

The Ohio Water Table

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Farmers Step Forward to Draw Down Atmospheric Carbon Dioxide on More Than 10 Million Acres

Reprint from *BusinessWire*, by **Allie Evarts**, Indigo Agriculture, aevarts@indigoag.com



Since the June 2019 launch of The Terraton Initiative, farmers have submitted 10M acres, a significant step forward for agriculture's role in reversing climate change

Indigo Agriculture, a company dedicated to harnessing nature to help farmers sustainably feed the planet, announces that farmers have submitted more than 10M acres of cropland to The Terraton Initiative, a global effort to draw down atmospheric carbon dioxide through agricultural soils. The Terraton Initiative was launched in June 2019 to measure and verify soil carbon, and provide growers incentives to adopt regenerative growing practices that reverse climate change and improve the economic and environmental resiliency of farming. The response, which significantly outpaced company projections, demonstrates the need for new income streams for growers, and a willingness to transition to regenerative practices at scale.

"Farmers, as stewards of the land, are best positioned to harness the potential of soils to act as the most immediate, affordable, and scalable solution to address climate change," said David Perry, Indigo's CEO. "If we're going to ask farmers to change their practices and play a leading role in removing carbon dioxide from the atmosphere, it is reasonable that they are compensated for this effort."

Regenerative farming practices, such as cover cropping, crop rotations, no-till farming, reduced pesticide and fertilizer use, and integrated livestock management, have been shown to capture atmospheric carbon dioxide through the natural process of photosynthesis. Due to the widespread use of conventional farming techniques today, average soil carbon content is anywhere between 0.5% to 1%; regenerative farming practices have the potential to restore soil carbon to native levels of 3% to 7%. If regenerative farming practices were adopted on the 12B acres of cropland and pastureland across the globe, more than a trillion tons – a teraton – of

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President's Column

Craig Smith, WMAO 2018-2019 President

Ohio EPA recently celebrated the 25th anniversary of its Voluntary Action Program. The Voluntary Action Program was created in 1994 to simplify the process for remediating and redeveloping old industrial sites. Under the Voluntary Action Program volunteers have converted often abandoned properties to beneficial uses, including public parks.

Another of Ohio EPA's programs is celebrating its 20th anniversary this year: Ohio's Source Water Assessment and Protection Program was approved by U.S. EPA in 1999. This program provides information to public water systems on their sources of drinking water, water quality impairments, and activities that increase the risk of long- or short-term impairments. Public water systems are encouraged to use this information to work with local partners to minimize these risks. Ohio EPA's Source Water Assessment and Protection Program staff work with state-wide partners to identify and implement strategies that support local efforts.

For these partnerships to work we need to understand how our programs relate to each other; to find common ground where our goals align, and our work supports each other's.

We tend to identify ourselves with one area of water resources management - drinking water, ground water, wastewater – and attend conferences and training focused solely in that area. We learn about innovate concepts, new programs, and potential new risks in our part of the water resources universe. We get immersed in our part of this universe. With limited time and resources, we can't attend every seminar, webinar, or conference that may be relevant to but outside our segment of water resources management.

The value of WMAO is that it allows us to peek into the other corners of the universe; to see the connections between the various disciplines that make up water resources management. We get to see how the work other water resource professionals are doing supports our work, and how our work supports theirs. This is what I look forward to when the Fall Conference rolls around; I know I'll learn about innovate concepts and programs outside of the drinking water and ground water parts of the water resources universe in which I work.

Without WMAO we may not have seen the connection between a water quality monitoring program and a public water system's drinking water source protection efforts. Peeking outside her part of the universe allowed one professional to see how a combined sewer separation program relates to and can be used as the starting point for a drinking water source protection program.

The two Ohio EPA programs celebrating their anniversaries this year are connected as well. Besides simplifying the process for remediating and redeveloping old industrial sites, the Voluntary Action Program also ensures that remedial efforts minimize site's impact to the water resources needed by our public water systems. To do this it uses the work done under the Source Water Assessment and Protection Program that identifies sources of public drinking water. It's not a monumental connection, but every connection, every partnership, every peek into another discipline is important.

