32nd Annual Conference

CONNECTING THE DROPS

WATERSHEDS & DATA & PEOPLE

MWMC maryland water monitoring council

November 19, 2026 • DoubleTree by Hilton Conference Center • Pikesville, Maryland

Maryland Water Monitoring Council 32nd Annual Conference

2026 MWMC Annual Conference Exhibitor

We would like to thank our exhibitors for their support. Be sure to stop by their tables to learn more about their work.





























Special thanks to **KCI** for sponsoring the Student Poster Contest and the After-Conference Social this year!
Stop by their table and thank them for their support!

Thank you to our **sponsor** who helped make this conference happen.



Interested in becoming an exhibitor or sponsor for next year's conference? Reach out to Katherine Hanna (mwmcsecretary.dnr@maryland.gov) for details.

Table Of Contents

Welcome from the Chair....4
The Carl S. Weber Awards....7
Above and Beyond Award....9
2026 Annual Conference Planning Committee....10
Agenda....11
8:30 Morning Plenary Session....11
10:30 – 12:00 Concurrent Sessions....13
1:30 – 3:00 Concurrent Sessions....15
3:30 – 4:00 Concurrent Sessions....17
Poster List....19
Plenary Speakers....21
Oral Presentation Abstracts....22
Poster Presentation Abstracts....48
MWMC 2025-2026 Annual Reports....66
Community Science Committee....68
Groundwater Committee....69
Information Management and Communication Committee....70
Lakes Committee....71
Monitoring and Assessment Committee....72
Student Committee....73
MWMC 2026 Board of Directors....74

The 32nd Annual Conference of the Maryland Water Monitoring Council

Welcome from the Chair of the MWMC Board of Directors - Byron Madigan

Connecting the Drops: Watersheds, Data, & People

On behalf of the MWMC Board of Directors, I'm excited to welcome you all here today to the 32nd annual conference of the Maryland Water Monitoring Council. Continuing this great tradition year after year takes great people to make it all happen! Starting with our Conference Planning Committee, who this year, not only planned another incredible event, but took on an additional task, putting out a call for abstracts for both in-person and poster presentations and then having the difficult job of selecting from all of the great individual abstracts the talks you'll hear throughout the day today. To the sponsors, vendors, speakers and poster presenters who took the time to analyze data and put together the information to share with us all today, and to our moderators, who may have the most difficult task today of keeping us on time during the individual breakout sessions: no pressure, but everyone's counting on you!!

Dave Rosgen once famously said that "tradition is one of the hardest things to change." Although he may not have meant it positively in its original context, the quote feels fitting as the Maryland Water Monitoring Council's conference continues its tradition well into its third decade.

This year's conference theme **Connecting the Drops: Watershed, Data, and People** speaks to the interconnectedness of all that we do and why we are all here today. From our actions on the landscape which affect water quality and ecology, to legislation and policy written with intent to improve conditions of the Chesapeake Bay and our watersheds, to monitoring data which help us to understand current conditions and our impacts on the natural world, to advocacy, to restoration, and on and on. These are the "drops" that are referred to in the theme. No single "drop" is isolated; when mixed together each of these "drops" combine to form our collective knowledge and describe our efforts to improve the conditions of our watersheds for the people who live in them.

Today's talks contribute more of these "drops" - beginning with our two great plenary speakers as well as dozens of talks across multiple sectors throughout the rest of the day. The Council is proud to contribute more "drops" for a 32nd year and are encouraged for the future by this great gathering of diverse people.

Our first plenary speaker is Lucinda Powers with the Environmental Protection Agency. Lucinda is an applied anthropologist and the Branch Chief for Partnerships and Accountability with the U.S. Environmental Protection Agency's Chesapeake Bay Program Office. Since joining the program in 2010, she has coordinated and led complex environmental, policy, and partnership initiatives to support the restoration and conservation of the Chesapeake Bay and its watershed. Previously, Lucinda specialized in water quality policy related to the Chesapeake Bay Total Maximum Daily Load (TMDL). In that role, she coordinated state and local efforts to develop and implement comprehensive watershed restoration plans. She holds both a Bachelor of Arts in Women's Studies and a Master of Applied Anthropology from the University of Maryland, College Park. Based in Annapolis, Maryland, Lucinda lives with her husband, Rob, and their dog, Skylar. Outside of her professional work, she enjoys traveling, practicing yoga, and exploring all things culinary.

Our second plenary speaker this morning is Tim Wheeler with the Bay Journal. Tim is a senior contributing writer for the Bay Journal. He has covered the Chesapeake Bay and other environmental issues for most of his career, including more than a decade with the Bay Journal and nearly 32 years as a reporter and editor with the Baltimore Sun and Evening Sun. He's a former president of the Society of Environmental Journalists and has won many awards, including the 2010 Excellence in Journalism Award from the Renewable Natural Resources Foundation. A native of West Virginia, Tim grew up eating oysters and followed his taste buds to the Bay. Tim holds a B.A. from the University of Virginia and a master's in journalism from Columbia University.

This year marks the 20th presentation of the Carl Weber Award, which recognizes an individual who has demonstrated sustained leadership and vision throughout a career in water monitoring. The Council will also present the Above and Beyond Award for the 10th year, honoring an emerging leader who is already helping protect and restore Maryland's waterways through watershed awareness, advocacy, education, and stewardship.

Additionally, the MWMC thrives because of professionals who donate their time, and if you have an interest in being part of the MWMC, I encourage you to reach out to the chair or co-chair of one of our great committees. Our Student Committee hosted a couple of career chats this past year with experts in the water monitoring world. Last fall, the Community Science Committee organized and hosted a data to decisions workshop, and our Monitoring and Assessment Committee planned a surface water temperature workshop this past spring. Additionally, this past year we saw the addition of our newest committee, the Lakes Committee, as well as greater collaboration within our Groundwater Committee. If you are interested in reading what our committees have been up to this past year, you can read all the committee reports within the conference program.

- Monitoring & Assessment Committee - Byron Madigan (bmadigan@carrollcountymd.gov)
- Stream Restoration Monitoring Sub-Committee - Brock Reggi (brock.reggi@deq.virginia.gov)
- Community Science Committee - Rupert Rossetti (rupertrossetti@gmail.com)
- Information Management & Communication Committee - Thavamani Rajapandi (trajapandi@coppin.edu)
- Groundwater Committee – Rubina Firdous (rubina.firdous@maryland.gov)
- Student Committee - Lindsay DeMarzo (ldemarzo@howardcountymd.gov)
- Annual Conference Planning Committee - Katherine Hanna (katherine.hanna@maryland.gov)
- Lakes Committee – Cathy Wazniak (catherine.wazniak@maryland.gov)

Closing Thoughts:

Since the very first MWMC conference, now spanning over three decades, we're bound to experience both major milestones and inevitable setbacks, from extreme weather events to constant shifts in the political climate, yet progress will continue, and in 2026, according to the University of Maryland's Center for Environmental Science's (UMCES) 2026 Chesapeake Bay Watershed Report Card, the Bay earned its highest overall health score of the past four decades.

Professional snowboarder and climate activist Jeremy Jones always says, *"Find what makes you happy and do it often, the world will be a great place for it".*

My charge to you today is to not only take what you hear today, these "drops", back to your work, to your research, to your organization and produce your own "drop", but to make your own additional connections with people here today. Learn about their data and the watersheds where they work and live, recognizing that every "drop" is connected—and that together, we can continue improving our watersheds, making them all great places.

Respectfully,

Byron Madigan

Byron Madigan

Chair, Maryland Water Monitoring Council



The Carl S. Weber Awards

For Vision and Leadership in Monitoring Maryland's Waters



Our vision for monitoring in Maryland…

The MWMC envisions a time when monitoring methods, programs, projects, and data are the product of collaboration and comparability among agencies and organizations. The resulting information will be accessible for use by all stakeholders and will facilitate sound decision-making in environmental management and protection.

Dr. Carl S. Weber. Among many other things, Carl was one of the founding Board members serving a term on the MWMC Board in the mid-1990s representing the academic community. Today we honor Carl's life and work and celebrate the qualities that made him such an important part of the Maryland monitoring community with the annual presentation of the Carl S. Weber Award. Beginning in 2007, the Award has been presented annually to an individual involved in water monitoring in Maryland who exhibits the spirit, vision and leadership so exemplified by Carl. One person can make a difference!

Carl was a founding member of the University of Maryland-Baltimore County (UMBC) Biological Sciences Department and taught there for nearly 40 years. Although his training was in biochemistry, he developed an interest in stream ecology in the 1980s and became a self-taught aquatic biologist, eventually creating and teaching extremely popular courses on stream and river ecology at UMBC. Carl used Herbert Run, a Patapsco tributary that flows through UMBC, as a living classroom for his students that spurred research and restoration activities on the stream. In 2002, Carl won the UMBC 2002 Alumni Association Award for Mentoring. Many of the students Carl taught and mentored went on to internships and careers in the environmental protection field. Carl was instrumental in bringing the National Science Foundation's Long-Term Ecological Research Network to UMBC through the Baltimore Ecosystem Study. He also served as the first chair of the Patapsco Tributary Team.

Carl's entry into the monitoring world began when he got involved with the Friends of Gwynns Falls/Leakin Park in his home watershed. In 1989, he took on an amazing volunteer task—leading a unique and innovative new project for Maryland Save Our Streams and Baltimore County. "Project Heartbeat" was the first program in the United States to train volunteers to collect and analyze benthic macroinvertebrates and to assess physical habitat using EPA's 1989 Rapid Bioassessment Protocol. Carl jumped right in and became involved in every aspect of the program. Over a 10 year period, thousands of volunteers were trained to collect benthic samples and identify them to the taxonomic family level in a controlled lab setting. Through Carl, UMBC provided lab space and equipment, and for several years, Carl taught and supervised all the lab volunteers to ID 200-300 samples a year. He chaired both the community steering committee and the technical advisory committee, building a bridge among volunteers, watershed organizations, academia, the County, the State, EPA, and other stakeholders—all represented on these committees.

For years, Carl performed all the lab quality control and data analysis for Heartbeat. He co-authored Project Heartbeat's Quality Assurance Project Plan, the first of its kind for a volunteer biological monitoring program. In the 1990s, Project Heartbeat had a profound impact on volunteer water monitoring, environmental education, and watershed collaboration—not only in Maryland, but across the country. Because of this program, Baltimore County has a quality baseline data set on the health of its streams spanning more than 10 years. Project Heartbeat maintained a high level of scientific credibility and the program contributed to advances made in stream assessment and analysis methods within the Maryland Department of Natural Resources and the Maryland Department of Environment. Certainly the road to DNR's "Streamwaders" program was paved, in part, by Project Heartbeat's success. No one person is more responsible for any of these accomplishments than Carl Weber.

Through this award, we celebrate Carl's life and work by acknowledging others who share his generous spirit, his commitment to Maryland's waters, his vision for collaboration, and his leadership in advancing monitoring and assessment.

Previous Winners

2025 - Ken Belt (Natural History Society of Maryland)

2024 - Mark Southerland (Tetra Tech)

2023 - Scott Phillips (United States Geological Survey, retired)

2022 - Bruce Michael (Maryland Department of Natural Resources, retired)

2021 - Rupert Rossetti (Octoraro Watershed Association)

2020 - Dan Boward (Maryland Department of Natural Resources, retired)

2019 - Jim Gracie (Brightwater, Inc.)

2018 – Cathy Wiss (Audubon Naturalist Society)

2017 – Dr. Walter Boynton (University of Maryland Center for Environmental Science)

2016 – Bonnie Bick (Mattawoman Watershed Society)

2015 – Frank Dawson (Maryland Department of Natural Resources, retired)

2014 – Jim Long (Mattawoman Watershed Society)

2013 - Paul Kazyak (Maryland Department of Natural Resources)

2012 - Charlie Conklin (Gunpowder Valley Conservancy)

2011 - Bill Stack (Center for Watershed Protection)

2010 - Sally G. Horner (Magothy River Association)

2009 - Peter Bergstrom (National Oceanic and Atmospheric Administration)

2008 - Ron Klauda (Maryland Department of Natural Resources)

2007 - Susan "Abby" Markowitz (Tetra Tech) and Dr. Paul Massicot (Maryland Department of Natural Resources)



Above and Beyond Award

Many of the previous Carl Weber Award recipients have had lengthy careers and been a part of public agencies. The Above and Beyond Award will allow the MWMC to recognize someone who represents the next generation of Maryland's water monitors and the future of the MWMC. Presented annually to recognize contributions of an up-and-coming member of Maryland's environmental community, the Above and Beyond Award is presented to a member who has volunteered time and energy towards the monitoring of Maryland's waters and has made a significant contribution to increasing watershed awareness, advocacy, education and stewardship.

Previous Winners

2025 - Lindsay Powers (Maryland Department of Natural Resources)

2024 - Liz Chudoba (Alliance for the Chesapeake Bay)

2023 - Susan Simonson (Antietam-Conococheague Watershed Alliance)

2021 - Daniel Savoy (Wicomico River Creekwatcher)

2020 - Andrew Sarcinello (Trout Unlimited)

2019 - Suzanne Etgen (Anne Arundel Watershed Stewards Academy)

2018 – Joseph Davis and Matthew Budinger (Baltimore County Public Schools)

2017 – Rebecca Kenyon-Sisler (Garrett County Educator)

2016 – Ann Strozyk (Howard County Educator)

2026 Annual Conference Planning Committee

Andy Becker	KCI Technologies, Inc.
Megan Brosh	Baltimore County Department of Environmental Protection and Sustainability
Lindsay DeMarzo	Howard County Office of Community Sustainability
John Denniston	Greenman-Pedersen, Inc.
Sadie Drescher	Chesapeake Bay Trust
Katherine Hanna (Chair)	Maryland Department of Natural Resources
Clark Howells	Washington Suburban Sanitary Commission
Maggie Howells	City of Baltimore Department of Public Works
Debra Joseph	Unaffiliated
Ken Mack	Montgomery County Department of Environmental Protection
Byron Madigan	Carroll Co. BRM
Mike McMahon	Maryland Department of the Environment
Becky Monahan	Maryland Department of the Environment
Mat Pajerowski	United States Geological Service
Nancy Roth	Tetra Tech, Inc.
Mark Southerland	Tetra Tech, Inc.
Mark Trice	Maryland Department of Natural Resources
Radhika Wijetunge	Howard County Department of Public Works – Stormwater Management

Additional thanks to:

Anthony Burrows	Maryland Department of Natural Resources (Online store, poster printing)
Mandy DeLeo	Patapsco Heritage Greenway (Registration table)
Tammy Domanski	Anne Arundel Community College (Registration table)
Rebecca Fox	Washington College (Registration table)
Mary Genovese	Maryland Department of Natural Resources (Conference preparation)
Tomas Ivasauskas	Maryland Department of Natural Resources (Conference preparation)
Jamie Jensen	Maryland Department of Natural Resources (Conference preparation)
Kara Kemmerer	Maryland Department of the Environment (Registration table)
Greg Mathews	Maryland Department of Natural Resources (Conference preparation)
Annie Tang	Maryland Department of Natural Resources (Conference preparation)

MARYLAND WATER MONITORING COUNCIL
32nd Annual Conference - Thursday, November 19, 2026
Connecting the Drops: Watersheds, Data, and People

Agenda

7:30 Registration Opens in Foyer

7:30 – 8:30 Poster Set-up/Continental Breakfast

8:30 Morning Plenary Session in Preakness AB

8:30 MWMC Board Chair's Call to Order - Byron Madigan, Carroll County BRM

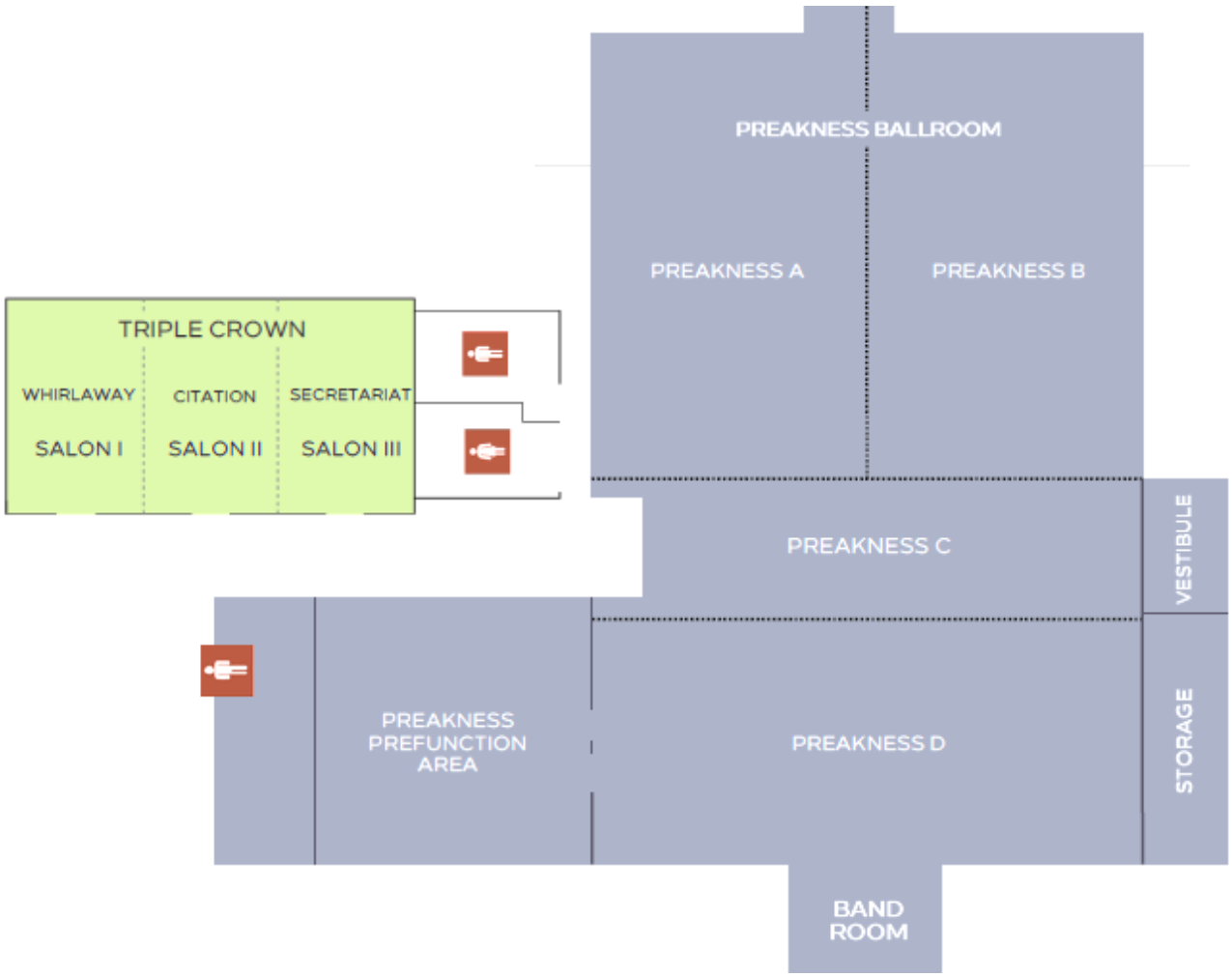
8:45 Plenary Speaker - Lucinda Powers, Environmental Protection Agency

9:15 Plenary Speaker - Tim Wheeler, Bay Journal

9:45 Carl S. Weber Award - Clark Howells, Washington Suburban Sanitary Commission

10:00 – 10:30 Break

10:00 Break/Poster Session - Authors Present



Agenda

Room topics span six locations across three time blocks. Each topic provides an overview of the scheduled presentations that occur every 30 minutes. Every effort is made to maintain this schedule, giving attendees the opportunity to visit multiple topics in a time block. Topics not following this schedule are marked by an asterisk (*) and explained in the corresponding section.

Overview of room topics across each time block:

Location	**10:30 - 11:00**	**1:30 - 3:00**	**3:30 - 4:30**
Preakness A	Restoration I	Restoration II	Restoration III
Preakness B	Stormwater I (Thermal Impact)	Stormwater II (Models & Maintenance)	Stormwater III (Contaminants)
Preakness D	Salt	Water Quality	Green Infrastructure
Triple Crown Whirlaway	Groundwater	Lakes I	Lakes II
Triple Crown Citation	*Student Lightning Talks	Community Science I	*Community Science II
Triple Crown Secretariat	Blue Carbon	Bay Restoration Modeling	Tech

Feel free to write in a session schedule below:

10:30 - 12:00

A. _____

B. _____

C. _____

1030 - 3:00

A. _____

B. _____

C. _____

3:30 - 4:30

A. _____

B. _____

10:30 – 12:00 Concurrent Sessions

A.) 10:30 – 11:00 B.) 11:00 – 11:30 C.) 11:30 – 12:00

Preakness A – Restoration I

Moderator: Mark Southerland and Nancy Roth (Tetra Tech)

A. WHERE DOES ALL THIS DAM SEDIMENT GO: HOLISTICALLY ASSESSING THE LONG-TERM FATE OF IMPOUNDMENT SEDIMENT RELEASES FROM DAM RELEASES - Zachary Clifton and Marina Metes, U.S. Geological Survey

B. LARGE SEDIMENT YIELD AFTER MITIGATION PROJECTS: THE STORY OF FOSTER BRANCH- Alex Soroka, U.S. Geological Survey

C. HERPETOFAUNAL USE OF CONSTRUCTED VERNAL POOLS AT STREAM RESTORATION SITES IN FAIRFAX COUNTY, VIRGINIA - Mark Southerland, Tetra Tech and Emily Benoit, Fairfax County

Preakness B – Stormwater I (Thermal Impact)

Moderator: Radhika Wijetunge (Howard Co.)

A. QUANTIFYING THERMAL IMPACTS OF STORMWATER IN AN URBANIZED BROOK TROUT WATERSHED - Neal Eshleman, MD DNR FABS

B. **CANCELLED** - *TEMPERATURE REDUCTION IN STORMWATER DURING FLOW THROUGH BIORETENTION - Iffat Afreen, University of Maryland, College Park*

C. THERMAL EVALUATION OF STORMWATER WET POND WITH GRAVEL LENS - Byron Madigan, Carroll County Government

Preakness D – Salt

Moderator: Ken Mack (Montgomery Co.)

A. COORDINATING WINTER SALT REDUCTION: JOINT STATE AND GRASSROOTS STRATEGIES IN MARYLAND - Camryn Arnstein, MDE and Samantha Puckett, Izaak Walton League of America

B. EPISODIC SALINIZATION IMPACTS THE COMPOSITION AND DECOMPOSITION OF DISSOLVED ORGANIC MATTER IN URBAN STREAMS - Ashley B. Dann, University of Maryland

C. FRESHWATER SALINIZATION ALONG THE WATERSHED CONTINUUM: FROM TRACKING SOURCES OF DEGRADATION TO EVALUATING RESTORATION - Sujay Kaushal, UMD

Triple Crown Whirlaway – Groundwater

Moderator: Mat Pajerowski (USGS)

A. IN-SITU TREATMENT OF PFAS IN GROUNDWATER AND OTHER TALL TALES - Amelia DaCruz, Tetra Tech and Avanti Corporation

B. BUILDING A GROUNDWATER FLOW MODEL FOR THE MARYLAND COASTAL PLAIN - John Harris, U.S. Geological Survey

C. MARYLAND GEOLOGICAL SURVEY: GROUNDWATER RESOURCES, RECENT STUDIES AND TOOLS IN DEVELOPMENT - Heather Quinn, Maryland Geological Survey

10:30 – 12:00 Concurrent Session ctd.

***Triple Crown Citation – Student Lightning Talks**
Student sessions are set in 15-minute intervals
Moderator: Lindsay DeMarzo (Howard Co.)

