# Impact

SUMMER 2024 NEWSLETTER VIRGINIA INSTITUTE OF MARINE SCIENCE

## NEW VIMS FOUNDATION BOARD MEMBERS ELECTED

VIMS is welcoming new members to the VIMS Foundation Board, effective July 1, 2024. The VIMS Foundation is a 501(c)(3) not-for-profit organization that supports VIMS priorities by promoting philanthropy and stewarding philanthropic resources. Members of this fiduciary Board serve three-year terms, during which time they act as ambassadors to position VIMS as the preeminent leader in coastal and estuarine science and education for Virginia and the world.

Please join us in welcoming:

**Lynn M. Dillon '75**
Lynn Dillon is a retired former senior vice president at Bank One, who has served William & Mary (W&M) in several capacities, including as a member of the W&M Board of Visitors, W&M Foundation Board, W&M Annual Fund Board, and W&M Alumni Association Board of Directors, for which she served as president from 2001 to 2003. She joined the VIMS Foundation Board in September of 2023 and has now been nominated and accepted for a full three-year term. Dillon graduated from W&M in 1975 before earning an MBA from George Washington University in 1982.

**Isaac D. Irby Ph.D. '17**
Isaac "Ike" Irby currently serves as senior advisor to Vice President Kamala Harris on the Biden-Harris 2024 campaign, and is an independent consultant focused on climate, sustainability, and innovation for a variety of clients across

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## IMPACT HIGHLIGHTS



## MIDDLE PENINSULA MARSHES & LIVING SHORELINES CREATE BENEFITS VALUED AT $6.4M

Marshes and living shorelines in the Middle Peninsula region of Virginia generate more than $6.4 million annually in economic value for recreational fishing, a figure more than three and a half times greater than the value associated with hardened shorelines, according to a study by researchers at VIMS.

Recently published in the journal *Ocean & Coastal Management*, the study is the first to assign an economic value to an ecological benefit of living shorelines.

"We don't have good models for comparing what we are losing in terms of ecosystem services when making decisions about coastal land use," says Andrew Scheld, lead author on the study and a trained economist specializing in fisheries. "That was our motivation for this work. We wanted information about the habitat preferences of anglers, and it just didn't exist."

With funding from the National Oceanic and Atmospheric Administration (NOAA) and assistance from the Virginia Marine Resources Commission, VIMS researchers created a survey instrument with input from a small focus group of anglers. They then surveyed more than 1,500 anglers from the Middle Peninsula region of Virginia about their fishing trips and shoreline habitat preferences.

*> An angler casts her fly line near a marsh in Virginia's Middle Peninsula.*

The data showed a clear proclivity among anglers for coastal marshes and living shorelines. The researchers

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# UNEXPECTED FINDINGS EMERGE IN NEW STUDY OF MARINE HEATWAVES

Published in the prestigious *Journal of Geophysical Research: Oceans*, a new study from VIMS leverages more than three decades of data to demonstrate that extreme water temperatures associated with marine heatwaves last longer than previously known, exhibit subsurface seasonal patterns, and are associated with the expansion of hypoxic zones.

In the study, School of Marine Science Ph.D. student Nathan Shunk, along with his co-authors Drs. Piero Mazzini (VIMS) and Ryan K. Walter (Cal Poly), explored data combined from three different monitoring programs in the Chesapeake Bay—the National Data Buoy Center, the Center for Operational Oceanographic Products and Services, and the Chesapeake Bay National Estuarine Research Reserve in Virginia—covering a period from 1986 to 2021.

"This study would not have been possible without thirty years of steadfast efforts by the various monitoring programs that collected the data we explored. So, I would like to thank the researchers and staff that make the use of these datasets possible," says Shunk.

