

Climate Change and Stormwater: A panel discussion of the latest research and use of that research

November 10, 2020, 1 pm to ~4:30 pm EST

Virtual meeting details emailed to registered attendees

Many of us are making stormwater management decisions based on rainfall patterns from past decades. We know that the climate is changing, and that the precipitation is changing. What rainfall data should we use to design stormwater practices today? What uncertainty is associated with this rainfall data? How much risk both in terms of flooding and cost are associated with the current vs future “way of doing business?” What does this uncertainty mean for our jurisdiction’s stormwater assets, budgets, and resiliency? What are other municipalities doing that worked and we should try or what did they do that did not work and we should perhaps avoid? How can we figure out what new information will help us today? If these questions are familiar to you, join our panel discussion.

These are a few common questions that the speakers will address to showcase pilot studies and research efforts in this field. The panel will share what has worked or not worked for them, their research findings, and where they are headed in the future. The panelists are interested to learn from you and hear your questions for them, what you have tried, and your thoughts for future research. Each panelist will speak for about eight minutes and allow two minutes for immediate questions at the end of their presentation. Each of the three panel sessions will end with about 10 minutes for questions/answers with the panel.

Agenda

Time	Presenters
1 to 1:20 pm	<u>Introduction to the Panel Discussion</u> by the Chesapeake Bay Trust Staff, Sadie Drescher and Jana Davis, Ph.D., and Leadership, Thomasina Poirot, Esq., Venable, LLP and Matthew Fleming, Director, Maryland’s Chesapeake and Coastal Service at the Maryland Department of Natural Resources
1:20 to 2:10 pm	<ol style="list-style-type: none"> 1. “Resilient design guidelines,” Melissa Deas, Climate Program Analyst, Department of Energy & Environment’s (DOEE) 2. “Climate change planning for NYC stormwater management,” Alan Cohn, Managing Director of Integrated Water Management, New York City Department of Environmental Protection 3. “Climate change and stormwater: Philadelphia Water Department’s approach to creating actionable precipitation projections,” Julia Rockwell, Manager, Climate Change Adaptation Program, Philadelphia Water Department, Office of Watersheds 4. “Nonstationary precipitation intensity-duration-frequency curves for infrastructure design in a changing climate,” Amir AghaKouchak, Ph.D., Professor of Civil and Environmental Engineering and Earth System Science, University of California, Irvine <p><i>Panel session #1 moderator: Jana Davis, Ph.D., Executive Director, Chesapeake Bay Trust</i></p>
10 min break	
2:20 to 3:10 pm	<ol style="list-style-type: none"> 5. “Challenges in determining future extreme rainfall projections in Florida,” Ana Carolina Maran, Ph.D., P.E., District Resilience Officer, South Florida Water Management District 6. “Development and applications of next-generation rainfall IDF curves,” Xixi Wang, Ph.D., P.E., Professor, Civil and Environmental Engineering, Old Dominion University 7. “Climate impacts to restoration practices and BMPs,” Jonathan Butcher, Ph.D., Director/Principal Hydrologist, Tetra Tech, Inc. 8. “Baltimore City: A city built on the water,” Kimberly Grove, P.E., Chief, Office of Compliance and Research, Baltimore City, Department of Public Works, Maryland <p><i>Panel session #2 moderator: Ari Engelberg, Implementation Project Officer, Chesapeake and Coastal Service, Maryland Department of Natural Resources</i></p>
10 min break	
3:20 to 4pm	<ol style="list-style-type: none"> 9. “Changing Precipitation Patterns on Maryland’s Eastern Shore,” Kaye Brubaker, Ph.D., Associate Professor, Director Maryland Water Resources Research Center, Civil and Environmental Engineering, University of Maryland 10. “Lower North East Creek watershed master plan,” Bryan Lightner, County’s Zoning Administrator, Department of Land Use and Development Services, Cecil County, Maryland 11. “Developing future projected intensity duration frequency (IDF) curves for the Chesapeake Bay watershed,” Michelle Miro, Ph.D. Water Resources Engineer, The RAND Corporation <p><i>Panel session #3 moderator: Megan Granato, Senior Program Director, Chesapeake and Coastal Service, Maryland Department of Natural Resources</i></p>
4 to 4:30 pm	Wrap up and action items , Sadie Drescher, Director of Restoration Programs, Chesapeake Bay Trust