A. RIVER OTTER (*LONTRA CANADENSIS*) HABITAT ASSESSMENT AND RESTORATION ON GWYNNS FALLS - Abigail Bachman, Stevenson University

B. EVALUATING THE EFFECTS OF INTRODUCED SPECIES ON NATIVE FISH FORAGING BEHAVIOR - Payton Barry, University of Maryland, Baltimore County

C. EXAMINING HOW SALT TOXICITY IN WILD RICE IS INFLUENCED BY PLANT ASSOCIATES IN CHESAPEAKE WATERSHEDS - Chani Dima, Hood College

D. **CANCELLED** - *AMPHIBIAN RESPONSES TO TEMPORARY CONSTRUCTION DISTURBANCE IN AN URBAN WETLAND - Yundoo Lee, McLean High School*

E. ANALYZING THE ROLE OF INVASIVE *DRESSENIA* IN FILTERING POLYETHYLENE TEREPHTHALATE PARTICLES AND DISSOLVED IBUPROFEN - Zoey Smith, Johns Hopkins University

F. EVALUATING SHIFTS IN ORGANIC MATTER COMPOSITION BEFORE AND AFTER STREAM RESTORATION - Regina Yuengling, University of Maryland, College Park

Triple Crown Secretariat – Blue Carbon
Moderator: Marie Panday (MDE)

A. UPDATES TO THE COASTAL BLUE CARBON MANUAL - Hannah Morrissette, Smithsonian Environmental Research Center

B. ASSESSING THE CARBON SEQUESTRATION CAPACITY OF THE POPLAR ISLAND WETLANDS - Lorie Staver, University of Maryland Center for Environmental Science (UMCES)

C. A YEAR IN REVIEW: WATER QUALITY PERFORMANCE OF HARBOR WETLAND COMPARED TO BALTIMORE'S INNER HARBOR - Taylor Long, National Aquarium

12:00 – 1:30 Break and Lunch

12:00 – 12:45 **Lakes Committee Meeting**
Location: Triple Crown Secretariat

12:10 – 12:45 **Lunch A**

12:45 – 1:20 **Lunch B**

1:00 – 1:30 **Student Poster Sessions to Judges**
Location: Foyer

Help Us Reduce the Lunchtime Crowd!



Orange sticker on your nametag?
Lunch A



Blue sticker on your nametag?
Lunch B

1:30 – 3:00 Concurrent Sessions
A.) 1:30 – 2:00 B.) 2:00 – 2:30 C.) 2:30 – 3:00

Preakness A – Restoration II
Moderator: Brock Reggi (VA DEQ)

A. CLOSING THE MONITORING-TO-DECISION GAP: TRANSLATING POOLED MONITORING SCIENCE INTO ACTIONABLE TOOLS - Sadie Drescher, Chesapeake Bay Trust

B. LANGFORD WATERSHED ALLIANCE: MONITORING RESTORATION SUCCESS AT A WATERSHED SCALE - Chelsea Peters, Washington College

C. EVALUATING STREAM RESTORATION EFFECTIVENESS: NUTRIENT, SEDIMENT, AND BIOLOGICAL RESPONSES AT UT SASSAFRAS - Allyson Bartell, Maryland DNR

Preakness B – Stormwater II (Models & Maintenance)
Moderator: Claire Welty (UMBC)

A. URBAN EVOLUTION AND THE SHIFTING STORMWATER BURDEN: IMPERVIOUS COVER EVIDENCE FROM 1.3 MILLION CHESAPEAKE BAY WATERSHED PARCELS - Adrielli Bonfanti Pagnoncelli, Morgan State University

B. TRANSFORMING STORMWATER MANAGEMENT: THE ROLE OF DATA IN MAINTENANCE - Kyndal Gehlbach, M-NCPPC Montgomery Parks

C. SENSORED PERMEABLE PAVEMENT FOR ELEVATED PERFORMANCE AND REDUCED MAINTENANCE - Aaron Fisher, Ernest Maier

Preakness D – Water Quality
Moderator: Colin Hill (KCI Technologies)

A. AMBIENT LEVELS OF PFAS IN MARYLAND SURFACE WATERS - Ben Daniels, MDE

B. TEMPORAL CHANGES IN 6PPDQ CONCENTRATIONS ACROSS STORM HYDROGRAPHS - Tristan Mohs and Tyler Bowser, US Geological Survey

C. TRANSLATING REGIONAL WATER QUALITY MONITORING DATA FOR NON-SCIENCE AUDIENCES - Nicole Horvath, Reservoir Center

Triple Crown Whirlaway – Lakes I
Moderator: Becky Monahan (MDE)

A. SOMETHING'S FISHY ABOUT HOLLAND PINES POND: FOLLOWING THE CLUES - Nancy Roth, Tetra Tech

B. **CANCELLED -** *TRANSLATING BENTHIC CYANOBACTERIA RESEARCH INTO MANAGEMENT TOOLS: VISUALIZING TOXIC HARMFUL ALGAL MATS (MICROSEIRA WOLLEI) IN MARYLAND ESTUARIES AND LAKES - Cathy Wazniak, Maryland Department of Natural Resources*

C. VERTICAL BIOGEOCHEMISTRY STRUCTURE IN CLOPPER LAKE, MARYLAND: SURFACE WATER SAMPLES DON'T TELL THE STORY - Jeffrey Cornwell, UMCES - Horn Point Laboratory

1:30 – 3:00 Concurrent Session ctd.

Triple Crown Citation – Community Science I
Moderator: Mandy DeLeo (Patapsco Heritage Greenway)

A. OVERCOMING OPERATIONAL HURDLES IN COMMUNITY-LED WATER QUALITY TESTING - Becky Golden, ShoreRivers

B. ALL FEATURES GREAT AND SMALL: DOCUMENTING VERNAL POOLS AND OTHER WETLANDS IN CENTRAL MARYLAND - Rachel Gauza, Montgomery Parks, M-NCPPC

C. LONGITUDINAL PERSISTENCE IN WATER QUALITY IMPACTS ACROSS NATURAL AND ANTHROPOGENIC TRANSITIONS - Weston Slaughter; University of Maryland

Triple Crown Secretariat – Bay Restoration Modeling
Moderator: Mike McMahon (MDE)

A. MANAGING EXPECTATIONS AND OPPORTUNITIES FOR A SHALLOW-WATER FOCUS IN CHESAPEAKE BAY RESTORATION - Jeremy Testa, UMCES Chesapeake Biological Laboratory

B. **CANCELLED** - *UNINTENDED CONSEQUENCES OF ESTUARINE MANAGEMENT - Molly Mitchell, Virginia Institute of Marine Science*

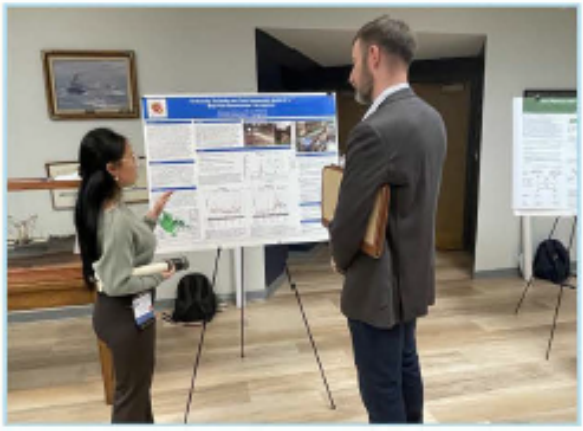
C. MOVING FORWARD WITH CESR: USING MONITORING DATA AND MODELING TO ASSESS LIVING RESOURCE RESPONSES TO RESTORATION - Kenneth A. Rose, UMCES - Horn Point Laboratory

3:00 – 3:30 Break

3:00-3:300 Announcement of Student Poster Award Winners
Location: Preakness A

2026 Annual Student Poster Award

Thank you to all the students presenting at this year's conference! We encourage everyone to check out their exciting work.



Each year students can

- Present their research
- Receive valuable feedback
- Enter the MWMC Student Poster Contest

All middle school, high school, and undergraduate students conducting water-related research are eligible.

Keep an eye out for next year's application period.

3:30 – 4:30 Concurrent Sessions
A.) 3:30 – 4:00 B.) 4:00 – 4:30

Preakness A - Restoration III
Moderator: Nancy Roth (Tetra Tech)

A. WORK IN THE WET VERSUS WORK IN THE DRY FOR STREAM RESTORATION: A COMPARISON OF DOWNSTREAM TURBIDITY AND SEDIMENT LOADS - Bryan Seipp, Ecosystem Planning and Restoration, LLC

B. ASSESSING RESPONSES TO URBAN STREAM RESTORATION: LONGITUDINAL PATTERNS IN CARBON AND NITROGEN ALONG WATERSHED FLOW PATHS - Muqarib Tahir Anwar, University of Maryland

Preakness B - Stormwater III (Contaminants)
Moderator: Megan Crunkleton (KCI Technologies)

A. TRACING TIRE TRANSIT: QUANTIFYING TIRE-DERIVED COMPOUNDS RELEASED ON AND AROUND MARYLAND BRIDGES INTO RECEIVING STREAMS - Cameron Stacey, UMCES

B. MOLECULAR DETECTIVES: TRACKING FECAL POLLUTION SOURCES IN THE ANACOSTIA WATERSHED - Megan Stallard, Smithsonian Environmental Research Center

Preakness D - Green Infrastructure
Moderator: Radhika Wijetunge (Howard Co.)

A. RETHINKING SYSTEMS PERFORMANCE AND THE PUBLIC VALUE OF GREEN INFRASTRUCTURE - Bello Mahmud, Morgan State University

B. ADAPTIVE WETLAND, STREAM, AND WATER QUALITY MANAGEMENT AND RESTORATION IN A REGULATORY SETTING: A LESSONS LEARNED CASE STUDY OF HOW EARLY GREEN INFRASTRUCTURE APPROACHES INNOVATED CONTEMPORARY COMPLIANCE PROTOCOLS - Andrew T. Der, HDR

Triple Crown Whirlaway - Lakes II
Moderator: Becky Monahan (MDE)

A. A REVIEW OF THE LIMNOLOGY OF RESERVOIRS AND IMPOUNDMENTS - Fred S. Lubnow, Princeton Hydro, LLC

B. MINOR INTERNAL SOURCES OF NUTRIENTS COMPARED TO EXTERNAL LOADING IN SHALLOW AGRICULTURALLY IMPACTED EASTERN SHORE RESERVOIRS - Andrea Pain, UMCES Horn Point Lab

3:30 – 4:30 Concurrent Session ctd.

***Triple Crown Citation - Community Science II**
Moderator: Rupert Rossetti (Octoraro Watershed Association)

A. COMBINING INCUBATIONS, SENSORS, AND MICROBIAL SOURCE TRACKING TO UNDERSTAND E COLI SOURCES ACROSS THE ANACOSTIA WATERSHED - Rebecca Hale, Smithsonian Environmental Research Center

B. *Community Science Committee - Introduction & Workshop Planning - Continues until 5:00pm

Triple Crown Secretariat - Tech
Moderator: Moderator: Tomas Ivasauskas (DNR)

A. FROM FIELD DATA TO ACTIONABLE INSIGHTS: A NONPROFIT'S JOURNEY TO STREAMLINED WATER QUALITY DATA MANAGEMENT WITH WQDAS (A SUCCESS STORY) - Najma Khokhar, TechZone MD LLC

B. OPEN-SOURCE SHALLOW WATER MONITORING IN R - Molly Westbrook, Maryland Department of Natural Resources

5:00 Adjourn

5:00 **Social at Union Craft Brewing** (registration required)



FRESHWATER AND MARINE & ESTUARINE SCIENCE SOLUTIONS

From headwater to blue water, providing environmental science and monitoring solutions to support resilient ecosystems, informed decision-making, and sustainable resource management.

CAPABILITIES

Freshwater Science
- Wetland Assessments
- Restoration Monitoring
- Surface & Groundwater Chemistry
- Watershed Assessments & Management Planning
- NPDES Permit Support
- BMP Performance Evaluation and Inspections
- Geomorphological Assessments
- Biological Monitoring (Fish, Benthos & Habitat)
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Poster List

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<STUDENT POSTER> RIVER OTTER (*LONTRA CANADENSIS*) HABITAT ASSESSMENT AND RESTORATION ON GWYNNS FALLS - Abigail Bachman, Stevenson University

BACTERIAL AND WATER QUALITY MONITORING IN THE GUNPOWDER RIVER - Braeden Bayne, Gunpowder RIVERKEEPER®

DETERMINING GROUNDWATER RESIDENCE TIME IN A WATERSHED USING DISSOLVED GASES AND AGE TRACERS, WAR BRANCH, CHESAPEAKE BAY WATERSHED, VA - Gerolamo (Jerry) Casile, USGS

SPATIAL AND TIME SERIES ANALYSIS OF INVASIVE CRAYFISH IN MARYLAND - Lydia Clark, MD DNR and Chesapeake Conservation and Climate Corps

ASSESSING BALTIMORE'S CREATED MARSHES' RESILIENCE TO SEA LEVEL RISE: THE MIDDLE BRANCH RESILIENCY INITIATIVE (MBRI) - Emma Cotter, Smithsonian Environmental Research Center

TARGETED CAPTURE EDNA ANALYSIS FOR AQUATIC BIOASSESSMENT - Joseph Craine, Jonah Ventures

<STUDENT POSTER> EXAMINING HOW SALT TOXICITY IN WILD RICE IS INFLUENCED BY PLANT ASSOCIATES IN CHESAPEAKE WATERSHEDS - Chani Dima, Hood College

EVALUATING MICROBIAL WATER QUALITY AND RAPID DETECTION METHODS FOR URBAN RECREATIONAL WATER SAFETY - Kathryn P Dixon, UMD and Smithsonian Environmental Research Center

COMPARING EDNA AND TRADITIONAL SAMPLING METHODS FOR ASSESSING ECOLOGICAL UPLIFT IN RESTORED STREAMS: A COMBINED LITERATURE REVIEW AND FIELD STUDY - Neil Fuller, EA Engineering, Science, and Technology Inc., PBC

USGS FLOW PHOTO EXPLORER: A FLEXIBLE AI/ML APPROACH TO TRANSFORMING TIMELAPSE IMAGERY INTO ENVIRONMENTAL INSIGHTS - Phillip Goodling, U.S. Geological Survey

<STUDENT POSTER> INVESTIGATING THE OUTCOMES OF WETLAND RESTORATION ON MACROINVERTEBRATE COMMUNITIES AFTER 22 YEARS - Amy Goodman, UMD

CHARACTERIZING MULTI-STRESSOR EXPOSURES TO JUVENILE STRIPED BASS IN THE CHESAPEAKE BAY: TEMPERATURE, NUTRIENTS, AND TOXINS - Brianna Hutchins, Towson University

<STUDENT POSTER> INVESTIGATING CHANGES IN BRIGHTNESS AND BACKGROUND MATCHING IN *COTTUS CAERULEOMENTUM* - James Keller, University of Maryland, Baltimore County

LOW-COST STACKABLE SENSING SYSTEM FOR NON-PERENNIAL STREAM DYNAMIC MONITORING - Lydia LaGorga, Smithsonian Environmental Research Center

MULTI-TIERED TRACKING OF AN EXTENSIVE *MARGALEFIDINIUM POLYKRIKOIDES* BLOOM IN TANGIER SOUND, MARYLAND (AUGUST 2026) - Elizabeth Larson, MD DNR

CANCELLED - <STUDENT POSTER> AMPHIBIAN RESPONSES TO TEMPORARY CONSTRUCTION DISTURBANCE IN AN URBAN WETLAND - Yundoo Lee, McLean High School

LOW-COST PASSIVE SAMPLING APPROACH TO MONITOR HYDROPHOBIC ORGANIC CONTAMINANTS IN STORMWATER - Nathalie Lombard, UMBC

CHARACTERIZATION OF STREAM CHEMISTRY OF STORMS FROM HIGH-FREQUENCY SENSOR DATA AT BALTIMORE ECOSYSTEM STUDY FIELD SITES - Mary McWilliams, UMBC/CUERE

REMOTE MAPPING AND ASSESSMENT OF SURFACE STORMWATER STORAGE IN THE CHESAPEAKE BAY WATERSHED - Marina Metes, U.S. Geological Survey (USGS)

COLLABORATING WITH CITIZEN SCIENTISTS TO REINSTATE SAMPLING OF IMPAIRED WATERSHEDS - Shannon Moorhead, Maryland Department of Natural Resources

CANCELLED - *<STUDENT POSTER> STOP, SWAP, AND ROLL - Atabong Njefe, Eleanor Roosevelt High School*

CANCELLED - *<STUDENT POSTER> CHARACTERIZING ANTIBIOTIC RESISTANCE IN ENVIRONMENTAL E. COLI IN THE ANACOSTIA WATERSHED - Janya Patel, University of Maryland, College Park*

<STUDENT POSTER> DYNAMICS OF STREAM NUTRIENT PATTERNS AND SPATIAL VARIATION IN THE ANACOSTIA WATERSHED - Sophie Penix, Smithsonian Environmental Research Center (Virginia Tech student who did a summer internship at SERC)

RESPONSE OF WHITE PERCH TO DEVELOPMENT IN A LONG-TERM MONITORING STUDY OF THE TRED AVON RIVER - Marisa Ponte, Maryland Department of Natural Resources

COMBINING MULTI-AGENCY MONITORING AND 2D HYDRODYNAMIC MODELING TO TRACK *E. COLI* FROM THE 2026 POTOMAC INTERCEPTOR SEWAGE SPILL - Shokoufeh Pourshahabi, Interstate Commission on the Potomac River Basin (ICPRB), River Spill Response Fellow

AFFORDABLE AND ACCURATE WATER MONITORS CAN DEPLOY FROM COMMERCIAL CRAB BOATS - Dietrich Ruehlmann, GaiaXus Inc

MONITORING NUTRIENT DYNAMICS AND MICROBIAL WATER QUALITY IN THE POTOMAC RIVER AFTER THE 2026 SEWAGE SPILL - Bianca Sanchez, Smithsonian Environmental Research Center

CONNECTING COASTAL OBSERVATIONS TO COMMUNITY RESILIENCE: EXPANDING MARYLAND'S WATER MONITORING NETWORK - Tina Sepahpur, Mid-Atlantic Regional Coastal Ocean Observing System (MARACOOS)

LONGITUDINAL PERSISTENCE IN WATER QUALITY IMPACTS ACROSS NATURAL AND ANTHROPOGENIC TRANSITIONS - Weston Slaughter, University of Maryland

ASSESSING THE IMPACT OF EDUCATION AND KNOWLEDGE ON SEPTIC AND WELL MAINTENANCE AND FUNCTIONALITY - Cameron Smith, University of Maryland

<STUDENT POSTER> ANALYZING THE ROLE OF INVASIVE *DRESSENIA* IN FILTERING POLYETHYLENE TEREPHTHALATE PARTICLES AND DISSOLVED IBUPROFEN - Zoey Smith, Johns Hopkins

TRACING TIRE TRANSIT: QUANTIFYING TIRE-DERIVED COMPOUNDS RELEASED ON AND AROUND MARYLAND BRIDGES INTO RECEIVING STREAMS - Cameron Stacey, University of Maryland Center for Environmental Science (UMCES)

DEVELOPMENT AND APPLICATION OF AN ECOTAXA IMAGE CLASSIFICATION WORKFLOW FOR MARYLAND PHYTOPLANKTON AND HARMFUL ALGAL BLOOM MONITORING USING FLOWCAM 8400 - Marlon Waits, Maryland Department of Natural Resources

MAPPING COASTAL WETLAND DATA AVAILABILITY AND CARBON STOCKS IN MARYLAND - Summer Walker, Smithsonian Environmental Research Center

EVALUATING TAMPLING LIMITATIONS AND POSSIBILITIES - Isabel Wamsteker, SERC

FIRST MARYLAND DETECTION AND GENETIC CHARACTERIZATION OF THE EPIPHYTIC CYANOBACTERIA, *AETOKTHONOS HYDRILLICOLA*, ON *HYDRILLA* IN ST. MARY'S LAKE, ST. MARY'S COUNTY - Catherine Wazniak, Maryland Department of Natural Resources

<STUDENT POSTER> EVALUATING SHIFTS IN ORGANIC MATTER COMPOSITION BEFORE AND AFTER STREAM RESTORATION - Regina Yuengling, University of Maryland, College Park

Plenary Speakers

Lucinda Power

U.S. Environmental Protection Agency

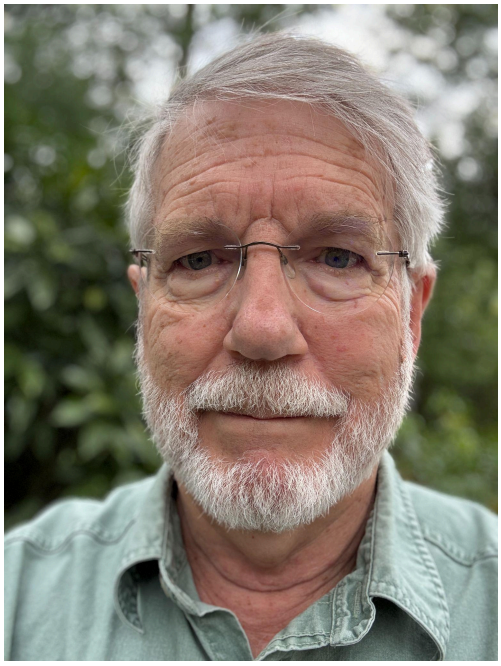


Lucinda Power is an applied anthropologist and the Branch Chief for Partnerships and Accountability with the U.S. Environmental Protection Agency's Chesapeake Bay Program Office. Since joining the program in 2010, she has coordinated and led complex environmental, policy, and partnership initiatives to support the restoration and conservation of the Chesapeake Bay and its watershed.

Previously, Lucinda specialized in water quality policy related to the Chesapeake Bay Total Maximum Daily Load (TMDL). In that role, she coordinated state and local efforts to develop and implement comprehensive watershed restoration plans. She holds both a Bachelor of Arts in Women's Studies and a Master of Applied Anthropology from the University of Maryland, College Park. Based in Annapolis, Maryland, Lucinda lives with her husband, Rob, and their dog, Skylar. Outside of her professional work, she enjoys traveling, practicing yoga, and exploring all things culinary.

Tim Wheeler

Bay Journal



Tim Wheeler is a senior contributing writer for the Bay Journal. He has covered the Chesapeake Bay and other environmental issues for most of his career, including more than a decade with the Bay Journal and nearly 32 years as a reporter and editor with the Baltimore Sun and Evening Sun. He's a former president of the Society of Environmental Journalists and has won many awards, including the 2010 Excellence in Journalism Award from the Renewable Natural Resources Foundation. A native of West Virginia, he grew up eating oysters and followed his taste buds to the Bay. He holds a B.A from the University of Virginia and a master's in journalism from Columbia University.

Oral Presentation Abstracts

(In order of primary author's last name)

***CANCELLED** – TEMPERATURE REDUCTION IN STORMWATER DURING FLOW THROUGH BIORETENTION*

Iffat Afreen; University of Maryland (UMD); iafreen@umd.edu

Coauthors: Allen Davis, UMD; Theodore Zabel, UMD

During summer, stormwater runoff from impervious surfaces exhibits elevated temperatures due to the absorption of solar radiation. These elevated temperatures can induce thermal stress in aquatic ecosystems, threatening the survival and reproductive success of cold-water fish species. The objective of this work is to assess the thermal attenuation of bioretention cells through field monitoring and controlled column experiments. Five field sites were instrumented in summer 2025, with cooling observed in ~77% of storm events, and monitoring is continuing in summer 2026. Controlled experiments used an instrumented bioretention column subjected to heated artificial stormwater; event mean temperature reductions ranged from 4.6 to 16.0 °C across tested depths (1-3 ft) and drainage area ratios (DARs; 20:1 and 10:1), with greater depth and lower DAR associated with improved performance. Internal water storage (IWS) experiments suggest that the thermal benefit of the store water may depend on storage configuration and degree of interaction between incoming runoff and stored water. Field and column results will be integrated to develop design guidance for media depth, drainage and bioretention surface area, IWS, and media particle size distribution. Ongoing analyses will quantify thermal load reduction and temperature breakthrough to support thermal mitigation of urban runoff.

Iffat Afreen is a master's student in Civil and Environmental Engineering at the University of Maryland, College Park, where she works as a Graduate Research Assistant. Her research focuses on the thermal pollution load mitigation of stormwater runoff using bioretention systems. Prior to graduate study, she worked in environmental sustainability, focusing on wastewater treatment, water and energy efficiency, and environmental compliance in the textile industry of Bangladesh.