A handwritten signature in black ink, consisting of a series of loops and a long horizontal stroke extending to the right.

carbon dioxide could be removed from the atmosphere. This potential is equivalent to the increase in atmospheric carbon dioxide levels since the start of the Industrial Revolution.

Until now, three main barriers have limited agriculture's potential to reverse climate change: measuring and verifying soil carbon at scale, grower dependency on chemicals and fertilizers, and lack of adequate financial incentives for growers. The Terraton Initiative, in collaboration with leading technologists, scientists, and growers, addresses these constraints to unlock agriculture as a leading climate solution. Advancements in remote sensing and data sciences allow for the accurate, efficient, and affordable measurement and verification of soil carbon levels. Similarly, discoveries in microbiology and data sciences reduce the need for chemical and fertilizer inputs while maintaining, or even increasing yields. Lastly, The Terraton Initiative offers substantial financial incentives to growers for adopting regenerative farming practices and drawing down carbon dioxide into their soils.

"We joke we're 'lazy' farmers because we use crop rotations to avoid tilling, but in our experience the science and economics support regenerative practices, so we couldn't find a reason not to enroll," said Josh Goding, a grower based in Nebraska who submitted his entire acreage to the program. "Misconceptions about agriculture's impacts on the environment are widespread so, as a farmer, I appreciate what Indigo is doing to quantify and educate others about our work."

"Ohio growers have submitted over 100,000 acres to Indigo Agriculture..."

"Our farm has gone through an evolution," said Loran Steinlage, owner of Iowa-based FLOLO farms. "Our evolution has taken us down the path of what many are calling 'regenerative.' Along the way, we've learned our farming practices are sequestering carbon and are just now beginning to understand how to measure that. When we changed over to regenerative practices, we experienced healthier soil and higher yields. With Indigo, we're now being compensated for the added benefit of pulling carbon dioxide out of the atmosphere. It's a win all the way around."

Ohio growers have submitted over 100,000 acres to Indigo Agriculture, which provides farmers with extra income for increasing their soil carbon. The initiative is focused on helping farmers transition to regenerative practices - with both a financial incentive and logistical support – to improve their soil fertility, reduce their input costs, and sustain their operation. It's \$0 for farmers to sign up for the program, with no commitment and a flexibility to adopt practices that fit the farms business.

Growers who sign up for The Terraton Initiative by the end of 2019 are eligible to receive a minimum of \$15 per metric ton of carbon dioxide sequestered in their soils. Individuals, governments, non-profit organizations, and corporations seeking to reverse their carbon footprint can pay enrolled farmers to achieve this status. For more information regarding Indigo Ag, or to participate in The Terraton Initiative, visit IndigoAg.com.

About Indigo Agriculture: Indigo improves grower profitability, environmental sustainability, and consumer health through the use of natural microbiology and digital technologies. The company's scientific discoveries and digital innovations create new value from soil to sale, benefiting tens of thousands of growers across millions of acres. Working across the supply chain, Indigo is furthering its mission of harnessing nature to help farmers sustainably feed the planet.

Ohio Floodplain Management Association



Flood Fest 2019: The Mitigation & Resilience Tour

By **Julie Lawson**, PE, CFM, Environmental Design Group

The Ohio Floodplain Management Association (OFMA) was honored to host the 43rd Annual Association of State Floodplain Managers (ASFPM) Annual Conference in May. This was the first time the conference has been hosted in Ohio, and we were excited to welcome over 1,000 professionals from around the world to Cleveland. This event could not have been successful without the leadership from Alicia Silverio and Shawn Arden, co-chairs of the OFMA Host Team, as well as the entire OFMA Host Team and the many volunteers who helped before and during the conference. Generous sponsorships also made this event possible.

Three technical field tours were offered during the conference. **The Flood Mitigation Tour**, led by Steve Ferryman, Ohio EMA, kicked off the week. Derek Shafer, West Creek Conservancy, and Paul Kovalcik, NEORSD, showed us the West Creek Confluence Restoration Project. Jason Ziss, Kurtz Bros., Inc, explained the Bedload Interception Project. Kristen Buccier, NEORSD, walked us through the Towpath Bank Stabilization Project. Paul Dey and Todd Sciano, Village of Valley View, highlighted the Valley View Mitigation Projects.



