



**28<sup>th</sup>**

*Annual Conference*

*Maritime  
Conference  
Center  
Linthicum,  
Maryland*

**WHAT  
ARE  
YOU  
DRINKING?**

*Protecting the Source*

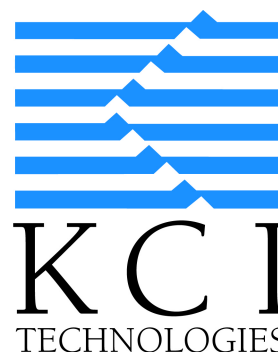
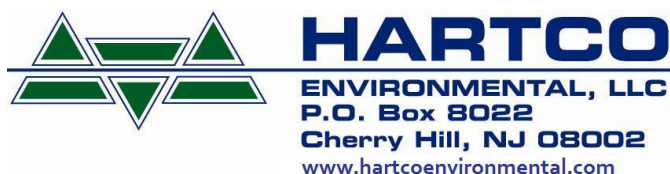
*December 15<sup>th</sup>, 2022*



## 2022 MWMC Annual Conference Sponsors and Vendors

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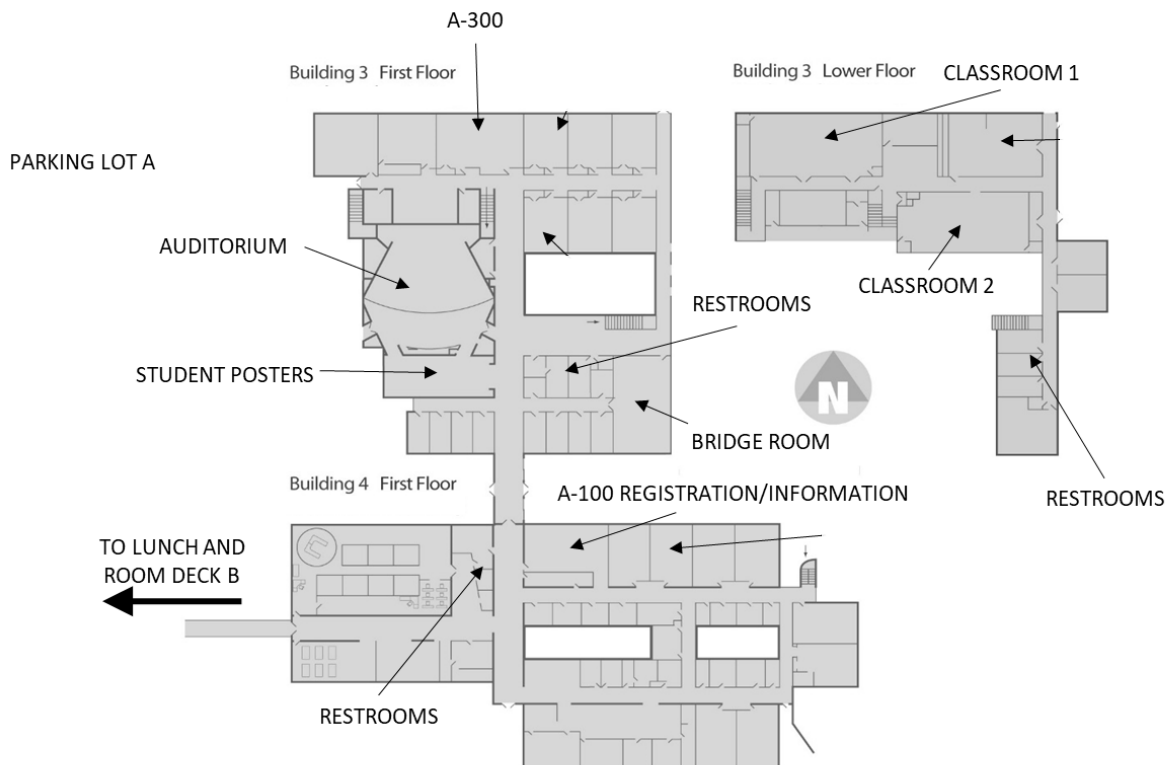
On the Cover - [Down Stream](#) - photo by Erika Sneeringer  
Cover artwork by Katherine Hanna (MD DNR)