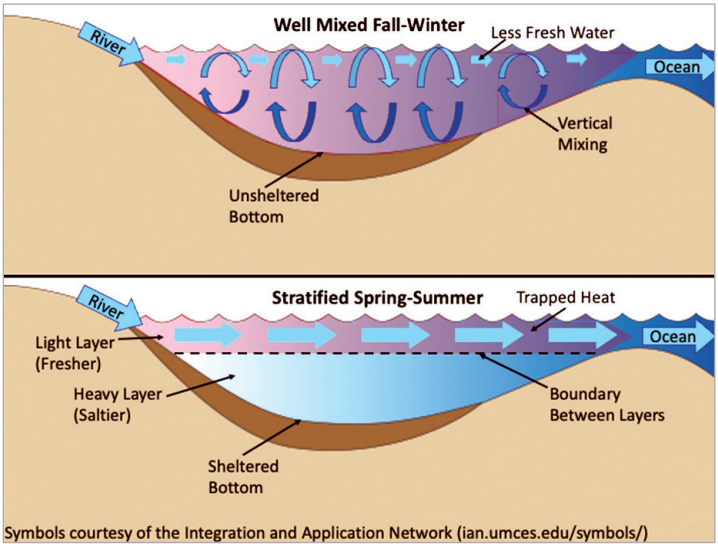
## SEASONAL VARIATION IN THE SUBSURFACE DURING MARINE HEATWAVES

The research shows that marine heatwave events have very different impacts in the subsurface depending on the season. Two regimes are documented: a "Homogeneous Season" and a "Stratified Season." During the "Homogeneous Season," taking place in the fall and winter, warming during marine heatwaves occurs throughout the entire water column, influencing bottom organisms. However, during marine heatwaves in the spring and summer "Stratified Season," warming is only seen in the near-surface and not the bottom.

The stratification (density contrast) of the water column inherent to spring and summer in the Chesapeake Bay serves to insulate the bottom from extreme conditions, possibly protecting organisms from exceeding their temperature tolerances. Weak stratification in the fall and winter, conversely, allows the heat to penetrate all the way to the bottom during marine heatwaves.

"It's impressive how small changes in density that we see throughout the year can determine how deep marine heatwaves can penetrate," says Shunk. "The slight increase in stratification (density contrast) in the summer acts as a blanket, blocking the downward reach of the marine heatwaves and therefore protecting the bottom from extreme heat. As we expect to see marine heatwaves becoming more frequent as a result of climate change, it is crucial to understand their behavior in the Chesapeake Bay."

Though temperatures are unlikely to exceed an organism's temperature tolerance and cause mortality during this time, elevated temperatures could still affect the behavior of organisms. Blue crabs are one example of an organism that could be impacted by this phenomenon. Marine heatwave temperature patterns could disrupt their migration patterns by initiating them early or by delaying them during the fall and winter when marine heatwave temperature anomalies are greater and present throughout the water column.




*> Graphical representation of seasonal variation in the subsurface during marine heatwaves.*

Before this study, marine heatwaves were thought to last about 11 days in the Chesapeake Bay, yet this research showed that surface temperatures are usually elevated months prior to and after the marine heatwaves, and days to weeks before and after marine heatwaves in the subsurface. Future studies related to heat stress in the environment should carefully consider the full duration of elevated temperatures.

*> Lead author Nathan Shunk.*

## DEAD ZONES: A MORE COMPLEX PICTURE

When it comes to oxygen distribution, the findings paint a more complex picture. This phenomenon doesn't happen only in the vertical, as depth changes, but also varies spatially across the Chesapeake Bay. While warming was seen across the entire length of the Bay, oxygen decreases were seen primarily in the deep channel. During marine heatwaves, dissolved oxygen concentrations decreased, meaning there was less oxygen in the water, with the greatest decreases occurring in the winter and spring.

In most instances from April through October, oxygen decreases were associated with an expansion of the hypoxic region of the Bay found in the deep channel of the Chesapeake Bay main stem. Commonly known as a dead zone, hypoxia has a significant, negative impact on marine life in the Bay. The co-occurrence of surface marine heatwaves and bottom hypoxia could lead to a temporary "squeeze" of the usable habitat in the water column for fish and other organisms.

Reflecting on the value of the data used for the study, Mazzini says, "I hope the important results from our research inspire the creation of monitoring programs in other estuaries worldwide. Long term data sets like those now available in the Bay are crucial to help us better understand climate change and its consequences, and guide future management actions that will help to protect our marine and estuarine environment for future generations."

# GOVERNOR YOUNGKIN, STATE OFFICIALS MARK KEY OYSTER RESTORATION MILESTONE

On April 22, Governor Glenn Youngkin, Representative Bobby Scott, and other state officials joined representatives from the Virginia Marine Resources Commission (VMRC) and the National Oceanic and Atmospheric Administration (NOAA) at VIMS to celebrate the achievement of the Chesapeake Bay Oyster Restoration Goal for the York River.

The event marked a significant milestone in Maryland and Virginia's ongoing partnership resulting from the 2014 Chesapeake Bay Watershed Agreement, which established a 2025 deadline for the restoration of oyster habitats in 10 Bay tributaries in Maryland and Virginia.


