



THE MARYLAND WATER MONITORING COUNCIL
in partnership with the
MARYLAND STREAM RESTORATION ASSOCIATION

presents

THE 29TH ANNUAL CONFERENCE

STEPPING UP OUR EFFORTS

NOW IS THE TIME



2023 MWMC Annual Conference Sponsors and Exhibitors

The Maryland Water Monitoring Council would like to express its gratitude to the Maryland Stream Restoration Association, without whom the Annual Conference would look very different this year.



We would also like to recognize the support of KCI, who again have sponsored the Student Poster Contest and the after-conference social at Heavy Seas Brewery.



Many thanks to our other sponsors and exhibitors.



Be sure to stop by their tables and thank them for their support of the 29th annual conference!

On the Cover - [Snakehead Electroshocking](#) – photo by [Stephen Badger](#)

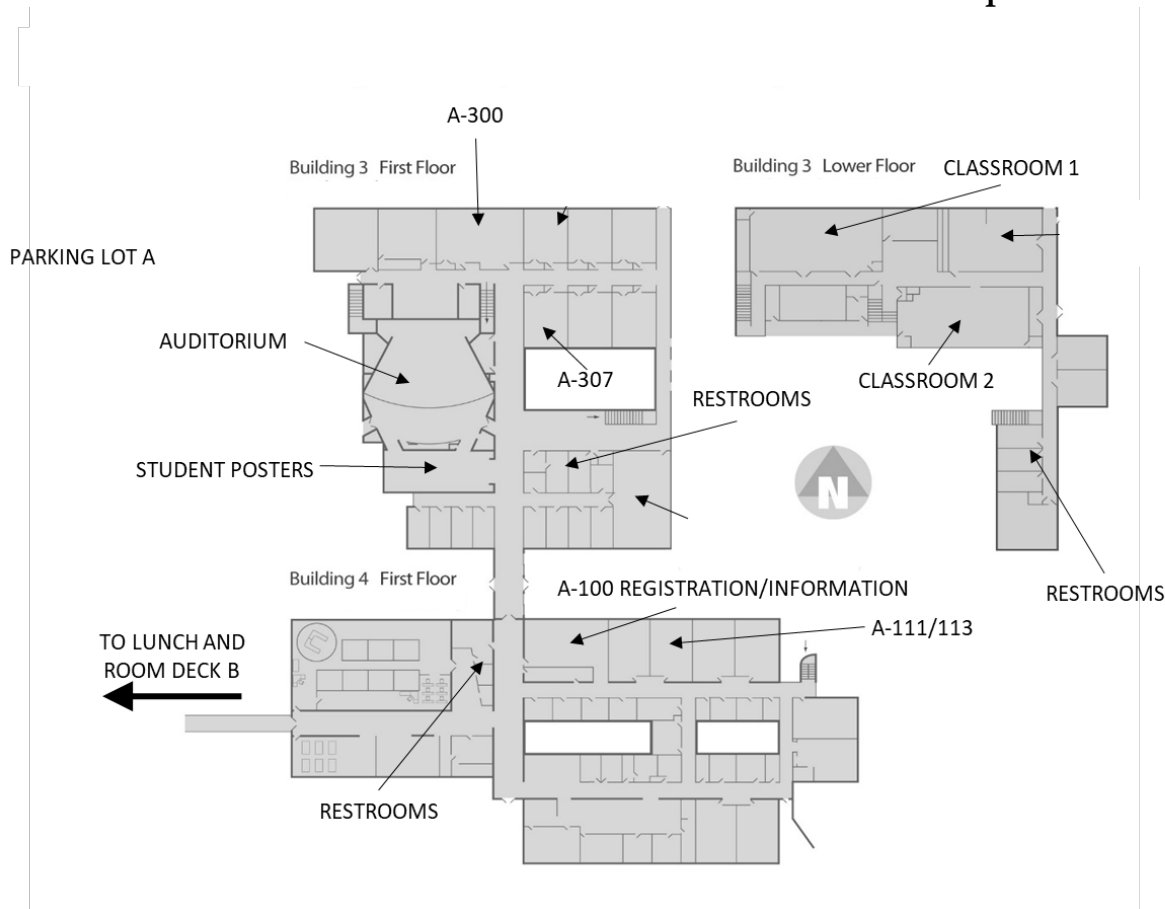
Cover artwork by Katherine Hanna (MD DNR)