**MARYLAND WATER MONITORING COUNCIL**  
**28th Annual Conference - Thursday, December 15, 2022**

**The 28th Annual MWMC Conference – What Are You Drinking? Protecting the Source**

- 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* – Mike Nardolilli – Executive Director, Interstate Commission on the Potomac River Basin
- 9:15     *Plenary Speaker* – Lee Currey – Director, Water and Science Administration, Maryland Department of the Environment
- 9:45     *Carl S. Weber Awards* – Clark Howells; City of Baltimore
- 10:00    Break/Poster Session – Authors Present

**2022 MWMC Annual Conference Floorplan**



Thanks to the 2022 MWMC Annual Conference Planning Committee – John Anthony (MDE), Andy Becker (KCI), Megan Brosh (Balto. Co.), Lindsay DeMarzo (Howard Co.), Davonte Douglas (MDE), Jason Dubow (MDP), Katherine Hanna (MDNR), Clark Howells (Balto. City), Ken Mack (Montgomery Co.), Mike McMahon (MDE), Becky Monahan (MDE), Mat Pajerowski (USGS), Robert Peoples (MDE), Mark Southerland (TetraTech), Matt Stover (MDE), and Mark Trice (MDNR)

Only speakers are listed for oral 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](http://www.marylandwatermonitoring.org). Following the conference, this agenda will contain links to presentation files, if available.

### *Concurrent Sessions - 10:30 –12:00*

<b>AUDITORIUM - Stormwater BMPs and Stream Restoration - Moderator: Michael Williams, University of Maryland</b>
Robert Hilderbrand - UMCES - THERMAL PROPERTIES OF DIFFERENT STORMWATER BEST MANAGEMENT PRACTICES
Keith Eshleman - UMCES - DETECTING AND UNDERSTANDING HYDROLOGIC CHANGE IN DEVELOPING WATERSHEDS: IS GREEN STORMWATER INFRASTRUCTURE MAKING A DIFFERENCE?
Michael Williams - UMD - PHASE I OF THE CAMPUS CREEK RESTORATION: COMPARISON OF ITS POLLUTANT REDUCTION CAPABILITY WITH OTHER RSCS

<b>Bridge Room - Maryland Biological Stream Survey I - Moderator: Scott Stranko, Maryland DNR</b>
Kyle Hodgson - MDNR - SUBJECT TO CHANGE: MARYLAND'S BENTHIC IBI AND BENTHIC MACROINVERTEBRATE TRENDS OVER A 14-YEAR PERIOD
Mary Genovese - MDNR - WATER CHEMISTRY OF MARYLAND STREAMS: QUANTIFYING CHANGES IN STREAM HEALTH OVER TIME
Mia Lenzenweger - MDNR - ANALYZING THE PHYSICAL HABITAT PATTERNS OF MARYLAND'S STREAMS

<b>Classroom 1 - Roles of Utilities - Moderator: Clark Howells, City of Baltimore</b>
Josh Weiss - Hazen and Sawyer - DEVELOPING A COMPREHENSIVE WATERSHED MANAGEMENT PLAN FOR BALTIMORE'S WATER SUPPLY RESERVOIRS
Sara Tomlinson - Baltimore Metropolitan Council - REGIONAL PLANNING FOR SOURCE WATER PROTECTION
Edward Cope - AA Co. - WELLHEAD PROTECTION FOR ANNE ARUNDEL COUNTY DPW AND PRIVATE WELLS

<b>Classroom 2 - Microplastics and Other Contaminants - Moderator: Becky Monahan, Maryland Department of the Environment</b>
Bob Murphy - TetraTech - MICROPLASTICS IN THE POTOMAC AND ANACOSTIA RIVERS
Johanna Gemperline - Maryland Geological Survey - IDENTIFICATION OF CHLORIDE SOURCES IN GROUNDWATER
Dr. Christine Knauss - UMCES - DETECTING AND IDENTIFYING MICROPLASTICS IN ENVIRONMENTAL SAMPLES

<b>A-300 - Salt - Moderator: Lindsay DeMarzo, Howard County Office of Community Sustainability</b>
Nicole Horvath - WSSC - EMBRACING REGIONAL COLLABORATION FOR SALTING AWARENESS
Nicole Christ - MDE - MDE SALT MANAGEMENT PROGRAMS
Kyle Hurley - Towson U. - QUANTIFYING FOUR DECADES OF CHLORIDE INPUTS TO THE BALTIMORE CITY DRINKING WATER RESERVOIRS

**Lunch 12:00 - 1:30**

**Poster Session - 1:00 - 1:30**

**Student Posters to present to judges at 1:00**

## *Concurrent Sessions - 1:30 –3:00*

<b>AUDITORIUM - Stream Restoration - Moderator: Michael Williams, University of Maryland</b>
Chris Ruck - Fairfax Co. - MEASURING URBAN STREAM RESTORATION SUCCESS: PROCESSES, GOALS, MONITORING, AND REGULATIONS MAY CONFOUND "ECOLOGICAL LIFT"
Katrina Napora - USGS - URBAN STREAM-FLOODPLAINS INCREASE SOIL PHOSPHORUS AND CARBON RETENTION ALONG A CHRONOSEQUENCE OF RESTORED STREAMS IN FAIRFAX COUNTY, VA, USA
Denise Clearwater - MDE - STREAM CORRIDOR RESTORATION AND UNINTENDED CONSEQUENCES

<b>Bridge Room - Maryland Biological Stream Survey II - Moderator: Scott Stranko, Maryland DNR</b>
Anastasia Simpson - MDNR - TRENDS IN MARYLAND FRESHWATER FISH ASSEMBLAGES OVER A 14-YEAR PERIOD ILLUSTRATE A CHANGING ENVIRONMENT
Tomas Ivaskauskas - MDNR - USING MBSS DATA TO IMPROVE OUR UNDERSTANDING OF FISH SPECIES OF GREATEST CONSERVATION NEED: AMERICAN BROOK LAMPREY AND PEARL DACE
Jackie Sivalia - MDNR - USING MBSS DATA TO ASSESS CONDITIONS AND TRENDS IN MARYLAND'S STRONGHOLD WATERSHEDS: ANTIETAM CREEK

<b>Classroom 1 - Vernal pools -- A Yes In My Backyard (YIMBY) Ecosystem - Moderator: Mark Southerland, Tetra Tech</b>
Mark Southerland - Tetra Tech - VERNAL POOLS AS BACKYARD ECOSYSTEMS AND HOW TO FIND THEM IN THE PATAPSCO VALLEY
Jorge Bogantes Montero - Anacostia Watershed Society - VERNAL POOL CONSERVATION IN THE ANACOSTIA RIVER WATERSHED AND THE DISTRICT OF COLUMBIA
Rachel Gauza - M-NCPPC - CONSERVATION ACTION AT YOUR FINGERTIPS: DOCUMENTING EPHEMERAL WETLANDS USING A TIERED APPROACH IN ARCGIS SURVEY123

<b>Classroom 2 - TMDLs - Moderator: Nancy Roth, Tetra Tech</b>
Marty Hurd - Fairfax Co. - FAIRFAX COUNTY'S USE OF THE NORTHERN VIRGINIA SALT MANAGEMENT STRATEGY (SaMS) TO ADDRESS THE TMDL FOR CHLORIDE IN ACCOTINK CREEK, VA
Mark Sievers - TetraTech - SEEING THE FOREST FOR THE TREES: INCORPORATING TREE PLANTING AND REFORESTATION INTO LOCAL TMDL WIPS
Douglas Griffith - AA Co. - PCB TMDL IMPLEMENTATION – MONITORING PCBs IN THE SAWMILL CREEK (ANNE ARUNDEL COUNTY, MD) WATERSHED

<b>A-300 - Contributed Talks - Moderator: Jason Dubow, Maryland Department of Planning</b>
Zach Clifton - USGS/DOEE - WHAT LIES BENEATH: INVESTIGATING PRE-COLONIAL RIPARIAN ECOSYSTEMS IN THE ATLANTIC COASTAL PLAN, MARYLAND, USA
Sadie Drescher - CBT - POOLED MONITORING INITIATIVE - WHAT WE HAVE ACCOMPLISHED TOGETHER
Sujay Kaushal - UMD - FRESHWATER SALINIZATION SYNDROME: RISK FACTORS, STAGES, AND MANAGEMENT

**3:00 – 3:30 Break/Poster Session – Authors Present – Announcement of Student Poster Award Winners (Auditorium)**

### *Concurrent Sessions - 3:30 –4:30*

#### **AUDITORIUM - Urban Runoff and Water Quality - Moderator: Michael Williams, University of Maryland**

Jackie Hoban & Erin McArdle - Montgomery Parks - MANAGING URBAN RUNOFF: NON-STRUCTURAL END-OF-PIPE STRATEGIES ON PARKLAND

Zachary Clifton - USGS/DOEE - EXAMINING SURFACE AND SUBSURFACE SEDIMENT SOURCES AND TRANSPORT PROCESSES IN AN URBAN WATERSHED WITH AN ENTIRELY BURIED STREAM NETWORK, WASHINGTON, D.C., USA

Alex Soroka - USGS - THE MARYLAND RIVER INPUT MONITORING PROGRAM: AN UPDATE ON NUTRIENT LOADS AND TRENDS

#### **Bridge Room - Maryland Biological Stream Survey III - Moderator: Scott Stranko, Maryland DNR**

Lindsay Powers - MDNR - EVALUATING A REGENERATIVE STORMWATER CONVEYANCE STREAM RESTORATION AND ITS EFFECTS ON WATER QUALITY AND BENTHIC MACROINVERTEBRATES: A CASE STUDY AT MUDDY CREEK

Ally Bartell - MDNR - EVALUATING STREAM RESTORATION EFFECTIVENESS: WATER QUALITY AND BIOLOGY AT AN UNNAMED TRIBUTARY TO THE SASSAFRAS RIVER

William Harbold - MDNR - MBSS DOCUMENTS INCREASED PASSAGE OF AMERICAN EELS AND OTHER MIGRATORY FISH IN THE PATAPSCO RIVER FOLLOWING DAM REMOVAL

#### **Classroom 1 - Forestry and Agriculture Best Management Practices - Moderator: Ken Staver, University of Maryland**

Elizabeth Hoffman - MDA - MARYLAND AGRICULTURE - PROMOTING AND ACHIEVING STREAM HEALTH

Nancy Roth - TetraTech - FARMS, FIELDS, AND FISH: A LANDSCAPE PERSPECTIVE

Bill Lamp - UMD - INSECT EVOLUTION IN STREAM AND RIVER ECOSYSTEMS AND THE CONSEQUENCES OF GLOBAL CHANGE

#### **Classroom 2 - Environmental Justice - Moderator: Megan Brosh, Baltimore County DEPS**

Briana Yancy - USEPA - DEIJ IN THE CHESAPEAKE BAY

Leah Staub - USGS - WHAT DO OUR EXISTING WATER QUALITY MODELS AND EXISTING MONITORING NETWORKS TELL US ABOUT CONDITIONS IN VULNERABLE COMMUNITIES?

Priscila B. R. Alves - UMD - ADDRESSING WATER ISSUES AND ENVIRONMENTAL JUSTICE WITH PARTICIPATORY APPROACHES

#### **A-300 - Climate Change - Moderator: Byron Madigan, Carroll County**

Jason Dubow - MDP - WATER RESOURCES ELEMENT GUIDANCE UPDATE: BEST PRACTICES FOR INTEGRATING CLIMATE CHANGE, IDENTIFYING SUITABLE RECEIVING WATERS

Srinidhi Gadiyaram - Centennial High School - HOW IS WATER AFFECTED BY CLIMATE, FLORA, AND FAUNA

Barnett Rattner - USGS - DO HARMFUL ALGAL BLOOMS ADVERSELY AFFECT WILDLIFE IN THE CHESAPEAKE BAY?

## *Posters*

<STUDENT POSTER> DOES ECTOPARASITE LOAD IN BND DEPEND UPON STREAM URBANIZATION OR PERSONALITY?  
- Kara Branstad, Towson University, [kbranst1@students.towson.edu](mailto:kbranst1@students.towson.edu)

<STUDENT POSTER> TRACKING HORSESHOE CRAB POPULATIONS WITH DNA BARCODING - Emily Ernst, Anne Arundel Community College Environmental Center, [erernst@aacc.edu](mailto:erernst@aacc.edu)

ASSESSING IRON ECOTOXICITY IN REGENERATIVE STREAM-WATER CONVEYANCE SYSTEMS IN ANNE ARUNDEL COUNTY - Megan Gaesser, Towson University, [mgaess1@students.towson.edu](mailto:mgaess1@students.towson.edu)

WATER MONITORING IN THE GUNPOWDER RIVER AND WATERSHED - Jenn Galler, Gunpowder River Keeper, [jgaller1112@gmail.com](mailto:jgaller1112@gmail.com)

<STUDENT POSTER> THE USE OF BENTHIC MACROINVERTEBRATES AS BIOINDICATORS OF WATER QUALITY IN FRESHWATER STREAMS - Makala Harrison, Mount St. Mary's University, [m.harrison@email.msmary.edu](mailto:m.harrison@email.msmary.edu)

BROOK TROUT LIMITED BY TEMPERATURE RATHER THAN NON-NATIVE TROUT IN A MARYLAND STREAM - Nathaniel (Than) Hitt, USGS Eastern Ecological Science Center, [nhitt@usgs.gov](mailto:nhitt@usgs.gov)

LONG-TERM EFFECTS OF URBANIZATION ON BLACKNOSE DACE SWIMMING PERFORMANCE - Jastine Honea, Towson University, [jhonea1@students.towson.edu](mailto:jhonea1@students.towson.edu)

THE VULNERABILITY OF ANNE ARUNDEL COUNTY ROAD TRANSPORTATION NETWORK TO FUTURE RELATIVE SEA LEVEL RISE - Sotonye Ikiriko, Morgan State University, [soiki1@morgan.edu](mailto:soiki1@morgan.edu)

THE IMPACT OF STREAM RESTORATION ON SEED DISPERSAL ACROSS FLOODPLAINS - Sara Kramer, Towson University, [skrame10@students.towson.edu](mailto:skrame10@students.towson.edu)

RAINWATER HARVESTING WEBINARS TO INCREASE KNOWLEDGE - Tacilorae Levell-Young, University of Maryland- College Park, Maryland Institute for Applied Environmental Health, [tlevell@umd.edu](mailto:tlevell@umd.edu)

RELATIVE SEA LEVEL RISE PROJECTION FOR BALTIMORE BASED ON TIDE GAUGE AND SATELLITE ALTIMETRY MEASUREMENTS - Yi Liu, Morgan State University, [yi.liu@morgan.edu](mailto:yi.liu@morgan.edu)

