



Pooled Monitoring Forum: Restoration Research to make Science and Regulatory Connections

Wednesday, June 16, 2021, from 9 AM to 5 PM

The Maryland Department of Natural Resources, the Maryland Department of the Environment, the Maryland Department of Transportation's State Highway Administration, the National Fish and Wildlife Foundation through the Environmental Protection Agency's Chesapeake Bay Program Office, Montgomery County Department of Environmental Protection, Anne Arundel County, the Chesapeake Bay Trust, and other Pooled Monitoring partners are excited to invite you to a forum in which the most recent restoration research will be presented and discussed. At this forum, regulatory staff and practitioners will have an opportunity to ask new questions and clarify the current state of scientific knowledge. Topics include efficacy of research practices for water quality and biological resources, potential chemical/physical impacts, effectiveness of stream restoration practices, climate change impacts/solutions, and "trade-offs." The speakers and audience will be charged with discussing how this science is used or could be used by regulators, discussing how the existing scientific knowledge could be translated to be useful for regulators and others, and identifying what questions remain unanswered.

This Pooled Monitoring Initiative's Restoration Research award program is a follow up item from a series of similar conversations held in 2012, 2013, 2014, and 2015, when the needs of both regulators and practitioners were articulated, and important questions asked and prioritized. The questions were posed to the research community to garner their help through the program that is now known as the Pooled Monitoring Initiative that asks questions through the Restoration Research award program. This forum keeps the promise made following those prior meetings to work towards answering the priority questions.

The Pooled Monitoring Program was recently added as an option in the Maryland MS4 permit BMP Effectiveness Monitoring and Watershed Assessment Monitoring (Assessment of Controls section) which expands the amount of research the program will support in future years and is an innovative strategy by the state to support and use the latest research results.

This forum is the 6th annual event where the Restoration Research awardees present their work to the regulatory audience and practitioners for their use and receive feedback for future research needed to support their work. Finally, at this forum we will gather additional research questions for future Request for Proposals in the program.

Charge to participants

- Regulatory Community – Use the information from this Forum to help inform the permit process. Ask the restoration researchers questions that can help with the permit process and help design future research projects to answer lingering questions.
- Practitioners – Use the information from this forum to design and build the most effective projects possible from a water quality and stream ecology standpoint. Ask questions that can help design future research projects that will help determine the types of projects that are most effective, as well as where and how they should be built.
- Researchers – Present your findings that addressed the key restoration question posed in the Restoration Research Request for Proposals. Be specific about the research question(s) identified for the study, previous work done on the subject, the experimental design, the results, the level of uncertainty/confidence in the findings, and most importantly how the audience can use the information you presented. Listen to what the audience still needs to know to make management decisions in their respective fields and how you might address their questions in future research.

Learn more about the Pooled Monitoring Initiative and its Restoration Research Award Program and the research projects completed by awardees at www.cbtrust.org/grants/restoration-research.

Agenda - as of 6/15/21

- 9 am to 9:45 am – Morning Session
 - Welcome, technology check, and charge for the day, Sadie Drescher, Director of Restoration Programs, Chesapeake Bay Trust
 - **“How research has been used to guide policy,”** Lee Currey, Director of the Water and Science Administration, Maryland Department of the Environment (MDE), introduced by Jana Davis, Executive Director of the Chesapeake Bay Trust

Presentations from recent Pooled Monitoring Initiative’s Restoration Research projects to answer the key restoration questions in watershed restoration in Maryland and throughout the Chesapeake Bay. This work is tailored to be useful to the regulatory and practitioner efforts.