MARYLAND WATER MONITORING COUNCIL
29th Annual Conference - Friday, November 17, 2023

Stepping Up Our Efforts: Now is the Time

- 7:30 Registration/Poster Set-up/Continental Breakfast – Registration in Room A-100
Morning Plenary Session (8:30-10:00) in the Auditorium
- 8:30 *MWMC Board Chair's Call to Order* – Matt Stover – Maryland Department of the Environment; Chair, MWMC Board of Directors
- 8:45 *Plenary Speaker – Dr. Dorothy Merritts – Franklin & Marshall College*
- 9:15 *Plenary Speaker – Adam Ortiz – Environmental Protection Agency Region 3 Administrator*
- 9:45 *Carl S. Weber Award* – Clark Howells; Washington Suburban Sanitary Commission
- 10:00 Break/Poster Session – Authors Present

2023 MWMC Annual Conference Floorplan



Thanks to the 2023 MWMC Annual Conference Planning Committee – Andy Becker (KCI), Megan Brosh (Balto. Co.), Lindsay DeMarzo (Howard Co.), Jason Dubow (MDP), Katherine Hanna (MDNR), Clark Howells (Balto. City), Ken Mack (Montgomery Co.), Mike McMahon (MDE), Becky Monahan (MDE), Mat Pajerowski (USGS), Nancy Roth (Tetra Tech), Mark Southerland (Tetra Tech), Matt Stover (MDE), and Mark Trice (MDNR).

Only the primary presenter is listed for oral and poster presentations. The online conference Program contains the full list of authors, co-authors, contact information, and abstracts. The Program can be viewed and downloaded from the MWMC website at www.marylandwatermonitoring.org. Following the conference, this agenda will contain links to presentation files, if available.

Concurrent Sessions - 10:30 –12:00

AUDITORIUM – Restoration I - Moderator: Byron Madigan, Carroll Co. Government

[RE-VISITING THE NATURAL RESOURCE RESPONSE ON ANNE ARUNDEL COUNTY STREAM AND WETLAND SITES POST-RESTORATION - Erik Michelsen, Anne Arundel County Department of Public Works](#)

[BIOLOGICAL RESPONSE TO STREAM RESTORATION - Mark Southerland, Tetra Tech](#)

[A POWER ANALYSIS TOOL IN R TO ENHANCE MONITORING STUDIES - Dong Liang, UMCES Chesapeake Biological Laboratory](#)

Classroom 1 - Applying Data to Inform Protection of High Quality Waters and Watersheds - Moderator: Nancy Roth, Tetra Tech

[GRASSROOTS EFFORTS TO RESTORE SOUTHERN MARYLAND WATERSHEDS - Mary Hoover, ACLT](#)

[ENVIRONMENTAL SITE DESIGN- AN ASSESSMENT OF EFFECTIVENESS IN MEETING WATER QUALITY PROTECTION GOALS - Eric Naibert, Montgomery Co. DEP](#)

[TARGETING AND RESTORATION EFFORTS - WHERE TO START? - Sarah McDonald, USGS Chesapeake Bay Program Office](#)

Classroom 2 - Agriculture and Water Quality Approaching the 2025 Chesapeake Bay TMDL Deadline - Moderator: Ken Staver, UMD Wye Research and Education Center

[MARYLAND AGRICULTURE'S APPROACH TO 2025 TMDL GOALS AND BEYOND - Elizabeth Hoffman, Maryland Department of Agriculture](#)

[CHANGES IN STREAM WATER QUALITY IN SMALL AGRICULTURAL WATERSHEDS BY EXPERIMENTAL BMP APPLICATION - Rebecca Fox, Washington College](#)