Old buildings were removed from the West Creek floodplain and the floodplain was expended, protected, and planted with native species.



Natural materials were used along the Cuyahoga River near the Cuyahoga Valley National Park Exploration Center to protect the Towpath Trail along the Ohio and Erie Canal.



Valley View used the Hazard Mitigation Grant Program to remove 1 home and elevate 10 homes to two feet above the 100-year water surface elevation to reduce repetitive flood losses.

The Rockin' Projects in Euclid Creek Tour followed, led by Bill Zawiski, Ohio EPA, and Elizabeth Hiser, Cuyahoga Soil & Water Conservation District. We visited the Willoughby-Euclid School of Innovation to see the habitat and floodplain restoration project, the Euclid Creek Lacustruary Restoration Project, and the Euclid Creek Army Corps of Engineers Flood Control Channel.



The stream was raised using cobble riffle structures and a floodplain bench was created. Students at the school helped re-establish the native riparian woody vegetation along the floodplain.



A historic lack of maintenance in this rolled concrete channel was allowed to remain since shoaling developed and created improved in-stream habitat.

Our final tour, **The Green Infrastructure Gig**, was led by NEORS staff including Janet Popielski, Kim Colich, Doug Lopata, George Remias, Mike Blair, and Jim Jones. We explored the Fleet Avenue Green Infrastructure Project, the Urban Agriculture Green Ambassador Project, the Fairhill/MLK Green Ambassador Project, the Woodland Central Green Infrastructure Project, and the Buckeye Road Green Infrastructure Project.



Vacant land along Fleet Avenue was used to create a bioretention basin to treat and convey stormwater runoff and to also create a neighborhood amenity.



Tour participants enjoying public art at Buckeye Road. Four blocks of abandoned structures were removed and replaced with a series of rain gardens and detention basins.

Top Regional Water Challenges for the 21st Century

By **Mike Ekberg**, The Miami Conservancy District

You may have heard me say this before—southwest Ohio is water rich. We have abundant, high-quality water when compared with other parts of our country and the world.

Yet, our region is not without challenges in managing water. Here are six water trends that may pose challenges to our community leaders for the foreseeable future.

Precipitation and runoff are trending up

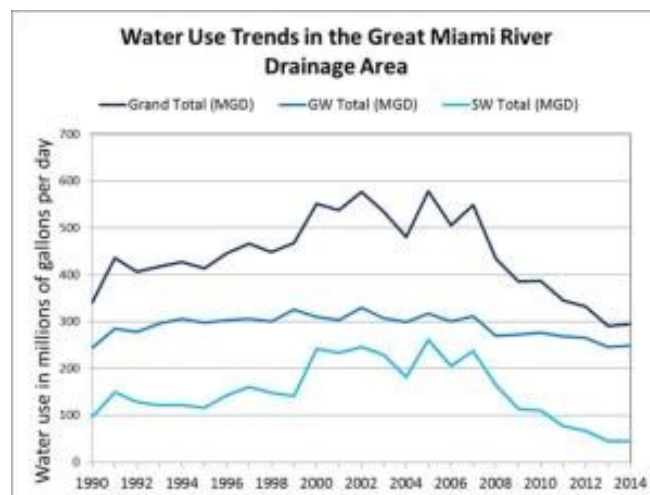
Our region is getting wetter. Mean annual precipitation and runoff (the amount of water that drains off land) in the region are trending up. In the 1960s, mean annual precipitation was around 37 inches per year. Today, mean annual precipitation is a little over 41 inches. That's an increase of about 4 inches per year. Not surprisingly, mean annual runoff shows a similar trend.

These trends are good news and bad news at the same time. The good news from a water quantity perspective is our region isn't likely to experience any long-term water shortages given current water uses. The bad news is our region could experience more frequent flooding outside of areas protected by The Miami Conservancy District (MCD). One thing that's clear is communities will likely deal with more frequent and intense rain events in the future.

Water use is trending down

According to data compiled by the Ohio Department of Natural Resources, water use for things such as drinking water, manufacturing, and irrigation are declining. Total ground and surface water used in the area that drains to the Great Miami River peaked in the early 2000s at slightly fewer than 600 million gallons of water per day. Water use is currently at about 300 million gallons per day.