- 9:45 am to 10:00 am – **Arthur Parola** (University of Louisville Research Foundation, Inc.), “Reliability of Two-Dimensional Hydrodynamic Models for Assessing Susceptibility of Stream Restorations to Flood Damage and Potential Effects of Climate Change”
- 10:00 am to 10:15 am – **Keith Eshleman** (University of Maryland Center for Environmental Science), “Assessing the effectiveness of ESD for achieving stormwater management objectives in the Upper Little Patuxent River Watershed, Howard County, MD”
- 10:15 am to 10:30 pm – **Sujay Kaushal** (University of Maryland College Park), “Evaluating impacts of freshwater salinization on mobilization of nutrients and metals from stormwater best management practices”
- 10:30 am to 10:55 am – **Jamie Suski** (EA Engineering, Science, and Technology, Inc., PBC), “Impacts of Regenerative Streamwater Conveyance on Iron in Restored Streams and Potential Effects on Aquatic Organisms”
 - Translation of the presentation by Dave Hirschman (Hirschman Water & Environment, LLC)
- 10:55 am to 11:20 am – **Mohammad Al-Smadi** (Virginia Polytechnic Institute and State University), “Effectiveness of stormwater management practices in protecting stream channel stability”
 - Translation of the presentation by Joe Berg, Biohabitats
- 11:20 am to 11:45 am **Cindy Palinkas** (University of Maryland Center for Environmental Science), “Long-term impacts of living shorelines to Sub Aquatic Vegetation (SAV) habitats in the Chesapeake Bay”
 - Translation of the presentation by Jana Davis, Executive Director, Chesapeake Bay Trust
- 11:45 am to 12:20 pm – **Karen Dinicola, LG, LHG, EIT**, Senior Policy Lead, Ecology Water Quality Program HQ (Lead for Washington State’s Pooled Resources program) “**Pooled Stormwater Monitoring**”
- 12:20 pm to 1:00 Lunch Break
- 1:00 pm to 1:25 pm – **Sujay Kaushal** (University of Maryland College Park), “Tree Trade-Offs in Stream Restoration Projects: Impact on Riparian Groundwater Quality”
 - Translation of the presentation by Sadie Drescher, Chesapeake Bay Trust
- 1:25 pm to 1:50 pm – **Deb Caraco** (Center for Watershed Protection, Inc.), “Using a Novel Research Framework to Assess Water Quality Impacts of Urban Trees”
 - Translation of the presentation by Laura Miller, Montgomery County Department of Environmental Protection
- 1:50 pm to 2:15 pm – **Theresa Thompson** (Virginia Polytechnic Institute and State University), “Improving Success of Stream Restoration Practices – Revised and Expanded”
 - Translation of the presentation by Ryan Cole (MDOT SHA)

- 2:15 pm to 2:40 pm – **Tom Jordan** (Smithsonian Environmental Research Center) in coordination with and for the awardee, Arundel Rivers Federation, “Watershed Scale Effects of Urban BMPs on Loads of Nutrients and Suspended Solids”
 - Translation of the presentation by Erik Michelsen, Anne Arundel County’s Department of Public Works or MD DNR
- 2:40 pm to 3:05 pm – **Byron Madigan** (Carroll County Government), “The self-recovery of stream channel stability in urban watersheds due to BMP implementation”
 - Translation of the presentation by Phillip Stafford (Maryland Department of Natural Resources)
- 3:05 pm to 3:30 pm – **Vanessa Beauchamp and Joel Moore** (Towson University), “Determining the effects of legacy sediment removal and floodplain reconnection on ecosystem function and nutrient export”
- Translation of the presentation by Scott Lowe, Director, Environmental Services, McCormick Taylor
- Will be presented in a “Lunch and Learn” webinar on 9/30/21 from 12-1pm (you’ll receive an invite to this), but canceled for this forum as of 6/2/21 ~~3:30 pm to 3:55 pm~~ — ~~Claire Welty~~ (University of Maryland Baltimore County), ~~“Quantifying the cumulative effects of stream restoration and environmental site design on nitrate loads in nested urban watersheds using a high-frequency sensor network”~~
 - ~~Translation of the presentation by Ari Engelberg, Maryland Department of Natural Resources~~

What are your top restoration questions? Let’s see what research questions rise to the top for next year’s Request for Proposals.

- 3:55 pm to 5:00 pm – Summary of top research questions from regulators and practitioners (e.g., I heard this but what about this, someone needs this research/tool, new question to consider, super interesting/kudos)
- Closing Remarks (5 minutes): Summary of today’s Pooled Monitoring Forum, input from attendees, and any action items/next steps (Sadie Drescher, Director of Restoration Programs, Chesapeake Bay Trust)

We are looking forward to “seeing” you all at this forum, hearing the recent Pooled Monitoring findings, and compiling research questions for next year’s call for proposals.