[AVOIDING NEGATIVE WATER QUALITY EFFECTS IN THE PURSUIT OF SOIL HEALTH - Ken Staver, UMD Wye Research and Education Center](#)

Room A-300 - Polychlorinated Biphenyls (PCBs) - Moderator: Mat Pajeroski, US Geological Survey

[MARYLAND'S PCB SOURCE TRACKDOWN STUDY IN LOWER BEAVERDAM CREEK - Elisabeth Green, MDE](#)

[PARTICULATE TRANSPORT OF LEGACY CONTAMINANTS IN THE ANACOSTIA RIVER WATERSHED - Trevor Needham, USGS](#)

[PCBS IN FISH AND WATER IN MD: LONG TERM AND SPATIAL TRENDS - Upal Ghosh, UMBC](#)

Room A-111/A-113 - Cutting Edge Biology: Ephemeral Streams, eDNA, and More - Moderator: Richard Mitchell, US Environmental Protection Agency

[SOURCE WATER MACROINVERTEBRATES: INDICATORS TO INFER FLOW REGIMES IN TINY HEADWATERS - Greg Pond, EPA](#)

[IDENTIFYING THE POTENTIAL CO-BENEFITS OF BEST MANAGEMENT PRACTICES \(BMPS\) ON INSTREAM BIOLOGICAL CONDITION USING CAUSAL INFERENCE APPROACHES - Sean Emmons, USGS Eastern Ecological Science Center](#)

[USING METABARCODING DATA FOR BIOLOGICAL ASSESSMENT - Lester Yuan, EPA Office of Water](#)

Concurrent Sessions - 10:30 –12:00 ctd.

Room A-307 – Harmful Algal Blooms - Moderator: Clark Howells, Washington Suburban Sanitary Commission

[THERE'S A NEW TOXIN IN OUR WATERS - Cathy Wazniak, Maryland DNR](#)

[WSSC WATER'S PROACTIVE HAB MONITORING PROGRAM - Steven Nelson, WSSC](#)

[HOW CAN HAB MONITORING SUPPORT DRINKING WATER TREATMENT? - Priscilla To, WSSC](#)

Lunch A - 12:00 – 12:45

Lunch B - 12:45 – 1:30

Poster Session – 1:00 – 1:30

Student Posters to present to judges at 1:00 in the Memorabilia Room

Concurrent Sessions – 1:30 –3:00

AUDITORIUM – Restoration II – Moderator: Nancy Roth, Tetra Tech

[DO ROOTS BIND SOIL? THE COMPLEX ROLE OF RIPARIAN VEGETATION IN BANK STABILITY – Tess Thompson, Virginia Tech](#)

[MARYLAND PORT ADMINISTRATION FOCUSES ON RESTORATION THROUGH THE BENEFICIAL USE AND INNOVATIVE REUSE PROGRAMS – Amanda Peñafiel, Maryland Port Administration](#)

CANCELLED - SHORELINE/WETLAND RESTORATION AND MANAGEMENT FOR WILDLIFE - Christopher Perry, Bourn Environmental

Classroom 1 – Charismatic Megafauna Monitoring – Moderator: Jason Dubow, Maryland Department of Planning

LONG TIME, NO SEA: BOTTLENOSE DOLPHINS IN CHESAPEAKE BAY – Jamie Testa, UMCES Chesapeake Biological Laboratory

[COASTAL MIGRATIONS OF SHARKS AND STINGRAYS – Rob Aguilar, SERC](#)

[ATLANTIC STURGEON RESEARCH ON THE NANTICOKE RIVER – Chuck Stence, Maryland DNR](#)

Classroom 2 – Thermal Impacts: It's Getting Hot In Here! – Moderator: Matt Stover, Maryland Department of the Environment

[THERMAL EVALUATION OF UPLAND STORMWATER BMPS – IMPACT OF DESIGN MODIFICATIONS TO BUFFER STREAM TEMPERATURES IN URBANIZED WATERSHEDS – Byron Madigan, Carroll County Government](#)