ASSESSING RESPONSES TO URBAN STREAM RESTORATION: LONGITUDINAL PATTERNS IN CARBON AND NITROGEN ALONG WATERSHED FLOW PATHS

Muqarib Tahir Anwar; Department of Geological, Environmental, and Planetary Sciences (GEPS) & Earth System Science Interdisciplinary Center (ESSIC), University of Maryland (UMD); Muqarib.T.Anwar@gmail.com

Coauthors: Sujay Kaushal, GEPS & ESSIC UMD; Ashley Mon, GEPS & ESSIC UMD; Regina Yuengling, GEPS UMD; Theodore Yang, GEPS UMD; Weston M. Slaughter, GEPS & ESSIC UMD; Ashley B. Dann, GEPS & ESSIC UMD

Urban streams are increasingly degraded by stormwater runoff, erosion, and altered hydrology, which boost pollutant transport, impair ecological function, and reduce capacity to retain nutrients and carbon. Urban development and hydrologic alterations have contributed to long-term degradation in the watershed of Campus Creek, a 5,400-ft urban stream with a 455-acre drainage area and 172 acres of impervious cover. Campus Creek was restored using step-pool conveyance, stream-floodplain reconnection, streambed raising, and riparian planting to improve water quality and stream stability. We evaluated restoration responses by examining changes in nutrient and carbon concentrations across time and space. Using longitudinal stream synoptic (LSS) monitoring, we tracked nitrogen and carbon along the main flow path from the headwaters to the outflow at Paint Branch Creek. Restoration dramatically reduced total dissolved nitrogen (TDN) concentrations when comparing pre- and post-restoration years. Ongoing monitoring reveals how carbon and nitrogen responses vary along the restored flow path. Sampling 10–12 longitudinal sites rather than relying on a single downstream station provides a more rigorous assessment of restoration effectiveness. Longitudinal monitoring can improve future restoration design and demonstrates the value of longitudinal sampling for evaluating restoration outcomes.

Muqarib T. Anwar is a 2025 graduate of the University of Maryland, College Park, holding a Bachelor of Science in Environmental Science and Technology, with a concentration in Ecological Technology Design. Post graduation, they secured a position as a lab manager and research assistant for the Biogeochemistry lab at the University of Maryland, College Park. With plans to pursue further education and research.

COORDINATING WINTER SALT REDUCTION: JOINT STATE AND GRASSROOTS STRATEGIES IN MARYLAND

Camryn Arnstein; Maryland Department of the Environment; camryn.arnstein@maryland.gov

Coauthor: Samantha Puckett, Izaak Walton League of America

A persistent water quality challenge facing Maryland is the increase of chloride in non-tidal streams due to winter salt runoff as the primary source of chloride impairments. This joint presentation by the Maryland Department of the Environment (MDE) and the Izaak Walton League of America (IWLA) highlights the intersection of state policy and grassroots action combating winter salt pollution to protect infrastructure, public health, and the environment. MDE will outline key strategies related to its adaptive management approach promoting widespread decreased use of winter salts while maintaining public safety, including engaging communities on this issue to promote awareness and action. Complementing these regulatory frameworks, IWLA will present the latest updates from its Salt Watch program. This broad citizen science initiative empowers community volunteers to monitor local watersheds, track chloride spikes, and advocate for smarter salt use, with a brief look at how they are expanding their reach through regional brewery engagement. Together, these initiatives demonstrate how regulatory agencies and non-profit organizations co-create scalable solutions to protect regional water resources. Attendees will learn how data-driven policy combined with creative community outreach can shift public behavior and engage communities in reducing chloride impacts in our watersheds.

Camryn Arnstein is a Natural Resources Planner with the Maryland Department of the Environment in the Watershed Protection, Restoration, and Planning Program of the Water and Science Administration. In her position, Camryn coordinates Maryland's winter salt reduction strategies and supports Maryland's Nonpoint Source Program through the Clean Water Act §319(h) Grant.

Samantha Puckett is the Clean Water Program Director at the Izaak Walton League of America. Samantha currently directs multiple staff and oversees the Save Our Streams, Salt Watch, and Nitrate Watch volunteer monitoring programs. She earned her bachelor's degree from Cornell University, and a Master's of Environmental Science and Policy at Johns Hopkins University.

<STUDENT> RIVER OTTER (LONTRA CANADENSIS) HABITAT ASSESSMENT AND RESTORATION ON GWYNNS FALLS

Abigail Bachman; Stevenson University; abachman@stevenson.edu

Coauthor: Joseph Matanoski

River otters (Lontra canadensis) have historically inhabited riverine systems throughout the Middle Atlantic region. Trapping, land-use change, and habitat destruction have reduced population size and range. Recently, a river otter population has established itself on the Gwynns Falls bisecting the Owings Mills campus of Stevenson University. This project determined the current state of this riverine habitat and specifically its suitability for an otter population. The feasibility of habitat restoration to ensure the success of this population was assessed. Fish community health was evaluated as an indicator of prey availability and stream health since otters require a diverse, abundant fish base to sustain a healthy population. The riparian buffer was assessed for native vegetative cover, which provides bank stability, and cover, essential to both stream integrity and otter habitat use. Significant non-native vegetation and flood-driven bank erosion were identified as major stressors, leaving banks with thin soil and limited large vegetation for den sites. Overall, habitat suitability was fair to moderate. Modest investment in restoration could meaningfully improve otter habitat on Gwynns Falls and beyond.

Abby Bachman is a senior studying environmental science at Stevenson University. She will graduate in December 2026. She has studied river otters for the past 4 semesters and also completed two internships as a wildlife biologist in California for Chambers Group Inc. She worked with house finches and three state-protected fish (Speckled Dace, Arroyo Chub, and Santa Ana Sucker). Ensuring their safety on an active construction site.

<STUDENT> EVALUATING THE EFFECTS OF INTRODUCED SPECIES ON NATIVE FISH FORAGING BEHAVIOR

Payton Barry; University of Maryland, Baltimore County (UMBC); pbarry3@umbc.edu

Coauthor: Tamra C. Mendelson, UMBC

The behavior of native species may change after the introduction of non-native congeners. Two species of freshwater fish, the Rainbow Darter (Etheostoma caeruleum) and Greenside Darter (E. blennioides), were recently introduced to the Potomac River in Maryland. Their introduction may affect the foraging behavior of the native Fantail Darter (E. flabellare) and Tessellated Darter (E. olmstedi). In this study, I sought to determine if native species exhibit a high degree of diet overlap with non-native congeners in streams where all four species are known to occur. Using gastric lavage, we collected partially digested stomach content from multiple populations throughout the year to determine the degree of dietary niche overlap between native and introduced congeners. These samples are then compared to the available macroinvertebrate prey at each population. If the introduction generates competition, there is potential for the exclusion of native species. A greater understanding of dietary niche overlaps between introduced and native species can determine whether introduced congeners threaten native species.

Payton Barry is a fifth-year Ph.D. candidate in the biological sciences program at the University of Maryland, Baltimore County. Under the mentorship of Dr. Tamra Mendelson, his thesis research examines the effects of introduced species on native populations, with a primary focus on the habitat preferences, foraging behavior, and seasonal migration patterns of non-game fishes. Payton's research projects utilize non-lethal methods and aim to aid conservation efforts by providing managers with further insight into fish behavior.

EVALUATING STREAM RESTORATION EFFECTIVENESS: NUTRIENT, SEDIMENT, AND BIOLOGICAL RESPONSES AT UT SASSAFRAS

Allyson Bartell; Maryland DNR; allyson.bartell@maryland.gov

Millions of dollars are spent on stream restorations in Maryland each year, but how can we measure the effectiveness of these efforts when many projects lack sufficient monitoring data? A stream restoration of an Unnamed Tributary to the Sassafras River was designed with the goal of reducing sediment and nutrient loads and providing ecological uplift. A comprehensive monitoring plan was implemented by the Maryland Department of Natural Resources to determine whether the restoration achieved its goals. The stream was monitored for three years before restoration (2017 to 2019) and five years after restoration (2020 to 2024). While sediment and nutrient loads were lower after restoration, some of those reductions were likely due to precipitation, discharge, and groundwater changes. Stream temperature was higher and dissolved oxygen lower post-restoration; however, the aforementioned precipitation changes may have contributed to this trend. Fish and benthic macroinvertebrate communities did not show ecological uplift, nor did they show decline despite construction disturbance and lower DO levels. As stream restorations remain a dominant method of sediment and nutrient reductions in Maryland, it becomes increasingly important that projects incorporate thorough monitoring plans to measure success and better inform the future of stream restoration science.

Allyson Bartell is a Natural Resources Biologist with DNR's Maryland Biological Stream Survey. She is a graduate of the Chesapeake Conservation and Climate Corps, and a current mentor for the program. She attended Johns Hopkins University, and currently lives in Baltimore with her two cats, Juniper and Heather.

WHERE DOES ALL THIS DAM SEDIMENT GO: HOLISTICALLY ASSESSING THE LONG-TERM FATE OF IMPOUNDMENT SEDIMENT RELEASES FROM DAM RELEASES

Zachary Clifton; U.S. Geological Survey (USGS); zclifton@usgs.gov

Coauthors: Marina Metes, USGS; Matthew Cashman, USGS; Brett McFarland, USGS; Ashley Ryan, USGS

The supply, transport, and fate of sediments are of vital importance in river geomorphology, but the spatiotemporal complexities of these processes are not fully understood. Fluvial sediment processes act on difficult-to-detect spatial scales, compounded by timescales spanning days to decades. Dam removals, particularly impounded sediments, provide unique opportunities to study the transport and fate of fluvial sediment over multiple timescales. This study leverages decades of lidar surveys of the Patapsco River floodplains and cross-sectional data collected during the standard operation of USGS streamflow gages to comprehensively capture the fate of impoundment sediments following the Simkins Dam and Bloede Dam removals in 2010 and 2018. Spanning from 2004-2024, this study found that different meteorological conditions following each removal and the confounding factor of a downstream dam radically affected erosion rates and fate of impoundment of sediments. Considerably more Bloede Dam impoundment materials likely reside in the channel today when compared to impoundment materials from Simkins Dam following the same timespan, potentially reducing the discharges needed to reach flood stages downstream. These results can help managers understand the potential ramifications of future dam removal projects by expanding our collective understanding of different removal scenarios.

Marina Metes and Zach Clifton have been with the U.S. Geological Survey's Maryland-Delaware-District of Columbia Water Science Center cumulatively for nearly two decades. Their work as part of the Center's Geomorphology Team focuses on the interactions between rivers and their adjacent floodplains, including helping develop the Survey's Floodplain And Channel Evaluation Tool (FACET), assessing the source of sediments throughout the mid-Atlantic, and producing advanced hydrologic connectivity models. They are both graduates of University of Maryland, Baltimore County (UMBC).

VERTICAL BIOGEOCHEMISTRY STRUCTURE IN CLOPPER LAKE, MARYLAND: SURFACE WATER SAMPLES DON'T TELL THE STORY

Jeffrey Cornwell; University of Maryland Center for Environmental Science (UMCES) - Horn Point Laboratory; cornwell@umces.edu

Coauthors: Michael Owens, UMCES; Andrea Pain, UMCES; Cathy Wazniak, MD DNR

Clopper Lake, a 90 acre recreational reservoir in Montgomery County constructed in 1975, has a history of harmful algal blooms (HAB) that disrupt activities in Seneca Creek State Park. In cooperation with Maryland DNR, UMCES investigated the chemistry of lake water and sediments to investigate the role in internal nutrient recycling processes in supporting the growth of algae and HAB's. The lake is characterized by a thermocline at ~4-5 m, with seasonal anoxia in the cooler hypolimnion. A classic redox sequence was illustrated in the water column, with oxygen, nitrate, Fe(II), hydrogen sulfide and methane profiles reflecting changing terminal electron acceptors. Vertical profiles of pigments, measured via YSI and HPLC, were highly heterogeneous with distinct layering at several depths in the water column. Strong vertical gradients in soluble reactive P and ammonium below the thermocline support high algal biomass and production at 3-4 m, with the community at that depth including HABs. Modest N and P effluxes from shallow water sediments, combined with accumulation in the hypolimnion, indicated that internal recycling of nutrients has an important role in sustaining primary production in the summer. With a number of different strategies being considered to mitigate HABs, the vertical zonation of processes and communities is critical to consider.

Jeffrey Cornwell is a biogeochemist at the UMCES Horn Point Laboratory in Cambridge, Maryland. His research interests have included the biogeochemistry of wetlands, estuarine sediments in many coastal areas, nutrient mitigation associated with oyster restoration, and the chemistry of freshwater reservoirs. In Maryland, his applied science research has included the sediment biogeochemistry of the Conowingo Reservoir, the chemistry of Poplar Island wetland soils, and chairing the expert BMP panel that has led to MDE crediting nutrient removal by oysters.

IN-SITU TREATMENT OF PFAS IN GROUNDWATER AND OTHER TALL TALES

Amelia DaCruz; Tetra Tech and Avanti Corporation; AMELIA.DACRUZ@tetratech.com

Coauthors: Christopher Nelson (eMinus LLC); Richard Spehar (BLDI Inc.)

Due primarily to the strength of the C-F bond, traditional in-situ remediation technologies such as chemical reduction, chemical oxidation, and bioremediation have shown limited success in treating PFAS. Thermal treatment can be effective, however very high temperatures are needed for complete mineralization thereby making treatment expensive and less practical for in-situ application. Groundwater pump and treat systems can remove PFAS however they are not effective at removing large amounts of contaminant mass and are typically required to operate over long periods of time i.e., decades.

D-FAS is an in-situ remediation technology that efficiently removes PFAS from soil and groundwater without groundwater extraction. D-FAS utilizes the physiochemical properties of PFAS to accumulate at air-water interfaces such as gas bubbles. Gas is injected into a groundwater well which causes a foam to accumulate on the groundwater surface. This foam is then removed by vacuum and condensed into a highly concentrated liquid ex-situ.

Ms. DaCruz, a recognized Professional Environmental Toxicologist (PET), has over 34 years of experience supporting federal, state, and private-sector clients. Her extensive communications and engagement background includes collaboration with White House staff, Members of Congress, DoD Generals and Admirals, and CEOs of Fortune 500 companies, while maintaining active involvement with field engineers, scientists, and technical personnel. She has successfully negotiated permits, developed protocols and methodologies, pioneered innovative environmental procedures, and published research resulting in both U.S. patent awards and peer-reviewed publications.

AMBIENT LEVELS OF PFAS IN MARYLAND SURFACE WATERS

Ben Daniels; Maryland Department of the Environment (MDE); ben.daniels@maryland.gov

Coauthors: Jessica Shulman, MDE; Tate Stevens, Temple University

The purpose of this study was to characterize ambient concentrations of per- and polyfluoroalkyl substances (PFAS) in Maryland surface waters to establish a statewide baseline. In September and October 2025, surface water samples were collected during baseflow conditions at 88 background locations across Maryland and analyzed for 40 target PFAS by U.S. Environmental Protection Agency (USEPA) Method 1633A. At least one PFAS analyte was detected at 98% of sample locations. Of the twelve PFAS detected overall, eight analytes exhibited widespread occurrence (> 60% detection frequency). Total detected PFAS (ΣPFAS) concentrations ranged from below laboratory detection limits to 61.2 ng/L (median = 15.4 ng/L). Chemical fingerprinting identified distinct PFAS signatures and precursors consistent with active or recent PFAS sources. Seventeen sample locations (19.3%) exceeded the USEPA Drinking Water Maximum Contaminant Level (MCL) for perfluorooctanoic acid (PFOA), eight of which also exceeded the MCL for perfluorooctane sulfonic acid (PFOS). Watershed imperviousness was positively correlated ($p < 0.001$) with ΣPFAS, suggesting that urbanization is a primary regional driver of ambient PFAS concentrations in surface water. This study establishes a statewide baseline for ambient PFAS in Maryland surface waters and provides a foundation for future source investigation efforts.

Dr. Ben Daniels, P.G., is a geologist and remedial project manager in the Maryland Department of the Environment Land Restoration Program. He earned a B.S. in physics from The College of New Jersey, an M.S. in geology from Boston College, and a Ph.D. in geography and environmental systems from the University of Maryland, Baltimore County. He has over eight years of experience in environmental consulting and is a licensed professional geologist. His work at the Maryland Department of the Environment includes conducting regulatory oversight of contaminated site cleanups and supporting state-led environmental investigations.

EPISODIC SALINIZATION IMPACTS THE COMPOSITION AND DECOMPOSITION OF DISSOLVED ORGANIC MATTER IN URBAN STREAMS

Ashley B. Dann; University of Maryland (UMD); adann11@umd.edu

Coauthors: Sujay Kaushal, UMD; Weston Slaughter, UMD; Sydney Shelton, UMD; Steven Hohman, U.S. EPA; Angela Padeletti, U.S. EPA

Dissolved organic matter (DOM) is a key energy source in freshwater food webs and is a vector for the sorption, transport, and transformation of metals and organic contaminants. Anthropogenic salt inputs have led to the salinization of freshwater ecosystems, which can affect DOM, nutrient cycling, and microbial communities. Our study examined how acute salinity pulses affect DOM composition and biological oxygen demand (BOD) by simulating road salt application through the experimental addition of pure NaCl to stream water and sediment samples in incubation experiments. Results from the incubation experiments show that DOM composition shifted from proteinaceous, labile, and fresh toward more humic and aromatic material in response to acute salinity pulses. Furthermore, 9 longitudinal synoptic surveys (LSS) were conducted at two sites between August 2024 and December 2025 to examine relationships among BOD, DOM composition, and specific conductance (SPC, a proxy for salinity) along flow paths. Results showed significant relationships ($p < 0.05$) among SPC, DOM composition, and BOD, thereby characterizing the interconnected relationships among salinity, oxygen, and carbon cycling. Our findings aim to investigate the impact of salinity, an underrecognized stressor, on stream metabolism and restoration success in urban freshwater ecosystems.

It's my pleasure to introduce Ashley Dann, a Ph.D. candidate at the University of Maryland, working in Dr. Sujay Kaushal's Biogeochemistry Lab. She earned her B.S. in Geology from the University of Florida before coming to UMD to pursue her doctorate. Ashley's research examines how anthropogenic stressors shape the biogeochemical behavior of dissolved organic matter in urban freshwater systems and whether dissolved organic matter, more broadly, can be leveraged to capture organic contaminants. After graduation, she plans to pursue a career in water management with a state or federal agency. Please join me in welcoming Ashley Dann.

<STUDENT> EXAMINING HOW SALT TOXICITY IN WILD RICE IS INFLUENCED BY PLANT ASSOCIATES IN CHESAPEAKE WATERSHEDS

Chani Dima; Hood College; chani_d@outlook.com

Coauthor: Dr. Sean Sharp, Hood College

Wild rice (Zizania aquatica) is an ecologically, economically, and culturally important wetland plant that grows in tidally influenced rivers and wetlands of the Eastern US. With sea level rise, salt-intolerant wild rice will be exposed to increasingly salty water. Plant associates are other plant species that grow alongside wild rice that can potentially mitigate salt toxicity in rice populations. Our project aimed to identify what plant associates are found with wild rice and how wild rice vigor was affected by their presence by performing boat surveys along the tidal freshwater tributaries of the Chesapeake Bay. Measurements included stem density and height, photosynthetic rates, biomass, and companion plant identification. In addition to boat surveys, we mapped the distribution of wild rice stands using an Unmanned Aerial Vehicle (UAV) as they relate to increasing salinity. Common plant associates include Schoenoplectus pungens, Pontederia cordata, Typha angustifolia, Polygonum pensylvanicum, and Typha latifolia. Rice was primarily found in creeks on the Potomac and Patuxent Rivers, but not the bay itself. We believe the Chesapeake's salinity limits rice from growing further downstream. As saltwater is pushed further upstream into these freshwater regions, the natural distribution of wild rice may shrink as a result.

Chani Dima is a Sophomore at Hood College majoring in both Biology and Studio Art. Currently, she is studying the impacts of saltwater intrusion on native wild rice populations. Her experience with environmental science dates back to high school, when she began undergraduate-level research on the water quality of the Monocacy River as an Early College Student at Frederick Community College. When she's not working in the lab, Chani can be found adding new birds to her life list and tending to her aquariums.

ADAPTIVE WETLAND, STREAM, AND WATER QUALITY MANAGEMENT AND RESTORATION IN A REGULATORY SETTING: A LESSONS LEARNED CASE STUDY OF HOW EARLY GREEN INFRASTRUCTURE APPROACHES INNOVATED CONTEMPORARY COMPLIANCE PROTOCOLS

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Managing growth in historically impacted agricultural and urbanizing watersheds requires integrating nonpoint source pollution controls with dynamic stream and wetland restoration. This ground-breaking (at that time) approach to a multi-phase land use conversion from agricultural to public, commercial, and residential, catalyzed innovative water quality management and habitat preservation initiatives across a 1,000-acre Potomac River tributary watershed in Montgomery County, Maryland. This long-term endeavor not only gave rise to many contemporary monitoring principles manifested in in regulatory criteria used now but also served as one of the earliest operational models of environmental site design, as well as established empirical baselines. The initiative demonstrated that strategic growth - could - achieve net environmental uplift and integrity. The outcomes focused on what were innovative principles at that time such as: "first flush" stormwater quality management above customary requirements; innovative waters of the U.S., including wetlands, avoidance techniques requiring contemporary jurisdictional interpretations; bioengineered road crossings; riparian habitat preservation and restoration; adaptive management of wetland mitigation habitats; incorporating creative cold-water (trout) habitat featuring resource uplift; and a proactive win-win public interest process.

Andrew T. Der is an Academy of Board-Certified Environmental Professionals Certified Environmental Professional and Environmental Manager for HDR's Mid-Atlantic practice with 33 years of experience working within the Chesapeake Bay watershed. Prior to that, he completed 18 years of service at the Maryland Department of the Environment leaving as a manager in the Water Management Program, was Director of Environmental Services for two civil engineering firms, and then the principle of Andrew T. Der & Associates, LLC. His specialties and experience include compliance; watershed studies; stormwater management; and wetland, forest, and stream mitigation/restoration.

CLOSING THE MONITORING-TO-DECISION GAP: TRANSLATING POOLED MONITORING SCIENCE INTO ACTIONABLE TOOLS

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Coauthors: Seth Theuerkauf, Ph.D., Thriving Coasts Consulting, LLC; Mimi Abdu, Chesapeake Bay Trust

Over the past decade, the Chesapeake Bay Trust's (the Trust's) Pooled Monitoring Initiative's Restoration Research Program (PMI-RRP) has pooled funding and expertise to address priority questions identified by regulators, practitioners, and scientists across the Chesapeake Bay watershed. The program has produced more than 60 peer-reviewed studies on stream restoration, stormwater best management practice (BMP) performance, pollutants of emerging concern, restoration tradeoffs, and monitoring and data optimization. Yet translating this growing body of science into information that can inform management remains a challenge. In 2025, the Trust engaged Thriving Coasts Consulting, LLC to synthesize a decade of PMI-RRP research into decision-ready resources for practitioners, regulators, funders, and local governments. The effort combines stakeholder needs research with a reproducible AI-assisted synthesis workflow, expert verification, and researcher peer review to develop five science synthesis briefing documents, interactive web products, and other communication tools. This presentation will introduce the Pooled Monitoring model, share key findings and lessons from the synthesis and stakeholder engagement, and discuss a networked approach for moving monitoring science beyond publication and into restoration practice. Learn more at https://cbtrust.org/grants/restoration-research/.

Sadie Drescher leads restoration programs at the Chesapeake Bay Trust, advancing watershed restoration, applied research, and collaborative efforts across the Chesapeake Bay region. Her work focuses on connecting science, funding, and practice to improve restoration outcomes. She holds an M.S. in Environmental Studies from the College of Charleston and a B.S. in Environmental Biology from Tennessee Technological University.

QUANTIFYING THERMAL IMPACTS OF STORMWATER IN AN URBANIZED BROOK TROUT WATERSHED

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Brook trout were first detected in an unnamed tributary (UT) to Big Pipe Creek outside of Manchester, MD in 2017. The brook trout within this tributary are the only known population on the eastern side of the Monocacy River drainage and inhabit the most developed brook trout watershed in the state. Their genetics are also unique, being most closely related to the extirpated Patapsco strain. Their isolation, susceptibility to impacts of urbanization, and genetics, make them a conservation priority. MDNR Freshwater Fisheries Program and Trout Unlimited Patapsco Valley Chapter conducted a watershed assessment in 2025 and 2026, with the goals of assessing biological condition, thermal regimes, and identifying sources of thermal or chemical stressors. A network of temperature loggers were deployed in perennial and intermittent channels, capturing high resolution data spatially and temporally. These data established that baseflow temperatures are suitable for brook trout, particularly compared to other piedmont brook trout streams. Multiple sources of thermal pollution were identified, including from agricultural ponds and urban stormwater. As surface runoff has a very low concentration of dissolved ions, conductivity data were used in a salt mass-balance approach to separate storm hydrographs and quantify thermal groundwater-surface water interactions throughout the watershed.

Neal is a natural resource biologist with Maryland Department of Natural Resources Fishing and Boating Services in the Freshwater Fisheries Program. He was also a biologist in MD DNR's Maryland Biological Stream Survey and ran Baltimore County Department of Environmental Protection's Biological Monitoring Program. He has a broad background in environmental science and freshwater ecology, but is enjoying his current role focusing on the conservation, enhancement, and management of central region fisheries. He is also working to finish his M.S. thesis at Towson University, where his research is focused on estuarine ecology.