The decline in water use is a result of several factors, including more water-efficient plumbing fixtures, increased efficiencies in industrial water use, a regional decline in manufacturing, and the closure of the DP&L Hutchings Station power plant.



Declining water use poses a challenge for many local water utilities struggling to maintain sufficient revenues to deal with rising infrastructure costs. In the past, water systems often made their financial projections based upon an assumption of rising water demand. This assumption is no longer valid. And yet, public water system infrastructure must be maintained if we want to have safe drinking water. Some water utilities may need to restructure rates to ensure sufficient revenues.

Nutrient levels in rivers and streams remain too high

Nitrogen and phosphorus levels in many area rivers and streams are too high and affect aquatic life. The most common sources of nitrogen and phosphorus are agricultural fertilizers and human sewage. When nitrogen and phosphorus are present in water at high levels, they fuel excessive algal growth in

the rivers where we like to recreate. Recent algal blooms in other parts of the US have been toxic. Agricultural leaders and communities that manage water-reclamation facilities are working to find a solution that cost-effectively reduces nutrients in our rivers and streams.

Road salt and fertilizers impact aquifers

Applications of road salt and nitrogen fertilizers are perhaps the two most prolific sources of man-made contaminants to aquifers. Elevated levels of chloride from road salt—and elevated levels of nitrate from fertilizers or failing septic systems—are present in regional aquifers. That's what groundwater data collected by the United States Geological Survey, the Ohio Environmental Protection Agency (Ohio EPA), and MCD show. Nitrate is a concern, because it can impact the health of infants. Excessive amounts of chloride can make drinking water more corrosive and potentially create problems with taste as well as high lead and copper in drinking water.



2012 algal bloom on the Great Miami River in downtown Dayton



Deicing agents such as road salt and brine can increase chloride in streams and rivers.

The take-home message is better methods for applying road deicing agents and agricultural fertilizers are needed in areas where regional aquifers are vulnerable to contaminants.

Do we know where these vulnerable aquifer areas are? We have a good start. Every public water system in Ohio that relies on groundwater has a defined source water protection area. A source water protection area is a map of all the aquifer areas which provide drinking water to a particular public water system. Those maps can be shared with farmers and road maintenance departments. It may be possible to reduce use or find better methods to apply fertilizers and road salt in these sensitive areas.

Widespread destruction of natural stream habitats

It used to be that most people's image of a polluted stream involved a factory with a big discharge pipe pouring toxic chemicals into the stream. That's no longer a top water quality threat to regional rivers and streams. According to Ohio EPA, human alterations to the stream channel are perhaps the most widespread cause of stream destruction. Human alterations can mean:

- Channelizing or straightening a stream channel.
- Removing the natural vegetation from a streambank.
- Increasing the impervious surface area that drains into a stream.
- Damming the stream channel.
- Developing in a stream's floodplain.

All of the activities listed above disrupt a stream's natural habitat, which can affect water quality in

the places many of us like to recreate. They also create other problems, such as soil erosion and flooding, which can lead to costly clean-up and restoration.

Solutions to the problem typically seek to preserve as much of the stream channel in its natural state as possible. Streamside setbacks, conservation easements, and low-impact development practices are tools that can minimize destruction of rivers and streams.

Micropollutants are present in our natural waters

Micropollutants are human manufactured compounds found at trace levels in streams, rivers, and aquifers. Some common micropollutants include pharmaceuticals, chemicals in personal care products, and chemicals used in household products and fire fighting foams such as per- and polyfluoroalkyl substances (PFAS). These compounds often get into the natural environment from sewage treatment plants. We don't know much about the toxicity of many of these compounds and conventional drinking water and sewage treatment processes do not remove all of them.



Modified stream channels have poor habitat and water quality.

Communities that recycle wastewater from sewage treatment plants into drinking water are already dealing with the issue of micro pollutants. Orange County California is an example. The Orange County Water District uses advanced wastewater treatment technologies to remove micro pollutants at the sewage treatment plant. The treated wastewater is injected into an aquifer and reused as a source of drinking water. The process is costly but necessary in a region where water is scarce.