[RISING WATER TEMPERATURES IN CHESAPEAKE BAY: RECOMMENDATIONS TO SUPPORT AND ENHANCE MONITORING AND RESEARCH TO ADDRESS IMPACTS TO ECOSYSTEMS – Bruce Vogt, NOAA Chesapeake Bay Office](#)

[POTENTIAL BENEFITS OF POND REMOVAL FOR TROUT CONSERVATION AND RESTORATION IN MARYLAND – Zachary A. Kelly, USGS Eastern Ecological Science Center](#)

Concurrent Sessions – 1:30–3:00 ctd.

Room A-300 – Contributed Talks I – Moderator: Megan Brosh, Baltimore County Environmental Protection and Sustainability

[SAVING BIRDS FROM WINDOW COLLISIONS – Mark Southerland, Safe Skies Maryland](#)

[MD TEMPERATURE TMDL DEVELOPMENT – Anna Kasko, MDE](#)

[QUANTIFYING THE THERMAL REGIME OF A MARYLAND USE CLASS IV STREAM USING A HIGH-FREQUENCY TEMPERATURE SENSOR NETWORK – Claire Welty, UMBC CUERE](#)

Room A-111/A-113 – Contributed Talks II – Moderator: Ken Mack, Montgomery County Department of Environmental Protection

[AN EVALUATION OF THE IMPACT OF SEASON IN THE EXECUTION OF MULTIMETRIC HABITAT ASSESSMENT APPROACHES IN ANNE ARUNDEL COUNTY, MARYLAND – Chris Victoria, Anne Arundel Co. Bureau of Watershed Protection and Restoration](#)

[SAWMILL CREEK: EFFECTS OF URBANIZATION ON FISH BIOLOGICAL INTEGRITY AND COMMUNITY STRUCTURE OVER 30 YEARS – Bryan Perry, Anne Arundel Co. Bureau of Watershed Protection & Restoration](#)

[USING MBSS DATA TO IMPROVE OUR UNDERSTANDING OF FISH SPECIES OF GREATEST CONSERVATION NEED: STRIPED SHINER AND GLASSY DARTER – Tomas Ivasauskas & Greg Mathews, Maryland DNR](#)

Room A-307 – Groundwater – Moderator: Mike McMahon, Maryland Department of the Environment

[THE MARYLAND OBSERVATION WELL NETWORK – Andrew Staley, Maryland DNR](#)

A PRELIMINARY ASSESSMENT OF DRINKING WELL WATER QUALITY ON FARMS IN MARYLAND – Andy Lazur, University of Maryland Extension

[EXPLORING RECYCLED WATER USE FOR IRRIGATION: A POTENTIAL GROUNDWATER CONSERVATION STRATEGY IN MARYLAND'S COASTAL PLAINS – Azbina Rahman, UMD](#)

3:00 – 3:30 Break/Poster Session – Authors Present

3:00 Announcement of Student Poster Award Winners in the Auditorium

Concurrent Sessions – 3:30–4:30

AUDITORIUM – Restoration III – Moderator: Brian Smith, Maryland Department of Natural Resources

[APPLYING FLOATING WETLAND TECHNOLOGY TO POST-INDUSTRIAL WATERFRONTS – Charmaine Dahlenburg, National Aquarium](#)

[RESTORATION OF MASONVILLE COVE FROM AN ILLEGAL DUMP TO AN URBAN WILDLIFE REFUGE – Jessica Keicher, MES](#)

[MEMORIES OF THE SOILS: ASSESSMENT OF POST-RESTORATION FLOODPLAINS AND NITROGEN REMOVAL EFFECTIVENESS – Joe Galella, University of Delaware](#)

Concurrent Sessions – 3:30 –4:30 ctd.