SENSORED PERMEABLE PAVEMENT FOR ELEVATED PERFORMANCE AND REDUCED MAINTENANCE

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Coauthors: Dr Alan Davis, UMD; Siena Butters, LID Center

Communities face growing pressures to manage urban stormwater. Permeable pavement mimics natural infiltration, but poorly designed first-generation systems clogged quickly, prompting regulatory restrictions that misalign with real-world performance.

Permeable articulating concrete block (P-ACB) pavements are a next-generation surface developed inspired by erosion control systems. This design delays clogging, increasing performance even without cleaning. To document this, real-time sensors in the stone base measure performance alongside a weather station. During storms, water enters the base quickly and exfiltrates into the soil over time.

At a site studied by the University of Maryland, the system captured all runoff and infiltrated most rainfall within 48 hours, removing all mobilized nitrogen, phosphorus, and total suspended solids. Instantaneous exfiltration rates exceeded 5.00 in/hr, with a 48-hour average of 0.99 in/hr. Most jurisdictions assume clay soil infiltrates at 0.18 in/hr—nearly an order of magnitude less than these field measurements. This discrepancy is due to heterogeneous soil; permeable paths allow water to exit. Sensors show the system handles large storms (>1.5 in) without reaching 75% capacity, despite a lack of maintenance.

Dr. Aaron Fisher is the VP of Business Development for Ernest Maier. He is responsible for PaveDrain, a heavy-duty permeable pavement, and fiberglass rebar, a sustainable, corrosion-proof alternative to steel. Dr. Fisher brings a deep technical background in sustainability. He has served as a contractor to the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy. He also led the innovation program at the Water Research Foundation on behalf of water utilities across the U.S. He holds a PhD in Chemical Engineering from the University of Maryland and a B.S. in Chemistry from Duke University.

ALL FEATURES GREAT AND SMALL: DOCUMENTING VERNAL POOLS AND OTHER WETLANDS IN CENTRAL MARYLAND

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Coauthor: Mimi Sanford, Maryland Department of Natural Resources

Montgomery Parks comprise more than 37,000 acres and 600 miles of streams, but what about wetlands? And what about wetland acreage in Maryland? And when do vernal pools meet the definition for protection? The answers seemed to be as cryptic as some of the small habitats staff and conservation partners were trying to protect. And the challenge extended well beyond park and jurisdictional boundaries. Fortunately, our understanding of the location and character of wetlands, from the smallest seasonal pools to countywide coverage, has grown by leaps and bounds over the past five years. From opportunistic encounters and field inventories to updated mapping through the US Fish and Wildlife Service National Wetland Inventory (NWI), emerging state priorities, and new legislation for Maryland's vernal pools, we are poised to make more data-driven and impactful decisions about non-tidal wetlands across the state than ever. This presentation will highlight results from local inventories, community science contributions, cross-county collaborations, state level and regulatory definitions, and all of the connections in between. Learn from examples of existing mapping, inventory, and monitoring efforts and explore what knowledge and management gaps remain when working towards better protection of non-tidal wetlands and their integral role in watershed health.

Rachel Gauza is a Principal Natural Resources Specialist with Montgomery Parks where she oversees biological monitoring and other aquatic assessments, including a revitalized effort to locate and document vernal pools and other ephemeral wetland habitat across nearly 38,000 acres of parkland. Ms. Gauza specializes in herpetology and aquatic ecology and has worked as a biologist and environmental educator throughout the DC Metropolitan region for more than 20 years.

TRANSFORMING STORMWATER MANAGEMENT: THE ROLE OF DATA IN MAINTENANCE

Kyndal Gehlbach; M-NCPPC Montgomery Parks; kyndal.gehlbach@montgomeryparks.org

Join Kyndal Gehlbach, NPDES Program Coordinator, as she shares Montgomery Parks' transformative journey in stormwater management—moving from paper maps and manual processes to dynamic GIS-based solutions. This presentation highlights how the integration of spatial data and web applications has enhanced compliance with the MS4 requirements of the NPDES Permit Program. Attendees will learn how GIS is being used to track stormwater facilities, streamline maintenance and inspections, and support the implementation of minimum control measures. With a focus on data accessibility, time savings, and proactive decision-making, this session offers valuable insights into the practical application of GIS in environmental compliance. Looking ahead, the Montgomery Parks stormwater team is embracing the power of data-driven tools to shape the future of stormwater management.

Kyndal Gehlbach manages Montgomery Parks' National Pollutant Discharge Elimination (NPDES) Program, ensuring compliance with federal and state permit requirements aimed at improving stormwater and reducing pollutant discharge into local waterways. With over a decade of experience in the field of natural resources, Kyndal brings a strong background in environmental permitting, geospatial applications, and field reconnaissance. Kyndal grew up in northern Maryland on the Gunpowder River which sparked her interest in water quality. She is also a proud UMBC alumni.

OVERCOMING OPERATIONAL HURDLES IN COMMUNITY-LED WATER QUALITY TESTING

Becky Golden; ShoreRivers; bgolden@shorerivers.org

To answer the frequent summer question, "Is it safe to swim in the water?", ShoreRivers' SwimTester volunteers monitor over 50 popular water access sites, including swimming holes, boat ramps, marinas, and yacht clubs. Every Thursday morning from Memorial Day to Labor Day, community science volunteers collect samples for Enterococci bacteria analysis using EPA-approved methods in ShoreRivers Tier III laboratories. This data empowers the public to make informed decisions about water contact and helps ShoreRivers identify bacteria pollution sources to collaborate with communities and government entities on solutions. This presentation examines the operational hurdles non-profit organizations face, such as volunteer engagement, funding, and Tier III approval, alongside key lessons in maintaining volunteer retention and chain-of-custody protocols across rural watersheds, managing in-house labs, and balancing real-time public health communications with regulatory standards.

As Watershed Scientist, Becky provides scientific support for ShoreRivers' policy and advocacy initiatives by identifying research needs, conducting studies, and translating findings into policy and restoration recommendations. She also manages and coordinates multiple water quality monitoring programs across Maryland's Eastern Shore. Previously, she worked with the National Marine Fisheries Service and Maryland DNR on aquatic habitat conservation and restoration, and regulatory reviews. Becky holds an M.S. in Oceanography from Florida Institute of Technology and B.S. degrees in Marine Science and Biology from East Stroudsburg University.

COMBINING INCUBATIONS, SENSORS, AND MICROBIAL SOURCE TRACKING TO UNDERSTAND *E. COLI* SOURCES ACROSS THE ANACOSTIA WATERSHED

Rebecca Hale; Smithsonian Environmental Research Center (SERC); haler@si.edu

Coauthors: Megan Stallard, SERC; Katrina Pagenkopp Lohan, SERC; Maureen Mitchell, Anacostia Riverkeeper (ARK); Derek Shea, ARK; Alyssa Freedman, ARK

Recreational access to urban streams is increasing, but high concentrations of pathogens affect the safety of urban streams. *E. coli* is frequently used as an indicator of fecal contamination to assess recreational water safety because these measurements are relatively low-cost and easy to implement. However, the interpretation and use of *E. coli* concentrations is limited because *E. coli* has multiple sources within urban environments, and measuring *E. coli* directly requires a 24-hour incubation, so data is never real-time. We are combining traditional incubation methods (IDEXX) with molecular source tracking (MST) and water chemistry analysis to characterize *E. coli* sources across the Anacostia River watershed at 20 existing tributary monitoring locations and assess potential chemical proxies that could be used to assess real-time estimates of *E. coli* concentrations. Across the Anacostia, *E. coli* concentrations are very high (geometric mean 497-2331 MPN/100ml) and correlated with human population density. Tryptophan-like fluorescence, a wastewater indicator, is the best predictor of *E. coli* concentrations across sites, explaining 40-62% of variation. These results suggest that wastewater is a major source of fecal contamination and that proxy sensor systems can provide accurate real-time information about recreational safety.

Rebecca Hale is senior scientist at the Smithsonian Environmental Research Center in Edgewater, MD where she directs the Watershed Science Lab. An ecosystem ecologist by training, she collaborates across disciplines to understand how urban water quality is shaped by land cover, infrastructure, and management decisions.

BUILDING A GROUNDWATER FLOW MODEL FOR THE MARYLAND COASTAL PLAIN

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Groundwater is the primary source of drinking water for most of the approximately 1.4 million people living within Maryland's Coastal Plain physiographic province, and it also supports agriculture, industry, and baseflow to streams that drain to the Chesapeake Bay and Maryland's inland bays. Population growth, land-use change, climate variability, saltwater intrusion, and emerging contaminants are raising concern about the long-term sustainability of this resource. To help address these challenges, the U.S. Geological Survey, in cooperation with the Maryland Department of the Environment, the Maryland Geological Survey, and Anne Arundel County, is developing a groundwater-flow model of the Maryland Coastal Plain aquifer system using MODFLOW 6. The process uses a reproducible, "forecast-first" workflow in which managers' questions guide model design. The regional Maryland model is nested within the existing Northern Atlantic Coastal Plain model and incorporates the recently updated, detailed hydrogeologic framework developed by the Maryland Geological Survey. It will serve as the foundation for finer-scale inset models that address local questions, such as saltwater intrusion risk and managed aquifer recharge. This presentation provides an overview of the project's background, objectives, and approach. Model construction is underway; simulation results are not yet available.

John Harris is a hydrologist at the U.S. Geological Survey Maryland-Delaware-DC Water Science Center, where his work focuses on hydrology and remote sensing. He recently graduated with a master's in Geology from the University of Maryland, College Park, where he studied the geomorphology and hydrology of Mid-Atlantic urban streams. Before graduate school, he worked in the environmental consulting field in Florida.

TRANSLATING REGIONAL WATER QUALITY MONITORING DATA FOR NON-SCIENCE AUDIENCES

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Coauthors: John Dawes, The Commons; Lucas White, Reservoir Center

Water quality data is essential for protecting local waterways and evaluating the effectiveness of stormwater management practices. While public agencies, utilities, and citizen science organizations are often equipped to interpret this data, most recreational water users are not. Combined with fragmented data platforms managed by multiple organizations and limited funding, it can be difficult to find reliable, real-time information about local water conditions. The Reservoir Center is addressing this challenge by deploying a network of real-time water quality monitoring stations across the Anacostia, Potomac, and Shenandoah Rivers. However, collecting data is only part of the solution. Equally important is making that information accessible and understandable for the public. This session will highlight how the Reservoir Center and The Commons partnered to develop a public-facing platform that delivers real-time water quality data from 10 monitoring stations. Attendees will learn about our user-centered design process, mobile-first accessibility features, and approaches for translating complex sensor data into meaningful insights that empower residents, researchers, and policymakers to make informed decisions and help protect local waterways. Project Developed in collaboration with the Anacostia Watershed Society, Anacostia Riverkeeper, and Potomac Riverkeeper Network.

Nicole oversees the Reservoir Center for Water Solutions where she manages their 100 non-profit partners as well as the DC Water Quality Monitoring Program. Before this role, Nicole spent 8 years as the Environmental Outreach Coordinator for WSSC Water, where she found her passion for the water sector.

John is the Executive Director at The Commons where he leads project strategy with a focus on system design and product development. The Commons delivers leveraged products and digital services to organizations working to improve water quality. Prior to founding the Commons, John worked at Environmental Integrity Project as a Research Analyst.

FRESHWATER SALINIZATION ALONG THE WATERSHED CONTINUUM: FROM TRACKING SOURCES OF DEGRADATION TO EVALUATING RESTORATION

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There is a growing need to improve and expand water quality monitoring approaches to more accurately track the sources, transport, and impacts of salt pollution and quantify the effects of best management practices (BMPs) on reducing salinity risks at the watershed scale. We demonstrate practical applications of longitudinal stream synoptic (LSS) monitoring to analyze water quality trends, transitions, and tradeoffs in managing salinity and water quality. We quantify: (1) downstream reductions in concentrations of salinity along a stream flowing to a major drinking water source due to engineered and nature-based solutions, (2) downstream reductions in salt ions and multiple pollutants and water quality tradeoffs along streams experiencing stormwater BMPs and stream restoration, (3) comparisons of downstream pollutant reductions along streams experiencing riparian forest conservation versus stream restoration, and (4) mapping and visualizing hot spots of salinity and pollutants along rivers. Longitudinal stream synoptic monitoring informs progress towards achieving multiple water quality goals and can be used as a screening tool for selecting monitoring sites and targeting management in strategic locations to reduce transport of multiple pollutants before committing costly resources.

Dr. Sujay Kaushal is a Professor in the Department of Geological, Environmental, and Planetary Sciences at the University of Maryland. He and his colleagues have published over 130 scientific papers. He is a Fellow of the International Association of Geochemistry and has received awards such as the Ron Hites Prize and U.S. Environmental Protection Agency's Scientific Technical and Advisory Committee Award with collaborators. Kaushal has served on committees such as the Chesapeake Bay Scientific Technical Advisory Committee, Maryland Governor's Scientific Advisory Panel and the U.S. National Academies Review of Approaches for Managing Pollutant Loads in Highway Stormwater Runoff.

FROM FIELD DATA TO ACTIONABLE INSIGHTS: A NONPROFIT'S JOURNEY TO STREAMLINED WATER QUALITY DATA MANAGEMENT WITH WQDAS (A SUCCESS STORY)

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Coauthor: Mollie Boyd, Severn River Association

Nonprofit organizations play a vital role in collecting water quality data that supports watershed protection, community engagement, and informed decisions. Yet, managing data from field collection through QA/QC, analysis, and reporting can be challenging when staff, time, and budgets are limited. This presentation highlights the collaboration between Severn River Association (SRA) and TechZone MD's Water Quality Data Acquisition Solution (WQDas) as a success story showing how technology can help nonprofit monitoring organizations save time, reduce manual effort, and improve data quality. Through this collaboration, SRA adopted centralized data management to support the complete monitoring workflow—from project and station management and field data collection to data import, automated QA/QC, visualization, analysis, and reporting. WQDas reduces reliance on spreadsheets and repetitive manual processes while promoting consistent, quality-controlled data.

It will address the challenge of sharing data publicly while maintaining quality. WQDas supports data review, QA/QC, and sharing through platforms such as Chesapeake Monitoring Cooperative (CMC), Swim Guide, and EPA WQX. This case study shows how technology and collaboration can help nonprofits spend less time managing data and more time understanding watersheds, communicating results, and supporting informed decisions.

Najma Khokhar is the founder of TechZone MD LLC and creator of water quality data management solutions (WQDas). She has more than 20 years of experience with the Maryland Department of the Environment (MDE), where she worked in air and water quality monitoring from 2003 to 2024. From 2019 to 2025, she served as Chairperson of the Information and Communications Committee of the Maryland Water Monitoring Council. She currently serves as a non-reserved member of the Monitoring Advisory and Coordination Committee (MACC) of the Delaware River Basin Commission. Najma holds an MS in Environmental Science from Towson University and an MS in Botany from the University of Balochistan, Pakistan.

CANCELLED - <*STUDENT*> *AMPHIBIAN RESPONSES TO TEMPORARY CONSTRUCTION DISTURBANCE IN AN URBAN WETLAND*

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Coauthor: Jiin Suh, Cornerstone Collegiate Academy of Seoul

Anthropogenic disturbances threaten amphibian populations through habitat fragmentation, degradation, and loss. This study analyzed six years (2020-2026) of citizen science monitoring data from an urban wetland in South Korea to evaluate amphibian responses to a one-year construction disturbance. Amphibian abundance, species richness, and community composition were compared across three study phases: before (2020-2021), during (2022), and after (2024-2026) construction. While total adult abundance and species richness did not significantly differ among phases, species-specific abundance showed contrasting responses: Boreal Digging Frog remained relatively stable, Japanese Tree Frog increased from before to after construction, and Black-spotted Pond Frog declined from during to after construction. Community composition shifted modestly, with significant differences only between the during- and after-construction phases. These findings suggest that the temporary construction disturbance had a relatively limited effect on community-level amphibian responses, although species-specific responses varied based on species' ecological characteristics. Urban wetland management should therefore incorporate multiple ecological indicators and develop species-specific management strategies. Long-term ecological monitoring may provide an evidence-based framework for urban wetland management.

Yundoo Lee is a rising senior at McLean High School and a citizen scientist at the Supyeoul Climate and Environment Network. For over six years, she has participated in long-term amphibian monitoring and urban wetland conservation initiatives in South Korea and the United States. Her research interests include conservation biology, environmental chemistry, and the application of bioengineering to ecological monitoring and conservation. She plans to pursue undergraduate studies in bioengineering or biochemistry and continue developing technologies or systems that support citizen scientists and environmental conservation.

A YEAR IN REVIEW: WATER QUALITY PERFORMANCE OF HARBOR WETLAND COMPARED TO BALTIMORE'S INNER HARBOR

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Coauthor: Charmaine Dahlenburg, National Aquarium

The National Aquarium Harbor Wetland is an 8,000 SF floating wetland in Baltimore's Inner Harbor. This highly engineered habitat serves as a model for postindustrial waterfronts, demonstrating the potential for restoration in urban environments to support biodiversity, improve quality, and engage our community. In 2025, Harbor Wetland completed its first full calendar year of continuous water quality monitoring. This milestone provided an opportunity to evaluate how water quality within the wetland's shallow water channel compares to the surrounding waters of Baltimore's Inner Harbor through seasonal changes and major water quality events. This presentation will highlight the findings of this comparative analysis and explore how Harbor Wetland responded to periods of environmental stress throughout the year.

Taylor Long is a Conservation Coordinator with the National Aquarium. She graduated from Stevenson University in 2019 and has been with the National Aquarium for 5 years. Her primary role is to oversee much of the day-to-day operations around the National Aquarium's new, free, outdoor exhibit, Harbor Wetland. In her work she monitors the wetland's biodiversity, water quality, coordinates educational programs, and tours.

A REVIEW OF THE LIMNOLOGY OF RESERVOIRS AND IMPOUNDMENTS

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While natural freshwater waterbodies are not common in Maryland, there are a large number of reservoirs and impoundments throughout the State. These artificial waterbodies serve as sources of potable water as well as provide flood control, hydroelectric power and are important recreational resources. Thus, this presentation will serve as an introduction and review of the limnology of these important waterbodies. Specifically, they will be compared and contrasted to natural waterbodies, from physical, chemical and biological perspectives. The unique ecosystem structure and processes of these artificial waterbodies will be discussed on how they impact water quality conditions. In turn, these discussed water quality impacts will include harmful algal blooms, accelerated rates of sedimentation, the appearance and distribution of invasive species and use-related impacts.

Dr. Fred S. Lubnow is the Senior Technical Director of Ecological Services at Princeton Hydro. He received his Bachelor of Science from Susquehanna University and his Master's and Ph.D. from the University of California Davis. Dr. Lubnow has been an environmental consultant for 30 years. His areas of expertise include Harmful Algal Blooms (HABs), in-lake management strategies and the development of watershed-based management plans. Dr. Lubnow is an adjunct professor at Delaware Valley University, PA where he teaches a class / lab on Watershed Management. He is also an adjunct professor at Villanova University, PA where he teaches a graduate course on Freshwater Ecology.

THERMAL EVALUATION OF STORMWATER WET POND WITH GRAVEL LENS

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Thermal pollution from urbanization and the retention of water in stormwater management facilities is a known detriment to the biological functionality of streams. Section 502(6) of the Clean Water Act considers heat as a pollutant, and temperature continues to be a focus of the category 5 listings within MDE's integrated report. Currently, typical stormwater retrofit designs address nutrient and sediment inputs, but do not necessarily include design elements that address thermal impacts, which likely increase stream temperatures during warmer months. Carroll County consists primarily of Use III and IV streams, and to generate a better understanding of what capacity specific BMPs have on reducing thermal impacts to the receiving waters, a long-term study was initiated that looked at the impact of design modifications to buffer stream temperatures in urbanized watersheds. This study compared a traditional bottom release wet pond with a bottom release wet pond that incorporated a "gravel lens" around the facilities dewatering pipe. Ideally, the "gravel lens" will reduce tailwater temperatures from the facility, minimizing the thermal impact to receiving waterways than that of traditional bottom release wet ponds.

Byron has been with Carroll County Maryland's Resource Management Division for the last 18 years and has overseen the groundwater, surface water and MS4 monitoring programs and requirements for the past 13 years as the Water Resources Manager for the Resource Management Office.

Byron has been a Board of Director for the Maryland Water Monitoring Council since 2016, serving as Chair of the Monitoring and Assessment subcommittee, and now as the current Chair for the MWMC Board. Byron graduated from Shippensburg University of PA in 2003 and currently lives just outside of Catoctin Mountain Park in Western Maryland. He enjoys trail running with his English Lab Bella, as well as rock climbing, and snowboarding with his daughter.

RETHINKING SYSTEMS PERFORMANCE AND THE PUBLIC VALUE OF GREEN INFRASTRUCTURE

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Coauthor: James Hunter, Morgan State University

Over the past decade, municipalities have made substantial investments in green stormwater infrastructure (GSI) to improve water quality, reduce flooding, and strengthen community resilience. Yet long-term performance is still commonly assessed through siloed engineering, economic, or ecological metrics that may not fully capture the outcomes communities value most. This presentation introduces the concept of Public Value of Green Infrastructure (PV of GI), a community-centered approach for evaluating whether GSI investments continue to deliver their intended public benefits throughout the infrastructure lifecycle. Recognizing that value is context-dependent, PV of GI begins with the premise that communities define what constitutes value and, consequently, how the return on infrastructure investment should be understood. By connecting community-defined outcomes with infrastructure performance, monitoring data, and lifecycle investment planning, PV of GI offers a systems-based approach for understanding return on GSI investment. The concept raises a broader question: are we monitoring infrastructure performance, or the public value infrastructure was intended to create? Ultimately, PV of GI could inform capital planning, maintenance priorities, and long-term infrastructure investment decisions.

Dr. Bello Mahmud is an interdisciplinary researcher and certified project manager with expertise spanning construction, civil, and environmental engineering. His academic and applied work focuses on infrastructure resilience and the long-term performance of infrastructure assets, bridging engineering and socioeconomic perspectives to address complex infrastructure challenges. He is a recipient of the NIST Distinguished Associate Award and has presented his research at reputable conferences and gatherings, including the annual Green Infrastructure Federal Collaborative workshop at the U.S. EPA Headquarters in Washington, DC.

TEMPORAL CHANGES IN 6PPDQ CONCENTRATIONS ACROSS STORM HYDROGRAPHS

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6PPDQ is an emerging contaminant connected to increased mortality rates in certain species of salmonids. The contaminant originates from 6PPD, an antiozonant used in tires to slow their degradation. Under normal driving conditions, friction between the tire and the roadway produces microscopic tire wear particles (TWPs). 6PPD flows into waterways during storm events and reacts with atmospheric ozone to create 6PPDQ. Challenges for sampling 6PPDQ stem from methodological limitations on sampling itself; concentrations at baseflow are often below detection limits. As a result, general information such as what watersheds have the highest concentrations of 6PPDQ concentrations and what part of a flood hydrograph host the highest concentrations of 6PPDQ are poorly understood. Autosamplers provide greater flexibility to field crews when the relationship between 6PPDQ concentration and storm flow is known. Our study examined eight total storm events in two different tributaries of the Anacostia River to quantify temporal changes in 6PPDQ concentrations within one storm event. Additionally, we reviewed local datasets of 6PPDQ sources to understand what watersheds may contain the highest 6PPDQ concentrations. Ideally, both facets of this study are useful to local cooperators as both proof of concept and as an answer to questions facing the sampling of this emerging contaminant.

Tristan Mohs is a Physical Scientist with the US Geological Survey, where he has worked for the past 8 years. In that time his focus shifted from surface water to geomorphology and now, finally, into habitat ecology where he researches fish and the ecosystems that support them. Tristan is currently pursuing his Masters in Wetland Ecology at University of Maryland, College Park.

Tyler Bowser is a Hydrologic Technician with the US Geological Survey and has worked there for 7 years. He fills rolls on a myriad of teams where he focuses on field sampling of water quality parameters and contaminants. Tyler is now an expert in autosamplers, autonomous drones, and stormwater collection.