I don't know what the ultimate answer will be for more humid regions such as southwest, Ohio. Perhaps a combination of limiting certain chemicals in consumer products combined with more advanced wastewater and/or drinking water treatment technologies will be the answer.

Moving Forward

All of these water challenges can be overcome. The know-how already exists. The key is you and me. Most of these water challenges are the direct or indirect result of how we live our lives—the neighborhoods we build, the services we demand, and the value we place on having clean water.

The solutions will require different ways of thinking and different approaches to the way in which our region develops land. Agricultural practices for fertilizers and stream conservation will have to improve. New investments in water reclamation technologies may be needed, and perhaps changes to water rates. Are we ready to embrace those changes?

What can you do to prepare? Here's a short list of ideas:

- Advocate for federal investment in water infrastructure upgrades.
- Include water management in short- and long-range community planning.
- Keep water protection at the top of your community's priorities.
- Write local policies that protect water.

Water Weirding

Hottest hots, driest dries, wettest wets, windiest wind[s] -David Orr, Oberlin College



WMAO 48th Annual Meeting and Symposium

November 13 & 14, 2019

Crowne Plaza - Columbus North / Worthington,
6500 Doubletree Ave, Columbus OH 43229

Members - \$250 - Non-members - \$300
(additional pricing listed [online](#))

Agenda on Pages 10 and 11

[Register](#) online.

Sponsorships and exhibit spaces are [available](#).