Classroom 1- Reintroduction Projects – Moderator: Ken Mack, Montgomery County Department of Environmental Protection

[RESULTS OF FAIRFAX COUNTY'S STREAM RESTORATION MACROINVERTEBRATE STOCKING PILOT STUDY – Jonathan Witt, Fairfax Co. Watershed Assessment Branch](#)

[FRESHWATER MUSSEL AUGMENTATION AND REINTRODUCTION IN MARYLAND – Matt Ashton, Maryland DNR](#)

Classroom 2 – Waterkeeper Litigation Case Studies – Moderator: Jason Dubow, Maryland Department of Planning

REIMAGINE MIDDLE BRANCH: AUTHENTIC COMMUNITY ENGAGEMENT FOR ENVIRONMENTAL JUSTICE – Brad Rogers, South Baltimore Gateway Partnership

[MONITORING WATER POLLUTION WITH DRONE TECHNOLOGY – Brent Walls, Upper Potomac Riverkeeper](#)

[WATER QUALITY MONITORING AND THE CLEAN WATER ACT BALTIMORE WWTPS CASE STUDY - Angela Haren, Chesapeake Legal Alliance](#)

Room A-300 – Per- and Polyfluoroalkyl Substances (PFAS) – Moderator: Becky Monahan, Maryland Department of the Environment

[PFAS IN MARYLAND'S COMMUNITY WATER SYSTEMS – Diana Kremer, MDE](#)

[TOTAL OXIDIZABLE PRECURSOR ASSAY FOR PFAS: IMPROVING TRANSFORMATION, RECOVERY, AND THROUGHPUT FOR SOIL SAMPLES – Lee Blaney, UMBC](#)

[PFAS: ONGOING EFFORTS WITHIN THE TOXIC CONTAMINANT WORKGROUP OF THE CHESAPEAKE BAY PROGRAM PARTNERSHIP – Emily Majcher, USGS](#)

Room A-111/A-113 – Student Lightning Talks – Moderator: Lindsay DeMarzo, Howard County Office of Community Sustainability

THE IMPORTANCE OF PRE-RESTORATION MONITORING: DESIGNING THE MONITORING STUDY AT EMORY WATERS NATURE PRESERVE – Zoe Jarvis, University of Maryland, Jug Bay Wetlands Sanctuary

MODELING THE CATCHMENT-SCALE EFFECTIVENESS OF RESIDENTIAL RAIN GARDENS FOR STORMWATER MANAGEMENT – Benjamin Daniels, UMBC

FILTERING SOLUTIONS: SAND FILTERS VS. WET PONDS IN STORMWATER MANAGEMENT - Garrett Tucker, McDaniel College

A-307 – Stormwater – Moderator: Stewart Comstock, Maryland Department of the Environment

[EFFECTIVENESS OF STORMWATER MANAGEMENT PRACTICES IN PROTECTING STREAM CHANNEL STABILITY – Tess Thompson, Virginia Tech](#)

[LONG TERM EFFECTIVENESS OF GREEN STORMWATER INFRASTRUCTURE AT PROJECT AND WATERSHED SCALES – Keith Eshleman, UMCES Appalachian Laboratory](#)

REVERSING THE HYDROLOGIC LEGACY OF DISTURBED COMPACTED URBAN SOILS – Stu Schwartz, UMBC

4:30 Adjourn –



SOCIAL AT HEAVY SEAS BREWERY STARTING AT 5:00 (registration required)

Posters

ASSESSING AND UNDERSTANDING SPATIOTEMPORAL VARIATION IN STABLE HYDROGEN AND OXYGEN ISOTOPE VALUES OF MARYLAND'S RIVERS - Syeda Sadia Ali, UMCES Chesapeake Biological Laboratory

INFLUENCE OF HISTORIC AND CURRENT LAND USE PRACTICES ON PCB CONTAMINATION OF SOILS AND STORMWATER SEDIMENTS IN THE CHESAPEAKE BAY WATERSHED - Yongcheng Cao, Department of Civil and Environmental Engineering, University of Maryland, College Park

A SIX-YEAR FIELD CASE STUDY: DYNAMICS OF ENHANCED TCE DECHLORINATION - Shih-Huai (Lora) Cheng, University of Maryland, College Park