Biographies (order per agenda)

Introduction to the Panel Discussion

- **Thomasina Poirot, Esq., Venable, LLP**

Thomasina is an associate with the Baltimore office of Venable LLP, a nationally ranked general practice law firm. As a member of Venable's Product Liability and Mass Torts Practice Group, her practice focuses on complex pharmaceutical litigation and insurance coverage matters, including advising nonprofits on insurance and risk management issues. She received her undergraduate degree from Villanova University and her law degree from the University of Baltimore School of Law. She is a dedicated volunteer and has a strong presence in the Baltimore community. She serves as co-chair of the Board of Directors for the Baltimore Tree Trust and is also on the Board Directors of South Baltimore Learning Center, Volunteering Untapped, and the Reginald F. Lewis Museum of Maryland African American History and Culture. She has previously served as the Chair of the Advisory Board of Business Volunteers Unlimited's GIVE program for young professionals and on the Board of Directors of the Friends of Great Kids Farm. She is the Defense Research Institute Young Lawyer's Liaison for Maryland Defense Counsel.

- **Matthew Fleming, Director, Maryland's Chesapeake and Coastal Service at the Maryland Department of Natural Resources**

Matt is the Director of Maryland's Chesapeake and Coastal Service at the Maryland Department of Natural Resources. In this role, he is responsible for the management, policy formulation and implementation, and administration of the programs and staff committed to protecting and enhancing Maryland's coast and ocean for present and future generations. Matt has been with the Department since 1997. With a commitment to building relationships and thinking across traditional disciplines and sectors, Matt believes that we will be better equipped as a broader community to address emerging issues of our coast and oceans. Matt is a graduate of the University of Maryland.

Panel Session #1

1. **Melissa Deas, Climate Program Analyst, Department of Energy & Environment's (DOEE)**

Melissa Deas is a Climate Program Analyst with the DOEE Urban Sustainability Administration. Melissa oversees the District's climate resilience work and coordinates the implementation of the District's climate adaptation plan, Climate Ready DC (<https://doee.dc.gov/climateready>). In this role, Melissa works collaboratively with other government agencies, residents, businesses and institutions to promote smart and forward-looking policies. Prior to working for the District, Melissa led Georgetown Climate Center's adaptation & equity projects. She has also worked on climate adaptation for the California Energy Commission and the Union of Concerned Scientists. Melissa received her B.A. in sociology from Harvard University and her masters in city planning from MIT.

2. **Alan Cohn, Managing Director of Integrated Water Management, New York City Department of Environmental Protection**

Alan Cohn is Managing Director of Integrated Water Management at the New York City Department of Environmental Protection, where he leads initiatives to prepare water systems for climate change and population growth. His team spearheads partnerships and programs to reduce system demand, protect critical infrastructure, and promote awareness and sustainable water measures in the built environment. These programs include a Water Demand Management Program to save 10 million gallons of water per day by 2022, a Water Conservation and Reuse Grant Pilot Program, and a Cloudburst Program and partnership with the City of Copenhagen focused on flood mitigation for extreme rain events.

3. **Julia Rockwell, Manager, Climate Change Adaptation Program, Philadelphia Water Department, Office of Watersheds**

Julia Rockwell is a water resources management professional with nearly a decade of experience working at the Philadelphia Water Department (PWD). PWD is a combined drinking water, wastewater and stormwater utility, serving approximately 1.7 million drinking water customers and providing wastewater services to over 2 million customers in the Philadelphia area. Julia has a diverse set of experiences at PWD that include serving as a project engineer on the nationally recognized Source Water Protection Program, leading development of a new, department-wide capital planning process, and initiating development and implementation of the Department's Climate Change Adaptation Program (CCAP). The CCAP's mission is to reduce the risks and associated expenses PWD will face from the impacts of climate change by identifying and implementing effective and

feasible adaptation strategies. A primary focus of Julia's current work is to mainstream the use of actionable climate change science in the utility's planning, design and decision-making processes. Julia holds a BS degree in Civil and Environmental Engineering from Bucknell University and a Master of Environmental Management Degree from Duke University.