Water Weirding

Wednesday, November 13, 2019

8:00 - 8:30	Registration and Coffee in Foyer 1 & 2				
8:30 - 9:00	Welcome and Introduction in Ballroom 3 & 4				
9:00 - 10:00	Keynote Address: Aaron Wilson , OSU Byrd Polar and Climate Research Center				
10:00 - 10:15	Break in Foyer 1 & 2				
	Ballroom 1 & 2	Ballroom 3	Ballroom 4	Pavilion	Special Events
10:15 -11:45	Mineral Resource Management	Ohio Lake Management Society	Ohio Department of Agriculture	Ohio Floodplain Management Association	
10:15 -10:45	Acid Mine Drainage Paint Pigment (Michelle Shively, Rural Action and True Pigments)	Weird Weather: Did the unprecedented precipitation of 2019 in the Maumee River watershed affect riverine planktonic cyanobacterial dynamics? (Doug Kane, Defiance College)	Innovating Voluntary Agricultural Conservation with State Incentives (Matt Lane, ODA)	10:15 - 10:45 National Flood Insurance Program & Floodplain Management Updates (ODNR Floodplain Management Program)	
10:45- 11:15	Ohio AML Pilot Projects - Combining Reclamation with Economic Development (Ben McCament, ODNR MRM)	Weather and Climate Impacts on Lake Erie and Coastal Systems (ODNR Coastal Management)	Agricultural Pollution Abatement Program (Jason Tyrell, ODA)	10:45 - 11:45 Risk Rating 2.0: Progress to Date and Next Steps (Shilpa Mulik, Federal Emergency Management Agency HQ)	
11:15 - 11:45	Proven Pilot Partnerships: Ohio AML Program & Rural Action (Marissa Lautzenheiser, Rural Action)	Grass Carp Invasion Update (Nikki King, University of Toledo)	Overview of Permitting of Large Livestock Facilities in Ohio (Andy Ety, ODA)		
12:00 - 1:00	Awards Luncheon in Pavilion, Vendor Challenge Drawing 1				
1:15 - 2:45	Ohio Dam Safety Organization	Ohio Lake Management Society	Sustainable Farming	Ohio Floodplain Management Association	
1:15 - 1:45	New Dam Construction in Guemsey County, Ohio (Matt Marquis & AJ Smith, Hull & Associates, Inc.)	Modeling Approach to Analyze Salinity Intrusion in Mentor Marsh (Suresh Sharma, Youngstown State University)	Regenerative Farming (Eric Pawlowski, OEFFA)	1:15 - 2:00 Why (Almost) Every Ohio Community Should be in the CRS Program (John Devine, FEMA Region 5)	
1:45 - 2:15	Design and Construction of Cannon Drive Levee - Phase 1 (Michael Rowland, S&ME)	Six Mile Aqueduct, A Restoration Project Steeped in Challenges and Rain (Matthew Gramza and Jacob Bench, ODNR Division of Engineering)	Regeneration from the Ground Up (Susan Jennings, Community Solution)		
2:15 - 2:45	Effects of scour, landslides and debris flows in Puerto Rico during Hurricane Maria (Daniel Pradel, Ohio State University)	Species Distribution Models for a Native Imperiled Minnow and a Non-native Sport Fish in Ohio (Ken Oswald, Ohio Northern University)	An Agro-Ecological Farmer's Perspective on Sustainably Adapting to an Ever-Changing Climate (Jeff Dickinson, Stratford Ecological Center)	2:00 - 2:45 Floodplain Frequently Asked Questions (ODNR Floodplain Management Program)	
2:45 - 3:15	Break in Foyer 1 & 2				
3:15 - 4:45	Ohio Dam Safety Organization	Ohio Lake Management Society	Nutrient Management	Ohio Floodplain Management Association	3:15 - 4:45 Salon B/C Careers in Water Resources: Professional and Student Networking Event
3:15- 3:45	Buckeye Lake Dam Improvements (Doug Evans, ODNR)	Best management practices could combat nutrient loadings to Lake Erie in a changing climate (Haley Kujawa, Ohio State University)	H2Ohio and Ohio's DAP (Joy Mulinex, Ohio Lake Erie Commission)	3:15 - 3:45 Reconnecting Streams with their Floodplains in the Chagrin River Watershed (Kristin Hebebrand, Chagrin River Watershed Partners)	
3:45 - 4:15	Removing the Tait Station lowdam from the Great Miami River (Kurt Rinehart, MCD)	Reservoir management for harmful algal blooms in drinking water sources (Ruth Briland, Ohio EPA)	Agricultural Soil Erosion and Water Quality Targets: Management Matters (Libby Dayton, Ohio State University)	3:45 - 4:15 USACE Flood Risk Reduction Opportunities (Laura Ortiz, USACE Buffalo District)	
4:15 - 4:45	High Hazard Dams - Emergency Action Plans and 2d Modeling (Charles Dewes, Christopher Burke Engineering)	Measuring streamflow, water quality and nutrient sediment loads in the Western Lake Erie Basin (Donna Runkle and Dennis Finnegan, USGS)	Agricultural Phosphorus Runoff and Water Quality Targets: Nutrient Placement (Shane Whitacre, Ohio State University)	4:15 - 4:45 Using GIS and HAZUS to Identify Flood Risk Areas (Matt Leshner, Stantec)	
5:00 - 6:00	Reception & Poster Session in Foyer 1 & 2				
6:00 - ?	Attendee Hospitality Event in Salon B/C				