*> Governor Youngkin speaks at VIMS about oyster restoration in the York River.*

"Through our good work to improve water quality, Virginia's oyster populations are at a 40-year high. We have the largest public replenishment program in the nation, and maybe the world," said Youngkin. "These public-private partnerships work. Science-based management strategies work. And when we commit ourselves, we can make a difference."

In the 20th century, the oyster population in the Bay plummeted due to overfishing and disease, culminating in a near collapse of the fishery in the late 1990s. To help enhance resistance to the primary diseases affecting oysters, VIMS established its Aquaculture Genetics and Breeding Technology Center (ABC), which uses a combination of selective breeding and genetics research to improve the traits of the native eastern oyster.

"VIMS scientists were instrumental in developing the idea of tributary-level oyster restoration, which was ultimately adopted by the Chesapeake Bay Watershed Agreement," said VIMS Dean & Director Derek Aday during his remarks. "Fundamental science to support the restoration effort from both ecological and commercial perspectives originated right here."


*> Participants celebrate restoration efforts by scattering signed oyster shells over the restored reef.*

The York River, one of five Virginia tributaries identified in the agreement, included over 200 acres of substrate planting, which creates natural habitat for the seeding of oysters. Similar efforts in the other tributaries identified in the agreement are also nearing completion.

At the conclusion of the main event, Youngkin and others signed their names on oyster shells before sampling oysters from a number of Virginia's oyster farms. Several participants then boarded VMRC vessels at VIMS' Boat Basin and headed out to one of the restoration sites on the York River to symbolically scatter the signed oysters over the reef to signify completion of the project.

# FROM THE GRADUATION STAGE TO THE U.S. DEPARTMENT OF THE INTERIOR

"Science is so flexible and fluid that it's important to stay open-minded and take advantage of the opportunities that come along," says recent Ph.D. graduate Alex Schneider '24 as she reflects on advice for others interested in marine science.

Schneider, who grew up in a small landlocked town in Northern Connecticut, fell in love with the ocean during visits to her grandparents in Rhode Island. "I always had my head and my hands in the water," she says, "I would collect snails and did a lot of fishing and crabbing with my dad as a kid, as well as a lot of sailing."

*> Alex Schneider '24, recent Ph.D. graduate of the W&M School of Marine Science at VIMS.*

While earning her undergraduate degree in environmental science at Villanova University, Schneider participated in the Research Experience for Undergraduates (REU) program through the National Science Foundation at Rutgers University. Through the connections she made in the REU, she attended an American Fisheries Society conference, where she met one of her future co-advisors, VIMS Professor Mary Fabrizio.

"I was doing blue crab research in New Jersey and a lot of the literature I was reading was coming from research in the Chesapeake Bay conducted by VIMS," says Schneider. "I met Mary at the conference and thought, 'I want to be her when I grow up.'"

After several years as a master's student in William & Mary's School of Marine Science (W&M's SMS) at VIMS, she officially entered the Ph.D. program. Schneider's Ph.D. dissertation compared various factors from when the blue crab population was in poor shape in the early 2000s against the subsequent rebound.

During her time at VIMS, Schneider was awarded both a Virginia Sea Grant Graduate Fellowship and a Willard A. Van Engel (WAVE) Fellowship, and for several years she served as the student co-lead for the VIMS chapter of the Society of Women in Marine Science.

Schneider credits support from faculty and peers at VIMS for her success, especially her co-advisors Fabrizio and Professor Romuald Lipcius, as well as Professor Jeffrey Shields, who was on her graduate committee. "We have advisors who help you through your degree program, as well as a graduate committee that is involved in all of your milestones," she says.

Schneider has now moved to Northern Virginia to work for the Bureau of Ocean Energy Management in the U.S. Department of the Interior, evaluating fisheries related to offshore renewable energy programs in the Atlantic.

Looking back at her time in graduate school, she says, "Whether it be students, people in the lab, faculty, or administrators, I've met some of my favorite people here at VIMS. I feel like nearly everyone you meet wants to help you. VIMS is a community."

# SHENANDOAH VALLEY EVENT HIGHLIGHTS VIMS' IMPACT BEYOND THE BAY

On a warm April evening, VIMS Dean & Director Derek Aday spoke at a special reception at the Long Branch Historic House and Farm in Boyce, Virginia. Hosted by VIMS supporters Rick Wallace, Dr. Tim Harvey '79 and Dr. Karen Kennedy Schultz '75, the event was organized to highlight how VIMS science reaches beyond the Chesapeake Bay.