PATAPSCO RIVER REPORT CARD: AN ANNUAL EXPLORATION OF WATER QUALITY AND ENVIRONMENTAL STEWARDSHIP - Amanda DeLeo, Patapsco Heritage Greenway

NUTRIENT ANALYTICAL SERVICES LABORATORY - Jerry Frank, UMCES Chesapeake Biological Laboratory

CENTER FOR THE STUDY OF ANTHROPOGENIC CHANGES IN ESTUARINE SYSTEMS (ACES) - Michael Gonsior, UMCES Chesapeake Biological Laboratory

<STUDENT POSTER> THE IMPORTANCE OF PRE-RESTORATION MONITORING: DESIGNING THE MONITORING STUDY AT EMORY WATERS NATURE PRESERVE - Zoe Jarvis, University of Maryland, Jug Bay Wetlands Sanctuary

A BIOSUSTAINABLE MICROFLUIDIC ELECTROCHEMICAL SENSOR FOR REAL-TIME MONITORING OF NITRATE IN GROUNDWATER AND STREAMS - Revati Kadolkar, University of Maryland Baltimore County

PRESENCE OF POLYCHLORINATED BIPHENYLS AND PCB TRANSFORMING BACTERIA IN STORMWATER - Birthe V. Kjellerup, University of Maryland

CITY AND NEIGHBORHOOD SCALE WASTEWATER-BASED EPIDEMIOLOGY MONITORING AND MODELING OF SARS-CoV-2, INFLUENZA A, AND RSV IN MARYLAND - Yuzhu Mao, University of Maryland, College Park

QUANTIFYING HIGH-FREQUENCY STREAM WATER QUALITY ALONG AN URBAN-TO-RURAL GRADIENT - Mary McWilliams, UMBC/CUERE

MONITORING IMPACTS OF SUBURBAN DEVELOPMENT ON STREAM HEALTH IN THE CLARKSBURG SPECIAL PROTECTION AREA, MARYLAND - Marina Metes, U.S. Geological Survey

EVALUATION OF INTERNAL SOURCES OF NUTRIENTS IN MARYLAND RESERVOIRS EXPERIENCING HARMFUL ALGAL BLOOMS - Andrea Pain, UMCES Horn Point

IMPROVING FRESHWATER MUSSEL PROPAGATION WITH NITRIFYING BACTERIA - Katherine Philipp, MD DNR

A NEW TOOL TO EMPOWER CITIZEN SCIENTISTS AND STUDENTS IN WATER QUALITY RESEARCH - Dietrich Ruehlmann, GaiaXus LLC

CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS AT THE UMCES CHESAPEAKE BIOLOGICAL LABORATORY (CBL) - Johan Schijf, UMCES Chesapeake Biological Laboratory

CHESAPEAKE BAY WATER WATCH: CITIZEN SCIENTISTS ENABLING SATELLITE REMOTE SENSING OF WATER QUALITY - Tara Sill, Smithsonian Environmental Research Center

VISUALIZING THERMAL FLUCTUATIONS MEASURED BY A HIGH FREQUENCY SENSOR NETWORK IN A MARYLAND USE CLASS IV STREAM - Nick Simeone, UMBC/CUERE and GES

SEPTIC TO SEWER? JUSTICE-FOCUSED STRATEGIES FOR ADDRESSING COASTAL SEPTIC SYSTEM FAILURES UNDER SEA LEVEL RISE AND INCREASED FLOODING - Emily Speierman, University of Maryland, College Park

<STUDENT POSTER> MICROPLASTICS IN THE PATAPSCO RIVER - Olivia Sunde, McDaniel College

<STUDENT POSTER> FILTERING SOLUTIONS: SAND FILTERS VS. WET PONDS IN STORMWATER MANAGEMENT - Garrett Tucker, McDaniel College

PREVENTION AND TREATMENT OF PERSISTENT ORGANIC POLLUTANTS IN STORMWATER AND SEDIMENT - Chen Yuan, University of Maryland