Water Weirding

Thursday, November 14, 2019

8:00 - 8:30	Registration & Coffee				
	Ballroom 1 & 2	Ballroom 3	Ballroom 4	Pavilion	Special Events
8:30 - 10:00	Recreation	Then & Now	Groundwater	Ohio Floodplain Management Association	9:00 - 12:00 Ohio Room Certified Floodplain Managers Exam
8:30 - 9:00	Clean Marina & Boaters (Heather Sheets, ODNR)	Cuyahoga: From Flame to Fame: The Story of an American River (Bill Zawiski, OH-EPA)	Statewide, Seamless Mapping of Groundwater Vulnerability using a Modified DRASTIC Model (Craig Nelson, ODNR Geological Survey)	8:30 - 9:00 OFMA General Session & Annual Meeting	
9:00 - 9:30	Water Recreation In Weird Times (Lisa Daris, Olentangy Paddle)		Water use in Ohio, the Nation, and moving towards a water-use real-time network (Kimberly Shaffer, USGS)	9:00 - 9:30 Climate Change Resiliency of Stormwater Infrastructure in NE Ohio (Jay Mosley, Environmental Design Group)	
9:30-10:00	Staying Afloat with Trends in Outdoor Recreation (Adria Bergeron and Kara Musser, Muskingum Watershed Conservancy District)		Sustaining Scioto Short Term Implementation Plan (Stephen Patchan, MORPC)	Ohio EPA's Underground Injection Control Program (L. Taliaferro III, Ohio EPA)	
10:00 - 10:15	Break in Foyer 1 & 2				
10:15 - 11:45	Ohio Watershed Professional Association	Data and Coordination	Drinking Water	Ohio Floodplain Management Association	10:15 - 12:00 Salon B/C Ohio Conservancy Districts Meeting
10:15 - 10:45	Enhancing the Utility of Macroinvertebrate Data Collected by Volunteers (Kurt Keljo, Franklin SWCD)	Development of Integrated Prioritization Systems to Support Water Quality Management Decision-Making (Edward Rankin, Midwest Biodiversity Institute)	Using Ultrasound to Control Cyanobacterial Blooms in Source Water Reservoirs (Zuzana Bohrerova, OSU)	10:15 - 11:00 Why Knowing How Much It Rained Delivers Beneficial Results (Mark Frazier - NWS Syracuse Indiana, Sarah Jamison - NWS Cleveland Ohio, Link Crawford - NWS Wilmington Ohio)	
10:45- 11:15	It should be normal by now- using systems thinking to protect rivers (Sarah Hippensteel Hall and Mike Ekberg, MCD)	Allen Creek Berm Opening - An Alternative to Noah's Ark (Jeremy Hedden, Bergmann Associates)	Impact of filter upset during conventional surface water treatment on UV disinfection efficacy (Judith Straathof, OSU)	11:00 - 11:45 Using Current Technology to Determine Both Fluvial and Pluvial Risk (Mark Seidelmann, Stantec)	
11:15-11:45	Challenges in watershed governance: A Cross-cultural comparison of Ohio and the Dominican Republic (Joseph Bonnell, PhD)	Flood Warning Services in a Wetter World (Sarah Jamison, NOAA)	Peeling the Onion, the Layers of Asset Management (Susan Schell, OEPA - DDAGW)		
12:00-1:00	Lunch in Pavilion with WMAO Annual Meeting, Vendor Challenge Drawing 2				
1:00- 1:30	WMAO Division Annual Meetings in Salon B/C, Water History Challenge				
1:30 - 3:00	Stormwater & Community Engagement	Education	Water Treatment	Ohio Floodplain Management Association	1:30 - 3:00 Salon B/C Ohio Water Resources Coordinating Meeting
1:30 - 2:00	Assessment of Bioretention Performance for Hydrology and Hydrocarbons (Abigail Tamkin, OSU)	Project WET Updates (Dennis Clement, OH-EPA)	Seawater sewage treatment with sand bioreactors (Kristen Conroy, OSU)	1:00 - 3:00 Certified Floodplain Manager & Professional Engineering Ethics Training (Alicia Silverio, ODNR and Chad Boyer, ms consultants, Inc.)	
2:00 - 2:30	Getting Rain Gardens Built without Lifting a shovel (Susan Bryan, Washtenaw County Water Resources)	Unique and Effective Ways to Educate for Improving Water Quality (Ryan Bourgart, OH-EPA)	Using Instream Bio-reactors to Improve Water Quality, Reduce Erosion and Change Stream Morphology (Kurt Keljo, Franklin SWCD)		
2:30 - 3:00	Educational Programs at Latham Park (Hala Zahreddine, Urban Park Development, LLC)	Ohio Watershed Leaders Conference— Seventeen Years and Still Evolving (Jerry Iles, OSU Extension Fairfield County)	Ohio EPA Panel		
3:00- 3:15	Break in Foyer 1 & 2				
3:15 - 4:45	Ice Cream Social in Pavilion, Door Prizes and Vendor Challenge Drawing 3				

WATER MANAGEMENT ASSOCIATION OF OHIO

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Dana Oleskiewicz, Administrative Director

www.wmao.org

The Water Management Association of Ohio (WMAO) is the one organization dedicated to all of Ohio's water resources.

VISION: To be recognized statewide as the go-to community for people who manage and safeguard Ohio's water resources.

MISSION: To support Ohio's water resource professionals with essential information, education, and networking opportunities

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