8. Mandate, 9. Wachapreague, 10. Planned, 11. Shark

VIMS | William & Mary
Virginia Institute of Marine Science

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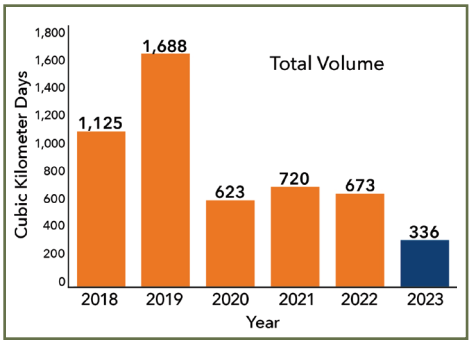

2023 CHESAPEAKE BAY DEAD ZONE IS THE SMALLEST ON RECORD

VIMS' annual report of "dead-zone" conditions in the Chesapeake Bay indicates that hypoxic, low-oxygen conditions in 2023 were at their lowest since monitoring began in 1985. When nutrients enter the water through polluted runoff, they feed algae and drive the growth of algal blooms, which eventually die and decompose, removing oxygen from the waters faster than it can be replenished. This creates a dead-zone of low-oxygen—or hypoxic—conditions at the bottom of the Bay that limit habitat for crabs, oysters, fish, and other wildlife. Describing the low levels of hypoxia in 2023 as "surprising," VIMS professor Dr. Marjorie Friedrichs says, "This may finally be clear evidence that our nutrient reduction strategies are improving water quality and fish and shellfish habitats."

SAVE THE DATE

One Tribe One Day
Tuesday, March 26

A Scientist Walks into a Distillery
Wednesday, March 27, 6:30pm – 8pm
Copper Fox Distillery, Williamsburg, VA

After Hours Lectures
Thursday, March 28, 7 – 8pm
Building Community Science Literacy and Future Leaders in Marine Science
Thursday, April 25, 7 – 8pm
Topic to be announced
Thursday, May 30, 7 – 8pm
Offshore Wind Energy

6th Annual Virginia Osprey Festival
Saturday, April 13, 9am – 4pm
Town Hill, Colonial Beach, VA

Northern Neck Sail & Power Squadron's Annual Spring Fling and Boat Show
Saturday, April 27, 10am – 3pm
Chesapeake Commons, Kilmarnock, VA

Mathews May Faire
Saturday, May 4, 9am – 4pm
Courthouse Green, Main St., Mathews, VA

A Scientist Walks into a Bar: Graduate Student Edition
Thursday, May 16, 6:30pm – 8pm
Frothy Moon Brewhouse, Williamsburg, VA

Marine Science Day
Saturday, June 1, 10am – 3pm

Marine Life Day
Saturday, September 21
Eastern Shore Lab, Wachapreague, VA

All events take place on the VIMS Gloucester Point campus, unless otherwise noted.
No charge for events. Reservation required.
Visit www.vims.edu/events or call 804.684.7061