4. **Amir AghaKouchak, Ph.D., Professor of Civil and Environmental Engineering and Earth System Science, University of California, Irvine**

Amir AghaKouchak is a Professor of Civil and Environmental Engineering and Earth System Science at the University of California, Irvine. His research focuses on natural hazards and climate extremes and crosses the boundaries between hydrology, climatology, remote sensing. One of his main research areas is studying and understanding the interactions between different types of climatic and non-climatic hazards including compound and cascading events. He has received a number of honors and awards including the American Geophysical Union's James B. Macelwane Medal and the American Society of Civil Engineers (ASCE) Huber Research Prize. Amir is currently serving as the Editor-in-Chief of *Earth's Future*. He has served as the principal investigator of several interdisciplinary research grants funded by the National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), and National Oceanic and Atmospheric Administration (NOAA). Amir has a passion for nature and landscape photography, and he uses his photos for creating educational materials. He has served as the principal investigator of several interdisciplinary research grants funded by the National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), and National Oceanic and Atmospheric Administration (NOAA). Website: <http://amir.eng.uci.edu/>

• **Panel Session #1 Moderator, Jana Davis, Ph.D., Executive Director, Chesapeake Bay Trust**

Dr. Jana Davis is the Executive Director of the Chesapeake Bay Trust, overseeing its work on watershed restoration, education, outreach, and innovation. Jana has been at the Trust since 2005, first as Assistant Director for Programs then as Associate Executive Director prior to assuming the role of Executive Director. Jana is trained as a marine ecologist, with a B.S. in biology from Yale University and a Ph.D. in oceanography from the Scripps Institution of Oceanography and has spent her career working at the intersection of science and policy. Her previous scientific work includes research in the applied realms of fisheries, aquaculture, and shoreline habitat restoration at Scripps; at the Smithsonian Environmental Research Center, where she was a postdoctoral fellow; and at the Williams College – Mystic Seaport Maritime Studies Program, where she was an oceanography faculty member. Prior to coming to the Trust, Jana served as an American Association for the Advancement of Science Congressional Science Fellow in the United State Senate, sponsored by the American Geophysical Union. Jana continues an active research program on shoreline restoration and ecology issues.

Panel Session #2

5. **Ana Carolina Maran, Ph.D., P.E., District Resilience Officer, South Florida Water Management District**

Carolina Maran, Ph.D., P.E. is the District Resilience Officer with South Florida Water Management District. In her role, she is responsible for coordinating resilience efforts across federal, state, regional and local agencies, advancing scientific research and data analysis to ensure the District's resilience planning and projects are founded on the best available science; and, developing and implementing comprehensive resiliency goals to mitigate and adapt to the challenges facing the District's infrastructure and core functions from sea level rise and other climate change impacts. Carolina has nearly 19 years of experience working on water resources planning, management, and regulation; water resilience, allocation rules and conflict resolution; hydrologic and hydraulic modeling, decision support systems and GIS. Prior to joining SFWMD, Carolina was the Water Manager at Broward County, worked over 10 years as a Water Resources Specialist for the Federal Water Agency in Brazil, and collaborated with International Organizations as part of technical consulting teams. She holds a Ph.D. in Civil and Environmental Engineering – Water Resources from Colorado State University and a Master's Degree in Water Resources Engineering from Parana Federal University in Brazil. Currently, she serves on the Florida Water and Climate Alliance Steering Committee, and on the Board of Directors of South Florida Hydrologic Society and the Resilient Utility Coalition.