More about the Pooled Monitoring Initiative’s Restoration Research program speakers:

Lee Currey, Director of the Water and Science Administration, Maryland Department of the Environment (MDE). Lee oversees both the States Clean Water Act and Safe Drinking Water Act Programs as well as serving as lead staff on the Governor's Chesapeake Bay Cabinet supporting Chairman Grumbles. Lee's administration is currently leading priority efforts to advance Chesapeake Bay Restoration, to provide a water quality certification for Conowingo Dam Relicensing, revise the next round of NPDES stormwater permits and test for lead in drinking water in schools, to name a few. Over Lee's many years with the Department he has served in various roles ranging from engineer to director. Prior to MDE Lee worked as an engineer in the private sector. Lee has a Bachelors and Master degree in Civil Engineering with a focus on Water Resources and is a registered professional engineer.

Arthur Parola, Ph.D., Director of the University of Louisville Stream Institute and Principle of Riverine Systems, LLC., University of Louisville Research Foundation, Inc. Art specializes in design of stream-wetland systems, riverine mechanics, and sediment transport. He has directed the design of more than 275,000 feet of stream channel re-establishment, rehabilitation, and enhancement, and hundreds of acres of riparian habitat restoration, including re-establishment, rehabilitation, and enhancement of floodplain wetlands. Art has partnered with state and federal agencies on stream restoration projects requiring complex riverine modeling, including two-dimensional hydrodynamic and sediment transport analysis. He also provides training to contractors and agency personnel to improve techniques used in restorations. He has extensive experience with urban restoration and has designed best management practice approaches for urban outfalls, bridges/culverts, and other infrastructure.

Keith Eshleman, Ph.D., Professor, University of Maryland Center for Environmental Science Appalachian Laboratory. Keith has published more than 60 peer-reviewed papers and dozens of technical reports. Prior to returning to academia, Keith was employed at the USEPA Environmental Research Laboratory in Corvallis, Oregon, and at The Ecosystems Center in Woods Hole, Massachusetts. Keith's research interests are in the areas of watershed and wetlands hydrology; groundwater/surface water interactions; biogeochemical processes in upland and wetland ecosystems; hydrochemical modeling; and ecosystem responses to natural disturbances, energy development, and land use change. Keith has a Ph.D. in Water Resources and S.M. in Civil Engineering from Massachusetts Institute of Technology and B.A. in Environmental Sciences from the University of Virginia.

Sujay Kaushal, Ph.D., Associate Professor, University of Maryland. Sujay is an Associate Professor in ESSIC and Department of Geology at the University of Maryland, College Park. His areas of expertise are Biogeochemistry and Hydrology. He completed a B.A. in Biology (concentration in Ecology and Systematics) at Cornell University, and he completed his PhD in Biology (concentration in Biogeochemistry) at the University of Colorado, Boulder. He completed his postdoctoral research at the Cary Institute of Ecosystem Studies (2003-2005). Before he joined University of Maryland, College Park,

he was an assistant professor at the University of Maryland Center for Environmental Science from 2005-2010. His research focuses on: long-term chemistry of fresh waters, effects of land use and climate on water quality, and managing and restoring freshwater ecosystems.

Jamie Suski, Ph.D., Senior Scientist, Water and Natural Resources, EA Engineering, Science, and Technology, Inc., PBC. Dr. Suski has sixteen years of experience in hypothesis driven research. She has her Master of Science degree in Environmental Toxicology investigating effects of military unique compounds to lizards and PhD in Ecology investigating community-level effects of increased salinization in aquatic systems. Her post-doctoral research investigated shifts in biodiversity patterns of aquatic communities.

Mohammad Al-Smadi, Ph.D., P.E. Research Adjunct Professor, Virginia Polytechnic Institute and State University. Dr. Al-Smadi is a Senior Hydrologist and Senior Water Resources Engineer. Dr. Al-Smadi is an international water resources expert (US Citizen). Licensed professional engineer (civil/water resources and environmental engineering) with emphasis on civil, water resources and environmental engineering and management, with 15 years of experience in water, land, and environment sectors serving in consulting firms, governmental institutions, donor agencies and universities in the United States, Saudi Arabia, and Jordan. Ten of the fifteen years were in the environmental and water resources consulting industry. Five years of experience in teaching and research in the field of civil, environmental, and water resources engineering. Direct groups and provide problem solving expertise, management skills, and leadership.