UPDATES TO THE COASTAL BLUE CARBON MANUAL

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Coauthors: Jaxine Wolfe, SERC; Nok Buapet, International Blue Carbon Institute; Mark Beeston, Conservation International; et al. (80 other co-authors)

The Coastal Blue Carbon Manual, originally created in 2014 by the International Blue Carbon Working Group, has been the global standard and base resource for blue carbon field, lab, and data measurements for over a decade. The field of blue carbon has gained a lot of momentum since then, which has led to many new avenues of research, resulting in updated methodologies, caveats, and special considerations based on application. A collaborative group of almost 100 blue carbon researchers and practitioners across countries, expertise, and ecosystem focus are working together to update the manual in its entirety. This new version, coming online early 2027, keeps with the original goal of being the first stop for those looking to do blue carbon research. Areas within the manual that are completely new to this version include increased directions for remote sensing, an entirely new chapter on lateral export, and highly detailed project designs based on project purpose. This version will also host an online, open-access repository of protocols and data sheet templates, with the intention of more frequent updates that can keep in tandem with the blue carbon literature as new or refined methods are released. This presentation will highlight the main updates to the manual and discuss feedback on how to increase the applicability of the resources within.

Hannah Morrissette is a biogeochemist that collaborates with countries throughout Latin America and the Caribbean to co-develop projects that achieve their coastal wetland scientific goals as determined through national management and international policy. With a particular focus on carbon movement and transformation within mangroves, marshes, and seagrass, Hannah prioritizes the applicability of her projects through data accessibility, scientific communication, and knowledge sharing for capacity expansion.

URBAN EVOLUTION AND THE SHIFTING STORMWATER BURDEN: IMPERVIOUS COVER EVIDENCE FROM 1.3 MILLION CHESAPEAKE BAY WATERSHED PARCELS

Adrielli Bonfanti Pagnoncelli; Morgan State University; adpag2@morgan.edu

Coauthor: James Hunter, Morgan State University

Urban stormwater engineering still leans on residential impervious-cover reference values published in 1986 (USDA TR-55 Table 2-2a), while the housing form those values describe has kept evolving. This presentation traces that evolution directly from the built record: a parcel-by-parcel measurement of impervious cover across 1.3 million properties in twelve Chesapeake Bay watershed jurisdictions in Maryland, Virginia, and the District of Columbia, read era by era through seven decades of construction. The talk follows the story from the measured surface to its consequences: how single-family lots changed after 2000, how the added surface concentrated on private lots rather than public streets, and how those shifts translate into runoff volumes and nutrient and sediment loads through a county-scale case study. The discussion connects the findings to practice: what aging reference values mean for design and modeling, and why the shifting burden matters for stormwater programs and green infrastructure. The central message is a measured present: development changed, the stormwater burden moved, and both can now be measured, parcel by parcel.

Adriélli Bonfanti Pagnoncelli recently earned her Ph.D. in Sustainable and Resilient Infrastructure Engineering from Morgan State University in Baltimore, where she also completed her M.S. in the same program. She earned her B.S. in Civil Engineering in Brazil in 2019. Her research focuses on stormwater infrastructure resilience, spanning stormwater fee financing and public perception, MS4 permit compliance, hydrologic modeling, and stakeholder-driven technology adoption. Her work bridges engineering, policy, and finance to help communities plan, fund, and sustain resilient stormwater systems.

MINOR INTERNAL SOURCES OF NUTRIENTS COMPARED TO EXTERNAL LOADING IN SHALLOW AGRICULTURALLY IMPACTED EASTERN SHORE RESERVOIRS

Andrea Pain; UMCES Horn Point Lab; apain@umces.edu

Coauthors: Michael Owens, UMCES Horn Point Lab; Jeffrey C. Cornwell, UMCES Horn Point Lab; Cathy Wazniak, MD Department of Natural Resources

Shallow Eastern Shore reservoirs Wye Mills Community Lake and Urieville Lake were developed in the 1950's but have recently had persistent water quality problems due to harmful algal blooms (HABs). High watershed to lake surface area ratios with agricultural development drive external nutrient loading, but internal nutrient loading from sediment could contribute and require different mitigation strategies. We investigated internal nutrient loading through seasonal sediment core incubations from both sites spanning from April 2025 to March 2026. Incubations revealed both sediment nitrogen (N) sources and sinks through nitrate consumption, ammonification, and denitrification. The balance of these processes led to a net release of 8.71 g N m-2 y-1 for Urieville and 1.46 g N m-2 y-1 for the Wye Mills site. Phosphorus (P) fluxes were very low and indistinguishable from zero for the Wye Mills site. P fluxes from Urieville Lake sediments exhibited high heterogeneity that resulted in an overall positive net annual efflux (0.61 g P m-2 y-1), though this rate was 16 times lower than established TMDLs inputs. Our results suggest that sediments in shallow agriculturally impacted reservoirs can be a net sink for P but only a minor source of N compared to external loading. Management strategies should therefore target reduction of watershed nutrient inputs for HAB mitigation.

Andrea Pain is an Assistant Professor at the University of Maryland Center for Environmental Science, Horn Point Laboratory. She received her bachelor's degree in Earth & Environmental Sciences from Wesleyan University, a master's degree in Environmental Systems Science from ETH Zurich, and a PhD in Geology from the University of Florida. Her research integrates biogeochemistry and hydrology to understand carbon and nutrient cycling in terrestrial-to-coastal aquatic environments, with an interest in applications for environmental management.

LANGFORD WATERSHED ALLIANCE: MONITORING RESTORATION SUCCESS AT A WATERSHED SCALE

Chelsea Peters; Washington College; cpeters4@washcoll.edu

Coauthors: Rebecca Fox, Washington College; Selina Cheng, Washington College; Maegan White, ShoreRivers

The Langford Watershed Alliance is a collaborative effort focused on improving water quality, habitat, and community resilience in the 27,000-acre Langford Creek watershed, a tributary of the Chester River. The Alliance brings together researchers, conservation organizations, government agencies, landowners, and community partners to develop a coordinated, science-based approach to restoration. In addition to establishing governance, developing an EPA 319-compliant watershed management plan, and identifying priority restoration projects, the Alliance is working to more explicitly integrate applied research into restoration planning and implementation. Current efforts include collecting baseline water quality and habitat data, expanding continuous monitoring, and designing studies that evaluate the performance of best management practices at both the site and watershed scales. In this presentation, we will describe the Alliance's structure, early progress, and approach to linking monitoring, restoration design, and post-project assessment. We will also discuss anticipated opportunities and challenges associated with using field data to measure BMP effectiveness, support adaptive management, and generate lessons that can inform restoration efforts across Maryland.

Chelsea Peters is Director of the Watershed Innovation Lab and an Associate Research Professor at Washington College's Center for Environment & Society. Her work focuses on watershed hydrology, water quality, coastal salinization, and applied restoration science. She leads the Langford Watershed Alliance, a collaborative effort integrating monitoring, research, and restoration planning.

MARYLAND GEOLOGICAL SURVEY: GROUNDWATER RESOURCES, RECENT STUDIES AND TOOLS IN DEVELOPMENT

Heather Quinn; Maryland Geological Survey (MGS); heather.quinn@maryland.gov

Coauthors: Andrew Staley, MGS; Rubina Firdous, MGS

The Maryland Geological Survey (MGS) maintains a variety of resources and datasets from previous investigations, along with information on ongoing and future projects, that support the understanding and management of groundwater resources in Maryland. This presentation will provide an overview of available geologic and hydrogeologic information and online tools that can support groundwater investigations and serve as useful resources for professionals working on groundwater-related issues throughout Maryland. The presentation will highlight online tools for accessing geologic and hydrogeologic data and information, along with data collection from new tools and equipment that will improve our understanding of groundwater resources. The presentation will provide an update on the status of the Maryland observation well network and present groundwater-level trends in Coastal Plain aquifers. Recent and ongoing groundwater quality investigations will be discussed, along with the status of a Coastal Plain aquifer information system and other groundwater-related projects.

Heather Quinn, a geologist with the Maryland Geological Survey (MGS), has over 30 years of experience working in geology, hydrogeology, and environmental and estuarine sciences. She serves on the Maryland State Board of Well Drillers and is a licensed Professional Geologist. Andrew Staley, Chief of the Hydrogeology and Hydrology Program at the MGS, with over 30 years of experience in hydrogeology, oversees the groundwater investigations at the MGS. Rubina Firdous, a hydrogeologist with the MGS, has a Ph.D. in Geology and over 20 years of experience in geological and groundwater research, both in the U.S. and overseas. Her work focuses on groundwater quality and geochemical investigations.

MOVING FORWARD WITH CESR: USING MONITORING DATA AND MODELING TO ASSESS LIVING RESOURCE RESPONSES TO RESTORATION

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Coauthors: Colin A. Hawes, Virginia Institute of Marine Science (VIMS); Dante M. L. Horemans, VIMS; Marjorie A. M. Friedrichs, VIMS; Kaylyn S. Gootman, U.S. EPA Chesapeake Bay Program Office; Bruce Vogt, National Marine Fisheries Service, Chesapeake Bay Office; Mary C. Fabrizio, VIMS; David G. Bruce, NOAA Chesapeake Bay Office, Cooperative Oxford Laboratory; Mark E Monaco (retired), National Centers for Coastal Ocean Science, NOAA

The recent CESR (Comprehensive Evaluation of System Response) report included suggestions for more explicitly considering living resource responses to program restoration actions. Two key components of large-scale ecosystem restoration planning are: (1) prioritizing individual projects or actions based on expected living resource responses, and (2) selecting and analyzing indicators of living resources to assess restoration progress and performance. As part of the CESR report, a framework was presented for using monitoring data and ecological modeling to examine the in-situ responses of living resources to restoration actions. Using a flow diagram and 12 key ecological concepts, the framework guides the creation of an implementation plan that outlines how monitoring data will be analyzed and how modeling will be conducted. In this presentation, we will describe, and demonstrate with analyses, how the framework is being implemented as Phase 1 of a multiphase approach for the Chesapeake Bay Program. The ultimate goal is the development of a habitat-based tool for informing the prioritization of projects. We also place our approach in the broader context of approaches used at other large-scale coastal ecosystem restoration programs in the US.

Kenny is the France-Merrick Professor in Sustainable Ecosystem Restoration at UMCES. He was previously at Louisiana State University and Oak Ridge National Laboratory. He received an MS and PhD from the University of Washington in Fisheries. He focuses on developing and applying modeling approaches for assessing habitat, population, multi-species, and food web responses to stressors and management actions. He is presently a member of the Science and Technical Committee (STAC) for the Chesapeake Bay Program. Kenny has published widely and was a member of writing tream for the CESR report.

SOMETHING'S FISHY ABOUT HOLLAND PINES POND: FOLLOWING THE CLUES

Nancy Roth; Tetra Tech; nancy.roth@tetratech.com

Coauthors: Shannon Brattebo, Tetra Tech; Tarig Omer, City of Virginia Beach; Jim Milliken, City of Virginia Beach

Holland Pines Pond in Virginia Beach has experienced seasonal episodes of poor water quality, extremely foul odors, and fish kills, raising concerns among local residents. To characterize potential drivers, we devised a six-month investigative study of this 5.5-acre stormwater pond, which drains to the tidal West Neck Creek. We conducted depth profiles and water quality sampling to characterize seasonal changes and a sediment core to assess potential internal phosphorus loading. We also monitored conditions at the outfall and in the downstream receiving water. We found that the pond experiences strong thermal and chemical stratification, preventing mixing during warmer months. Extremely low dissolved oxygen was observed below the chemocline. Total phosphorus and nitrogen concentrations were high, especially at depth. Sediments had high phosphorus, particularly iron-bound and loosely-sorbed forms, which is released under anoxic conditions. We found the pond to be hypereutrophic, with very poor water clarity, low DO, and high chlorophyll-a. Complete mixing in November resulted in the release of intense nuisance odors, accompanied by a substantial fish kill. Seasonal mixing appears to be triggered by increased inflows from West Neck Creek, associated with precipitation events, above-average high tide events, and strong, sustained northerly winds along with cooling temperatures.

Nancy Roth is a Senior Watershed Scientist with Tetra Tech's Center for Ecological Sciences in Owings Mills, Maryland. Ms. Roth has a background in aquatic ecology and brings 30 years of experience in watershed assessment and restoration planning. She has supported the Chesapeake Bay Program, Maryland Biological Stream Survey, and several local government programs in Virginia and Maryland. She is a graduate of Carleton College in Minnesota and holds a master's degree from the University of Michigan in Conservation Biology and Ecosystem Management. She enjoys exploring the Chesapeake and its rivers by canoe, kayak, and paddleboard.

WORK IN THE WET VERSUS WORK IN THE DRY FOR STREAM RESTORATION: A COMPARISON OF DOWNSTREAM TURBIDITY AND SEDIMENT LOADS

Bryan Seipp; Ecosystem Planning and Restoration, LLC; bseipp@eprusa.net

Coauthors: Carol Wong, Center for Watershed Protection; Kip Mumaw, Ecosystem Services; Rich Starr, Ecosystem Planning and Restoration

Stream restoration can reduce streambank erosion and improve aquatic habitat, but construction activities temporarily mobilize sediment. Limited field research has directly compared the water quality effects of construction within active streamflow ("wet" construction) with construction in temporarily diverted or dewatered channels ("dry" construction). This study evaluated turbidity, total suspended solids (TSS) loads, and construction productivity associated with both methods at three Maryland stream restoration sites. Construction-related sediment loads were also compared with estimated loads from a 1.25-year storm event to provide context for the magnitude of sediment release.

Wet construction produced higher average turbidity and greater TSS loads than dry construction at all three sites. On a per-linear-foot basis, wet construction generated sediment loads equivalent to those produced by approximately 11–21 feet of dry construction. Differences in construction production rates were comparatively modest, ranging from 9% to 15%. Construction-related sediment loads at two sites were lower than estimated loads from a 1.25-year storm event, whereas loads at the third site exceeded that benchmark. The third site had a smaller drainage area, lower baseflow, and steeper stream gradient, suggesting that site characteristics may influence the relative magnitude of construction-related sediment release.

These findings support dry construction as a means of reducing sediment release during stream restoration and indicate that observed differences in construction productivity were small relative to differences in sediment loading. However, storm-event comparisons provide context for sediment mass rather than a direct measure of ecological effects. Additional monitoring across a broader range of stream and watershed conditions is needed to determine how site characteristics influence construction-related sediment release and to inform the selection of construction methods.

Bryan Seipp is a Senior Environmental Scientist, Forester, and Project Manager with Ecosystem Planning and Restoration's Baltimore office, bringing more than 24 years of experience in watershed assessment, stream restoration, stormwater management, and forest management. His work spans project planning and design, construction coordination, and post-construction monitoring, with an emphasis on connecting applied research with restoration practice. Mr. Seipp served as Principal Investigator for the study comparing water quality effects of wet and dry stream restoration construction methods at three Maryland sites. His primary responsibilities included, coordinating field data collection, and working with construction contractors to facilitate monitoring during active restoration. He collaborated with research partners who led the data analysis and report preparation. Before joining EPR, Mr. Seipp served as Director of Project Development at Ecotone LLC and Senior Project Manager at the Center for Watershed Protection. He is a Maryland Licensed Professional Forester and ISA Certified Arborist.

LONGITUDINAL PERSISTENCE IN WATER QUALITY IMPACTS ACROSS NATURAL AND ANTHROPOGENIC TRANSITIONS

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Coauthors: Sujay Kaushal, UMD; Evan Quinter, Potomac Riverkeeper; Lisa Wu, Potomac Riverkeeper; Catherine Guadlip, Upper Potomac Riverkeeper; Trey Sherard, Anacostia Riverkeeper; Sydney Shelton, UMD; Ashley Dann, UMD; Ashley Mon, UMD; Muqarib Anwar, UMD;

Here we present a synthesis of synoptic water quality data collected over 2023-2926 which ranges in scale from intensive surveys of a small urban watershed (Sligo Creek, MD) to collaborative community science synoptics which traverse much of the Potomac River watershed, enabled by a unique collaboration between UMD and the Potomac, Upper Potomac, and Anacostia Riverkeepers. Along the non-tidal to tidal transition in the Potomac and Anacostia rivers and key tributaries around Washington, D.C., we document consistent longitudinal patterns in dissolved inorganic carbon (DIC), dissolved organic carbon (DOC), total dissolved nitrogen (TDN), *E. coli*, and other metrics. We compare these to rapid response survey data during major pollution and hydroclimatic events, including the 2026 Potomac Interceptor spill, 2025 Potomac jet fuel spill, and various road salt, drought, and storm events. Across scales, we discuss multiple solute tradeoffs, such as coupling between warm season TDN depletion and DOC enrichment in landscape features which increase residence time, while these same features show cold-season tradeoffs between attenuation of salt event peaks and increased chronic salinity at baseflow. Beyond tradeoffs and spatial persistence in water quality, we discuss practical lessons from developing collaborative community science and responsive monitoring approaches.

Wes Slaughter is a PhD candidate in the University of Maryland Department of Geologic, Environmental, and Planetary Sciences. He is currently a Maryland SeaGrant Fellow working on tracking biogeochemical connectivity and pollutant interactions across the Potomac watershed.

<STUDENT> ANALYZING THE ROLE OF INVASIVE *DRESSENIA* IN FILTERING POLYETHYLENE TEREPHTHALATE PARTICLES AND DISSOLVED IBUPROFEN

Zoey Smith; Johns Hopkins University; zoey.smith1296@gmail.com

Coauthors: Linda Tseng, The City College of New York; Walter Bowyer, Hobart and William Smith Colleges; Nan Crystal Arens, Hobart and William Smith Colleges

Two species of Dressenia mussel invaded the Great Lakes basin and surrounding river systems in the 1980s, displacing native mussel species as the dominant filter feeder in many lake systems. We ask whether Dressenia's vigorous filtering could contribute to the removal of particulate or dissolved contaminants. We test this by challenging Dressenia with 10 μm polyethylene terephthalate (PET) particles, a common microplastic in lake systems, and ibuprofen, a common pharmaceutical found in lakes that receive treated wastewater. Dressenia from Seneca Lake in Upstate New York were maintained in laboratory culture. Four replicate groups of 10 mussels each were exposed to 4 mg/L of PET particles labeled with Nile Red dye, while four identical replicates were untreated. Tissue and feces were collected after four days, organic matter removed, and PET concentrations measured using fluorescence microscopy. On average, mussels filtered 23% (± 7.3%) of the PET particles. Of these, they retained 31% while excreting the rest, demonstrating the potential for Dressenia to redistribute microplastic particles. Using the same design, we evaluated whether ibuprofen concentration could be reduced by adhesion to PET particles filtered by Dressenia. A 1000 μg/L solution of ibuprofen was added to the PET treatment group. There was no significant reduction in ibuprofen concentration after 4 days.

Zoey is a sophomore at Johns Hopkins University studying environmental science and playing Division I lacrosse. She completed this research during an REU through Hobart and William Smith Colleges and The City College of New York this past summer. Zoey plans on pursuing a career in marine biology research, and she hopes to expand on her interest in coastal ecology and conservation through her work in the future.

LARGE SEDIMENT YIELD AFTER MITIGATION PROJECTS: THE STORY OF FOSTER BRANCH

Alex Soroka; U.S. Geological Survey (USGS); asoroka@usgs.gov

Coauthors: Kelly McVicker, USGS, Jennifer Olszewski, USGS

The Foster Branch watershed in Harford County, Maryland, is small (less than 2 square miles) and until recently the land cover was split between forest and suburban residential communities. From 2014 to 2018, Harford County implemented restoration and stormwater mitigation projects to improve water quality in Foster Branch. In 2015, the USGS installed a continuous water quality monitoring station (USGS 01585075) and began water sample collection to monitor for environmental benefits of these projects. In 2022, forest clearing and subsequent development occurred in the upper portion of the Foster Branch watershed, coinciding with increases in suspended sediment concentrations and turbidity. The enhanced data collection at Foster Branch allowed for accurate sediment load calculation before, during, and after development. In 2022, the year of greatest watershed disturbance, suspended sediment load was greater than 1200 tons per square mile of watershed. Sediment load models using high frequency data estimated 25% higher sediment transport than models using only discrete sample data. This presentation will discuss the advantages of high frequency monitoring to understand the effects of changing land management.

Alex Soroka is a USGS physical scientist working in Maryland to answer the question: How is our water quality changing and why? Alex's day to day work is focused on understanding changes in nitrogen, phosphorus and sediment within non-tidal portions of the watershed. He is personally invested as Alex likes to swim in our local waterways, and wants to make open-water-swimming accessible and safe to all.

HERPETOFAUNAL USE OF CONSTRUCTED VERNAL POOLS AT STREAM RESTORATION SITES IN FAIRFAX COUNTY, VIRGINIA

Mark Southerland; Tetra Tech; Mark.Southerland@tetratech.com

Coauthors: Emily Benoit, Fairfax County; David Neely, Tetra Tech; Nancy Roth, Tetra Tech; Chris Ruck, Fairfax County; Samantha Tockman, Fairfax County

Fairfax County is undertaking a vernal pool sampling program to assess characteristics of vernal pools constructed at stream restoration projects and at reference pools, and whether these characteristics influence use of these habitats by amphibians and reptiles (collectively, herpetofauna) and fairy shrimp (order Anostraca). Sampling uses a combination of visual searches, dipnetting, acoustic recording, and timed searches to assess herptile and fairy shrimp communities in these pools. Other data are collected to document physical and habitat characteristics of the pools. Sampled in 2026 included 116 pools: 99 restored and 17 reference. Sampling documented the presence and abundance of key vernal pool indicator species Wood Frog (Lithobates sylvaticus), Marbled Salamander (Ambystoma opacum), and Spotted Salamander (Ambystoma maculatum), along with other common herpetofauna. Acoustic data over the spring to summer period were used to track calling activity. This data set is being used to develop a suite of recommendations to enhance the effectiveness of constructed vernal pools as habitat for these groups.

Mark Southerland has a Ph.D. in ecology and 35 years experience in monitoring, assessment, and restoration of ecosystems in Chesapeake Bay watershed. Mark has chaired the MWMC and Patapsco Heritage Greenway, and authored successful legislation to allow environmental landscaping, require bird safe buildings, and inventory vernal pools.

Emily Benoit, an ecologist with Fairfax County's Watershed Assessment Branch, conducts assessments to support watershed management and natural resource conservation. Previously, at the Florida Fish and Wildlife Conservation Commission, she conducted habitat assessments of ephemeral wetlands to support conservation of federally endangered salamander species.

TRACING TIRE TRANSIT: QUANTIFYING TIRE-DERIVED COMPOUNDS RELEASED ON AND AROUND MARYLAND BRIDGES INTO RECEIVING STREAMS[

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Coauthors: Andrew Heyes, UMCES, Benjamin Oyler, UMCES, Carys Mitchelmore, UMCES

Tire-derived compounds (TRC) are emerging contaminants that are comprised of both tire additives and their transformation products. These include N-(1,3-Dimethylbutyl)-N'-phenyl-1,4-phenylenediamine (6PPD), an antioxidant that reduces tire degradation, and its oxidized form 6PPD-quinone, which is acutely toxic to some fish species at ng/L concentrations. As tires wear, TRCs are released onto roads and storm events wash them into waterways where light, air, and water rapidly transform them to other compounds, complicating assessments on environmental TRC concentrations. Effective environmental risk assessments demand accurate TRC concentration measurements at potential sources and sinks during storm events to account for short-term storm-flushed as well as chronic sediment-bound TRC exposure. Our study explores TRC presence in the Chesapeake Bay watershed using sample processing techniques that limit post sampling TRC transformations and capture bridge runoff, a theorized TRC source to waterways. Maryland bridges over rivers were sampled before, during, and after storm events to understand TRC stream dynamics. A variety of bridges and stream characters were sampled; samples included runoff, stream water, and sediment for TRC extraction. Early work suggests that bridge character influences TRC load to receiving streams, giving insights on design elements that mitigate TRC impact.

Cameron Stacey is a second year master's student at the University of Maryland Center for Environmental Science completing her work at the Chesapeake Biological Laboratory as a Solomons House Fellow. She completed her bachelor's degree at Texas A&M University in Oceanography with a minor in Chemistry. Her current research interests center around freshwater contaminant chemistry.