"In the past few years, as we learned even more about VIMS and its impact," says Harvey, "we realized that many folks in our area were unaware of the gem that VIMS is and how it has potential to grow and expand its reach and mission. So, we set up an event in lovely Clarke County with the team at VIMS so that Dr. Aday could speak and interact with folks in the Piedmont and upper Shenandoah Valley to share how VIMS directly helps the economy of the Commonwealth while working on protecting waterways, habitat, and coastal resiliency in challenging times, all the while educating the next generation of scientists."

Aday delivered a presentation, "The World Around You… Thanks to VIMS," to discuss VIMS' critical influence on Virginia's preparedness for flooding and storm events, sustaining healthier waterways in the Commonwealth, and even the seafood we all enjoy.

Event attendees included nature enthusiasts and informed citizens concerned about the effects of global change. The engaged crowd asked questions about sustainability and actions they could take to make a difference.

"Our family loves the waters of Virginia," says Wallace, "and has strong, generational ties to William & Mary. In honor of our much-missed Aunt Geraldine who instilled a deep love of the Piankatank River for so many of us in our youth, we set up a small fund at VIMS. The extended family joined in enthusiastically. We intend to do more during estate planning."

Located at the base of the Blue Ridge Mountains, the beautiful 400-acre property was the perfect setting for a robust conversation about how VIMS research has important, practical implications for citizens and policymakers across the Commonwealth and beyond.

Interested in hosting a VIMS event? Contact Crystal Booker at cbbooker@vims.edu or 804.684.7099.

*Exciting Updates to the VIMS Foundation Board, continued from page 1*

NGOs, philanthropy and the private sector. He formerly served in the Biden administration as special assistant to the president and deputy domestic policy advisor and chief climate advisor to the vice president. Irby earned his Ph.D. from W&M's School of Marine Science at VIMS in 2017.

**C. Evans Poston Jr. '02**

Evans Poston Jr. is director of government affairs at Hunton Andrews Kurth LLP, working on public affairs and strategies consultancy. After graduating from W&M in 2002, he earned an MPA from Old Dominion University and an MBA from the University of Virginia (UVA) Darden School of Business. He has previously worked for the transport and logistics conglomerate A.P. Moller-Maersk Group. Poston Jr. currently serves on the Darden School Foundation Board and formerly served on the UVA Board of Visitors, as well as the UVA Health System Board.

**Ronald B. Risdon '74**

Ronald "Ron" Risdon is Of Counsel at Schulte Roth & Zabel LLP, where he focuses on secured lending and corporate finance, including syndicated credit facilities, public and private offerings of debt securities, fund finance and restructurings and bankruptcy. His clients include banks, direct private lenders, hedge funds and private equity funds. Risdon was awarded a J.D. by the University of Virginia School of Law in 1977, following his graduation from W&M with a B.A. in 1974.

"We are thrilled to have four incredibly accomplished individuals join the VIMS Foundation Board and look forward to their leadership and service on behalf of VIMS" says Marise Robbins-Forbes, executive director of advancement.

# THANK YOU! GENEROUS SUPPORTERS MAKE ONE TRIBE ONE DAY A SUCCESS

On March 26th, William & Mary (W&M) and VIMS held our annual day of giving, One Tribe One Day. As it was the 11th anniversary of the event, members of the VIMS Foundation Board set a unique challenge: 511 donors would unlock $100,000 for the VIMS Impact Fund. Your support helped us meet and exceed our goals!

***Over 600 donors contributed to VIMS, raising over $260,000 in total to advance our mission, a 19% increase in fundraising over 2023.***

VIMS Foundation Board Treasurer, Rich Lafferty, was the day's leading supporter of VIMS. Explaining his gift, Lafferty says, "As someone who has spent the last 25 summers enjoying the Chesapeake Bay, and as a three-year member of the VIMS Foundation Board, I am impressed with VIMS' work on coastal resilience and protecting our fish and shellfish populations. Making our coastal communities stronger and more resilient for the future is our responsibility."

Thanks to generous contributions, VIMS won W&M's Gerdelman Challenge for most faculty and staff donors, as well as three of the hourly challenges for most donors.

"One Tribe One Day is all about coming together as a community to support this amazing place," says Executive Director of Advancement Marise Robbins-Forbes. "With the efforts of so many supporters, as well as our faculty

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## THANK YOU!