6. **Xixi Wang, Ph.D., P.E., Professor, Civil and Environmental Engineering, Old Dominion University**

Xixi Wang is a Professor of Civil and Environmental Engineering at Old Dominion University (ODU) in Norfolk, Virginia. Prior to his current position, Xixi worked as an Associate Professor at ODU, an Assistant Professor at Tarleton State University, a Research Scientist at University of North Dakota, a Civil Engineer at Michael Baker Jr. Inc., and an Assistant Professor at

Tsinghua University. His current research areas focus on the effects of climate change and human activity on water resources, water-soil-vegetation nexus and equilibrium with changing climate, and watershed hydrology and stormwater management. Xixi has served as the Principal Investigator on several research projects focused on spatiotemporal variation of precipitation as influenced by nonstationary climate. He has authored more than 80 peer-reviewed research papers, books, and book chapters, including several on precipitation trend and frequency analyses. He earned his bachelor's (1989) and master's (1993) degrees in Hydrology and Water Resources Engineering from Tsinghua University, and holds a doctoral (2001) degree in Agricultural Engineering from Iowa State University. Xixi has been a registered professional engineer in North Dakota (#5145) since 2003 and in Texas (#99798) between 2007 and 2011.

7. Jonathan Butcher, Ph.D., Director/Principal Hydrologist, Tetra Tech, Inc.

Dr. Jonathan Butcher, a Professional Hydrologist with over 35 years' experience in water quantity and quality modeling, is currently leading a project for CBT to develop future-climate Intensity-Duration-Frequency (IDF) curves for storm events in the State of Maryland and assess their potential impacts on road flooding, BMP performance, and channel stability. Over the last 11 years Dr. Butcher has supported EPA's Office of Research and Development in a variety of studies investigating potential effects of climate change on watershed functions and responses. He was the lead investigator and author of EPA's influential "20 Watersheds" study of potential runoff and water quality responses to climate change and has recently supported EPA in a series of projects investigating climate effects on BMP performance. Dr. Butcher is a senior hydrologist with Tetra Tech's Research Triangle, NC office.

8. Kimberly Grove, P.E., Chief, Office of Compliance and Research, Baltimore City, Department of Public Works, Maryland

Kimberly Grove is a professional engineer, whose 20+ years of experience has spanned the spectrum of civil engineering including stormwater management, land development design, environmental site assessment and remediation, geotechnical engineering and forensic analysis, construction management, and materials testing. A graduate of the Florida Institute of Technology, Ms. Grove spent most of her career as a private engineering consultant working throughout the Southeast and mid-Atlantic region, until she joined Baltimore City Department of Public Works in December 2010. Ms. Grove currently serves as the Chief for the Office of Compliance and Research, which is committed to enhancing environmental regulatory compliance for the Department through collaboration, management program improvements, and regulatory enforcement. She also works with the Water Environmental Federation Stormwater Institute; Urban Waters Federal Partnership Actionable Science Committee; & the Baltimore Ecosystem Study to integrate scientific research with policy decisions for the Department.

• Panel Session #2 Moderator, Ari Engelberg, Implementation Project Officer, Chesapeake and Coastal Service, Maryland Department of Natural Resources

Ari Engelberg is an implementation project officer with Maryland's Chesapeake and Coastal Service at the Department of Natural Resources. In this role he is responsible for restoration and research project grant management and providing technical assistance in the implementation of new financing strategies, policies, and tools related to Chesapeake Bay restoration. Ari has a B.A. in Political Science and Environmental Studies from Goucher College and an M.S. in Environmental Science from the SUNY College of Environmental Science and Forestry. Before working with the State of Maryland Ari was a research fellow at the USEPA's Office of Water where he worked with state environmental managers across the nation to document successful watershed restorations.

Panel Session #3

9. Kaye Brubaker, Ph.D., Associate Professor, Director Maryland Water Resources Research Center, Civil and Environmental Engineering, University of Maryland

Dr. Kaye Brubaker is Associate Professor of Civil & Environmental Engineering at the University of Maryland, College Park (UMCP) and Director of the Maryland Water Resources Research Center. She earned her B.S. in Civil Engineering at UMCP, and her Sc.M. and Ph.D. from the Massachusetts Institute of Technology. She pursues a variety of teaching and research interests, centering on water's important role in the Earth's climate system and the effects of climate variability and change on precipitation, stream flow, and water quantity and quality for environmental and societal sustainability. She serves on Maryland's interdisciplinary, interagency Hydrology Panel and Hydraulics Panel.