MOLECULAR DETECTIVES: TRACKING FECAL POLLUTION SOURCES IN THE ANACOSTIA WATERSHED

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Coauthors: Maureen Mitchell, Anacostia Riverkeeper (ARK); Alyssa Freedman, ARK; Derek Shea, ARK; Sophie Penix, SERC; Isabel K. Wamsteker, SERC; Katrina Pagenkopp Lohan, SERC; Rebecca L. Hale, SERC

The Anacostia Watershed is a historically contaminated watershed in Maryland and the District of Columbia. It is impacted by fecal contamination, which can enter streams via sewage overflows, illicit connections, runoff, and animal waste. Culturable *Escherichia coli* (*E. coli*) methods are used to assess fecal contamination but have a 24-hour turnaround and do not identify sources. We sampled 20 Anacostia tributary streams biweekly from May-Sept 2025 for *E. coli* and to assess microbial sources (human, dog, and deer). All sites exceeded EPA's 410 MPN/100 mL single value threshold for *E. coli* (geometric mean range: 510 to 2,459 MPN/100 mL). All three targets were detected at all sites, but human targets dominated 55% of sites (11 of 20). Human, dog, and deer co-dominated 25% of sites (5 of 20) at lower concentrations, while the remaining sites were dominated by dog or deer sources alone. These preliminary results suggest that wastewater inputs are a major source of fecal contamination across the Anacostia watershed. Future work will assess how sources vary across flow conditions. Understanding fecal contamination sources is essential for identifying mitigation strategies since many of these sites are frequently used for recreation.

Dr. Megan Stallard is a postdoctoral research fellow with the Smithsonian Environmental Research Center (SERC) in Edgewater, Maryland. Driven by a desire to return to water quality monitoring and research, she transitioned to SERC from her previous role as a toxicologist with the EPA. Her interests include stormwater monitoring, management, and using fecal source tracking tools to improve recreational water quality. Her prior experience includes monitoring groundwater wells for fecal contamination during a postdoc position at UNC Chapel Hill, as well as supporting stormwater permit activities—including the operation of a microbial source tracking laboratory—for Metro Nashville, Tennessee.

ASSESSING THE CARBON SEQUESTRATION CAPACITY OF THE POPLAR ISLAND WETLANDS

Lorie Staver; University of Maryland Center for Environmental Science (UMCES); lstaver@umces.edu

Coauthors:Pain, Andrea (UMCES); Cornwell, Jeffrey (UMCES)

The Poplar Island (PI) restoration project is a placement site for dredged material from navigation channels in upper Chesapeake Bay. Our goal was to quantify C pools and C sequestration in three PI tidal marshes spanning 7 – 16 years in age, using a combination of existing and new data. The study showed that >90% of the C stock resides in the original placed dredged material. Mean C sequestration rates calculated from vertical accretion ranged from 116 – 185 g C m-2 y-1 and 60.8 – 74.2 g C m-2 y-1 in the low marsh (LM) and high marsh (HM), respectively, and showed a decline with marsh age. Methane (CH4) emissions were higher in the LM (32 ± 16 g C m-2 y-1) compared with the HM (4 ±3 g C m-2 y-1). The highest CH4 fluxes occurred in the summer in the LM, and within the LM, were negatively correlated with elevation. Thus, dredged material placement in island restoration projects preserves the C stored in navigation channel sediments, while marshes both protect the underlying C stock and sequester C at a high rate. Management which enhances the marshes will promote C sequestration, including addition of dredged material to enhance elevation, prescribed burning to improve vegetation health and preservation of exterior dikes to limit organic matter export. C sequestration can be maximized by achieving marsh platform elevations which optimize plant production and CH4 export.

Lorie Staver is an Associate Research Professor at the University of Maryland Center for Environmental Science, Horn Point Laboratory. She is an ecologist whose research focuses on restoration, primarily on the establishment and development of tidal marshes. She has been involved in the Poplar Island restoration project for over 20 years. Her research includes similar studies of living shorelines, and prior work included contributions to the Chesapeake Bay SAV restoration efforts.

MANAGING EXPECTATIONS AND OPPORTUNITIES FOR A SHALLOW-WATER FOCUS IN CHESAPEAKE BAY RESTORATION

Jeremy Testa; UMCES Chesapeake Biological Laboratory; jtesta@umces.edu

In 2024, the Chesapeake Bay Program Scientific and Technical Advisory Committee (STAC) published the Comprehensive Evaluation of System Response (CESR) report, which laid out an assessment of the progress and challenges in meeting the Chesapeake Bay TMDL. One of the central perspectives of the report was that additional nutrient load reductions would be difficult to achieve in the coming decades, and that new thinking was required to meet restoration goals. One of the well-received ideas put forward by CESR was that the recovery of living resources (e.g., blue crabs, finfish, underwater grasses) could be boosted by placing additional focus on the Chesapeake's shallow water habitats. While this is an attractive idea that aligns with traditional Chesapeake Bay restoration priorities, CESR did not provide detailed analyses or diverse examples to illustrate how a "shallow-water" focus would accelerate restoration. In this presentation, I aim to offer a perspective on the challenges of implementing meaningful shallow-water restoration, a discussion of the uncertainty facing such efforts, and the opportunities such efforts might allow. To do so, I draw upon examples of water quality dynamics across a wide range of Chesapeake Bay tributaries.

Jeremy Testa is an estuarine ecosystem ecologist who has been studying Chesapeake Bay ecology and water quality since 2003. Dr. Testa's research focuses on understanding anthropogenic and climatic influences on stressors such as oxygen depletion, estuarine acidification, and eutrophication.

CANCELLED - *TRANSLATING BENTHIC CYANOBACTERIA RESEARCH INTO MANAGEMENT TOOLS: VISUALIZING TOXIC HARMFUL ALGAL MATS (MICROSEIRA WOLLEI) IN MARYLAND ESTUARIES AND LAKES*

Cathy Wazniak; Maryland Department of Natural Resources (MD DNR); catherine.wazniak@maryland.gov

Coauthors: Amy Hamilton, MD DNR; Julia Devine, Maryland Sea Grant; Annalise Kenney, Maryland Sea Grant; Judy O'Neil, University of Maryland Center for Environmental Science

Between 2023 and 2025, monitoring efforts across Maryland revealed the presence of toxic benthic harmful algal mats. Findings confirmed that these filamentous cyanobacterial mats produce potent neurotoxins (saxitoxins) that accumulate in lower trophic levels (e.g., amphipods) and persist in aquatic environments. To bridge the gap between complex ecological research and practical risk mitigation, a collaborative initiative between Maryland Sea Grant, MD DNR, and UMCES developed a dual-poster visual communication strategy. The Scientific Visualization: Designed for resource managers, researchers, and scientific audiences, this illustration details the anatomical structure of Microseira wollei, mechanisms of mat buoyancy driven by photosynthetic oxygen entrapment, nutrient cycling dynamics in low-nutrient conditions, and toxin persistence in aquatic food webs. The Public Health Visualization: Designed for public outreach at State Parks, veterinary clinics, and digital/social media platforms, this poster translates key ecological risks into actionable public safety measures—emphasizing pet protection (e.g., preventing ingestion/licking of mats) and clear instructions for reporting blooms via the MD DNR Eyes on the Bay website.

Cathy Wazniak is an Environmental Program Manager with the Maryland Department of Natural Resources. Her responsibilities include coordinating MD's phytoplankton and harmful algal bloom monitoring programs as well as Maryland Coastal Bays and offshore water quality monitoring and assessments. She earned her master's degree with UMD Marine Estuarine and Environmental Sciences program. She was a Sea Grant Knauss Fellow under the Assistant Secretary of the Navy. She is the chair of the MD Harmful Algae Bloom Taskforce, member of the Maryland Coastal Bays National Estuary Program STAC and CBP modeling committees.

OPEN-SOURCE SHALLOW WATER MONITORING IN R

Molly Westbrook; Maryland Department of Natural Resources (MD DNR); molly.westbrook@maryland.gov

Coauthors: Andrew Keppel, MD DNR; Jamie Strong, MD DNR; Mark Trice, MD DNR

Navigating environmental monitoring data from collection in the field through quality assurance to final analysis is a time-consuming, often expensive, and sometimes confusing process, especially when multiple instruments are involved. In 2025, the Maryland Department of Natural Resources built an open-source serial data collection application using the R programming language to manage the data streams of YSI EXO multiparameter water quality sondes and GPS units. This app allows access to, and real-time processing of, sonde and navigation data without requiring proprietary software and with minimal hardware set-up. This talk will showcase the capabilities of open-source coding to manage serial data streams, and examine initial data collected in the Severn River in the summer of 2026. This application represents a new level of access and customization for water monitoring, including combining serial data streams, flexibility in visualizing the data in real time, and abilities for built-in field notation and timestamps.

Molly Westbrook earned their BS in Marine Science from the University of Maine, and MS in Biology at the University of Maryland College Park. Their previous research spans a variety of topics, including coral bleaching, salmon developmental physiology, and applications of machine learning to understanding early-life cichlid behavior. In 2025, Molly joined Maryland's Department of Natural Resources as a Water Quality Informatics administrator, where they developed a number of open-source data applications for public data access and internal data collection.

<STUDENT> EVALUATING SHIFTS IN ORGANIC MATTER COMPOSITION BEFORE AND AFTER STREAM RESTORATION

Regina Yuengling; University of Maryland (UMD) ryuengli@umd.edu

Coauthors: Lauren Smith, UMD; Theodore Yang, Eleanor Roosevelt High School; Sujay Kaushal, UMD; Muqarib Anwar, UMD Ashley Mon, UMD; Wes Slaughter, UMD, College Park; Ashley Dann; UMD

Urban streams receive variable chemical inputs from natural fluxes and urban development, which can degrade ecosystem processes and increase nutrient loads. Riparian buffer restoration and step-pool conveyance can support the aquatic health of streams via nutrient load and stormwater management, but data tracking biogeochemical shifts in urban streams pre- and post-restoration remains limited. Unlike common indices (TDN, DO, DOC), optical indices provide insight into biogeochemical recovery, which can inform researchers in tracking organic pollution sources and stream health. We conducted longitudinal stream synoptic (LSS) monitoring at 12 sites along the University of Maryland Campus Creek from 2022 to 2026. We analyzed phase 2 of an ongoing Regenerative Stream Conveyance (RSC) project (completed 2026) which focused on creating step-pools and restoring bankside plant life. Spatiotemporal analysis shows an increase in DOM indices corroborated by increased DO and decreased DOC downstream of step-pool restoration, indicating increased local microbial activity. Excitation emission matrix spectroscopy (EEMS) showed changes in stabilized aromatic structures and refractory organic matter following restoration. These findings help evaluate biogeochemical processes altered during stream-floodplain restoration, though further long-term data needs to be collected to confirm trends.

Regina Yuengling is a senior at the University of Maryland majoring in Chemistry. She works as an undergraduate researcher in the UMD Biogeochemistry Laboratory, and also acts as president of the American Water Works Association chapter at the University of Maryland

Poster Presentation Abstracts

(In order of primary author's last name)

<STUDENT POSTER> RIVER OTTER (*LONTRA CANADENSIS*) HABITAT ASSESSMENT AND RESTORATION ON GWYNNS FALLS

Abigail Bachman; Stevenson University; abachman@stevenson.edu

Coauthor: Joseph Matanoski

River otters (*Lontra canadensis*) have historically inhabited riverine systems throughout the Middle Atlantic region. Trapping, land-use change, and habitat destruction have reduced population size and range. Recently, a river otter population has established itself on the Gwynns Falls bisecting the Owings Mills campus of Stevenson University. This project determined the current state of this riverine habitat and specifically its suitability for an otter population. The feasibility of habitat restoration to ensure the success of this population was assessed. Fish community health was evaluated as an indicator of prey availability and stream health since otters require a diverse, abundant fish base to sustain a healthy population. The riparian buffer was assessed for native vegetative cover, which provides bank stability, and cover, essential to both stream integrity and otter habitat use. Significant non-native vegetation and flood-driven bank erosion were identified as major stressors, leaving banks with thin soil and limited large vegetation for den sites. Overall, habitat suitability was fair to moderate. Modest investment in restoration could meaningfully improve otter habitat on Gwynns Falls and beyond

BACTERIAL AND WATER QUALITY MONITORING IN THE GUNPOWDER RIVER

Braeden Bayne; Gunpowder RIVERKEEPER® (GRK); bbayne2029@gmail.com

Coauthors: Theaux Le Gardeur, GRK; Luke Kretschman, Skidmore College; Joe Ottomano, GRK; Steve Duker, GRK; Sophie Zuckman, GRK

Gunpowder RIVERKEEPER® is a 501(c)(3) nonprofit that protects water quality, sensitive species, and community interests in the traditionally overburdened Bird, Bush, Middle, and Gunpowder River watersheds. Comprising roughly 800mi2 these watersheds host Brook Trout in the upper, forested, reaches and Atlantic Sturgeon in the tidal basins. Over 1.5 million people in the Baltimore-Metro area use the Gunpowder for drinking water and many more for recreation: fishing, crabbing, boating, and swimming. 26 species of finfish use areas such as this for spawning. Gunpowder RIVERKEEPER® monitors water quality throughout the combined watersheds following the Chesapeake Monitoring Cooperative's Tier III approved methodologies ensured for accuracy and precision. The data we collect can help inform local, regional, and state-level water resource management, restoration, and protection efforts. Bacterial monitoring for *E. coli* takes place at five sites from Memorial Day to Labor Day using the IDEXX method. Physio-chemical parameters are measured in the tidal Gunpowder River using a YSI handheld device at seven sites. Our monitoring metrics help inform our advocacy efforts and provide information to the public on safe swimming guidelines and recreation. Based on community input, pilot water quality monitoring programs were implemented to test bacteria levels in the Gunpowder and Bush Rivers.

DETERMINING GROUNDWATER RESIDENCE TIME IN A WATERSHED USING DISSOLVED GASES AND AGE TRACERS; WAR BRANCH, CHESAPEAKE BAY WATERSHED, VA

Gerolamo (Jerry) Casile; U.S. Geological Survey (USGS) MD-DE-DC Water Science Center; jcasile@usgs.gov

Coauthor: Allison Casile, USGS Water Mission Area

A technique is presented for determining the age of GW inflow to a stream at baseflow. This technique uses stream samples collected over one complete diurnal temperature cycle of the stream analyzed for dissolved argon, nitrogen, and the age tracers sulfur hexafluoride and CFC-113. The dissolved gas concentration of a stream lies between atmospheric equilibrium and the concentration of the inflowing groundwater. An equation representing the dissolved gas concentration of the stream is solved for the concentration of the inflowing groundwater which allows an age interpretation. A case study involving two sampling events at varying stream gage levels is presented for War Branch in the Chesapeake Bay Watershed. Results for the two sampling events give ages of the inflowing GW to the stream at baseflow of about 40-50 years.

SPATIAL AND TIME SERIES ANALYSIS OF INVASIVE CRAYFISH IN MARYLAND

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Coauthor: Ally Bartell, MD DNR

In Maryland, crayfish play a critical role as keystone species in freshwater ecosystems. Their foraging and burrowing behaviors shape physical habitat structures and regulate food availability across aquatic food webs. They also serve as an essential prey resource. However, native crayfish populations are increasingly threatened by habitat degradation, poor water quality, and the spread of non-native invasive crayfish species. Invasive crayfish often outcompete native species due to their larger adult sizes, faster growth rates, and higher behavioral aggression, leading to widespread shifts in community composition. To evaluate these long-term dynamics, this study uses Rstudio to create a statewide assessment of invasive crayfish distribution and abundance throughout Maryland using Maryland Biological Stream Survey database records spanning from 2008 to 2025. Spatial mapping was conducted to delineate the expanding geographic ranges of key invasive species across major watersheds. Complementing the spatial analysis, a time-series analysis was performed to identify abundance trends throughout the sampling periods. This research provides critical insights into the expansion patterns of invasive crayfish in Maryland, and can be used for informing targeted management strategies, biosecurity protocols, and conservation priorities to protect Maryland's native aquatic biodiversity.

ASSESSING BALTIMORE'S CREATED MARSHES' RESILIENCE TO SEA LEVEL RISE: THE MIDDLE BRANCH RESILIENCY INITIATIVE (MBRI)

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Coauthors: Summer Walker, SERC; Jaxine Wolfe, SERC; Andre Rovai, SERC

This project expands integrated monitoring of the Middle Branch Resiliency Initiative (MBRI) to include wetland sediment accretion and stability, vegetation cover and communities. Net surface elevation change in the restored wetlands will be measured across six sites within the four MBRI regions, with 2-3 monitoring stations per site. Following construction, each monitoring station will consist of a Rod Surface Elevation Tables (RSET) coupled with two marker horizons using the mesh technique. Two surface soil core samples will be collected to estimate bulk density and organic matter, carbon, and nitrogen accumulation rates. At each station, three 0.25-m^2 vegetation plots will quantify species composition, cover, and height; aboveground biomass will be estimated using SERC marsh-specific allometric equations, and 50-cm soil cores will measure belowground biomass. RSET measurements will occur every six months, while all other variables will be assessed annually. Measures will be compared over time within each site to assess changes to sediment accretion and wetland stability post-restoration.

TARGETED CAPTURE EDNA ANALYSIS FOR AQUATIC BIOASSESSMENT

Joseph Craine; Jonah Ventures; josephmcraine@jonahventures.com

Environmental DNA (eDNA) has long held promise for stream bioassessment, but existing methods have struggled to detect the diversity of aquatic invertebrates needed to fulfill that promise. Targeted capture addresses this limitation by using synthetic RNA probes to enrich genetic material from a broad range of organisms before sequencing. We introduce this approach and present examples from Boulder Creek, Colorado and other sites across the US. Results highlight detection of aquatic invertebrates and fish, including taxa central to conventional bioassessment. With one assay, hundreds of genera can now be detected in a given stream, ranging from insects, annelids, and mussels. Targeted capture can generate data for bioassessment scores now, connecting the longstanding promise of eDNA to practical measures of stream condition. This approach offers monitoring programs a way to expand biological assessment and evaluate ecological differences among sites using water samples.

<STUDENT POSTER> EXAMINING HOW SALT TOXICITY IN WILD RICE IS INFLUENCED BY PLANT ASSOCIATES IN CHESAPEAKE WATERSHEDS

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Coauthor: Dr. Sean Sharp, Hood College

Wild rice (Zizania aquatica) is an ecologically, economically, and culturally important wetland plant that grows in tidally influenced rivers and wetlands of the Eastern US. With sea level rise, salt-intolerant wild rice will be exposed to increasingly salty water. Plant associates are other plant species that grow alongside wild rice that can potentially mitigate salt toxicity in rice populations. Our project aimed to identify what plant associates are found with wild rice and how wild rice vigor was affected by their presence by performing boat surveys along the tidal freshwater tributaries of the Chesapeake Bay. Measurements included stem density and height, photosynthetic rates, biomass, and companion plant identification. In addition to boat surveys, we mapped the distribution of wild rice stands using an Unmanned Aerial Vehicle (UAV) as they relate to increasing salinity. Common plant associates include Schoenoplectus pungens, Pontederia cordata, Typha angustifolia, Polygonum pensylvanicum, and Typha latifolia. Rice was primarily found in creeks on the Potomac and Patuxent Rivers, but not the bay itself. We believe the Chesapeake's salinity limits rice from growing further downstream. As saltwater is pushed further upstream into these freshwater regions, the natural distribution of wild rice may shrink as a result.

EVALUATING MICROBIAL WATER QUALITY AND RAPID DETECTION METHODS FOR URBAN RECREATIONAL WATER SAFETY

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Extreme weather and infrastructure failures introduce pathogens into urban waterways, therefore posing a risk to recreators. Exposure can lead to health impacts such as gastrointestinal illness and skin infections. Routine monitoring is important, however, current time-consuming methods cause delays in sharing water quality information. Rapid detection methods are needed to protect people from pathogen exposure in real time. Since March 2026, we have sampled two sites weekly in a Baltimore urban stream for Escherichia coli, a common fecal indicator bacteria, and Staphylococcus aureus. One sampling site is co-located with a high-frequency in-situ water quality sensor. *E. coli* was present at concentrations above the Environmental Protection Agency recreational water quality standard of 410 MPN/100mL in 89% (39/45) of the samples with a mean concentration of 2,239 MPN/100mL. S. aureus was presumptively present in 95% (39/41) of samples and 5% (2/41) of samples were positive for methicillin-resistant S. aureus (MRSA). Future work will identify associations between bacteria, water depth, and water quality parameters including temperature, conductivity, optical brighteners, nitrogen, phosphorus, and dissolved organic matter fluorescence. Understanding environmental conditions that may predict unsafe water conditions in urban streams in real time is critical for protecting health.

COMPARING EDNA AND TRADITIONAL SAMPLING METHODS FOR ASSESSING ECOLOGICAL UPLIFT IN RESTORED STREAMS: A COMBINED LITERATURE REVIEW AND FIELD STUDY

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Coauthors: Martha McCauley, EA EST; Greg Zucknick, EA EST; Jose Andres, Cornell University

Stream restoration activities have been widely implemented throughout the Chesapeake watershed to address ecological degradation; however, evidence of ecological uplift is currently limited. As such, identifying appropriate metrics to determine the success of restoration projects, including benefits for native ecological communities, is imperative. Recent advances in environmental DNA (eDNA) techniques are prompting a shift away from traditional methodologies; however, the widespread implementation of eDNA-based methods in stream monitoring is hindered by a lack of standardized methods and reporting requirements, as well as a lack of direct comparisons between physical and molecular-based techniques. Consequently, this Chesapeake Bay Trust-funded project aimed to perform a literature review focusing on currently used methods for eDNA analysis of freshwater macroinvertebrates and research comparing traditional and eDNA approaches. In addition, field sampling of 20 restored streams within the Chesapeake region was performed, with collocated eDNA and physical sampling for macroinvertebrates conducted at three locations per stream along a gradient of distance. This poster presentation will include a synthesis of all data currently available on this ongoing project, including insights from the literature review and any field biotic or molecular data.

USGS FLOW PHOTO EXPLORER: A FLEXIBLE AI/ML APPROACH TO TRANSFORMING TIMELAPSE IMAGERY INTO ENVIRONMENTAL INSIGHTS

Phillip Goodling; U.S. Geological Survey (USGS); pgoodling@usgs.gov

Coauthors: Jennifer Fair, USGS; Amrita Gupta, Microsoft AI For Good Lab; Jeffrey Walker, Walker Environmental Research

Timelapse imagery is a powerful tool for characterizing changing environmental systems. However, large volumes of imagery are a challenge to manage and interpret, serving as a barrier for local, state, tribal, and non-profit organizations that lack this capacity. To address this need, we developed a web-based approach called the U.S. Geological Survey Flow Photo Explorer (FPE) [www.usgs.gov/apps/ecosheds/fpe] that uses timelapse images and human-generated annotations to train an AI model for estimating relative quantities of environmental variables without the need for any direct measurements. While developed to monitor streamflow, the FPE system can also monitor algal blooms, ice and snow cover, and even wildlife population density. The approach uses low-cost trail cameras to collect timelapse imagery (typically every 15 minutes), which are uploaded to the FPE website. Once images are uploaded, users annotate random pairs of images for each site, indicating which image shows more of the desired environmental variable (e.g., streamflow). These annotations are then used train an AI model, which produces a dimensionless timeseries of the environmental variable from the images. This presentation provides an overview of the method and solicits feedback on ways to make this system even more flexible and easy to use.

<STUDENT POSTER> INVESTIGATING THE OUTCOMES OF WETLAND RESTORATION ON MACROINVERTEBRATE COMMUNITIES AFTER 22 YEARS

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Coauthors: Emily Rodriguez, UMD; William O. Lamp, UMD

Wetland restoration aims to regain the ecosystem services lost by the past destruction of wetlands. Methods can include both the rehabilitation of historic wetlands and the creation of new wetlands. Further research into the long-term effects of wetland restoration methods on macroinvertebrate communities is necessary to understand if restored wetlands can support natural communities. The objective of this study is to compare the present macroinvertebrate community compositions among rehabilitated, created, and natural Delmarva Bay wetlands to past datasets. Macroinvertebrate sweep samples and water quality parameters were collected from each wetland type monthly from March to August 2025. Previous literature published 9 years post-restoration found that the macroinvertebrate communities converged in the rehabilitated and natural wetland, while they remained distinct in the created wetland. We hypothesize that the rehabilitated community will continue to converge towards the natural wetland community, while the created community will also converge towards the natural community but at a slower rate. The results suggest that rehabilitated Delmarva Bays reflect natural wetland macroinvertebrate functions over a shorter timescale than created Delmarva Bays.