**VIMS is grateful for the service of VIMS Foundation Board members whose terms have recently ended. Your contributions of time, talent and treasure were invaluable. Join us in showing appreciation for...**

**Anne M. Whittemore**
**Henry "Chip" R. Hortenstine III**
**Jennifer Latour**
**David N. Meeker**
**Carroll "Coby" W. Owens III**
**William "Bill" J. Strickland**
**Pierce Walmsley**

# MARINE SCIENCE DAY DRAWS 2,000+ WITH EDUCATIONAL EXHIBITS & HANDS-ON ACTIVITIES

Visible from the Coleman Bridge that connects Yorktown and Gloucester, VIMS' waterfront research and education facilities often pique curiosity. Marine Science Day, our marquee outreach event of the year, offers a closer look. This year, the 22nd annual Marine Science Day attracted more than 2,000 visitors, setting a recent attendance record.

Exhibits at our free, family-friendly event were as exciting as they were varied, from Chesapeake Bay blue crab touch tanks and fish gut dissection demonstrations to seagrass safaris and pollinator gardens. At the VIMS Beach, attendees of all ages waded into the water to use seine nets, assisted by experts from the Chesapeake Bay National Estuarine Research Reserve in Virginia who helped them identify their catch.

"It has been a great event for the whole family," said Mouna Litz, who was attending with her husband and three children. The Litzs moved from Germany to Gloucester last year and had heard about VIMS, but it was their first time visiting campus. She added that while the seining was their family's favorite moment, "we loved all the crafts and all the different hands-on activities. There was something for every age group."

*> The Litz family enjoyed hands-on learning during their first visit to Marine Science Day.*

Several research groups used the day to mark key milestones. The Center for Coastal Resources Management celebrated 50 years of conducting their Shoreline & Tidal Marsh Inventory with guided tours of the Carl Hershner Teaching Marsh. Meanwhile, the Multispecies Research Group marked the 50th anniversary of their longline shark survey with a hands-on shark-measurement activity and several sets of shark jaws on display.

Two seafood cooking demonstrations by Chef Winslow "Win" Goodier, executive chef and culinary director of Nuttall's Store, reached full audience capacity as he taught, cooked and distributed delicious samples. Vessel tours were another popular attraction, as three of our research vessels were open to the public at the boat basin, where participants could additionally observe a seminar on scientific diving. For the second year in a row, VIMS also put on a marine-related career fair, sponsored by Bank of America, where 165 attendees learned about careers in marine science and related fields.

The enthusiasm for learning was palpable throughout the day, according to Dominion Energy Vice President Offshore Wind, Joshua Bennett, who is a member of the VIMS Foundation Board and volunteered at the event. "This was my first Marine Science Day," Bennett says. "As a board member, I was struck by the abundance and quality of community engagement led by staff and students alike. I lost count of the number of times I heard 'that is so cool!' after explanations of questions asked. The diversity of the visitors was reflective of our local communities and that really made me proud to be part of this day."

Marine Science Day is funded, in part, by significant support from the Dominion Energy Charitable Foundation.

During the event, the VIMS Diversity & Inclusion Committee hosted a communal quilt activity, where participants could create their own quilt square to be added to an ongoing project led by Steve Prince, director of engagement and distinguished artist in residence at William & Mary's Muscarelle Museum of Art. The William & Mary Peninsula Alumni Group also had a well-attended table.

Over 250 volunteers contributed in some way to Marine Science Day, led by Assistant Director of Outreach and Engagement Kristen Sharpe, who says, "Thank you to all who came to our campus to learn about VIMS' research and impact throughout Virginia and beyond. It is always exciting to allow members of our local and extended communities to peek behind our brick walls and explore our facilities, speak with our scientists and students and learn about the vast diversity of research topics in the Chesapeake Bay."

"Over the course of the day, over 2,000 people were able to get a closer glimpse at the impact VIMS has on the lives of our citizens, including many school-age children and young adults who we hope will be able to better visualize themselves as ocean lovers and marine scientists, and who may help solve the problems facing our oceans and other aquatic habitats in the future!"