10. **Bryan Lightner, County's Zoning Administrator, Department of Land Use and Development Services, Cecil County, Maryland**

Bryan Lightner has his bachelor's degree in Geography. He has been working for Cecil County's Department of Land Use and Development Services for over three years. He's currently the County's Zoning Administrator and is staff to the Planning and Commission and Board of Appeals, reviews building permits and answers zoning questions related to County ordinances, and implements the County's Green Infrastructure Plan. He's also a Certified Floodplain Manager and is currently the County's Community Rating System (CRS) Coordinator.

11. **Michelle Miro, Ph.D. Water Resources Engineer, The RAND Corporation**

Dr. Michelle Miro is a Water Resources Engineer with expertise in water resources policy and management and climate resilience planning. She is also a professor at the Pardee RAND Graduate School. Dr. Miro is a co-investigator for the National Oceanic and Atmospheric Administration (NOAA) Mid-Atlantic Regional Integrated Sciences and Assessments (MARISA) program, where she leads coastal resilience and stormwater management research, seasonal climate summaries and analyses on extreme precipitation. She co-led the development of Puerto Rico's water sector recovery plan, including a strategic review of and recommendations for drinking water, wastewater, stormwater and flood control infrastructure projects, system operations and long-term planning. Dr. Miro serves as a co-investigator on a National Academy of Science coastal resilience grant focused on flood risk and climate resilience for communities in the Gulf of Mexico and has carried out and co-lead projects that apply methods for decision making under deep uncertainty (DMDU) to water resources agencies and utilities in Southern California and South America. Her portfolio of work also includes projects on groundwater management in urban and agricultural regions, collaborative climate planning in the Hampton Roads region of Virginia and transboundary water management between India and Pakistan.

- **Panel Session #1 Moderator, Megan Granato, Senior Program Director, Chesapeake and Coastal Service, Maryland Department of Natural Resources**

Megan Granato is a Senior Program Director at the Maryland Department of Natural Resources, where she specializes on restoration and climate resilience financing programs. Megan provides grant management for the Chesapeake and Atlantic Coastal Bays Trust Fund, which supports the implementation of innovative, cost-effective, and efficient restoration projects across the state. She also manages the Chesapeake Bay Implementation Grant funding provided by the Environmental Protection Agency, which supports progress towards achieving the *2014 Chesapeake Bay Watershed Agreement* goals and outcomes. Megan has a B.A. in Biology from Hamilton College and a M.S. in Natural Resource Management from North Carolina State University. Her previous experience includes working as a restoration ecologist for an environmental consulting firm in California and researching the plants and soils of restored stream corridors in North Carolina.

- **Panel Planning Lead, Sadie Drescher, Director of Restoration Programs, Chesapeake Bay Trust**

Sadie joined the Chesapeake Bay Trust (Trust) in 2014 and has over 20 years of environmental experience. At the Trust Sadie supports Chesapeake Bay restoration through innovative award programs and research efforts supported by stormwater utility/CIP funds, mitigation funds, local operating funds, and state/federal funds. Sadie leads a team of four restoration professionals to competitively award projects, deliver restoration results to partners, and communicate the findings to the Chesapeake Bay community. She has a M.S. in Environmental Studies from the College of Charleston and a B.S. in Environmental Biology from Tennessee Technological University. Sadie's work focuses on watershed restoration and stormwater management to support science, policy, engagement, and training. Sadie's email is sdrescher@cbtrust.org.

A note of gratitude: Thank you so much to all the presenters and moderators. Your hard work made today possible. Thanks also to the attendees for sharing your thoughts and ideas with the group. Enjoy the day/Sadie

Panel Organized by:

