

2019



48th Annual Water Management Association of Ohio Conference

PROCEEDINGS

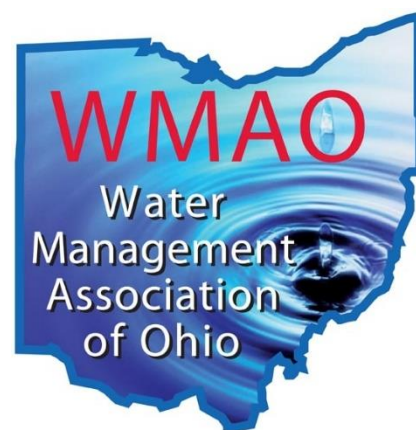


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Wednesday November 13, 2019

10:15 – 11:45 am

Mineral Resources Management

Acid Mine Drainage Paint Pigment (Michelle Shively, Rural Action and True Pigments)

Biography: Michelle Shively is the Watershed Coordinator for the Sunday Creek Watershed Group. She coordinates the day to day activities of the watershed group, including water quality monitoring, community outreach and environmental education, reclamation projects, and managing and writing the various grants that fund the programs in the watershed.

Michelle previously served as an AmeriCorps VISTA Volunteer with Rural Action, working with the Huff Run Watershed Restoration Partnership in 2006. She also has experience working at an environmental education center in Flagstaff, Arizona where she led field trips, implemented educational programs, and worked to secure grant funding for the center. Michelle returned to the Athens area and began working with Sunday Creek in 2010 as an ODNR Intern, then a Water Quality Specialist and was hired as the Watershed Coordinator in August 2011.

Michelle has a Bachelor's degree in Environmental Geography and a Master's degree in Environmental Studies from Ohio University. Her final Master's project was a comprehensive study and report on Pine Run, a sub-basin in the West Branch of Sunday Creek. She lives in Athens and enjoys hiking, gardening, reading and attending sporting events and cheering for the Ohio Bobcats.

Abstract: Using an innovative technology, our team is working to bring acid mine drainage impacted streams back to life by removing iron oxide and processing it into pigment, a valuable commodity that can be sold to pay for the treatment process, create jobs in rural communities, and fund additional watershed restoration projects. Acid mine drainage (AMD) impacts thousands of miles of streams across Appalachia in economically depressed communities with few jobs for the current generation. However, through an engineered biochemical process, the polluted water can yield a commercial grade iron pigment that can be sold in industrial quantities. Our first full-scale treatment plant in Millfield, Ohio, will restore 7 miles of currently dead stream, while employing 5 people in an innovative new business. Rural Action is working with Ohio University professors Dr. Guy Riefler and John Sabraw, as well as the Ohio Department of Natural Resources, to scale up the treatment technology, produce effective paint pigments, demonstrate profitability, and create acclaimed artwork to highlight environmental restoration. The United States iron oxide pigments industry is valued at \$335 million, and the U.S. uses about 240,000 tons of pigment each year, much of it imported from China. With our first plant, we will produce 1% of that consumption with a natural, sustainable process. We believe this technology can be replicable to many other AMD sites throughout Central Appalachia; our goal is to bring streams back to life, while making the U.S. iron pigment supply chain more sustainable. Our first full-scale True Pigments facility will be located at the Truetown Discharge, the largest single source of AMD in Ohio. Funds from the AML Pilot program will be used for site development at Truetown. Our plans for expansion include other discharge sites in Central Appalachia

Ohio AML Pilot Projects - Combining Reclamation with Economic Development (Mike Bowden, Ohio Dept. of Natural Resources)

Biography: Mike is the Abandoned Mine Land Projects Administrator for the ODNR Division of Mineral Resources Management. Mike has worked for ODNR for over 22 years.

Abstract: OSM awarded Ohio's AML Program Pilot program funds in the amount of \$10 million in 2016, 2017, and 2018. The uncertainty associated with these funds included how funding would occur as well as structuring a new program with goals that were different than Ohio AML has strived to achieve. Initially our program reviewed projects that were already in the AML development phase to see if they included long term economic benefits or if it could be incorporated into the project scope. In several cases project scopes were modified and advanced as AML Pilot projects. As additional AML Pilot funding was made available in 2017 and 2018, we shifted our focus to developing projects that prioritized economic development while accomplishing important AML reclamation. Currently Ohio AML Pilot projects will increase recreational opportunities, develop commercial sites, improve historical coal community economies, and develop new innovative products derived from AMD discharges. Most projects underway, 13 of 23, have an outdoor recreational enhancement component. These projects include partnerships with many private and public organizations including the development of bike trails, multi-use rail trails, expanding hunting and camping opportunities and development of new hiking trails. Commercial site development or expansion is the main goal at four sites, including reclamation and drilling and grouting underground mines. Our most innovative project includes building an AMD treatment facility to recover iron for use in pigment production for the paint industry that will dramatically improve stream quality downstream on one of Ohio's largest and damaging AMD seeps in the state. The AML Pilot funding initially challenged Ohio's AML staff due to the change in focus from traditional reclamation to that challenge has been overcome and projects are being implemented that not only reclaim AML sites but will have a lasting economic benefit in our historically coal impacted communities.

Proven Pilot Partnerships: Ohio AML Program & Rural Action (Marissa Lautzenheiser, Rural Action)

Biography: Marissa Lautzenheiser is the Middle Tuscarawas River Watershed Coordinator with Rural Action, in Mineral City, Ohio. After working with both USDA and ODNR, she joined Rural Action in 2012 as a watershed coordinator. She is a life-long resident of the Tuscarawas River Watershed.

Abstract: Ohio was included in the federal AML Reclamation Economic Development Pilot program starting in 2017. Since then, \$10 million dollars has annually been allocated to the state for implementing reclamation projects that have an economic development nexus. One of the directives of the federal guidance from the Office of Surface Mining Reclamation and Enforcement (OSMRE) is to ensure public engagement at the local level with citizens, economic development programs, and public organizations to achieve economic and community development goals consistent with community and/or regional interests.

Rural Action (RA) has been a regional leader in sustainable development since 1991. Partnerships between the Ohio Department of Natural Resources, Division of Mineral Resources Management

(ODNR-DMRM) and Rural Action have existed since 1994 and have resulted in numerous successful AML projects. RA watershed staff manage, monitor, and assist in maintaining both active and passive acid mine drainage treatment projects throughout eastern Ohio.

The relationship between Rural Action and ODNR-DMRM was recognized as an asset to implementing the Pilot program. A contract was established outlining the counties where education, outreach, and project proposal development assistance would be undertaken. Rural Action then undertook an extensive communication plan, reaching out to the many rural communities and stakeholders that could benefit from the Pilot program.

As a result of this Pilot partnership, one project is currently under construction, two have been approved for funding from OSMRE, two Pilot proposals are being co-developed, and many more are being considered. The partnership between Rural Action and ODNR-DMRM can serve as a model for other states and tribes to strengthen their community engagement and, in turn, ensure the local support and long-term commitment necessary for meaningful and successful AML projects. The presentation will review key reasons for success, share communications materials, and overview effective community engagement strategies related to AML programming.

Ohio Lake Management Society

Weird Weather: Did the Unprecedented Precipitation of 2019 in the Maumee River Watershed Affect Riverine Planktonic Cyanobacterial Dynamics? (Doug Kane, Defiance College)

Biography: Doug Kane is a Professor of Biology in the Division of Natural Sciences, Applied Sciences, and Mathematics at Defiance College. His research interests lie in plankton and benthic invertebrate ecology.

Abstract: To determine toxin concentrations and potential biological and chemical drivers of toxin production by cyanobacteria in the Maumee River we initiated monitoring of the river in 2018 and continued this study in 2019. The “weird weather” of 2019 provided a natural experiment to test the effect of large spring and summer rainfall events and subsequent reduced planting of crops in the Maumee River watershed on in-river conditions. During summer and fall of 2018 and 2019 we monitored 6 sites (from near the Ohio-Indiana border to suburban Toledo) for nutrient concentrations, phytoplanktonic community composition, and toxin concentrations (both microcystins and saxitoxins, by ELISA) and performed molecular analysis of the *mcyE* and *sxtA* genes. Herein, we report differences and similarities in these parameters between years and suggest what the projected wetter years in the future will mean for riverine cyanobacterial dynamics in this large river

Weather and Climate Impacts on Lake Erie and Coastal Systems (Jason Trapp, Ohio Dept. of Natural Resources)

Biography: Jason Trapp is a civil engineer who has spent 10 years working with the ODNR Office of Coastal Management. For Ohio lakefront owners he is often the first line of communication for questions regarding Lake Erie, coastal design recommendations and permitting. Through his work he has

visited most of Ohio's diverse Lake Erie coastline to directly assist owners with finding more appropriate and resilient coastal solutions while improving lake access and reducing impacts to the resource.

[He graduated from Youngstown State University with a bachelor's degree in civil engineering and obtained the Coastal Engineering Certification from Old Dominion University. He previously worked for Ohio EPA and Trumbull County Soil and Water Conservation District as an erosion and sediment control plan reviewer and site inspector.]

Abstract: This presentation will highlight various weather and climate impacts on the Lake Erie and Coastal Systems.

Grass Carp Invasion Update (Nikki King, University of Toledo)

Biography: Research associate in the Aquatic Ecology Lab at the Lake Erie Center. Research focuses on Grass Carp reproduction and potential impacts on wetland vegetation. MS in Aquatic Biology from Bucknell University, BS in Biology from Hiram College.

Abstract: "Asian carps" are a group of invasive fish threatening to invade the Great Lakes. Grass Carp, one of the species of Asian carps, have been present in the Great Lakes since at least the early 1980's. Grass Carp feed on aquatic vegetation and pose a substantial threat to Great Lakes wetland ecosystems. Although occasional Grass Carp have been captured since the early 1980s, it was assumed that most were sterile escapees from stocked ponds. However, spawning was first documented in the Great Lakes in 2015 with the collection of fertilized eggs from the Sandusky River, a Lake Erie tributary. Monitoring has since continued, and Grass Carp spawning has now been documented in multiple years and in two Great Lakes tributaries. Development of eggs and modeling suggests that recruitment of individuals is possible, and the 2012 capture of juvenile fish suggests that recruitment may have already occurred. Therefore, controlling the species has become a priority for management agencies and removal efforts are underway.

Ohio Department of Agriculture

Innovating Voluntary Agricultural Conservation with State Incentives (Matt Lane, Ohio Dept. of Agriculture)

Biography: Matt Lane is the Water Quality Specialist with the Division of Soil and Water Conservation at the Ohio Department of Agriculture. He started working with the Division in 2011 as a soil scientist after receiving a Master's degree from Ohio State University in soil science. He spends most of his time working on agricultural pollution, nutrient management and ODA's water quality programs.

Abstract: Ohio Department of Agriculture, Division of Soil and Water Conservation with local soil and water conservation districts are leading innovation for agricultural water quality practice implementation in the Western Basin of Lake Erie and statewide. This presentation will provide insights into state implementation strategies to reduce nutrients to Ohio waters from farmland and provide an overview and update of programs including the Soil and Water Phosphorus Reduction Program.

Agricultural Pollution Abatement Program (Jason Tyrell, Ohio Dept. of Agriculture)

Biography: Jason Tyrell has a BS in Ag Business Management and Rural Development from West Virginia University. Previously was an intern for OSU Extension Belmont County, Earth Team volunteer for NRCS and an Ag Resource Specialist for Guernsey SWCD. Currently works for ODA-DSWC.

Abstract: Overview and update of the ODA-DSWC Agricultural Pollution Abatement Program rules and laws.

Overview of Permitting of Large Livestock Facilities in Ohio (Sam Mullins, Ohio Dept. of Agriculture)

Biography: Sam Mullins was appointed Chief of the Division of Livestock Environmental Permitting in June 2019. In this capacity, he administers the division's day-to-day operations, provides technical assistance to Ohio's concentrated animal feeding facilities, and acts as a liaison between ODA and Ohio's livestock, agriculture, and environmental groups. He previously served as an Agriculture Environment Inspector with the division, starting in April 2015, until he was promoted to a Natural Resources Engineer in September 2017. Mullins, an Ohio licensed professional engineer, graduated from The Ohio State University with a B.S. in Agricultural Engineering in 2011.

Abstract: The Division of Livestock Environmental Permitting at the Ohio Department of Agriculture is responsible for permitting Concentrated Animal Feeding Facilities in the state of Ohio. This presentation will provide an overview of permit statistics and the permitting process.

Ohio Floodplain Management

10:15 - 10:45

National Flood Insurance Program, Floodplain Management, & Ohio Emergency Management Agency Updates (Alicia Silverio, Ohio Dept. of Natural Resources & Dan Clevidence, Ohio Emergency Management Agency)

Biography: Alicia Silverio is the NFIP Coordinator for Ohio within ODNR's Floodplain Management Program, she assists with the implementation and administration of the National Flood Insurance Program throughout the State of Ohio by providing technical guidance to assist communities maintain NFIP compliance, evaluating local floodplain management programs, and recommending improvement measures.

Ms. Silverio is a Certified Floodplain Manager as recognized by the Association of State Floodplain Managers and Past President of the Ohio Floodplain Management Association. She is a graduate of The Ohio State University where she acquired a Bachelor of Science Degree in Natural Resources (majoring in Environmental Science with emphasis in Water Quality). Ms. Silverio has been with ODNR's Floodplain Management Program since 1999

Dan joined the Ohio Emergency Management Agency in 2013 as a Mitigation Specialist. Prior to joining Ohio EMA Dan worked in Wayne County for over 5 years first serving as the Emergency Management Technician. Dan graduated from The University of Akron with a Bachelor's of Science in Emergency Management. He is also a Certified Floodplain Manager.

Abstract: This presentation will be a brief update on the national Flood Insurance Program, the Floodplain management program, and the Ohio Emergency Management Agency.

10:45 – 11:45

Risk Rating 2.0: Progress to Date and Next Steps (Shilpa Mulik, Federal Emergency Management Agency HQ)

Biography: Shilpa Mulik is currently supporting the NFIP Transformation Initiative known as Risk Rating (RR 2.0). Her responsibilities with the RR 2.0 program include: serving as a Subject Matter Expert (SME) for Floodplain Management, a Change Management Lead for Mitigation, and Outreach and Communication Lead for the FEMA Regions and its State Partners. In her regular role when not supporting RR 2.0, she works for the Floodplain Management Division (FPMD) at FEMA HQ. Her duties in FPMD include serving as a Regional Liaison for Regions 3, 6, and 7 to provide technical assistance on various engineering as well as compliance issues; review and approval of the potential Letter of Map change (LOMC) violations within all 10 Regions; participating on all cross-cutting FEMA Risk Management Directorate efforts that may impact floodplain management, such as Base Level Engineering, LOMC processes and procedures, and the most recent development of floodways for 2D modeling. In addition, she also serves as a FPM SME on the Technical Mapping Advisory Committee (TMAC) – currently serving on "Shifting from Binary to Graduated Risk subcommittee". Shilpa moved to FEMA HQ over two-and-a-half years ago from the FEMA office in Region 9, where she initially started in the Floodplain Management Division and later moved to the Risk Analysis Division serving as a Regional Engineer. During her time in Region 9, Shilpa managed multi-million dollar coastal

and riverine mapping projects. Shilpa is an engineer by training and started her career with FEMA's mapping contractor and managed the LOMC group for Regions 6 and 9 prior to moving to FEMA as a full-time staff member. Shilpa has been involved with the RR 2.0 effort since its inception and will continue to support it in the near term to assist with the rollout efforts.

Abstract: In the quest to be a world-class insurance operation and to close the insurance gap, FEMA's Federal Insurance Directorate (FID) is focused on improving the service provided to customers - flood insurance policyholders. A significant part of this transformation is Risk Rating 2.0, which will redesign the way FEMA rates a property's flood risk and prices insurance. This presentation will provide an overview of the new rating approach (Risk Rating 2.0) that will make understanding risk easier for agents and customers by leveraging industry best practices and current technology. In addition to providing the latest updates on Risk Rating 2.0 during this session, FEMA staff will also address audience questions.

1:15 – 2:45 pm

Ohio Dam Safety Organization

New Dam Construction in Guernsey County, Ohio (Matt Marquis and AJ Smith, Hull & Associates, Inc.)

Biography: **Matt** has more than 8 years of engineering experience in the design of large earthwork and water resource projects, including earthen dams, landfills, and ash ponds. His areas of expertise include hydraulics and hydrology (H&H) and erosion and sediment control (E&SC). He is experienced in the preparation of storm water pollution prevention plans E&SC plans for construction projects, developing Emergency Action Plans for Emergency Preparedness for large dams and industrial sites across the state of Ohio and Kentucky, and the design of storm water best management practices (BMPs) for large earthwork projects. His hydrologic and hydraulic experience includes detailed stream flow and watershed analyses, flood routing, dam break analyses, and the evaluation of several complex outlet devices on dams and landfills including pressure pipe flow, weirs, gravity pipe flow, culvert design, outlet protection, stilling basin design, and riprap channel armoring design. Matt is responsible for managing and assisting with the design and drafting of heavy civil design projects and the preparation of construction plans and specifications. Matt has worked closely with ODNR on the investigation and rehabilitation of multiple private and state-owned dams.

AJ has over 17 years of engineering experience in the design and construction of large earthwork and water resource projects, including dams. His areas of expertise include hydraulics and hydrology, geotechnical engineering, and erosion and sediment control. He has worked closely with ODNR on the investigation and rehabilitation of multiple private and state-owned dams. AJ currently manages Hull's St. Clairsville, Ohio office. His engineering team is responsible for the permitting, design and construction of fresh water impoundments, well pads, roadways, and stormwater control systems for the shale oil & gas industry. AJ received his bachelor's degree in civil engineering from Ohio Northern University and his master's degree specializing in geotechnical engineering from OSU.

Abstract: A new Class II dam in Guernsey County, Ohio was completed in 2018, impounding an 18.8-acre lake for a private water supply. This presentation covers the project from initial planning through

construction and final engineering certification. The presentation will include lessons learned during construction with the principal spillway wall underdrain system. Hull proposed and implemented a solution involving Aquablok® to reduce the potential for seepage where the lake levels introduced concern.

Design and Construction of Cannon Drive Levee - Phase 1 (Michael Rowland, S&ME, Inc.)

Biography: Michael Rowland, P.E. is a senior engineer in S&ME's Columbus office where he manages the civil department, focusing on the evaluation and repair of dams and the design of new dams. He recently served as the president of the Ohio Dam Safety Organization.

Mr. Miles Hebert, P.E. serves as the Director of Water Resources for EMH&T. He is a Certified Floodplain Manager who works with various communities in developing floodplain regulations, as well as overseeing small and large scale projects.

Abstract: In conjunction with an overall reimagining of the Ohio State University main campus, Cannon Drive is in the process of being relocated and reconstructed to in part serve as a levee. The project is located between campus and the Olentangy River and will ultimately extend from King Avenue to Lane Avenue, a distance of just under a mile. The new flood protection barrier replaces an earthen levee that was no longer deemed reliable. Construction of Phase 1, from King Avenue to John Herrick Drive, was completed this past summer. The levee has been designed to provide protection up to a 500-year event on the Olentangy River. In support of the design, the existing flood hazard mapping was updated. The Phase 1 levee principally consists of an earthen embankment featuring a clay core which was incorporated into the new Cannon Drive roadway embankment. At certain locations, owing to the presence of utilities, jet grouting was used to create a low permeability barrier in lieu of compacted clay. In addition to the levee, the project included the construction of a large pump station. This presentation will briefly discuss the project background and will describe the hydrologic and hydraulic analyses used to estimate the required protection elevation. Details of the levee design will be reviewed including constraints which drove the design at some locations. Lastly, construction will be discussed including challenges that were overcome.

Effects of Scour, Landslides and Debris Flows in Puerto Rico during Hurricane Maria (Daniel Pradel, Ohio State University)

Biography: Dr. Pradel is Professor of Practice in Geotechnical Engineering at The Ohio State University. He has 30 years of practice, and many of his projects were located in areas with high seismic demands. He has worked on projects located in four continents, including large dams, slope stabilizations, regional transportation projects, and foundation designs. He has also performed numerous reconnaissance visits after major natural hazard events such as Earthquakes, Landslides and Hurricanes.

Abstract: Hurricane Maria was classified as a strong Category 4 hurricane before making landfall in Puerto Rico, on September 20, 2017. Maria triggered more than 40,000 landslides and debris flows throughout the small island, damaged the spillway of Guajataca Dam (prompting the evacuation of 70,000 people), resulted in severe coastal erosion, destroyed a significant portion of the road network, and devastated Puerto Rico's electric power grid. Significantly, less than two weeks before Maria, Hurricane Irma showered the island with torrential rains that saturated the island steep slopes, making

them extremely vulnerable to landslides and debris flows; hence, indirectly Irma magnified the geotechnical impacts of Maria in a significant manner. This paper summarizes the geotechnical impacts of hurricane Maria documented by the authors, which were members of the Geotechnical Extreme Events Reconnaissance (GEER) team sent to the island in the aftermath of hurricane Maria. To reduce the impacts from extreme events such as Hurricane Maria, the engineering community must adapt and improve its designs and construction practices to enhance the resiliency of our infrastructure and lifelines. The geotechnical failures presented in this article provide important insight on the geotechnical modes of failure and infrastructure vulnerability during similar extreme events.

Ohio Lake Management Society

Modeling Approach to Analyze Salinity Intrusion in Mentor Marsh (Suresh Sharma, Youngstown State University)

Biography: Dr. Sharma is an Associate Professor at Youngstown State University having extensive experience in hydrologic and watershed modeling in a climate change and climate variability context.

Abstract: Salinity is a crucial environmental problem leading to profound consequences in wetland plants and aquatic habitats including the rapid development of *Phragmites australis*, which are extremely vulnerable to capture fire and this eventually affects the overall ecosystem of the marsh. In this study, a simple approach has been presented to conduct hydrologic modeling and salinity prediction in the ungagged watershed through continuously recording stage and electrical conductivity using a Levellogger and Barologger from two tributaries namely Blackbrook and Marsh Creek. In addition, stream cross-sections and velocity of the streamflow were recorded intermittently in the Blackbrook Creek to develop a rating curve and generate continuous streamflow data. The watershed model, Soil and Water Assessment Tool (SWAT), was calibrated and validated to a monthly scale with good model performance. The analysis suggested that the total monthly observed salinity loading for Blackbrook and Marsh Creek was in the range of 10.23 ton to 163.98 ton and 65.63 ton to 2028.13 ton, respectively. While salinity concentration was higher in Blackbrook, the salinity loading to the downstream marsh was 10 times higher from Marsh Creek. The Salinity loadings was linearly correlated with streamflow on a daily ($R^2 = 0.76$) and monthly ($R^2 = 0.86$) scale, which was utilized to generate the salinity loadings in streamflow events of various years of the historical period.

Six Mile Aqueduct, A Restoration Project Steeped in Challenges and Rain (Matthew Gramza and Jacob Bench, Ohio Dept. of Natural Resources)

Biography: **Matt Gramza** is a Water Resources Engineer and Certified Floodplain Manager with more than 20 years of engineering experience. He currently serves Civil & Environmental Consultants, Inc. as a Principal and is experienced in diverse water projects.

Jacob E. Bench, P.E. is a Project manager for ODNR Division of Engineering. His experience includes construction management, dam safety engineering, and emergency response engineering. He serves as a volunteer engineer on the Ohio Task Force 1 Urban Search and Rescue team.

Abstract: Originally authorized by the Ohio Legislature in 1836, Six Mile Aqueduct on the Miami & Erie Canal opened to the public in 1845. In 1906, the culvert was rebuilt into the popularly visited and photographed aqueduct structure that is highly visible from the State Route 66 Bridge over Six Mile Creek in St. Marys. May 10, 2018, the northwest wingwall failed and the ODNR Team was called into action for emergency response to temporarily stabilize the structure, save it from collapse and potential uncontrolled breach of the canal. Following temporary stabilization, structural assessment and during the later stages of the final rehabilitation design and permitting, history repeated itself. April 26, 2019, the Six Mile Watershed (approximately 17.5 square miles) received over 4.7 inches of rain in less than six hours (100-Yr Event). ODNR Park Staff identified the active failure of the temporary stabilization measures for the northwest wingwall. The ODNR Engineering Team immediately mobilized to the site to assess, provide emergency response direction, and began 24-hour monitoring. The structure was once again temporarily stabilized, this time with a robust bridge span system. May 17, 2019, history repeated and the site received over 4.2 inches of rain in less than four hours (another 100-Yr Event). With Mother Nature clearly not on the project team's side, the final design, permitting, and construction were expedited. Against all odds, construction is nearing completion.

Species Distribution Models for a Native Imperiled Minnow and a Non-native Sport Fish in Ohio (Ken Oswald, Ohio Northern University)

Biography: Kenneth Oswald is an Assistant Professor of Biology at Ohio Northern University whose research interests include evolutionary history and conservation of rare species, particularly freshwater fishes.

Abstract: Sport fisheries have been primary drivers of introductions of non-native fishes throughout North American inland waters for more than a century. While these introductions satiate angling demand, they are problematic in freshwater systems with rare fauna. Tonguetied minnow (*Exoglossum laurae*) is Endangered in Ohio, where it is restricted to a ~60 km segment of the Mad River, a headwater tributary of the Great Miami River drainage. Despite its imperilment, the Mad River is annually stocked with several thousand non-native brown trout (*Salmo trutta*) to sustain a popular sport fishery. In this study, Poisson regressions were used in combination with maximum entropy species distribution models to estimate in-stream habitat requirements of tonguetied minnow and brown trout in the Mad River. Poisson regressions identified water temperature, stream gradient, and channel type as important for tonguetied minnow, whereas water temperature, stream gradient, in-stream cover, riffle habitat, and total dissolved solids were identified for brown trout. Maximum entropy species distribution models based on these results found that only water temperature and stream gradient were important for each species. Ecological constraints therefore likely prevent tonguetied minnow from escaping extirpative risks resulting from interspecific interactions with brown trout introduced for sport fishing.

Sustainable Farming

Regenerative Farming (Eric Pawlowski, Ohio Ecological Food and Farm Association)

Biography: Eric Pawlowski is a Sustainable Agriculture Educator with the Ohio Ecological Food and Farm Association, one of the nation's oldest and largest organic certification agencies. Eric has extensive experience managing certified organic and biodynamic diversified production and livestock operations. Eric has earned certificates from the International Organic Inspectors Association in organic inspection, and the Ohio State University in FDA/FSIS Food Processing Technology. He is active in his community as a parks camp recreation board commissioner, and historical society archivist.

Abstract: This presentation will discuss a board perspective of regenerative farming in the state of Ohio.

Regeneration from the Ground Up (Susan Jennings, Community Solution)

Biography: Susan Jennings is Executive Director of the Arthur Morgan Institute for Community Solutions. In 2017, with the support of the Yellow Springs Community, she led the 77 year old non-profit in the purchase of a 128 acre farm, now called Agraria

Abstract: The 21st century is ripe with conflict and dissolution. Climate catastrophe, water woes, food insecurity, economic instability, species collapses and massive migrations challenge humanity to set a radically-different course. Thankfully, farmers, environmentalists, researchers, and activists have been partnering on regeneration projects that provide a hopeful glimpse of a healthy future for all who share the planet. Come to learn what's happening at Community Solutions regenerative farm Agraria, what's possible regionally and globally, and how you can participate.

An Agro-Ecological Farmer's Perspective on Sustainably Adapting to an Ever-Changing Climate (Jeff Dickinson, Stratford Ecological Center)

Biography: Jeff Dickinson has been involved in sustainable agriculture for the last 48 years, highlighted with his work with David and Wilson Orr at the Meadowcreek Project, Ohio State's Sustainable Agriculture Program, and Stratford Ecological Center.

Abstract: The rapid pace of climate change has served primarily to exacerbate the previous challenges facing the present and future generations of all farmers. But perhaps the world's climate crisis has also served to push boundaries of what we call regenerative agriculture, as it forces us to problem-solve even further into greater water, soil and biological conservation. Can there be a new agro-ecological paradigm that even exceeds our current vision of ecological harmony? Jeff Dickinson will summarize some of his own experiential, albeit anecdotal observations of farming in a world of unpredictable weather, how this has impacted water, soil and nutrient management for his livestock, horticultural and agronomic crops, and the relationships this farming system has with its natural ecosystem. This is not just a question of how to react to unpredictable weather patterns, but how to redesign our farming systems and our mindset: What should we be expecting from natural resources to provide us food? Are our expectations too high? What should we expect from our water, soil and biological resources – as they too are adapting to these abrupt weather changes? Can we minimize inputs even further? Can we

mimic nature even more? Along this path, we will take a brief look at some of the successful agricultural models that were developed before the climate change discussion, which may provide some clues as we continue to adapt our way through our climate crisis.

Ohio Floodplain Management

1:15 – 2:00 pm

Why (Almost) Every Ohio Community Should be in the CRS Program (John Devine, Federal Emergency Management Agency Region 5)

Biography: John Devine has been a NFIP Specialist and CRS Regional Coordinator for the FEMA Region V office in Chicago since 2006. His disaster related experience includes events in all areas of the country, including 4 major disasters in Ohio.

Abstract: The National Flood Insurance Programs' Community Rating System (CRS) offers flood insurance discounts, technical assistance and increased flood resilience in communities. This presentation examines the key barriers to entering CRS and provides resources for communities that are ready to join.

2:00 – 2:45pm

Floodplain Frequently Asked Questions (Katherine Goeppner, Ohio Dept. of Natural Resources)

Biography: Ms. Goeppner joined to ODNR's Floodplain Management Program as an Environmental Specialist in January 2011. She coordinates the state's involvement in FEMA's latest mapping initiative, Risk MAP (Mapping, Assessment, and Planning), which is aimed at bridging the gaps between flood hazard identification and flood risk assessment. This involves collecting and prioritizing flood hazard study needs, preliminary DFIRM reviews and non-regulatory product reviews. Katherine is also involved in providing technical assistance to communities concerning floodplain management, regulations review and requests for FEMA models.

She is Certified Floodplain Manager (CFM) and has achieved Engineer Intern (EI) as recognized by the State Board of Registration for Professional Engineers and Surveyors of the State of Ohio. She received a Bachelor of Science in Agricultural Engineering, concentrating in Soil and Water Engineering from The Ohio State University.

Abstract: This presentation will cover some of the most frequently asked questions that the Ohio Floodplain Management Program receives.

3:15 – 4:45 pm

Ohio Dam Safety Organization

Buckeye Lake Dam Improvements (Doug Evans, Ohio Dept. of Natural Resources)

Biography: Doug Evans is a Project Manager with Ohio's Dam Safety Program where he conducts periodic safety inspections of dams and reviews plans and specifications for the repair or construction of dams. Doug has 25 years of geotechnical engineering experience with emphasis in the design and construction of dams and other heavy civil projects. His areas of expertise include forensic investigations of slope and foundation failures as well as laboratory testing of earthen and geosynthetic materials.

Abstract: Formed nearly 200 years ago, Buckeye Lake has a rich and varied history of industry and recreation. In the 1830s, the lake supplied water for the Ohio and Erie Canal systems. Following the demise of canal transportation, the state-owned lake was repurposed as Ohio's first state park and opened to the public. In 2014, the Ohio Department of Natural Resources and the United States Army Corps of Engineers assessed the condition of the dam finding that the more than 370 homes built into the earthen embankment significantly compromised the integrity of the structure and that it posed a significant risk to the public. Interim risk reduction measures including lowering the lake level were implemented immediately while a permanent remedial solution was developed. The eventual design utilized deep soil mixing technology to create a standalone gravity dam upstream of the existing earthen embankment dam. The new dam is a first-of-its-kind in the country, pioneered a new standard in dam rehabilitation, and won the 2019 National Rehabilitation Project of the Year Award from the national Association of State Dam Safety Officials.

Removing the Tait Station Low Dam from the Great Miami River (Kurt Rinehart, Miami Conservancy District)

Biography: Kurt Rinehart is MCD's chief engineer and has served in that role since December of 2006. He joined MCD in 1979. Kurt has worked in many areas of watershed management including flood protection, dam safety, levee accreditation, floodplain management.

Abstract: The Miami Conservancy District (MCD) improved river safety, river access, water quality and the aesthetics of the Great Miami River by removing the Tait Station low dam located at River Mile 76.6 near Dayton, Ohio. The Miami Conservancy District owned the low dam. The low dam area is located within the MCD flood protection area; levees are present on both sides of the river. The low dam did not provide flood protection. The Tait Station Low Dam was originally constructed in 1935 as part of a coal-fired electric generating plant. The power plant was mothballed in 1983 and subsequently demolished, so the dam no longer served a purpose. The structure of the Tait Station Low Dam created an extreme hazard for people using the river for recreation. Removing the low dam eliminated the danger of the hydraulic boil on the downstream side which can trap and drown people who float over the low dam. The abutments on either side of the low dam were left in place and serve as access points for people to

fish or launch a watercraft. Pre- and Post-project water quality monitoring is being collected to assess the impact of removing the Tait Station low dam. Hydraulic modeling of the Great Miami River after the dam is removed showed that the water depths will be only slightly lower than pre-removal conditions indicate. The project is an ODOT in-lieu fee project.

High Hazard Dams - Emergency Action Plans and 2D Modeling (Charles Dewes, Christopher Burke Engineering)

Biography: Charles Dewes is a water resources engineer with Christopher Burke Engineering at their regional headquarters office in Indianapolis. Charles is a registered P.E. and CFM with expertise in floodplain modeling and drainage.

Abstract: High Hazard dams across the Midwest present planning challenges as embankment and spillway infrastructure continues to deteriorate. In Ohio alone, there are 365 identified Class I High Hazard dams. Using newer 2D modeling techniques and high-resolution inundation mapping, high hazard dam owners and affected downstream resident communities can invest in Emergency Action Plans to help identify risk areas that would be impacted by dam failures. Inundation mapping for Sunny Day and Critical (Design) Flood failure events can help stakeholders identify impacted roads, submerged infrastructure, and evacuation routes. Emergency Action Plans and inundation mapping not only serve as necessary tools to increase disaster preparedness but also inform stakeholders on how to set priorities for potential dam rehabilitation and decommissioning projects.

Ohio Lake Management Society

Best Management Practices Could Combat Nutrient Loadings to Lake Erie in a Changing Climate (Haley Kujawa, Ohio State University)

Biography: Haley Kujawa is a PhD student at Ohio State working with Dr. Margaret Kalcic. She received her master's in environmental science at Ohio State this past spring. Her research is in watershed modeling with a focus on water quality.

Abstract: Climate change is a concern for Lake Erie, where changes in temperature and precipitation have potential to worsen the annual harmful algal bloom. In this study, we used multiple watershed models and climate models to quantify the certainty in mid-century discharge and nutrients from two scenarios: a) "business-as-usual" farm management and b) increased adoption of agricultural best management practices. Five models for the Maumee River Watershed, Lake Erie's largest watershed located mainly in northwest Ohio, were created by independent research groups using the Soil and Water Assessment Tool (SWAT). Each group was allowed freedom to make certain model assumptions. All models were calibrated to a gauge near the outlet. We drove the SWAT ensemble with daily temperature and precipitation predictions from six general circulation models (GCMs). In both scenarios, discharge predictions were similar and were correlated with changes in precipitation. For nutrients, uncertainty is greater for the business-as-usual scenario and we cannot say which direction nutrients will change. We find increased adoption of BMPs has mixed results for annual nitrogen but shows agreement for decreasing total phosphorus (-41%) and dissolved reactive phosphorus (-18%)

annually and total phosphorus (-34%) and nitrogen (-25%) during the March-July period. These results suggest targeting increased adoption of agricultural best management practices will likely combat nutrient loadings in the mid-century.

Reservoir Management for Harmful Algal Blooms in Drinking water sources (Ruth Briland, Ohio Environmental Protection Agency)

Biography: Ruth Briland works in the Emerging Contaminants section of Division of Drinking and Ground Waters at Ohio Environmental Protection Agency. She has a doctoral and master's degrees from The Ohio State University studying aquatic ecology.

Abstract: Harmful algal blooms and the algal toxins that they produce pose a threat to drinking water sources and increase costs to the water system for monitoring, treatment, and waste disposal. Reservoir management strategies can help avoid these costs by concerns by limiting nutrients and preventing cyanobacterial blooms. Source water monitoring tools and plans are key to implement data-driven reservoir management and to determine the efficacy of bloom mitigation technologies. This presentation will provide a general overview of reservoir management, monitoring tools, and relevant regulations along with case study examples.

Measuring Streamflow, Water Quality and Nutrient Sediment Loads in the Western Lake Erie Basin (Donna Runkle and Dennis Finnegan, U.S. Geological Survey)

Biography: Dennis Finnegan has a bachelor's from the Ohio State University. As a Physical Scientist for 27 years with the USGS, Dennis collected and published streamflow and water-quality data for various projects.

Donna Runkle has a bachelor's from the University of Iowa and master's from Oklahoma State University. As a hydrologist with the USGS for 42 years in four States, Donna has collected groundwater, streamflow, and water-quality data for various projects.

Abstract: Nutrients (nitrogen and phosphorus) and sediment runoff from agricultural and urban practices are of concern in the Western Lake Erie Basin (WLEB) watersheds of Ohio and Indiana. Large inputs of nitrogen and phosphorus can cause algal blooms that can produce cyanotoxins or compounds that cause taste and odor problems in water supplies. In 2014, the U.S. Geological Survey (USGS) began measuring streamflow and collecting water-quality samples to determine nutrient and sediment concentrations and loads from tributaries of the Maumee River that flow into Lake Erie. Currently, 13 monitoring stations in Ohio and three in Indiana are equipped with continuously recording streamgages and refrigerated automatic water-quality samplers. One of the stations, the Maumee River at Antwerp, Ohio, is designated a "Supergage" because it is also equipped to continuously monitor dissolved oxygen, temperature, specific conductance, turbidity, pH, and nitrate concentrations. USGS scientists will describe the monitoring process and present nutrient and sediment concentration and loading results for data collected over a variety of wet and dry years.

Nutrient Management

H2Ohio and Ohio's DAP (Joy Mulinex, Ohio Lake Erie Commission)

Biography: Before joining the Commission, Mulinex served as Director of Government Relations for Western Reserve Land Conservancy. Previously, she managed the bipartisan House-Senate Great Lakes Task Force in D.C. and worked for Senator Mike DeWine.

Abstract: In the mid-1990s, toxin-producing blue-green algal blooms began to appear in the western basin of Lake Erie. When an algal bloom produces toxins, it moves from being a nuisance to a health and safety threat for boaters, swimmers, and everyone who relies on Lake Erie as a water source. For over a decade, nutrient levels into Lake Erie have been higher than the levels of the 1980s. Blooms of varying intensity have occurred most years since 2003. Nearly 3 million Ohioans get their drinking water from Lake Erie. Additionally, Lake Erie helps generate over \$15 billion in tourism-related economic impact. For these reasons, the State of Ohio must work on an effective response to algae blooms in Lake Erie. H2Ohio is the water quality initiative Governor DeWine introduced to invest in targeted, long-term solutions to ensure clean and safe water in Lake Erie and throughout Ohio. The H2Ohio Fund will help ensure safe and clean water across Ohio by providing the resources necessary to plan, develop, and implement targeted long-term water solutions. There are three strategies that are key to H2Ohio: land-based strategies, water-based restoration, and monitoring. The Ohio Department of Natural Resources, Ohio Environmental Protection Agency, Ohio Department of Agriculture, and Ohio Lake Erie Commission will work together through H2Ohio to address critical water quality needs and support innovative solutions to some of the state's most pressing water challenges.

Agricultural Soil Erosion and Water Quality Targets: Management Matters (Libby Dayton, Ohio State University)

Biography: Dr. Dayton is a Soil Scientist at The Ohio State University. and has an active research program, one aspect of which is focused on understanding and reducing agricultural erosion and phosphorus runoff risk.

Abstract: The newly developed On-Field Ohio tool provides users a long-term, average estimate of field-scale, edge-of-field phosphorus (P) runoff and erosion risk. The power is the ability to compare crop management scenarios to evaluate changes in erosion and P runoff risk. On-Field Ohio allows farmers to prioritize time and resources to make effective management decisions.

Presented will be examples of erosion and phosphorus runoff outcomes based on field properties and farmer practices, in relation to achieving improved water quality outcomes.

Agricultural Phosphorus Run-off and Water Quality Targets: Nutrient Placement (Shane Whitacre, Ohio State University)

Biography: Shane Whitacre is a soil scientist in the Ohio State School of Environment and Natural Resources with a focus on fate, transport, human and ecological exposure to chemicals in the environment.

Abstract: The newly developed On-Field Ohio tool provides users a long-term, average estimate of field-scale, edge-of-field phosphorus (P) runoff and erosion risk. The power is the ability to compare management scenarios to evaluate changes in erosion and P runoff risk. On-Field Ohio allows farmers to prioritize time and resources to make effective management decisions. Presented will be examples the phosphorus runoff outcomes associated with fertilizer/manure placement methods based on field properties and farmer practices.

Ohio Floodplain Management

Reconnecting Streams with Their Floodplains in the Chagrin River Watershed (Kristin Hebebrand, Chagrin River Watershed Partners)

Biography: Kristen Hebebrand is a Project Manager at CRWP. She has experience in a variety of stream assessment techniques. At CRWP Kristen develops NPS-IS plans, writes grants, is a Phase II coordinator, and manages stream and reforestation projects.

Abstract: Increased urbanization, stormwater runoff, and loss of riparian vegetation are challenges in the Chagrin River watershed, which has maintained relatively high water quality and riparian forest cover. These sources of impairment lead to streambank erosion and loss of natural floodplain connection. Chagrin River Watershed Partners, Inc (CRWP) works closely with its member communities and park districts, conservation partners, and contractors to develop cost effective natural solutions to address these impairments. This presentation will cover several case studies of stream restoration and floodplain reconnection projects including projects completed along the mainstem of the Chagrin River and along one of its tributaries, Griswold Creek. This presentation will share CRWP's project planning and management approach, site specific challenges, and a variety of restoration techniques used to restore floodplain access, including large woody debris, weirs, and rock riffle structures will be discussed.

USACE Flood Risk Reduction Opportunities (Laura Ortiz, U.S. Army Corp. of Engineers)

Biography: Laura Ortiz, CFM is a Community Planner in the USACE Buffalo District whose primary responsibilities include working on projects and programs designed to reduce future flood risk. Laura also is involved interagency risk reduction initiatives.

Abstract: The US Army Corps of Engineers (USACE) has many programs available to assist communities in the identification programs which may assist local governments with reducing future flood risk. This presentation will provide an overview of the USACE programs and the processes required to initiate a study or activity with the Corps. Study authorities to be covered include the Continuing Authorities Program especially those that directly address flood risk reduction and those authorities which are applicable for both riverine and coastal systems. Authorities to be discussed include the Continuing

Authorities Program, General Investigations, Planning Assistance to States and the Flood Plain Management Services Programs. Information on the Ohio Silver Jackets Team will be provided along with information on the Interagency Projects which are designed to provide a leveraging of agency assets for reducing flood risk through studies and non-structural initiatives. The presentation will cover processes and funding requirements in order to engage the USACE. In addition, this presentation will also highlight the Ohio Environmental Infrastructure Program and outline the process required to engage the USACE with this authority. The state of Ohio is represented by four USACE Districts and this presentation will also provide contact information for those attendees who would like to make further contact with the USACE. Time will also be factored into the presentation for questions.

Using GIS and HAZUS to Identify Flood Risk Areas (Matt Lesher, Stantec, Inc.)

Biography: Matt Lesher is a project manager with experience managing and working on all aspects of hazard mitigation planning, floodplain management, FEMA Flood Hazard and Risk Analysis projects and grants management. He supports FEMA Region II and V on multiple riverine, Levee Analysis and Mapping Procedures (LAMP) and Discovery projects in Ohio, Michigan, Minnesota, Puerto Rico and New York.

Abstract: Employing GIS into the hazard mitigation planning process creates better data to inform mitigation plans and provides defensible supporting evidence for mitigation projects and the pursuit of grant funding. Using case studies inside and outside Ohio, we will illustrate how tools and methods such as Hazus, depth grids, tornado tracks, and more can help evaluate both city-wide and site-specific datasets to better identify and assess risk.

Thursday November 14, 2019

8: 30 – 10 am

Recreation

Clean Marina and Boaters (Heather Sheets, Ohio Dept. of Natural Resources)

Biography: Heather Sheets is the Ohio Clean Marinas Program Coordinator with the Ohio Department of Natural Resources. She educates and provides technical assistance to Ohio's boating community on environmental laws, rules and best management practices.

Abstract: The Ohio Clean Marinas Program is a partnership between Ohio Sea Grant, the Ohio Department of Natural Resources, and the Lake Erie Marine Trades Association that encourages marinas and boaters to use best management practices to keep Ohio's coastal and inland waterway resources clean. The Program enhances environmental stewardship in the recreational boating industry by making marinas and boaters more aware of environmental laws and recommendations and recognizing proactive members of the community as 'Clean Marinas.' Since 2005, training, educational outreach, and assistance have been provided to the Lake Erie marina community to aid in voluntary compliance with environmental regulations that address nonpoint source pollution and other environmental impacts on site. A Clean Boater Program was created in 2006 to further educate the recreational boating community on environmental best management practices. In 2015, the Ohio Department of Natural Resources' Division of Watercraft funded the expansion of the program statewide, engaging participants in both Lake Erie and Ohio River watersheds. Through continued efforts to strengthen and expand existing partnerships, the Ohio Clean Marinas Program serves as an example of a way for university, industry, and agency organizations to work together to achieve a common goal - improved air and water quality.

Water Recreation In Weird Times (Lisa Daris, Olentangy Paddle)

Biography: Lisa Daris is the owner of Olentangy Paddle, a small business that connects people to waterways through recreation and education. She is an educator with the Ohio River Foundation and has served on the Friends of the Olentangy Watershed board.

Abstract: I'll be talking about the weather patterns that have affected my kayaking business. I will be showing cycles of 'rain events' that have in the past occurred once every 100 years but are occurring more frequently. I'll be emphasizing the necessity of why our infrastructure needs upgraded due to these weather events.

Staying Afloat with Trends in Outdoor Recreation (Adria Bergeron and Kara Musser, Muskingum Watershed Conservancy District)

Biography: Adria Bergeron is the Marketing and Public Affairs Administrator with the MWCD. Kara Musser is a Program Coordinator at MWCD. She is a certified Parks and Recreating Professional. She also is a kayak instructor, Flatwater Solo and Tandem Instructor, and River Canoe Instructor through the American Canoe Association.

Abstract: This presentation will discuss the trends in outdoor recreation and how MWCD adapts.

Then & Now

Cuyahoga: From Flame to Fame: The Story of an American River (Bill Zawiski, Ohio Environmental Protection Agency)

Biography: Bill Zawiski has worked for the Ohio EPA since 1989 and is currently the Water Quality Group Supervisor at the Northeast District. Bill received his Bachelor's and Master's degrees in Biology from the University of Akron. Trained as a biologist, he has taken an active role in the movement in this area to remove dams to improve the quality of rivers. He has coauthored several professional publications on dams and water quality. He has also worked on numerous TMDLs in the district office.

Abstract: The Cuyahoga River is known worldwide as the river that caught fire. The story of this river is one of recovery— recovery of an ecosystem, of a connection to flowing water and its importance to humans. Join us on a journey into Cuyahoga River history, the life and times of an American river

Sustaining Scioto Short Term Implementation Plan (Rachael Beeman, Mid-Ohio Regional Planning Commission)

Biography: Rachael is a water resources planner with the Mid-Ohio Regional Planning Commission, and for five years has managed the Greenways Water Quality Program. Rachael's work is focused on the intersections of people, natural resources, and equity. She builds productive and collaborative relationships across levels, geographies, and backgrounds in ways that enhance mutual trust and commitment and advance resilience initiatives in the region.

Abstract: Rare and extreme weather events are becoming more common. Over the past few years, the region has experienced record-breaking heat, unprecedented flooding, and prolonged periods of drought. The science is clear that change is occurring and its impacts on a growing region like Central Ohio can be significant. The Mid-Ohio Regional Planning Commission (MORPC), with many different partners, initiated the Sustaining Scioto study in 2011 to identify risks to the region's water resources due to climate change. This proactive, science-based study was completed to ensure that Central Ohio has clean and secure water resources for current residents and businesses, and to sustain needs from future growth. The study uses the United States Geological Survey (USGS) watershed modeling to assess the impacts of changing weather patterns and regional development on water resources within the Upper Scioto watershed. These results along with the guidance of a Stakeholder Advisory Group were used to develop adaptive strategies to manage water quality and quantity during extreme drought or flood. In 2018, MORPC, along with the City of Columbus, Del-Co Water Inc and the Franklin County Engineer's Office started the development of the Sustaining Scioto Short Term Implementation Plan that will identify key performance indicators and a road map to implementing projects within a 5-year timeframe.

Groundwater

Statewide, Seamless Mapping of Groundwater Vulnerability using a Modified DRASTIC Model (Craig Nelson, Ohio Dept. of Natural Resources)

Biography: Craig Nelson is a hydrogeologist in the Ohio Department of Natural Resources, Division of Geological Survey's Groundwater Resources Group. His work focuses primarily on groundwater modeling, groundwater mapping, and the maintenance of the Ohio Water Well Database. He received his B.S. in Environmental Science – Hydrology from the University of Maryland, Baltimore County, and an M.S. and Graduate Certificate in Hydrology and Water Resources from the University of Arizona

Abstract: The sustainable management of Ohio's groundwater resources requires policies founded on reliable, readily available scientific data. As population, precipitation extremes, and public understanding of groundwater as a precious resource expand, decision-makers must increasingly address issues of groundwater protection in ways that promote both sustainable use and public health. Critical to such efforts are accurate, data-driven assessments of groundwater vulnerability. Groundwater's vulnerability to contamination is a key factor in many environmental permitting processes and the siting of new developments and production wells. Understanding its degree and spatial distribution is therefore a crucial step in protecting the integrity of the state's groundwater resources. To address these issues, the Ohio Geological Survey, with funding from the Ohio Water Development Authority, has embarked on a 3-year project to develop a statewide, seamless coverage of groundwater vulnerability using a modified DRASTIC model. In addition to completing the unmapped areas of the state, this project will revise and refine previously published "Pollution Potential" maps, correcting boundary conflicts and standardizing methodologies to create a single, statewide system. The final product will become the new standard for groundwater vulnerability assessment in Ohio. Derivative maps—including those of net recharge and conductivity—will also be produced for use by consultants and groundwater modelers

Water Use in Ohio, the Nation, and Moving Towards a Water-use Real-time Network (Kimberly Shaffer, U.S. Geological Survey)

Biography: Kimberly Shaffer has a degree in Civil Engineering from The Ohio State University and has worked for the U.S. Geological Survey for the past 22 years. She is the USGS Water-Use Data and Research Coordinator.

Abstract: Water availability is a concern in the Nation and water managers need enhanced temporal and spatial water-use data. Historically, the U.S. Geological Survey (USGS) has compiled water-use data every five years for the Nation since 1950 by working in cooperation with local, State, and Federal agencies. Due to data availability and the data review process, these reports are typically available 3-4 years after the compilation. The USGS Water-Use Data and Research Program (WUDR) was authorized under the SECURE Water Act in 2009 to develop and operate a financial assistance program with State water resource agencies to improve water-use reporting. Under WUDR, States received funding starting in 2015. In addition, the USGS is working on developing models for thermoelectric power, irrigation, and public supply water-use categories, which account for 90 percent of the water withdrawals in the Nation. These models will deliver estimates of water use at higher spatial and temporal resolutions. To verify and validate the models, daily and real-time water-use data are needed.

Ohio EPA's Underground Injection Control Program (L. Taliaferro III, Ohio Environmental Protection Agency)

Biography: Mr. Taliaferro has been with Ohio EPA for 34 years and have been the manager of the Underground Injection Control Unit for 21 years. He has been a member of the US EPA National Technical Workgroup for the UIC program for more than 10 years.

Abstract: Ohio EPA currently regulates Class I, IV and V injection wells under the authority of Chapter 6111 of the Ohio Revised Code and has primacy over the federal program for these injection well types under the Federal Safe Drinking Water Act. Ohio EPA ensures that the injection of fluid into the ground via a well does not cause an exceedance of primary drinking water standards in an underground source of drinking water. There are 15 permitted Class I injection wells in Ohio. These well inject waste below the USDW and are usually several thousand feet deep. Class IV injection wells inject hazardous waste into or above a USDW and are banned in Ohio unless they are used as part of an approved ground water remediation plan. Class V injection wells inject non-hazardous fluids into or above a USDW. These include, in part, large capacity septic systems, storm water drainage wells, nonhazardous industrial waste disposal wells, mine backfill wells, and injection wells used in ground water remediation projects. There are over 23,000 active Class V injection wells in Ohio. 25 of these are permitted Class V non-hazardous industrial waste injection wells in Ohio as well as several thousand permitted Class V mine backfill injection wells. All other Class V injection wells are approved by rule.

Ohio Floodplain Management Association

OFMA General Session & Annual Meeting

Climate Change Resiliency of Stormwater Infrastructure in NE Ohio (Jay Mosley, Environmental Design Group)

Biography: Jay has more than 30 years of experience in water resources, stormwater design, hydrology and hydraulic modeling in Ohio, California, and Arizona. Jay and his wife, Michele enjoy traveling to visit their sons in Tucson, Arizona and Portland, Oregon. In his free time, Jay enjoys playing volleyball, cycling, swimming, snowboarding, driving his 1960 Austin Healey Sprite, and hiking with their puppy Layla.

Abstract: Recent available climate data and climate change projections will be used to evaluate the impacts of observed and projected changes on existing storm water controls in NE Ohio and the region. The modeling will provide an evaluation of the resiliency of storm water controls such as basins to climate changes.

Floodplain Resiliency: The Coming Convergence of Disruption (Julie Lawson, Environmental Design Group)

Biography: Julie specializes in hydrologic and hydraulic modeling, stormwater and floodplain management. She loves solving complex problems and educating others about technical issues. She earned a BSCE and MSCE from Ohio University. Julie, her husband, Keith, her daughters, Maya and Ava, and their dog, Kali, live in Strongsville. She enjoys spending time with her family, hiking, biking, and volunteering.

Abstract: This presentation will look at floodplain resiliency in the face of disruption.

10:15 – 11:45 am

Ohio Watershed Professional Association

Enhancing the Utility of Macroinvertebrate Data Collected by Volunteers (Kurt Keljo, Franklin Soil and Water Conservancy District)

Biography: Kurt Keljo has been a watershed specialist at Franklin Soil and Water Conservation District since 2011. His educational background includes an MS in environmental science from The Ohio State University where his studies focused on wetlands.

Abstract: The ability of the Ohio EPA to collect data on the aquatic life in Ohio's streams is limited and perhaps going through some changes. Available data is not always adequate to meet the needs of watershed groups and other interested stakeholders. Volunteers are collecting macroinvertebrate data in particular that could potentially enhance the data set collected by the Ohio EPA. However, most volunteers collect Level 1 data, and the standard MAIS method used to collect Level 2 has some drawbacks, especially outside of south/southeast Ohio, where it was developed and calibrated. Drawing on data collected by the Ohio EPA in Central Ohio (176 samples), this presentation will explore these issues, offering some options for enhancing the usefulness of volunteer macroinvertebrate data, even the information generated by Level 1 sampling.

It Should Be Normal by Now - Using Systems Thinking to Protect Rivers (Sarah Hippensteel Hall and Mike Ekberg, Miami Conservancy District)

Biography: Sarah Hippensteel Hall is MCD's manager of watershed partnerships. She builds diverse partnerships throughout the Great Miami River Watershed - a 15 county region in southwest Ohio. Sarah joined MCD in 2001.

Mike Ekberg is MCD's manager for water resource monitoring. A hydro-geologist, Mike has been with MCD since 2000. He is responsible for all MCD operations concerning collection of water quantity and quality data. Before coming to MCD, Mike worked as a hydrogeologist for the Ohio EPA and as a staff geologist for Dames and Moore in Cincinnati. He holds a bachelor of science degree in geology from Lehigh University in Pennsylvania, a master of science degree in geology from the University of Cincinnati and an MBA at Wright State University with an emphasis on project management.

Abstract: Water here and across the United States faces multiple threats from a changing climate, polluted runoff from land, and our own personal actions. Encouraging stewardship of our water is critical to protecting health and quality of life. Plentiful, high-quality water is critical to the region's health and economy. The Miami Conservancy District supports stewardship of the Great Miami River Watershed's water resources. MCD's non-regulatory role focuses on technical data, analysis and expertise. Staff collects data along rivers and aquifers, hosts events and educational programs, and builds awareness of water and water-related causes. MCD collaborates with elected officials and community leaders, providing them with valued insight to support the region's overall health, vitality and growth. MCD leads with research and insight, enabling people living and working within the Great Miami River Watershed to make safe, sustainable choices that reduce the impact on our water. The Dayton region is home to an abundant source of groundwater. The Buried Valley Aquifer stores about 1.5 trillion gallons of water underground. It provides drinking water for more than 2.3 million people. More than 6,600 miles of rivers and streams flow through the watershed and are enjoyed for fishing and paddling. As river recreation grows, keeping the water clean for users becomes more and more important.

Challenges in Watershed Governance: A Cross-cultural Comparison of Ohio and the Dominican Republic (Joseph Bonnell)

Biography: Joe Bonnell has been working in watershed management for almost 30 years, including 22 years with the Ohio State University. He has a master's degree in environmental science from the School of Public and Environmental Affairs at Indiana University and a PhD in natural resources from OSU. He returned to Ohio in May after 18 months in the Dominican Republic, which included 9 months as a Fulbright Scholar at ISA University in Santiago.

Abstract: This presentation will explore shared challenges in watershed governance between the Dominican Republic and Ohio. The presenter completed a nine-month Fulbright Scholarship teaching and research project in Santiago, Dominican Republic between August 2018 and April 2019. His research focused on the role of government and nongovernmental organizations in creating governance structures for addressing non-point sources of pollution. He will compare and contrast cases from Ohio, observed during 20 years in water resource management at The Ohio State University, and the Dominican Republic. Watershed organizations in both contexts face many of the same challenges, in particular how to coordinate the efforts of multiple organizations and political jurisdictions and how to engage landowners and managers in the adoption of agricultural best management practices.

Data and Coordination

Development of Integrated Prioritization Systems to Support Water Quality Management Decision- Making (Edward Rankin, Midwest Biodiversity Institute)

Biography: Edward T. Rankin is a senior research associate at the Midwest Biodiversity Institute. Primary areas of expertise include fish ecology, water quality, biological assessment, and watershed stressor analyses.

Abstract: We have developed and are developing Integrated Prioritization Systems (IPS) at the watershed scale in three regions of Ohio, Illinois, and Wisconsin. An IPS is a data exploration tool that

can be used to evaluate and prioritize environmental restoration projects by synthesizing and analyzing large amounts of data collected over a sufficient period of time, under a representative range of conditions, and presenting it in a comprehensive database format. The data presentations are aimed at presenting an understandable picture of the current condition of stream and river sites, reaches, and watersheds across the region of interest. Both high quality and impaired (i.e., not meeting Water Quality Standards) sites and reaches are identified and assigned a restorability rating for impaired sites and a threatened and susceptibility rating for sites that are attaining their applicable WQS. The synthesis of biological, chemical, physical, and landscape information in an IPS is intended to assist in the setting of priorities for both restoration and protection projects and planning for future obligations and needs. Our development of IPS has evolved from comparatively simple spreadsheet formats to more complex yet informative Power BI dashboards and GIS formats. Compared to other prioritization schemes our IPS is unique by using rigorous, standardized ambient biological, chemical, and habitat data as the primary response variables and restoration and protection targets.

Allen Creek Berm Opening - An Alternative to Noah's Ark (Jeremy Hedden, Bergmann Associates and Nathan Zgnilec, OHM Advisors)

Biography: Jeremy Hedden, PE graduated from Michigan State University with a BSCE and is Vice President of Infrastructure for Bergmann's Midwest Region. He has worked on highway, rail, and bridge projects over his 20 years and was the Project Manager on this endeavor.

Nathan holds degrees in Civil and Environmental Engineering from Michigan Tech University. He works as an engineer for OHM Advisors in the Environmental and Water Resources Group. He focuses primarily on collection systems studies and stormwater management throughout Michigan and Ohio.

Abstract: This Non-localized Flood Risk Reduction Project involved creating a railroad berm opening near the mouth of the Allen Creek in the City of Ann Arbor. The berm was built over 100-years ago and is oriented perpendicular to the overland drainage flow pattern. As Ann Arbor continued to develop land south of the berm, the enclosed Allen Creek drain became overtaxed during heavy rains causing floodplain depths in this area of up to 10-feet. By constructing an opening (twin culverts sized 12-feet by 7-feet) flooding will be reduced by as much as 7-feet. The project is partially funded through a FEMA Hazard Mitigation Grant. In addition, with separate funding but in conjunction with this project, a new pedestrian connection linking downtown Ann Arbor and its neighborhoods with the Border to Border (B2B)/Iron Belle Trail is proposed. The pedestrian tunnel will be located immediately east of the proposed flood relief culverts, and was integral to MDOT and Amtrak supporting the flood risk reduction project. Minimizing flooding will improve water quality by reducing the Allen Creek contamination of the Huron River. This presentation will summarize the challenges and options evaluated for conveying flood waters through the berm including B/C analysis using FEMA tools, coordinating with local stakeholders/private property owners, hydraulic modeling and weir design, as well as the constructability challenges associated with maintaining rail traffic during construction.

Flood Warning Services in a Wetter World (Sarah Jamison, National Oceanic and Atmospheric Administration)

Biography: Ms. Jamison is a hydrologist for the National Weather Service Offices' in Cleveland Ohio with support to Buffalo New York. Born in Maine, she graduated with a bachelor's degree in Meteorology with a minor in Hydrology from Florida Institute of Technology. Ms. Jamison has worked at the National

Weather Service Offices in Missouri, North Carolina, and lastly Ohio where she has been since 2010. Her primary responsibility as Service Hydrologist is to warn the public of potential flooding.

Abstract: Are we experiencing more flooding events? According to NOAA climatologists, Ohio has experienced an increase in the number of extreme precipitation events (precipitation greater than 2 inches) since the mid-1990s. In Ohio over the last fifty years the actual number of heavy precipitation events has doubled. Warming temperatures over the last century allow the air to hold more moisture. This means that the rainfall intensity has steadily increased with heavy downpours. This has resulted in flooding of streams as well as combined storm drainage systems which are repeatedly overwhelmed. The impacts vary based on the vulnerability of the area receiving or downstream of the heavy rain. Constant changes in watersheds either through development or mitigation can greatly alter their risk level for flash floods. What is evident is the increased intensity of rainfall events is leading to an overall increase in flood risk. The National Weather Service is continuing to adjust our flood warning programs to keep up with the ever-changing intensity of rain events along with changes in the watersheds.

Drinking Water

Using Ultrasound to Control Cyanobacterial Blooms in Source Water Reservoirs (Zuzana Bohrerova, Ohio State University)

Biography: Dr. Zuzana Bohrerova, MPH, serves as a Research Specialist in the Department of Civil, Environmental and Geodetic Engineering at OSU and as the Associate Director of the Ohio Water Resources Center. Her research interest lies in the area of microbial disinfection and recovery in natural and engineered systems.

Zuzana Bohrerova^{1,2}, C.R. Weaver^{1,3}, Chin-Min Cheng¹, Elizabeth Crafton⁴, Yousuf Yousuf¹ and Linda Weavers^{1,2}

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⁴Phycologist, Source Water Quality Engineer, Hazen and Sawyer, Columbus, OH

Abstract: In Ohio, seasonal harmful algal blooms (HABs) have increased in frequency and intensity. These blooms have greatly affected many water resources in Ohio, including drinking water reservoirs. Reservoir management strategies are typically broken into three categories: physical, chemical and biological. Ultrasound is a physical strategy that may be an important bloom prevention and mitigation strategy. Compared to other physical strategies and use of algaecides, ultrasound has the advantage of low energy, no chemical addition, and the possibility that cell lysis and release of toxin does not occur. Using a bacterial surrogate and cyanobacterial mixture, we evaluated the effect of ultrasound deployed in pond on aerotops (gas vesicles) and other viability and stress markers in these microorganisms

Impact of Filter Upset During Conventional Surface Water Treatment on UV Disinfection Efficacy (Judith Straathof, Ohio State University)

Biography: Judith Straathof is a Master of Science student at Delft University of Technology studying Environmental Engineering. She is doing her thesis research as a visiting scholar at the Ohio State University with Dr. Natalie Hull and Dr. Zuzana Bohrerova

Abstract: Cryptosporidium and Giardia are protozoan parasites that cause waterborne illnesses in humans. Water treatment plants are required to remove or inactivate them to a regulated degree. UV disinfection efficiently inactivates the chlorine-resistant (oo)cysts, but water quality impacts how much UV light reaches the microbes for disinfection. If the water has high turbidity, low UV transmission, or particles that cause particle shielding, the UV light can be absorbed or scattered allowing Cryptosporidium and Giardia to pass through UV disinfection without being inactivated. Therefore, no inactivation credit is given when the combined filter turbidity exceeds 0.3 NTU (95th percentile) or 1 NTU (maximum). However, studies have shown partial inactivation when turbidities are higher than 0.3 and 1 NTU. This study examines the impact of turbidity after coagulation and flocculation under conditions of filter malfunction. Due to extreme weather events occurring more frequently, more high turbidity events may occur. Results showed that particles larger than 12µm are more reflective than particles smaller than 12µm in flocculated water with high turbidity. Although it is possible that larger particles shield spores more, the UV light could reach spores due to higher reflectivity leading to partial inactivation. Preliminary Low-Pressure UV exposure results show that there is 0.5 log inactivation in flocculated water at a dose of 80 mJ/cm² for endospores - a protozoan cyst surrogate.

Peeling the Onion, the Layers of Asset Management (Susan Schell, Ohio Environmental Protection Agency)

Biography: Susan Schell has a BS in Chemical Engineering from The Ohio State University, Class III certified water supply operator, with nearly 30 years at Ohio EPA, serving as a plan reviewer, a water system inspector, the manager of the Engineering & Infrastructure group.

Abstract: For many public water systems asset management is a daunting task and getting started is a heavy lift. The best place to start is to go with what you know and build on it. That means working on the asset inventory and condition assessment. This is the basic building block of asset management. It doesn't have to be super sophisticated at this point, that can be built up as the system gets their feet under them. Once a system knows what their assets are and what kind of shape they're in, they can looking at remaining useful life and criticality. From that they can look at where they want to be in the future and how their existing infrastructure needs to be improved to get there. This is identifying the gaps and putting together the capital improvement plan. Plan the work and work the plan. This helps explain the needs of the system to the utility management group and the general public in a straightforward and transparent manner. It lays out the financial needs in a way that people can understand. It also helps educate the customers about the responsibilities of operating a public water system. Asset management is a team effort, and everyone has a part to play in making a water system sustainable and economical for the long haul.

Ohio Floodplain Management Association

Why Knowing How Much It Rained Delivers Beneficial Results (Mark Frazier, National Weather Service Indiana, and Sarah Jamison and Link Crawford, National Weather Service Ohio)

Biography:

Abstract:

Using Current Technology to Determine Both Fluvial and Pluvial Risk (Mark Seidelmann, Stantec, Inc.)

Biography: Mr. Seidelmann was born and Raised in Columbus. Graduated with a BS and MS in Civil Engineering from Ohio State and has extensive experience performing and managing FEMA projects.

Abstract: One of the biggest struggles of flood modeling is selecting parameters that accurately represent the risk in a given flood event. Modeling a limited number of events with select parameters does not convey risk for flood events not simulated in the analysis and does not account for uncertainty of the variables. Current computing technology has made it possible to process hundreds, if not thousands, of model runs for varying flood events, storm derations, storm distributions, and modeling parameters allowing the modeler to assess a wider range of flood events and take uncertainties for modeling parameters into account. Historically, flood damage has been attributed to traditional overflow of the stream banks that is seen in riverine flooding (Fluvial); however, more advanced flood modeling assesses flood damage resulting from accumulation of rainfall in low lying areas disconnected from a stream (Pluvial). Increased computing power and the addition of 2D modeling capabilities to publicly available software has made it easier to assess this pluvial risk. These modeling techniques can be used to create heat maps and annual exceedance curves that are combined with depth damage curves to estimate average annualized loss at a local level.

1:30 – 3:00 pm

Stormwater & Community Engagement

Assessment of Bioretention Performance for Hydrology and Hydrocarbons (Abigail Tamkin, Ohio State University)

Biography: Abby recently finished her PhD in Ecological Engineering at Ohio State under the direction of Jay Martin, studying water quality and hydrocarbon quantification in bioretention.

Abstract: Bioretention is a common green infrastructure practice for urban and suburban stormwater management. While research has shown this technology to reduce stormwater volume and improve stormwater quality, there is a gap in knowledge regarding long term performance. Additionally, hydrocarbons are an important but understudied stormwater pollutant. Column studies indicate bioretention is effective at reducing hydrocarbons in stormwater flows, but there is limited research

confirming this in field settings. To address both concerns, simulated storms (3.5 mm equivalent) were performed evaluating the hydrological performance and hydrocarbon removal of a bioretention cell six years post installation. Despite an apparent increase in preferential flow (indicated by rapid bromide tracer breakthrough and accelerated water table response rates), there was no significant difference in volume reduction between 2011 (average 53%) measurements and those done in this study (2015-16: average 69%), after accounting for runoff volume differences. These results indicate continued effective operation of this facility, at least during small events. Hydrocarbon mass reductions (83%) were similar to other studies while concentration reductions were lower (53%), possibly due to low input concentrations (0.58 mg/L). Within each cell, concentrations did not vary significantly over the year of study, indicating steady state conditions and no accumulation during the period of study.

Getting Rain Gardens Built Without Lifting a Shovel (Susan Bryan, Washtenaw County Water Resources)

Biography: Susan Bryan is the Rain Garden Coordinator at the Washtenaw County Water Resources Commissioner's Office. Her degree is from the University of Michigan – Master of Landscape Architecture. She has been working with volunteers for 10 years, developing and teaching the Master Rain Gardener course. The results are new rain gardens for schools, libraries, residents – now 460 of them – and they are all maintained beautifully.

Abstract: Do you need to pay residents to install rain gardens? What if you didn't? What if you convinced more than 460 people to build rain gardens on their own dime? And maintain it themselves? Washtenaw County Water Resources runs a training program for residents that gets 70 rain gardens built a year – without lifting a shovel. The training is known as the Master Rain Gardener Certification class. This proven model gets rain gardens built – on a budget. This class utilizes strategies ranging from invoking the social contract, to leveraging peer networks. The Master Rain Gardener class is appropriate for all kinds of communities – rural or urban. People love to be the one "in the know", and to pull themselves up by their own bootstraps. Maybe you have tried offering rain garden workshops – but no one builds a rain garden. Lessons learned will be presented on how to offer a rain garden training that will yield results. This training fulfills Storm Water NPDES requirements for pollution reduction, public education, and post-construction runoff control.

Educational Programs at Latham Park (Hala Zahreddine, Urban Park Development, LLC)

Biography: Hala Zahreddine completed her bachelor's degree in Agricultural Sciences and her master's degree in Plant Sciences at the American University of Beirut, in Lebanon. In 2005, she earned a Doctorate Degree in Horticulture and Crop Science from the Ohio State University.

Abstract: Latham Park was dedicated to the City of Hilliard as an educational park in 1990. The existing amenities at the park are a 4.5 acre pond, a trail, a stream and wetlands. In spring 2018, and after couple of years of planning with various entities, the first round of educational programs at Latham Park was carried out with the participation of 75 high school students. This fall, over 350 students rotated among different educational stations at Latham Park. The success of the program highlights the need for hands-on activities related to environmental education in outdoor nature settings.

Education

Project WET Updates (Dennis Clement, Ohio Environmental Protection Agency)

Biography: Dennis graduated from Hocking College in March 1994 with Associates of Applied Sciences in Wildlife Management and Interpretive Services. His background includes two years substitute teaching for Tri-Rivers Career Center, 6 years as education coordinator with the Morrow SWCD, and 18 years with the Ohio EPA, Office of Environmental Education (OEE) as an Environmental Public Information Officer 1. In January 2015, he was appointed Project WET State Coordinator for Ohio. In his spare time, he is a carded equine judge for the American Buckskin Registry Association, International Buckskin Horse Association, Pinto Horse Association and The Ponies of America. He is also certified 4-H Equine Judge in Ohio and Michigan.

Abstract: Have you ever wondered what is happening with water education in Ohio? Do you know what OWEPE means? This session will provide updates on Project WET – Ohio, numbers reached with this water curriculum in 2018, the new climate change additions to the curriculum and the possibility of being involved with the creation of the Great Lakes Kid’s Booklet. Come dive into our session and learn about how YOU can be included.

Unique and Effective Ways to Educate for Improving Water Quality (Ryan Bourgart, Ohio Environmental Protection Agency)

Biography: Ryan Bourgart works as a grant manager and environmental educator with the Ohio EPA. He has about five years of cumulative experience in environmental education, consulting, and other environmental fields.

Abstract: Education projects recently funded by Ohio Environmental Education Fund grants illustrate unique techniques for effectively communicating with target audiences on how to improve water quality. The Franklin Soil and Water Conservation District’s (SWCD) “Gardening for Clean Water” project focused on providing garden centers with workshops, training, and literature about storm water solutions. Franklin County Drainage Engineer constructed an Augmented Reality Sandbox, which is a digital display that uses software to project a topographic map filled with kinetic sand. A tool used by middle and high school students, the general public, and several SWCDs, the Sandbox simulates infiltration patterns and can be used to implement site-specific storm water solutions. One of these solutions was demonstrated in Hamilton County SWCD’s “Storm Sewer Retrofit Project”, which retrofitted a large stormwater outfall and presented performance data to MS4s. Mill Creek Alliance’s “Water Quality Education and Monitoring” project is an example of storm water solution evaluation by involving underserved youth in the analysis of water quality at 47 sampling sites in Mill Creek, declared in 1997 to be one of the most endangered urban rivers in North America. These projects demonstrate how to effectively educate a variety of target audiences in unique ways about green infrastructure through implementing new exhibit technology and upgrading traditional volunteer monitoring programs.

Ohio Watershed Leaders Conference – Seventeen Years and Still Evolving (Jerry Iles, Ohio State University Extension)

Biography: Jerry has worked with OSU Extension for the past nineteen years. He has served as the South District Watershed Management Agent and OSU South Centers Watershed Educator. He currently chairs the annual Ohio Watershed Leaders conference.

Abstract: The premise for the Ohio Watershed Leaders Conference was to provide statewide training and networking opportunities for watershed professionals. The conference is moved around the state each year to focus on various regional water quality issues. Locations are camp like settings including OSU's Stone Lab, Cuyahoga Valley National Park, Lake Hope State Park and several 4-H and scout camps. The informal setting allows state and federal agency staff and university researchers a chance to network with community watershed groups and local watershed planners. The format in recent years includes a field trip on day 1 to watershed restoration sites and day 2 consists of participants giving presentations on their projects, agency staff providing information on best practices and grant funding directions. This presentation will cover lessons learned in the previous seventeen years of conferences.

Water Treatment

Seawater Sewage Treatment with Sand Bioreactors (Kristen Conroy, Ohio State University)

Biography: Kristen Conroy earned her Masters in Biological Engineering from OSU in 2017. She has lived and worked in East Africa and currently leads international engineering service learning trips for OSU. She is working on her PhD under Dr. Karen Mancl.

Abstract: From California to Capetown, many arid and semi-arid areas have strained freshwater supplies. Several of these same communities are coastal and have ample access to seawater. The city of Hong Kong has made use of its coastal location by using seawater to flush toilets in 80% of its residencies. Seawater toilet systems offer advanced sanitation without straining limited freshwater supplies. The large-scale wastewater treatment plants (WWTP) employed in Hong Kong are not applicable in small, rural communities. This study is testing a sewage treatment technology applicable to rural, coastal areas. Studies in Southern and Eastern Africa have shown that people desire flush toilets over dry improved sanitation technologies, indicating that sewage will be produced as sanitation access increases. Sand bioreactors offer a low-cost, low-maintenance technology to treat sewage. The objective of this study is to test the ability to treat sewage with seawater level salt content. Wastewater from lab-scale septic tanks is dosed onto sand bioreactor columns. The artificial wastewater is made with primary sludge from the municipal WWTP and salinity representative of seawater. After 14 months, one third of the columns have experienced clogging and reduced ammonia removal but have been restored after a resting period. Columns without clogging removed 90% of TOC and 99% of ammonia from months 4-14. The study is ongoing.

Using Instream Bio-reactors to Improve Water Quality, Reduce Erosion and Change Stream Morphology (Kurt Keljo, Franklin Soil and Water Conservation District)

Biography: Kurt Keljo has been a watershed specialist at Franklin Soil and Water Conservation District since 2011. His educational background includes an MS in environmental science from The Ohio State University where his studies focused on wetlands.

Abstract: In November of 2013, Franklin Soil and Water Conservation District installed several bioreactors, also referred to as stream inserts, constructed from a proprietary matrix, called Brotex, in a small stream on the eastside of Franklin County. The project was monitored pre and post-installation for nutrient levels, bacteria, macroinvertebrates and fish. Monitoring indicated a significant increase in the fish numbers and diversity, an increase in the presence of sensitive taxa of macroinvertebrates and some reduction in bacteria counts. In 2018, the Friends of the Lower Olentangy Watershed (FLOW) installed 5 inserts in a small tributary to the Olentangy, and in 2019, Franklin Soil and Water installed two insert projects, consisting of more than 15 inserts each in the Blacklick Creek watershed, incorporating wood structures to enhance the impact of the inserts. While the 2013 project focused on improvements to water quality, the most recent projects attended to reducing erosion and changing stream morphology as well. The presentation will discuss these projects, describing the installation methods, lessons learned and any data on changes in the installation streams.

USEPA Strategic Plan-National Compliance Initiative (2018- 2022) NPDES Significant Non-Compliance (Bill Palmer, Ohio Environmental Protection Agency)

Biography: Bill has 25 years of experience working at Ohio EPA and started his career in 1988 as a criminal investigator in the Special Investigations Unit. Bill eventually became Manager of the Special Investigations Unit.

Bill left the OEPA in 1998 and worked for several years at the Wyoming Department of Environmental Quality as the Emergency Response Coordinator. Bill returned to Ohio and worked for five years in the private sector as a Territory Manager for Chemtron Corporation.

Bill joined the Division of Surface Water in 2016 as the Compliance Manager working out of Central Office.

Bill is a graduate of the University of Wyoming with a B. S. in Fisheries Management from The University of Wyoming.

Abstract: This presentation will look at the USEPA Strategic Plan-National Compliance Initiative (2018-2022) NPDES Significant Non-Compliance goals and the items that the Ohio EPA is working on to accomplish these goals.

Ohio Floodplain Management Association

Certified Floodplain Manager and Professional Engineering Ethics Training (Alicia Silverio, Ohio Dept. of Natural Resources and Chad Boyer, ms consultants, Inc.)

Biography: **Alicia Silverio** is the NFIP Coordinator for Ohio within ODNR's Floodplain Management Program, she assists with the implementation and administration of the National Flood Insurance Program throughout the State of Ohio by providing technical guidance to assist communities maintain NFIP compliance, evaluating local floodplain management programs, and recommending improvement measures.

Ms. Silverio is a Certified Floodplain Manager as recognized by the Association of State Floodplain Managers and Past President of the Ohio Floodplain Management Association. She is a graduate of The Ohio State University where she acquired a Bachelor of Science Degree in Natural Resources (majoring in Environmental Science with emphasis in Water Quality). Ms. Silverio has been with ODNR's Floodplain Management Program since 1999

Mr. Boyer serves as the Water Resources Department Manager for ms consultants in Columbus, OH. At ms, Mr. Boyer manages and designs water resources related projects, specializing in floodplain hydrologic and hydraulic analysis and storm water management projects. Mr. Boyer holds a Bachelor of Science Degree in Civil and Environmental Engineering. He is a Certified Floodplain Manager and Professional Engineer.

Abstract: This presentation will cover the CFM and PE Code of Ethics and how these apply to the daily life of floodplain professionals.

TerrAqua Movie Viewing

<https://youtu.be/KweijpXK7Is> - The Easiest Ways to Fix Climate Change is Population Control and Going Vegan – right?

https://youtu.be/6cRCbgTA_78 - What's the Big Deal with a Few Degrees?

Future Viewing Suggestion:

<https://youtu.be/1nuGVdYo038> - I Live in the Midwest, Does Climate Change Matter to Me?

<https://youtu.be/-BvcToPZCLI> - The Most Important Thing You Can Do to Fight Climate Change: Talk About It