***Marine Science Day 2024 was made possible through the generous support of our sponsors:***

**Dominion Energy Charitable Foundation, The Owens Foundation, Across Virginia Contractor Education, Canon Virginia, Gloucester Toyota, Phillips Energy, Bank of America, GO2 Delivery, Chesapeake Marine Training Institute, C.A. Barrs Contractor, Chesapeake Bank, Colonial Pipeline, Southern Trade Realty, Peninsula Heating & Air, and Phyllis Simonetta.**


*> Several young attendees dazzled with unique outfits in the Marine Costume Contest and Parade. Photo credit Virginia Sea Grant.*

*One Tribe One Day, continued from previous page*

and staff, VIMS indeed came together and had our best year yet. Thank you to everyone who participated and led to this success!"

Private philanthropy funds our students, our scientists, and our essential research that informs citizens and policymakers, helping them understand and conserve our precious waterways.

If you missed One Tribe One Day, you can still make a difference! All gifts made to VIMS, regardless of the day, support our efforts to keep marine environments and coastal communities vibrant and healthy. To learn more, visit **VIMS.edu/giving** or contact Marise Robbins-Forbes (marise@vims.edu) or Susan Maples (susan@vims.edu).

# MAJOR CONTRIBUTORS HONORED AT ANNUAL PATHFINDERS CEREMONY

Lights twinkled brightly in the Freight Shed event venue at Yorktown Beach on the evening of April 12th as VIMS honored our own shining stars during the Pathfinders ceremony. This annual event acknowledges the contributions of some of the Institute's most generous and consistent supporters.

In his welcoming remarks, Dean & Director Derek Aday described VIMS' strategic direction, made possible in part by the philanthropy of the event attendees. Aday then honored nine new inductees into the Pathfinder Society, which consists of those whose lifetime giving to VIMS has reached $100,000 or more: Elana R. Anderson and Jasper Kornerup, David Driver, Robert Gammisch, James "Hal" Hardaway, Richard "Rick" and Susan Hill, and Richard and Pamela Lafferty.

The evening also saw the announcement of VIMS' preeminent donor recognition, the Pathfinder Award, which is only presented when service and contributions are extraordinary. This year, the commendation was unexpectedly awarded twice; to Hal Hardaway, and to Rick and Susan Hill.

*> Pathfinder Society inductees with VIMS Dean & Director Derek Aday. From left to right: Robert Gammisch, Derek Aday, Hal Hardaway, Richard and Pamela Lafferty, Susan and Richard Hill. Inductees Elana R. Anderson, Jasper Kornerup, and David Driver were unable to attend. Photo credit: Jenny McQueen.*

The featured speaker of the evening was VIMS Professor Robert Latour, director of the Multispecies Research Group, which includes the Virginia Shark Monitoring and Assessment Program. The program recently celebrated the 50th anniversary of its longline shark survey, one of the longest-running surveys of its kind in the world. Latour emphasized the importance of attendees' support, which enables VIMS scientists to conduct critical research and advisory services that help us better understand and conserve marine ecosystems.

Invitees included donors who have given at least $5,000 to VIMS in the current fiscal year, documented VIMS in their estate plan and/or have lifetime giving to VIMS of $100,000 or more.

## CALL TO HELP FUND VIMS VISITOR CENTER RENOVATION

VIMS is raising funds for renovation of its popular, 40-year-old visitor center in Watermen's Hall on our Gloucester Point campus. As VIMS' "front door," the visitor center welcomes thousands of visitors from across the Commonwealth and around the country. Students, teachers, families and individuals of all ages come to VIMS to learn more about the Bay and VIMS' essential research. The Cabell Foundation has awarded a 1:1 challenge grant, providing $400,000 once $400,000 is raised (with a deadline of 12/31/24). Gifts can be made to the Visitor's Center Enhancement and Maintenance Fund (5486) at **VIMS.edu/giving**. Thank you for making a contribution today! Your support is needed.

*> The visitor center is popular among students and other visitors.*

*Middle Peninsula Marshes & Living Shorelines Create Benefits Valued at $6.4M, continued from page 1*

also estimated the total costs of fishing trips based on reported individual trip expenses plus the assessed value of the travel time for the trip. Trips to marshes and living shorelines were found to be the least expensive and require the shortest travel times across different habitats, creating substantial value for Middle Peninsula anglers.

"With living shorelines, you're essentially creating a marsh for the purpose of protecting the shore," said coauthor Donna Marie Bilkovic, a marine ecologist and professor at VIMS whose research informs the restoration and conservation of shoreline habitats. "You hear a lot of anecdotal evidence from fishermen and property owners about increases in fish populations resulting from living shoreline projects, and this was reflected remarkably in the results of our survey."

The action of waves against hardened shorelines creates deeper pockets of water that are less conducive to the life cycles and diets of many species of marine life. In contrast, living shorelines and marshes provide cover for smaller fish and other species important to the food chain. This creates a more diverse and resilient ecosystem, which benefits recreational fishing.

VIMS Marine Recreation Specialist Susanna Musick, another member of the research team, is also the principal investigator for the Virginia Game Fish Tagging Program and works closely with anglers. Being well connected to the local fishing community, she is heartened to see the research findings aligning with the observations of her fellow anglers.

"Through our tag return data, we know the importance of natural shoreline areas, especially for species like speckled trout," said Susanna. "But, as someone who grew up fishing on the Middle Peninsula, I also know which areas offer productive shoreline habitat. It was so gratifying to see the outcomes of the study reflect the experience of the angling community as a whole."

Living shorelines provide many other ecological benefits that can be associated with economic impact. Like hardened or armored shorelines, they mitigate erosion from waves and storm surges. However, they also filter out unwanted nutrients from runoff and trap sediment, serving as an important carbon sink.

"Fisheries are one important component, but we are working to estimate values for many of the other services such as carbon sequestration, flooding risk reduction and nutrient removal," said Scheld. "The better we can account for these ecosystem services, the more informed coastal communities can be when making decisions impacting their environment, economy and overall quality of life."

# VIMS CELEBRATES 50 YEARS OF SHARK RESEARCH: A MILESTONE FOR MARINE CONSERVATION

"Honestly, it is an otherworldly experience," says Kaitlyn O'Brien, a Ph.D. student at William & Mary's School of Marine Science (W&M's SMS) who cannot hide her enthusiasm when discussing the longline shark survey performed annually by VIMS. "During those fleeting moments of interaction with these incredible animals, it is impossible not to marvel and feel the utmost respect at the sheer beauty of nature's design."

The longline survey, which is celebrating five decades of research, is part of VIMS' broader Virginia Shark Monitoring and Assessment Program (VASMAP). The 50th anniversary of the pioneering shark survey marks a milestone in scientific research and demonstrates VIMS researchers' dedication to understanding and conserving marine life.

Sharks regulate their prey's populations, preventing cascading effects throughout the food web, leading to healthier, more balanced marine ecosystems. Increasing our knowledge of sharks and their effects on coastal environments, and advising policymakers and practitioners, aligns with W&M's Vision 2026 Water Initiative to find "innovative solutions to ensure the resilience of the world's oceans, coasts and waterways."

Initially led by Jack A. Musick, and now directed by Robert J. Latour, the shark survey assesses the diversity, abundance, and distribution of shark species in the Atlantic Ocean, particularly along the Virginia coast. "The longline survey is among the longest running shark surveys in the world," says Latour, "and is by far the longest of the surveys included in northwest Atlantic shark stock assessments."

## FROM A PILOT STUDY TO A LONGSTANDING RESEARCH PRODUCT WITH SCIENTIFIC & POLICY APPLICATIONS

The origins of the shark survey trace back to a successful 1973 pilot study. "The VIMS longline survey is the brainchild of the late Jack Musick, who held a long-standing fascination with sharks and their relatives," says Latour.

The following year, VIMS researchers established permanent survey locations and set baseline shark population estimates, which proved to be serendipitous before the release of the 1975 film "Jaws." Public reaction to the film led to a sudden spike in shark killings that contributed to the decline of several species of Atlantic sharks. By 1990, Virginia's most common species of shark, the sandbar shark, had declined by 50% and continued to trend downward.

In 1993, VIMS' shark survey findings aided the National Oceanic and Atmospheric Administration (NOAA) to implement the first Fishery Management Plan for Sharks of the Atlantic Ocean, which managed all U.S. Atlantic shark fishing from Maine through Texas. Many of the federal management measures for Atlantic sharks established in that plan are the basis for those still in place today.

As fishing regulations have helped shark populations rebound, Latour says that "data from the shark research program at VIMS continues to inform stock assessments and fishery management plans at federal and state levels, ensuring that resulting policies are based on a strong scientific foundation." Organizations that rely on VIMS data include the Atlantic States Marine Fisheries Commission (ASMFC), National Marine Fisheries Service, and Virginia Marine Resources Commission.

Latour took over direction of the program in 2010. Reflecting on his tenure, he says, "I have tried to build on Jack's legacy in terms of maintaining and expanding data collection, graduate student training, and public awareness of the importance of sharks to the marine environment."

## FACE-TO-FACE WITH APEX PREDATORS: IMPACTFUL RESEARCH IS ALSO A THRILLING EDUCATION EXPERIENCE

Aboard a research vessel, VIMS scientists capture and assess sharks at eight fixed stations, as well as up to eight additional stations that can vary from year-to-year. Researchers examine the sharks for species identification, length, sex, and maturity. They also take photographs and a DNA sample, then tag the shark before release.

O'Brien counts herself fortunate that she recently participated in the examination of some of the largest sharks ever caught in the history of the survey; two mature tiger sharks "that dwarfed me in size," she says. "Standing beside these magnificent creatures, measuring over double my own five-foot nine-inch height, was a truly humbling experience."

*> VIMS Ph.D. student Kaitlyn O'Brien participates in the annual longline shark survey. Photo credit: Virginia Sea Grant.*

By consistently monitoring shark populations over five decades, VIMS data has been instrumental in identifying threats to shark populations and informing conservation efforts and policy-making initiatives. Latour says that over the past fifty years, "data from the survey have been used in hundreds of scientific studies on the distribution, abundance, biology, and ecology of Mid-Atlantic sharks, which have provided foundational knowledge on these apex predators."

O'Brien adds that the longline survey offers essential, immersive fieldwork training for graduate students. "Engaging directly with marine life provides a tangible connection to the subjects of my research, grounding my understanding in real-world observations… Working on the longline survey not only expands my practical skills, but also fosters a holistic approach to scientific inquiry, enriching my education and strengthening my commitment to marine conservation and research."

Today, VIMS continues to monitor, analyze, and forecast changes in shark movements and habitats. Yet as we celebrate the 50th anniversary of the shark research program, overfishing, bycatch, habitat destruction, and climate change continue to pose formidable threats to sharks and broader marine biodiversity.

Co-principal investigator James Gartland '24 says, "As shark stocks continue to recover and the spatial distributions of these species expand and shift in response to a warming ocean, I'm interested to see how our catch compositions may change and study the potential impacts on the structure and function of our ecosystems."

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# 26TH ANNUAL BLUE CRAB BOWL HOSTED IN-PERSON AT VIMS FOR THE FIRST TIME SINCE 2019

Sixteen teams from 15 high schools across the Commonwealth competed in this year's Blue Crab Bowl, one of 17 regional competitions of the annual National Ocean Science Bowl.

"We were thrilled to see the Blue Crab Bowl return in-person to VIMS," says Marine Education Specialist Bethany Smith. "It's always so fun to watch some of our future leaders in marine science tackle these incredibly difficult questions."

On the first day of the event, students toured VIMS and attended an ocean science career panel. The 78 competing students and 22 teachers then spent a full day engaged in tournament competition, with 47 matches in total.

Broadwater Academy ultimately emerged victorious, with Grafton High School in second place. Third and fourth place honors went to the Catholic High School/Isle Wight combined team and Catholic High School, respectively.

The Blue Crab Bowl is a cooperative effort between VIMS and Old Dominion University's Department of Ocean and Earth Sciences. Over the course of this year's event, more than 55 VIMS faculty, graduate students, and staff volunteered their time to ensure the event's success.

*> 2024 Blue Crab Bowl winners Broadwater Academy. Photo credit: Virginia Sea Grant.*

## SAVE THE DATE

**VIMS @ Colonial World Nature Conservation Day BioBlitz 2024**
Saturday, July 20, 8am – 12pm
New Quarter Park, Williamsburg, VA

**VIMS @ Shark Week**
Monday, July 22, 9am – 3pm
Virginia Aquarium & Marine Science Center, Virginia Beach, VA

**After Hours Lectures**
Thursday, July 25, 7pm – 8pm
*State of the York*
Thursday, August 29, 7pm – 8pm
*Adult Summer Camp!*

**VIMS @ Virginia Pawpaw Festival**
Saturday, August 24, 10am – 4pm
Historic Endview, Newport News, VA

**CBNERR-VA Discovery Lab: Predators of the Skies**
Wednesday, September 18, 6pm – 8pm

**Marine Life Day**
Saturday, September 21, 12pm – 4pm
Eastern Shore Lab, Wachapreague, VA

**VIMS @ York County's 5th Annual BugFest**
Saturday, September 28, 10am – 2pm
Grafton Middle School, Yorktown, 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