CHARACTERIZING MULTI-STRESSOR EXPOSURES TO JUVENILE STRIPED BASS IN THE CHESAPEAKE BAY: TEMPERATURE, NUTRIENTS, AND TOXINS

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Coauthors: Christopher Salice, Towson University; Krista Kraskura, Towson University

Striped bass are among the most ecologically and economically important fish species in the Chesapeake Bay. Juveniles spend their first several years in estuarine habitats before migrating to coastal waters. However, juvenile recruitment has remained low in recent years, contributing to concerns about the Chesapeake Bay population. At the same time, the Bay is affected by multiple, co-occurring environmental stressors, including elevated water temperatures, low dissolved oxygen, and contaminants that may harm aquatic life. The overarching objective of this study is to better understand juvenile striped bass exposure and their responses to these stressors. We are using water-quality data from Maryland's long-term monitoring program to characterize environmental conditions in important juvenile habitats and conducting a complementary laboratory study to evaluate the thermal tolerance of juvenile striped bass. Here, we present a preliminary analysis of water temperature, dissolved oxygen, and other key water-quality parameters (e.g. nitrogen) in several Western Shore tributaries that provide habitat for juvenile striped bass. This study will help characterize the occurrence and co-occurrence of environmental stressors in critical juvenile habitat and provide a foundation for evaluating how these conditions may affect juvenile striped bass health and recruitment.

<STUDENT POSTER> INVESTIGATING CHANGES IN BRIGHTNESS AND BACKGROUND MATCHING IN *COTTUS CAERULEOMENTUM*

James Keller; University of Maryland, Baltimore County (UMBC); jamesk5@umbc.edu

Coauthors: Payton Barry, UMBC; Tamra Mendelson, UMBC

Background matching is an important antipredator adaptation that allows animals to reduce their detectability by predators. Freshwater sculpins can change their body brightness in response to environmental backgrounds, but the extent and behavioral significance of this ability remain poorly understood outside the Lake Baikal region. Little is known about brightness change and background selection in the Blue Ridge Sculpin (*Cottus caeruleomentum*), a freshwater fish endemic to the Blue Ridge region of Maryland. This study investigates whether individual *C. caeruleomentum* preferentially select backgrounds that match their body brightness and whether their brightness changes in response to the selected environment. Wild-caught individuals will be exposed to an aquarium containing four quadrants of different substrate colors representing a range of brightness values. Background preference will be determined from video recordings, while changes in body brightness will be quantified from photographs taken before and after each trial. We predict that individuals will preferentially occupy backgrounds that closely match their body brightness and alter their brightness toward that of their preferred background. These findings will provide insight into camouflage in freshwater sculpins and contribute to the ecological understanding and conservation of this Maryland endemic species.

LOW-COST STACKABLE SENSING SYSTEM FOR NON-PERENNIAL STREAM DYNAMIC MONITORING

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Coauthors: Hale Rebeca, SERC; Rich Roy, SERC

Non-perennial streams are the most abundant freshwater hydrologic feature on Earth, shaping stream habitats and biogeochemistry through patterns of drying and rewetting. Despite this, they prove challenging and costly to monitor, and are poorly represented in our understanding of stream ecosystems and water quality. The rise in availability of low-cost off-the-shelf sensors has made scaling watershed-wide experiments feasible. Absence/presence sensors have proven useful in quantifying stream network expansion, still, additional data on stream temperature, sediment moisture, and water depth can provide more detailed information about flow and biogeochemical conditions. To address this gap, we experimented with the design of a low-cost, stackable sensing system for monitoring sediment saturation, stream water level, and temperature. This system makes use of the DS18B20 Digital Temperature Sensor and the Gravity: IP65 Capacitive Soil Moisture Sensor, using a staggered sensor array to calculate water level. The system, tested for accuracy in a lab setting, could enable the determination of flowing branches within a watershed. We are testing this design in an intermittent stream, where the distributed data on soil moisture and stream flow can be integrated with outlet water chemistry to improve source tracking and better our understanding of non-perennial streams.

MULTI-TIERED TRACKING OF AN EXTENSIVE *MARGALEFIDINIUM POLYKRIKOIDES* BLOOM IN TANGIER SOUND, MARYLAND (AUGUST 2026)

Elizabeth Larson; Maryland Department of Natural Resources (MD DNR); elizabeth.larson@maryland.gov

Coauthors: Catherine Wazniak, MD DNR; Michelle Tomlinson, National Centers for Coastal Ocean Science; Kami Lentzsch, CBT Chesapeake Conservation & Climate Corps; Amy Hamilton, MD DNR

In early August 2026, an expansive harmful algal bloom (HAB) event occurred in Tangier Sound, Maryland, requiring an integrated multi-tiered tracking approach to evaluate its scope and environmental progression. Initial detection via remote satellite imagery on August 6 flagged an extensive algal bloom across the sound. Aerial reconnaissance conducted on August 7 in coordination with Natural Resources Police aviation defined the spatial extent of the bloom, estimating coverage at approximately 66 square miles extending over 25 miles from near Fishing Bay, south to Pocomoke Sound, and into the main stem of the Chesapeake Bay. Targeted opportunistic field collection and microscopic laboratory analysis confirmed positive detections across multiple sites for the ichthyotoxic dinoflagellate *Margalefidinium polykrikoides*. Known for causing reddish-brown water ("rust tide") and production of bioactive compounds toxic to fish and shellfish. It presents no threat to human health. Environmental monitoring recorded a rapid dissipation of surface cell density and visible discoloration following thunderstorms and wind-driven mixing on August 10–11. Satellite observations confirmed the physical displacement and westward transport of the remnant bloom across the bay. On August 17, the bloom was reduced in size. While blooms occur routinely in VA, this species is rarely observed in MD waters.

CANCELLED - <*STUDENT POSTER*> *AMPHIBIAN RESPONSES TO TEMPORARY CONSTRUCTION DISTURBANCE IN AN URBAN WETLAND*

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Coauthor: Jiin Suh, Cornerstone Collegiate Academy of Seoul

Anthropogenic disturbances threaten amphibian populations through habitat fragmentation, degradation, and loss. This study analyzed six years (2020-2026) of citizen science monitoring data from an urban wetland in South Korea to evaluate amphibian responses to a one-year construction disturbance. Amphibian abundance, species richness, and community composition were compared across three study phases: before (2020-2021), during (2022), and after (2024-2026) construction. While total adult abundance and species richness did not significantly differ among phases, species-specific abundance showed contrasting responses: Boreal Digging Frog remained relatively stable, Japanese Tree Frog increased from before to after construction, and Black-spotted Pond Frog declined from during to after construction. Community composition shifted modestly, with significant differences only between the during- and after-construction phases. These findings suggest that the temporary construction disturbance had a relatively limited effect on community-level amphibian responses, although species-specific responses varied based on species' ecological characteristics. Urban wetland management should therefore incorporate multiple ecological indicators and develop species-specific management strategies. Long-term ecological monitoring may provide an evidence-based framework for urban wetland management.

LOW-COST PASSIVE SAMPLING APPROACH TO MONITOR HYDROPHOBIC ORGANIC CONTAMINANTS IN STORMWATER

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Coauthors: Eswar Chandra Pudur Vrushailapath, UMBC; Jasmine Ives, UMBC; Upal Ghosh, UMBC

Hydrophobic organic contaminants (HOC) in stormwater runoff can be a major source of total loading to waterbodies. Quantifying storm driven inputs is critical for understanding HOC mass balance in impaired waterbodies and identifying ongoing sources from land. Extensive monitoring is however limited by the current tools available like automated samplers and their cost to monitor storm events. Here we propose a cost-effective way to monitor HOCs during storm events with passive sampling of water column and suspended sediments. The approach was first tested at the Lower Beaverdam Creek (MD), which was identified as a major source of ongoing PCB inputs to the Anacostia River, and subsequently applied to the Gwynns Falls (MD), where limited data are available. An increase of PCB concentrations, both in the dissolved and particulate phases, was measured at the downstream location compared to the upstream. The absence of dilution effect during high flow events indicate increased mobilization of PCB sources during the storm event. PCB concentrations measured in the suspended sediments collected by the sediment traps were close to previously measured values using ISCO sampling and support the use of our optimized sediment traps as a low-cost alternative sampling technology.

CHARACTERIZATION OF STREAM CHEMISTRY OF STORMS FROM HIGH-FREQUENCY SENSOR DATA AT BALTIMORE ECOSYSTEM STUDY FIELD SITES

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Coauthors: Claire Welty, UMBC; Peter Groffman, CUNY and Cary Institute; Jon Duncan, Penn State; John Lagrosa, UMBC

High-frequency sensors were installed in 2023 at locations where the Baltimore Ecosystem Study has collected weekly stream chemistry data for 28 years. These sites are co-located with USGS stream gaging stations spanning a gradient of urbanization and watershed size. Added sensors include YSI EXO2 sondes outfitted with specific conductance, temperature, turbidity, pH, and dissolved oxygen probes collecting data at a 5-minute frequency, and s::can Spectrolyserv3 sondes collecting TOC, DOC, and NO3-N at a 15-minute frequency. Data enable investigation of responses of stream chemistry to storm events including consistency in water quality patterns across storms and land cover. Here we compare behavior of NO3-N, SC, suspended sediment, TOC, and DOC over multiple storm events within and across the gradient of sites. Suspended sediment [mg/L] is estimated from turbidity [FNU] from our previously-collected data relating the two quantities. This work is part of the Baltimore Social-Environmental Collaborative Urban Integrated Field Laboratory, supported by DOE.

REMOTE MAPPING AND ASSESSMENT OF SURFACE STORMWATER STORAGE IN THE CHESAPEAKE BAY WATERSHED

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Coauthors: Kristina Hopkins, USGS; Nicholas Santoro, USGS; Nathaniel Rosenbloom, USGS

There is currently no regional, comprehensive database of urban stormwater best management practices (BMP) that includes stormwater storage estimates for the Chesapeake Bay watershed. A new machine learning model has been developed to remotely map the location and size of stormwater ponds and roadside swales using 1-meter (1m) resolution lidar-derived topography. Inputs to the model include landscape metrics derived from the 1m lidar that emphasize topographic depressions, along with a digitized dataset of polygons representing the extent of stormwater ponds, roadside swales, and stormwater storage from as-built engineering designs.

A U-Net convolutional neural network model was trained using the input datasets to remotely map these targeted stormwater features within a small urban watershed in Clarksburg, Maryland. Elevation from the 1m lidar was then used to characterize each stormwater feature with metrics on depth, area, and volume to estimate the potential stormwater storage of each stormwater facility. Storage estimates were compared with the storage volume that each stormwater facility was originally engineered to hold.

The model was applied to 30 urban and suburban basins within the Chesapeake Bay watershed (drainage areas between 10-30 sq. km) to support other efforts related to enhanced understanding of the effects of BMP implementation on aquatic ecosystems.

COLLABORATING WITH CITIZEN SCIENTISTS TO REINSTATE SAMPLING OF IMPAIRED WATERSHEDS

Shannon Moorhead; Maryland Department of Natural Resources (MD DNR); shannon.moorhead@maryland.gov

Coauthors: Jeffrey Horne, MD DNR; Marisa Ponte, MD DNR; Marek Topolski, MD DNR; Theaux M. Le Gardeur, Gunpowder RIVERKEEPER; Jim Uphoff, MD DNR

To better understand the effects of development and impervious surface on anadromous fish spawning habitat, we have sampled stream ichthyoplankton (fish eggs and larvae; IP) in nontidal portions of various Chesapeake tributaries each spring from 2006-2018 and 2024-2026. In addition to evaluating how the percent presence of herring (Pherr) in these samples is influenced by development and stream conductivity, we also compared the presence of target anadromous species IP at each site to the results of historic (1970s) DNR spawning habitat surveys. In 2026, we partnered with Gunpowder Riverkeeper, training volunteer citizen scientists to sample the Bush and Gunpowder Rivers. The Bush River tributaries were last sampled in 2005-2008 and 2014; the Gunpowder Rivers were not recently sampled and we chose sites sampled during the historic habitat survey for direct comparison. Volunteers used a YSI to record temperature, conductivity, and dissolved oxygen during sample collection. We also deployed HOBO loggers to monitor conductivity hourly at three Big Gunpowder River sites. Preliminary results indicated low presence of eggs and larvae and high stream conductivity, associated with road salt; these results are consistent with other urbanized watersheds.

<STUDENT POSTER> STOP, SWAP, AND ROLL

Atabong Njefe; Eleanor Roosevelt High School; atabongnjefe@gmail.com

Unlike sewer drains, storm drains release runoff into bodies of water (such as the Chesapeake Bay) without being treated by a facility. Sediments like dirt, dust, and sand carried by runoff pollute the Bay, as they increase turbidity and block sunlight from reaching its floor. However, the infiltration of sediments can be mitigated via proper storm drain filtration. A variety of storm drain designs are used in Maryland, which leaves questioning on which storm drain design prevents the most sediment from entering the Bay. Five drain designs were chosen based on most common usage. To replicate each design's drainage holes, a stencil was used to cut out holes in plastic storage box lids. Three gallons of water mixed with 187 grams of dirt, oil, leaves, and grass were slowly poured on each drain to simulate runoff. Data recording the amount of sediment filtered (g) was collected once the water finished draining. Drain designs were then ranked on their average amount of sediment filtered across five trials. The "Traditional Grate" design filtered an average 64.3 g (32%) of sediment from the runoff. The rankings following were "Stone Trench Drain" (62 g), "French Drain" (58.6 g), "Trench Drain" (52.6 g), and "Slot Drain" (50.6 g). These findings support the implementation of more "Traditional Grate" drains to reduce sediment infiltrating watersheds like the Chesapeake Bay.

CANCELLED - <*STUDENT POSTER> CHARACTERIZING ANTIBIOTIC RESISTANCE IN ENVIRONMENTAL E. COLI IN THE ANACOSTIA WATERSHED*

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Coauthors: Suhana Chattopadhyay, UMD; Leena Malayil, UMD; Maureen Mitchell, Anacostia Riverkeepers; Amy R. Sapkota, UMD

Elevated levels of *Escherichia coli* (*E. coli*) can occur in surface water in urban watersheds due to stormwater runoff, wildlife, and potential sewage inputs. The Anacostia River watershed has a long history of urban pollution and water quality impairment, but relatively little is known about the prevalence of antibiotic resistance in environmental *E. coli* populations. This project examined antibiotic resistance patterns in *E. coli* collected from multiple sites throughout the watershed. Water samples were collected from nine monitoring locations representing different environmental conditions, including mainstream and tributaries with historically high or low bacterial contamination. Samples were collected during multiple periods throughout the year to capture potential temporal variation in bacteria presence, and *E. coli* was cultured from the samples. Isolates were tested for susceptibility to six antibiotics and classified as resistant (R), intermediate (I), or susceptible (S). Results showed varying resistance levels among antibiotics and monitoring sites, confirming the presence of antibiotic-resistant bacteria in the watershed. These findings suggest that urban waterways may serve as reservoirs for resistant bacteria and highlight the importance of monitoring water quality and pollution sources in urban watersheds.

<STUDENT POSTER> DYNAMICS OF STREAM NUTRIENT PATTERNS AND SPATIAL VARIATION IN THE ANACOSTIA WATERSHED

Sophie Penix; Smithsonian Environmental Research Center (SERC) (Virginia Tech student who did a summer internship at SERC); penix.sophie@gmail.com

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Despite improvements in infrastructure and best management plants, high nutrient loading into urban watersheds, such as the Anacostia, persists. This can have cascading impacts on the Chesapeake Bay. Aging infrastructure, population density, and impervious development introduce nutrient sources and transportation mechanisms that end up downstream or in larger waterways. Understanding sources of nutrient loading is needed to inform watershed management. We asked how nutrient concentrations varied with land cover and sociodemographics across 20 tributaries of the Anacostia River. Sites were sampled biweekly from May-Sept in 2024 and 2025 and water samples were analyzed for total nitrogen, total phosphorus, nitrate, ammonium, and phosphate. Using mixed-effects linear regression to account for multiple observations, we found that nitrate was best predicted by watershed turfgrass cover, suggesting that fertilizer could be a main source. Phosphate was best predicted by house density and tree canopy over impervious surface, suggesting that leaking wastewater systems were a source. Linking nutrient monitoring data to high-resolution land cover data may help identify urban nutrients sources. Our results suggest that these may differ for nitrogen and phosphorus. Understanding sources of nutrients from urban areas can help identify mitigation strategies.

RESPONSE OF WHITE PERCH TO DEVELOPMENT IN A LONG-TERM MONITORING STUDY OF THE TRED AVON RIVER

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Coauthors: Jeffrey Horne, MD DNR; Shannon Moorhead, MD DNR; and Jim Uphoff, MD DNR

Continuous summer fish community and water quality monitoring have been conducted on the Tred Avon River since 2006, coinciding with major urban development at the headwaters. This watershed is on the cusp of transitioning to suburban development. Increased development in mesohaline subestuaries, such as Tred Avon River, has been found to cause a decline in fish abundance and presence, due to increased hypoxia in deeper channel habitat. White Perch, a recreationally important panfish, spawn in the upper Choptank River and migrate to Tred Avon River as Young-of-Year (YOY) and adults. Over the past 20 years, adult White Perch presence has declined significantly in Tred Avon River, correlating with increased development. No associations were found between YOY White Perch presence and level of development or channel oxygenation. An evaluation of the larger Choptank River watershed indicated that YOY White Perch observed in the Striped Bass Program Juvenile Abundance Index (JAI) surveys correlated with YOY White Perch presence in Tred Avon River. However, adult White Perch presence in Tred Avon River showed a downward trend rather than following the pattern of YOY White Perch from the Choptank JAI. White Perch in the Tred Avon River are subject to numerous habitat suitability changes due to development that impact the predictive relationship between YOY and adult populations.

COMBINING MULTI-AGENCY MONITORING AND 2D HYDRODYNAMIC MODELING TO TRACK *E. COLI* FROM THE 2026 POTOMAC INTERCEPTOR SEWAGE SPILL

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The Potomac River is the main drinking water source for the Washington, DC, metropolitan area. During spills, the Interstate Commission on the Potomac River Basin (ICPRB) predicts contaminant arrival times and concentrations at downstream intakes using one-dimensional tools that cannot show where a plume travels laterally across the river. ICPRB is developing a two-dimensional Delft3D Flexible Mesh model of the Potomac River, built on high-resolution USGS topobathymetric LiDAR and forced by USGS discharge, downstream water level, and tributary inflows. On January 19, 2026, the Potomac Interceptor collapsed near Cabin John, Maryland, initiating a sewage release totaling an estimated 243 million gallons of raw sewage and providing a test case. We compiled about 2,600 *E. coli* samples collected by multiple agencies. The model is coupled offline to D-Water Quality to simulate *E. coli* transport and die-off, with mass conservation verified to within 0.2 percent using a conservative tracer test. We will compare simulated and observed *E. coli* concentrations to assess the roles of dilution, incomplete lateral mixing, and die-off, with implications for spill response, monitoring station placement, and sampling strategies.

AFFORDABLE AND ACCURATE WATER MONITORS CAN DEPLOY FROM COMMERCIAL CRAB BOATS

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Coauthors: Valen Dinh, GaiaXus; Cpt. CJ Canby, F/W Miss Paula; Lee Brindel, GaiaXus

Bottom-water conditions can vary over short distances and times, yet conventional monitoring systems are stationary, expensive, or difficult to use during commercial fishing. We evaluated whether affordable GaiaXus Water Guardian sensors could be integrated into crabbing operations and provide local water-quality data. Five sensors were attached to crab pots aboard the F/V Miss Paula and deployed near Sandy Point State Park in Chesapeake Bay from June 6–11, 2026. They recorded depth, salinity, turbidity, temperature, and relative chlorophyll at 15-minute intervals. Deployment and retrieval took less than 30 seconds per pot and did not interfere with vessel operations. After retrieval, data uploaded automatically to an online portal. Sensor depth, salinity, and temperature patterns were compared with NOAA Station 44063 data. The sensors followed patterns observed at the NOAA buoy and recorded localized fluctuations. Between June 9 and 10, sensor depth and turbidity changed together, suggesting a possible local turbidity-current event not apparent in the distant buoy record. All sensors were recovered clean, with no visible algal growth after five days. These results show that affordable sensors can be deployed from working crab boats to expand monitoring of conditions where crabs are harvested. Further deployments can determine how local conditions relate to catch.

MONITORING NUTRIENT DYNAMICS AND MICROBIAL WATER QUALITY IN THE POTOMAC RIVER AFTER THE 2026 SEWAGE SPILL

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In January 2026, the Potomac River interceptor released an estimated 243 million gallons of untreated sewage, triggering a collaborative monitoring effort among the Potomac Riverkeeper, Smithsonian Environmental Research Center, and University of Maryland. Samples for *E. coli*, nutrient concentrations, water quality, sediment, and environmental DNA were collected above, at, and below the spill site along the Potomac River. After the spill, there was an immediate increase in dissolved organic carbon and total dissolved nitrogen at the spill site, with concentrations exceeding 5 mg C/L and 10 mg N/L, though upstream and downstream concentrations remained low. Elevated nitrate concentrations at all sites in February suggest seasonal patterns unrelated to the spill. Ammonia concentrations remained low until late April, when there was an increase to 0.45 mg N/L at the spill site, possibly a lagged response to the spill. The dynamic nature of nutrient responses to the spill over space and time illustrate the complex interactions between the spill, seasonal variation in hydrology and nutrient chemistry, and other sources of nutrients downstream of the spill including combined sewer overflows and the Anacostia River. Coordinated monitoring efforts can separate spill-related impacts from seasonal patterns and inform future emergency responses and public health management decisions.

CONNECTING COASTAL OBSERVATIONS TO COMMUNITY RESILIENCE: EXPANDING MARYLAND'S WATER MONITORING NETWORK

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Coauthor: Dr. Timothy Canty, Earth System Science Interdisciplinary Center, University of Maryland

Reliable, timely water level observations are critical for understanding coastal hazards, improving situational awareness during storms and extreme events, and supporting communities in preparing and responding to coastal flooding. MARACOOS, in partnership with University of Maryland Climate Resilience Network's Hydronet Program is expanding access to these observations through the Water Level, Waves and Webcams (WWW) network, a coordinated initiative across the Integrated Ocean Observing System (IOOS) Regional Associations to address critical gaps in coastal hazard observations. Across the Mid-Atlantic, the WWW network provides near real-time, hyper-local, openly accessible data, with deployments supporting communities such as Annapolis, Breezy Point, Crisfield, St. Michaels, etc., in Maryland. This presentation will highlight Maryland's water level sensor deployment plan, collaboration with community partners, and demonstrate both the MARACOOS OceansMap platform and the UMD Hydronet dashboard. This complementary effort will show how local observation can provide communities with timely information and access to actionable water level monitoring data.

LONGITUDINAL PERSISTENCE IN WATER QUALITY IMPACTS ACROSS NATURAL AND ANTHROPOGENIC TRANSITIONS

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Coauthors: Sujay Kaushal, UMD; Evan Quinter, Potomac Riverkeeper; Lisa Wu, Potomac Riverkeeper; Catherine Guadlip, Upper Potomac Riverkeeper; Trey Sherard, Anacostia Riverkeeper; Sydney Shelton, UMD; Ashley Dann, UMD; Ashley Mon, UMD; Muqarib Anwar, UMD.

Here we present a synthesis of synoptic water quality data collected over 2023-2026 which ranges in scale from intensive surveys of a small urban watershed (Sligo Creek, MD) to collaborative community science synoptics which traverse much of the Potomac River watershed, enabled by a unique collaboration between UMD and the Potomac, Upper Potomac, and Anacostia Riverkeepers. Along the non-tidal to tidal transition in the Potomac and Anacostia rivers and key tributaries around Washington, D.C., we document consistent longitudinal patterns in dissolved inorganic carbon (DIC), dissolved organic carbon (DOC), total dissolved nitrogen (TDN), *E. coli*, and other metrics. We compare these to rapid response survey data during major pollution and hydroclimatic events, including the 2026 Potomac Interceptor spill, 2025 Potomac jet fuel spill, and various road salt, drought, and storm events. Across scales, we discuss multiple solute tradeoffs, such as coupling between warm season TDN depletion and DOC enrichment in landscape features which increase residence time, while these same features show cold-season tradeoffs between attenuation of salt event peaks and increased chronic salinity at baseflow. Beyond tradeoffs and spatial persistence in water quality, we discuss practical lessons from developing collaborative community science and responsive monitoring approaches.

ASSESSING THE IMPACT OF EDUCATION AND KNOWLEDGE ON SEPTIC AND WELL MAINTENANCE AND FUNCTIONALITY

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Coauthors: Allison Reilly, UMD; Andy Lazur, UMD; Raul Cruz-Cano, Indiana University School of Public Health; Rachel Rosenberg Goldstein, UMD

Septic system and private well users are responsible for conducting maintenance to minimize contamination, thus it is important to understand the association of education and septic and well maintenance practices. We distributed a 40-question survey to septic system and private well users in the Mid-Atlantic region and conducted Fisher's Exact Test and logistic regression to analyze associations between education, maintenance and perception. Preliminary results from 343 respondents found that of the 98% (334/342) who had a septic system, 51% (157/305) reported not conducting maintenance in the last 5 years. Of the 90% (285/315) of respondents who had a well, 41% (114/278) described their well as in "very good" condition, however only 21% (58/280) tested their well in the last year. Seventy-nine percent (229/291) of respondents have not attended any trainings, however 60% (173/286) were interested in attending a training. The logistic regression showed that participants who had not attended trainings for septic systems were significantly less likely to have completed septic system maintenance in the last 5 years compared to participants that had attended trainings (OR=0.33; 95% CI: 0.17, 0.65; $p<0.01$). This research demonstrates that education access can benefit proper septic system maintenance and presents a case for increased education efforts by education providers.