MEASURING HEADWATER STREAM INCISION IN THE MARYLAND PIEDMONT USING LIDAR - Marina Metes, U.S. Geological Survey, [mmetes@usgs.gov](mailto:mmetes@usgs.gov)

CHESAPEAKE BAY WATER WATCH: CITIZEN SCIENTISTS ENABLING SATELLITE REMOTE SENSING OF WATER QUALITY - Patrick Neale, Smithsonian Environmental Research Center, [nealep@si.edu](mailto:nealep@si.edu)

IMPACTS OF URBANIZATION AND SALT APPLICATION ON BENTHIC COMMUNITIES AND WATER QUALITY IN RED RUN WATERSHED OVER TWO DECADES OF URBAN DEVELOPMENT, Nguyen Tien Anh Quach, Towson University, [nquach1@students.towson.edu](mailto:nquach1@students.towson.edu)

<STUDENT POSTER> FACTORS INFLUENCING THE DISTRIBUTION AND ABUNDANCE OF FAIRY SHRIMP IN VERNAL POOLS, CORCORAN WOODS EXPERIMENTAL FOREST - Shannon Pearce, Anne Arundel Community College, [sbpearce@mymail.aacc.edu](mailto:sbpearce@mymail.aacc.edu)

<STUDENT POSTER> YOUTH CLIMATE INSTITUTE AMBASSADORS INVESTIGATE DIFFERENCES IN STREAM TEMPERATURE IN HOWARD COUNTY FRESHWATER STREAMS - Malachi Peavey, Youth Climate Institute Certified Ambassador, [malachi.i.p.1@icloud.com](mailto:malachi.i.p.1@icloud.com)

INITIAL LOOK: SAWMILL CREEK BIOLOGICAL INTEGRITY PROJECT - Bryan Perry, Anne Arundel County Bureau of Watershed Protection and Restoration, [pwper85@aacounty.org](mailto:pwper85@aacounty.org)

PFAS IN THE CHESAPEAKE BAY AND DELMARVA REGION - Michella Salvitti, University of Maryland Eastern Shore, [mpsavitti@umes.edu](mailto:mpsavitti@umes.edu)

SURVEY OF THE BENTHIC ANNELID COMMUNITY IN FORESTED AND URBANIZED REACHES OF A FIRST ORDER MARYLAND STREAM - Andrea H. Shirdon, University of Maryland, [ashirdon@terpmail.umd.edu](mailto:ashirdon@terpmail.umd.edu)

DETERMINING THE IMPACT OF WELL MAINTENANCE, CONDITION, TYPE, AND LOCATION FACTORS ON E. COLI AND TOTAL COLIFORM IN MARYLAND FARM PRIVATE DRINKING WATER WELLS - Cameron Smith, University of Maryland College Park, Maryland Institute of Applied Environmental Health, [csmith51@terpmail.umd.edu](mailto:csmith51@terpmail.umd.edu)

ACTIVITIES BEING CONDUCTED BY THE MARYLAND DEPARTMENT OF NATURAL RESOURCES TO SUPPORT FRESHWATER MUSSEL RESTORATION IN THE SUSQUEHANNA RIVER BASIN - Zach Taylor, Maryland Department of Natural Resources, [zachary.taylor@maryland.gov](mailto:zachary.taylor@maryland.gov)

PREDICTIVE E. COLI MODELING AT LAKE LINGANORE IN FREDERICK COUNTY - Jill Tysse, Hood College, [tysse@hood.edu](mailto:tysse@hood.edu)

MONITORING STREAM THERMAL RESPONSE TO SUMMER STORMS IN A HIGHLY URBANIZED WATERSHED USING A HIGH-DENSITY, HIGH-FREQUENCY SENSOR NETWORK - Claire Welty, UMBC, Center for Urban Environmental Research and Education (CUERE), and Dept. of Chemical, Biochemical, and Environmental Engineering, [weltyc@umbc.edu](mailto:weltyc@umbc.edu)