Cindy Palinkas, Ph.D. Associate Professor, University of Maryland Center for Environmental Science (UMCES) Horn Point Laboratory. Cindy's professional expertise is in the formation and preservation of sedimentary strata in the geologic record; sediment deposition and accumulation in intertidal, fluvial, estuarine and continental-shelf environments; radioisotope geochronology; sediment-vegetation interactions. Cindy has a Ph.D. and a M.S. in Geological Oceanography from the University of Washington and a B.A. in Earth Planetary Science from Johns Hopkins University.

Keynote, Karen Dinicola, LG, LHG, EIT, Hydrologist/Engineer in the Water Quality Program of the Washington State Department of Ecology. Karen has worked in water science, management, and policy for over 30 years and specifically on stormwater manuals, stormwater permits, and stormwater monitoring around Washington State for the past 20 years. Karen provides support and policy guidance for the stakeholder and technical groups that make recommendations for regional monitoring to Ecology and other key agencies. Karen received her B.S. in Mechanical Engineering from Duke University and her M.S. in Civil Engineering from the University of Texas.

Deb Caraco, P.E., Senior Water Resources Engineer, Center for Watershed Protection, Inc. Deb has been a Center for Watershed Protection (the Center) employee since 1996, and currently works for the Center remotely from Ithaca, New York in the beautiful Finger Lakes Region. Her areas of focus include IDDE, pollutant modeling, stormwater design, and data analysis. She has a Master of Engineering in Biological and Environmental Engineering from Cornell University, and is completing a Master of Applied Statistics from Penn State in Fall of 2017. Deb enjoys hiking, cross country skiing, reading and music, but is a nerd at heart and her true loves are board games, puzzles and spreadsheets.

Tess Thompson, Ph.D., Associate Professor, Turner Fellow of Engineering, Biological Systems Engineering, Virginia Polytechnic Institute and State University (VT). Tess has worked as an engineer in state government and private consulting, and as a consultant to US AID. Her research in watershed management focuses on stream and wetland restoration, urban stream systems, and streambank erosion. A former president of the American Ecological Engineering Society, she currently serves as vice-chair of the River Restoration Committee of ASCE-EWRI and on the advisory board for the International Ecological Engineering Society. Tess has a BS in Agricultural Engineering from VT, MS in Civil Engineering from NC State University, and a Ph.D. in Biological Systems Engineering from VT.

Tom Jordan, Ph.D., Principal Investigator, Senior Staff Scientist, Smithsonian Environmental Research Center (SERC), Tom's research investigates the transport and transformation of nitrogen and phosphorus in ecosystems. Since starting at SERC in 1980, he has studied the sources of nutrient releases from watersheds, the uptake of nutrients by wetlands and riparian forests, and the fates and effects of nutrients in estuaries, especially in Chesapeake Bay and its watershed. Tom has a B.S. in Biology from Bucknell University and Ph.D. in Biology from Boston University.

Byron Madigan, Water Resources Supervisor (Carroll County, Maryland), Byron has supported clean water efforts in Carroll County for the last 10 years in various roles, and currently oversees the activities of the Water Resource Division related to the County's NPDES MS4 monitoring and assessment requirements, watershed restoration projects, as well as several other project specific and grant funded monitoring programs. Byron is also an adjunct professor in the Environmental Studies Department at McDaniel College, and has served as a board of director for the Maryland Water Monitoring Council since 2016. Byron has a BS in Environmental Science from Shippensburg University of Pennsylvania.

Vanessa Beauchamp, Ph.D., Associate Professor, Towson University. Vanessa's research program work tests and refines ecological models of succession, identify environmental thresholds involved in plant community change, and the role of arbuscular mycorrhizal fungi in plant community dynamics. A large part of her research program involves practical applications related to management, conservation and

restoration of plant communities. Vanessa has a Ph.D. in Plant Biology from Arizona State University and a B.S. in Biology from the University of California, Irvine.

Joel Moore, Ph.D. Associate Professor of Geosciences, Towson University. Joel's areas of expertise include: 1) Connections between mineral weathering and soil chemistry, tectonics, ecosystems, and climate shaping the Earth's surface; 2) Understanding issues of societal relevance such as carbon sequestration, soil and water quality, and ecosystem sustainability; and 3) Investigating Earth surface processes, hydrology, and biogeochemistry. Joel has a Ph.D., Geosciences from Pennsylvania State University and a B.A., Geology and History from Wheaton College.