<STUDENT POSTER> ANALYZING THE ROLE OF INVASIVE *DRESSENIA* IN FILTERING POLYETHYLENE TEREPHTHALATE PARTICLES AND DISSOLVED IBUPROFEN

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Coauthors: Linda Tseng, The City College of New York; Walter Bowyer, Hobart and William Smith Colleges (HWS); Nan Crystal Arens, HWS

Two species of *Dressenia* mussel invaded the Great Lakes basin and surrounding river systems in the 1980s, displacing native mussel species as the dominant filter feeder in many lake systems. We ask whether *Dressenia*'s vigorous filtering could contribute to the removal of particulate or dissolved contaminants. We test this by challenging *Dressenia* with 10 μm polyethylene terephthalate (PET) particles, a common microplastic in lake systems, and ibuprofen, a common pharmaceutical found in lakes that receive treated wastewater. *Dressenia* from Seneca Lake in Upstate New York were maintained in laboratory culture. Four replicate groups of 10 mussels each were exposed to 4 mg/L of PET particles labeled with Nile Red dye, while four identical replicates were untreated. Tissue and feces were collected after four days, organic matter removed, and PET concentrations measured using fluorescence microscopy. On average, mussels filtered 23% (± 7.3%) of the PET particles. Of these, they retained 31% while excreting the rest, demonstrating the potential for *Dressenia* to redistribute microplastic particles. Using the same design, we evaluated whether ibuprofen concentration could be reduced by adhesion to PET particles filtered by *Dressenia*. A 1000 μg/L solution of ibuprofen was added to the PET treatment group. There was no significant reduction in ibuprofen concentration after 4 days.

TRACING TIRE TRANSIT: QUANTIFYING TIRE-DERIVED COMPOUNDS RELEASED ON AND AROUND MARYLAND BRIDGES INTO RECEIVING STREAMS

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Coauthors: Andrew Heyes, UMCES, Benjamin Oyler, UMCES, Carys Mitchelmore, UMCES

Tire-derived compounds (TRC) are emerging contaminants that are comprised of both tire additives and their transformation products. These include N-(1,3-Dimethylbutyl)-N'-phenyl-1,4-phenylenediamine (6PPD), an antioxidant that reduces tire degradation, and its oxidized form 6PPD-quinone, which is acutely toxic to some fish species at ng/L concentrations. As tires wear, TRCs are released onto roads and storm events wash them into waterways where light, air, and water rapidly transform them to other compounds, complicating assessments on environmental TRC concentrations. Effective environmental risk assessments demand accurate TRC concentration measurements at potential sources and sinks during storm events to account for short-term storm-flushed as well as chronic sediment-bound TRC exposure. Our study explores TRC presence in the Chesapeake Bay watershed using sample processing techniques that limit post sampling TRC transformations and capture bridge runoff, a theorized TRC source to waterways. Maryland bridges over rivers were sampled before, during, and after storm events to understand TRC stream dynamics. A variety of bridges and stream characters were sampled; samples included runoff, stream water, and sediment for TRC extraction. Early work suggests that bridge character influences TRC load to receiving streams, giving insights on design elements that mitigate TRC impact.

DEVELOPMENT AND APPLICATION OF AN ECOTAXA IMAGE CLASSIFICATION WORKFLOW FOR MARYLAND PHYTOPLANKTON AND HARMFUL ALGAL BLOOM MONITORING USING FLOWCAM 8400

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Monitoring phytoplankton dynamics and Harmful Algal Blooms (HABs) in estuarine systems requires rapid, reliable cell enumeration and taxonomic identification. Traditional manual light microscopy is labor-intensive and limits sample processing throughput, creating challenges for timely water quality management. To streamline workflow capabilities, a machine learning image classification system was developed in EcoTaxa using digital flow imaging micrographs captured by a FlowCam 8400. Water samples collected across Maryland estuarine monitoring sites between 2023 and 2026 were analyzed to generate a comprehensive image classification set encompassing dominant local microalgal taxa and morphotypes. The resulting machine learning system were applied to routine monitoring samples collected from mainstem Chesapeake Bay stations CB3.3C and CB4.3C. The automated pipeline enabled rapid cell counting and morphological sorting, proving particularly effective for accelerating cell density determinations during potentially HAB events. While the current automated workflow successfully reduces analysis time for targeted high-density taxa and early bloom detection, variations in cell orientation, debris, and morphological overlap present challenges for full community characterization. Further refinement of training sets, advanced feature extraction, and taxonomist validation are ongoing.

MAPPING COASTAL WETLAND DATA AVAILABILITY AND CARBON STOCKS IN MARYLAND

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Coauthors: Emma Cotter, SERC; Andre Rovai, SERC; Jaxine Wolfe, SERC

Coastal wetlands serve as important carbon sinks and provide valuable ecosystem services, yet the data needed to quantify and manage these ecosystems are often unevenly distributed and inaccessible to the public. The Coastal Carbon Network maintains and hosts a publicly available synthesis of carbon data from coastal wetland ecosystems. In this presentation, the availability and representation of wetland data across Maryland is examined at a sub-state level, focusing on watershed-level patterns in data quantity, type, utility, habitat representation, and spatial distribution. We assessed where existing datasets provide coverage of MD coastal wetland habitat and identify potential geographic and habitat-specific gaps in publicly available data. Additionally, we synthesized available soil carbon data to visualize carbon stocks across MD watersheds. By examining data availability alongside carbon stocks, this presentation highlights both areas that are well-represented in existing datasets and where additional data collection or publication could improve our understanding of MD coastal carbon resources. This assessment emphasizes how publicly accessible data inventories can identify opportunities to strengthen regional datasets, support future carbon modeling efforts, and improve the accessibility of coastal wetland data for researchers, decision-makers, and community members.

EVALUATING TAMPLING LIMITATIONS AND POSSIBILITIES

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Coauthors: Savannah Domenech, University of Idaho Boise; Jessie Ribera, University of New Mexico; Megan Stallard, SERC; Lydia LaGorga, SERC; Rachael Mady, SERC; Rebecca Hale, SERC

Optical Brightener (OB) Tampling is a quick and low-cost method used to monitor sewage effluent in streams through the submergence of a tampon in stream water and fluorescence under UV exposure to determine the presence or absence of OBs. This would provide a more accessible water quality monitoring alternative to traditional *E. coli* testing. Although this method is successfully used in Texas, our tampling trials in the Anacostia watershed were unsuccessful, with negative OB results even in areas of known sewage discharge. Two positive results at the untreated sewage discharge point suggest that OBs are discharged into streams but are not typically at levels detectable with this method. To pinpoint why we were unsuccessful and better understand the limitations of this tool we quantified detection limits, investigated potential rapid uptake of OBs by background organic matter (OM), assessed the variability in reading the fluorescence of tampons, and tested tampling in streams with high frequency sensors that measured OBs. In this poster, we highlight the results from lab experiments that assessed OB removal by stream and soil organic matter, a focus group to interpret tampon samples, and comparison of tampling results to high frequency sensor OB data. Ultimately, we hope that our results can inform communities when they can use this tool to assess their local waterways.

FIRST MARYLAND DETECTION AND GENETIC CHARACTERIZATION OF THE EPIPHYTIC CYANOBACTERIA, *AETOKTHONOS HYDRILLICOLA*, ON *HYDRILLA* IN ST. MARY'S LAKE, ST. MARY'S COUNTY.

Catherine Wazniak; Maryland Department of Natural Resources; catherine.wazniak@maryland.gov

Coauthors: Susan Wilde, University of Georgia (UGA); Tobias Haymes, UGA; Theresa Hattenrath, New York State Dept of Health

Avian Vacuolar Myelinopathy (AVM) is a fatal neurological disease affecting waterfowl and raptors, caused by the neurotoxin aetokthonotoxin (AETX), which is synthesized by the cyanobacterium *Aetokthonos hydrillicola* growing epiphytically on invasive *Hydrilla verticillata*. It is widespread in the Southeast U.S., especially in Georgia and Florida. We report the first documented detection of *A. hydrillicola* in Maryland, isolated from *Hydrilla* leaves collected in St. Mary's Lake. Initial diagnostic screening via epifluorescent microscopic analysis identified *A. hydrillicola* morphological characteristics, which were subsequently supported by expert evaluation. Molecular confirmation was performed using real-time polymerase chain reaction (RT-PCR), confirming the presence of *A. hydrillicola* DNA. Further analysis identified genes from biosynthetic gene clusters of both aetokthonotoxin (aetxE/aetxA) and aetokthonostatin (aestF/aestK) confirmed the genetic potential of the local strain to synthesize these cyanotoxins. Current work using analytical verification of active, bioaccumulated toxins using high-performance liquid chromatography-tandem mass spectrometry (HPLC/MS) is currently underway. Field sampling is expanding across Maryland to assess the geographic distribution and prevalence of *A. hydrillicola*, providing critical data for wildlife management and ecological risk mitigation.

<STUDENT POSTER> EVALUATING SHIFTS IN ORGANIC MATTER COMPOSITION BEFORE AND AFTER STREAM RESTORATION

Regina Yuengling; University of Maryland (UMD); ryuengli@umd.edu

Coauthors: Lauren Smith, UMD; Theodore Yang, Eleanor Roosevelt High School; Sujay Kaushal, UMD; Muqarib Anwar, UMD; Ashley Mon, UMD; Wes Slaughter, UMD; Ashley Dann, UMD

Urban streams receive variable chemical inputs from natural fluxes and urban development, which can degrade ecosystem processes and increase nutrient loads. Riparian buffer restoration and step-pool conveyance can support the aquatic health of streams via nutrient load and stormwater management, but data tracking biogeochemical shifts in urban streams pre- and post-restoration remains limited. Unlike common indices (TDN, DO, DOC), optical indices provide insight into biogeochemical recovery, which can inform researchers in tracking organic pollution sources and stream health. We conducted longitudinal stream synoptic (LSS) monitoring at 12 sites along the University of Maryland Campus Creek from 2022 to 2026. We analyzed phase 2 of an ongoing Regenerative Stream Conveyance (RSC) project (completed 2026) which focused on creating step-pools and restoring bankside plant life. Spatiotemporal analysis shows an increase in DOM indices corroborated by increased DO and decreased DOC downstream of step-pool restoration, indicating increased local microbial activity. Excitation emission matrix spectroscopy (EEMS) showed changes in stabilized aromatic structures and refractory organic matter following restoration. These findings help evaluate biogeochemical processes altered during stream-floodplain restoration, though further long-term data needs to be collected to confirm trends.

Maryland Water Monitoring Council 2025-2026 Annual Reports

This report summarizes MWMC activities from November 2025 through November 2026.

2025 marked the 31st year for the Council, and 2026 its 32nd year. The Board of Directors continued to guide the Council toward its goals and new members provided fresh ideas that helped move the Council forward. The 2025 Annual Conference drew 475 attendees. Included were a host of exciting talks and posters, and the post-conference social was held at Heavy Seas Brewery in Halethorpe. Committee work continued in earnest, including a number of workshops and webinars. The Council entered 2026 with a renewed commitment to pursue the three Cs – Communication, Coordination and Cooperation - among water monitoring agencies and organizations throughout the State.

Board of Directors

The MWMC Board of Directors has been under the leadership of Byron Madigan (Carroll County) and Mat Pajerowski (United States Geological Survey) serving as Chair and Vice-Chair, respectively. Nominations of prospective Board members to fill five vacant seats have been approved by Josh Kurtz, Maryland Department of Natural Resources Secretary: Mandy DeLeo (Patapsco Heritage Greenway), Tammy Domanski (Anne Arundel Community College), Rebecca Fox (Washington College), Danielle Hankins (Harford County), Elizabeth Hoffman (Maryland Department of Agriculture). Heather Quinn (Maryland Department of Natural Resources MGS) has elected to remain in her seat for a second term, which does not require a vote among the Board. Andy Becker (KCI Technologies) and Nancy Roth (Tetra Tech) seek to continue for another term, and the Board's voting process is underway. Megan Brosh (Department of Environmental Protection and Sustainability) will be leaving her seat on the Board at the end of 2026. Nominations of prospective Board members to fill one vacant seat are underway, and will be submitted for approval following the Board's decision.

Although not a Board member, the Board welcomed Cathy Wazniak (Maryland Department of Natural Resources) in January. Cathy has organized and is chairing the new Lakes Committee. Additionally, Rubina Firdous (Maryland Department of Natural Resources MGS) has taken on leadership of the Groundwater Committee and with the help of Heather Quinn (Maryland Department of Natural Resources MGS) and Mat Pajerowski (United States Geological Survey) has assembled a roster of committee members hailing from a wide range of backgrounds and experiences.

Learn more about the MWMC Board of Directors.

2025 Annual Conference

The 31st Annual Conference was once again held at the Maritime Institute on November 20. With 475 in attendance, the event's theme was Embracing Innovation to Protect and Restore Maryland's Waters. An informative plenary session started with an inspiring talk by Jeremy Werdell (satellite oceanographer), followed by a call to action by Rich Ortt (Maryland Department of Natural Resources). Ken Belt (Natural History Society of Maryland) received the 19th Annual Carl Weber Award. Lindsay Powers (Maryland Department of Natural Resources) received the 9th annual Above and Beyond Award. Session topics included Microbial Source Tracking, Community Science, Blue Carbon, Stormwater Innovations, Restoration, eDNA, Drone Surveys, Agriculture, Student Lightning Talks, and more. Fifty-one talks, a panel discussion, 35 posters (including 10 student posters), 11 vendor exhibits, and a sponsor all contributed to a diverse and well-rounded agenda.

Workshops and Webinars

Stream Monitoring Roundtable

MWMC sponsored the 18th Maryland Stream Monitoring Roundtable at the USGS Water Science Center in Catonsville. The goals of the February 26th event were to 1) discuss who is doing what, where, when and how; 2) avoid potential duplication of effort by sampling at the same stream site; and 3) facilitate data sharing. The Roundtable drew 21 presentations by staff from agencies, consulting firms, academic institutions, and NGOs and 32 attendees onsite and 97 attendees online. Prior to the gathering, presenters provided georeferenced site information to DNR to produce a statewide map of sampling sites in 2026. This map was displayed during the event so participants could examine site overlap, gaps, and sampling protocols to be used during 2026. For more information about the Roundtable, contact Alex Fries at afries@umces.edu.

You're Getting Warmer: Taking the Temperature of Maryland's Waters Workshop

In cooperation with the US Geological Survey's Maryland-Delaware-DC Science Center, the Monitoring and Assessment Committee presented a workshop related to surface water temperatures on April 15th, entitled You're Getting Warmer: Taking the Temperature of Maryland's Waters. The focus of this workshop, which had over 150 registrants attend either in person or virtually, was to discuss current and historic observations of cold-water resources and cold-water species within the state of Maryland, share various case studies examining the fate and transport of thermal energy and impacts within urban and rural areas, and expand awareness to the current status of the aquatic life assessment of Maryland's cold-water resources. There were 17 total presentations given throughout the day related to current monitoring and observations, temperature case studies, regulatory updates, as well as community science and citizen resources.

What's in store for 2026 and 2027?

2026 will be the 32nd year for the Council and this year's annual conference will continue the tradition of offering an excellent opportunity for anyone in the water community to share their research, ideas and contacts. The Conference Planning Committee began planning the November 19 conference in January and the event will feature plenary talks by Lucinda Power (United States Environmental Protection Agency) and Tim Wheeler (Bay Journal). The Community Science Committee plans to hold a workshop in fall 2027 to address the question "How do we turn scientific observations into compelling stories that help communities understand, care, and act?"

Full committee reports can be found following the MWMC Annual Report.

Submitted by Katherine Hanna
MWMC Executive Secretary
October 29, 2026

Maryland Water Monitoring Council
2026 Annual Committee Report
Community Science Committee

Chair

Rupert Rossetti, Octoraro Watershed Association

Committee Mission Statement:

The Community Science Committee works to design and implement programs, activities, and tools to facilitate and improve community science and stewardship. These programs, activities, and tools of the Council will focus on and assist watershed organizations, volunteer monitoring programs, and other non-traditional monitoring communities in Maryland.

2026 Status

The Committee meets virtually every month (currently the 3rd or 4th Wednesday from 4 – 5 pm.) and intends to also meet face-to-face twice a year.

Aside from networking and learning from one another, our primary work as a committee is organizing and holding workshops that address topics of interest to the monitoring community.

On October 8, 2025, the Community Science Committee hosted the Data to Decisions: Why Your Data Matter workshop at the UMBC Technology Center in Halethorpe, Maryland, marking the first workshop of its kind held by the committee since 2016. The workshop convened community science monitoring groups alongside state, federal, and nonprofit partners to explore how community-collected data are used in decision-making processes across Maryland and the Chesapeake Bay watershed. Through facilitated discussion and shared examples, participants examined common barriers to data use, including capacity, funding, volunteer support, and navigating data quality expectations, while highlighting successful pathways where community science data inform regulatory reporting, restoration planning, trend analysis, and public communication. The workshop emphasized the importance of data transparency, standardization, metadata, and collaboration, with a particular focus on connecting community monitoring efforts to broader management and policy decisions.

We are currently developing a workshop for the Fall of 2027, with the following theme (succinctly summarized by Tom Guay, co-Chair): **How do we turn scientific observations into compelling stories that help communities understand, care, and act?**

If you are interested in finding out more, please join us for the last portion of the Community Science Breakout session. You can meet the Committee, provide input on the workshop during the design phase. We welcome new members to the committee.

For more information, please contact Rupert at rupertrossetti@gmail.com or Katherine Hanna at mwmcsecretary.dnr@maryland.gov.

Submitted by Rupert Rossetti
Committee Chair and MWMC Board Member
October 25, 2026

Maryland Water Monitoring Council
2026 Annual Committee Report
Groundwater Committee

Chair

Rubina Firdou, Maryland Department of Natural Resources MGS

2026 Status

The MWMC Groundwater Committee was reactivated in 2026 to bring together professionals working on groundwater-related issues across Maryland and provide opportunities for collaboration and information sharing.

The committee held its first meeting on August 24, 2026, with members representing different agencies and academia. During the meeting, we discussed the committee's goals, ongoing groundwater activities, and areas where we could work together. Members shared their thoughts on important groundwater issues in Maryland and identified several topics of interest, including PFAS, chloride contamination, managed aquifer recharge, saltwater intrusion, and groundwater in fractured-rock settings.

One of our immediate priorities was to increase groundwater representation at the upcoming MWMC Annual Conference. Committee members discussed potential presentation topics and speakers and helped identify groundwater-related research and projects that could be highlighted at the conference.

Moving forward, we would like the committee to serve as a place where members can share information about ongoing and upcoming groundwater projects, monitoring activities, available data resources, and emerging groundwater concerns. We also hope to identify gaps in groundwater monitoring and explore opportunities for collaboration among state and local agencies, universities, and other organizations.

As the committee is just getting started, our focus over the coming year will be on encouraging active participation, holding regular meetings, and identifying a few priority areas where we can work together and make meaningful progress.

Submitted by Rubina Firdous
Committee Chair
October 13, 2026

Maryland Water Monitoring Council
2026 Annual Committee Report
Information Management and Communication Committee

Chair

Thavamani Rajapandi, Coppin State University

No report submitted.

Maryland Water Monitoring Council
2026 Annual Committee Report
Lakes Committee

Chair

Cathy Wazniak and Becky Monahan

Looking ahead to 2027, we are looking for a new co-chair for this committee. If interested, please reach out to catherine.wazniak@maryland.gov

The MD Lakes Committee was activated in January 2026 and has 49 members. Membership is diverse regionally and includes State, Local and private members. The committee held two virtual meetings this year on May 22 and Oct 20. Attendance was 25 and 27 respectively.

Many States have Lake Management Societies (chapters of the North American Lake Management Society, NALMS) to help bring together lake managers, scientists, the public and government officials dedicated to the management, restoration and protection of lakes, reservoirs and their watersheds. Since MD has a long standing MD Water Monitoring Council, a committee was a logical entity to foster cooperation among lake groups and share monitoring/management information. This year's conference will include two dedicated lake-focused sessions.

The committee developed an objective and mission statement. The first meeting included presentations and discussions on Lakes outreach, MWMC conference planning, overview of Lake Assessment in MD and Economic Cost of Harmful Algae Blooms in MD. The second meeting included updates on drought impacts on Baltimore Reservoirs, overview of Lakes in the Integrated Report, Invasive species management, 2026 freshwater harmful algae blooms, Maryland Geological Survey new monitoring capabilities for shallow bathymetry and drone surveys, quality control of ultrasonicator data at Cunningham Falls State Park, and new benthic mat scientific illustrations.

The group will have its first in person get together today during lunch in room Triple Crown Secretariat. Feel free to join us!

Lakes Committee Objective: Sharing information on lake management, assessment, habitat restoration and mitigation of blooms, and planning a session for the MWMC annual conference.

Lakes Committee Mission Statement: The Maryland Lakes Committee is committed to safeguarding the ecological integrity, source water protection, recreational value, and long term resilience of Maryland's lakes and reservoirs. We plan to advance this mission by assessing biotic and abiotic indicators of lake health and watershed by identifying emerging environmental challenges and coordinating science based strategies to mitigate impacts from pollution, climate change, harmful algae blooms, sedimentation, invasive species, and land use pressures. Through collaboration with state agencies, local communities/government, scientific partners and industry representatives, we will work to ensure that Maryland's lakes remain healthy, accessible, and thriving natural resources for generations to come.

Submitted by Cathy Wazniak
Committee Chair
November 6, 2026

Maryland Water Monitoring Council
2026 Annual Committee Report
Monitoring and Assessment Committee

Chair

Byron Madigan, Carroll Co. BRM

2026 Activities and Accomplishments

A workshop specific to surface water temperature, "You're Getting Warmer: Taking the Temperature of Maryland's Waters" was held as a hybrid event on April 15, 2026, at the USGS Water Science Center. The focus of this workshop, which had over 150 registrants attend either in person or virtually, was to discuss current and historic observations of cold-water resources and cold-water species within the state of Maryland, share various case studies examining the fate and transport of thermal energy and impacts within urban and rural areas, and expand awareness to the current status of the aquatic life assessment of Maryland's cold-water resources. There were 17 total presentations given throughout the day related to current monitoring and observations, temperature case studies, regulatory update as well as community science and citizen resources.

The 18th (mostly) Annual Maryland Stream Monitoring Roundtable was held as a hybrid event on February 26, 2026, at the USGS Water Science Center. There were 32 people in attendance at USGS, with an additional 97 attendees online. 21 presentations were given overall by federal, state, and local representatives, as well as academia and non-profits regarding the 'what, where, and when' of planned monitoring for 2026. Mark Trice (DNR) and Molly Westbrook (DNR) collaborated to produce an online map of all submitted data points for 2026 monitoring to assist with potential opportunities for cross agency collaboration. The roundtable was moderated by Alexandra Fries.

Currently, the Monitoring and Assessment subcommittee is in the process of planning their next deliverable, potentially another workshop or individual webinars focusing on monitoring-based discussions.

Submitted by Byron Madigan
Committee Chair and MWMC Board Chair
October 5, 2026

Maryland Water Monitoring Council
2026 Annual Committee Report
Student Committee

Chair

Lindsay DeMarzo, Howard Co. OCS

The committee oversaw the outreach related to the annual conference poster session and student talks, including advertising to local schools, professors, and organizations. Committee members also aided in poster judging during the annual conference.

The student committee hosted a very successful third annual student lightning round during the 2025 conference and looks forward to hosting student sessions into the future. We enjoyed the insightful contributions of our students to the field with eight students presenting in the lighting round and eleven student posters.

The committee also hosted a student career chat in February 2025 in which a panel of water experts answered questions about developing their careers in the field. Students enjoyed the casual atmosphere and ability to gain insight from those in the midst of their careers.

The committee expanded to welcome new members, now at nearly 20 members, and now includes a student attendee to share input directly from the student's perspective.

Submitted by Lindsay DeMarzo
Committee Chair and MWMC Board Member
October 23rd, 2026

Maryland Water Monitoring Council
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