

33RD ANNUAL INDIANA LAKES MANAGEMENT CONFERENCE



**APRIL 7TH & 8TH, 2022
SWAN LAKE RESORT
PLYMOUTH, INDIANA**

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AGENDA

Wednesday, April 6th, 2022 – Early Arrivals

5:00pm-7:00pm Exhibitor Set Up – Salon I and II
7:00pm-8:30pm Hospitality Hour/Meet and Greet – Meet at Swan Lake Chophouse

Thursday, April 7th, 2022

8:00am-9:00am Registration – Vendor Exhibits Open

9:00am – 10:00am

Welcome and Plenary (Salon I & II)

Welcoming Remarks; Logistics of the Conference – *Sarah Powers, ILMS President*

Plenary: What is not known: A new approach to fix broken Indiana lakes
– *Dr. Jerry Sweeten, Ecosystems Connections Institute*

Vendor Ignite for Stream, Lake, Watershed, and Basin

10:00am – 10:15am BREAK (Salon I & II)

10:15am – 11:45am Concurrent Sessions

Track 1: Lake Project Spotlight (Salon I & II)

Track 2: Water Resource Management (Salon III)

Track 1: Lake Project Spotlight

10:15am-10:45am Lake Galbraith: the triumphs and tribulations of watershed stewardship of a 30-acre kettle lake – *Adam Thada, The Poor Handmaids of Jesus Christ*
10:45am-11:15am Using Moving Water as a tool in reducing Muck Through Oxidation – *Matt Rayle, American Lake and Pond Management*
11:15am-11:45am SET: Building a Sound Decision Process – *Bridget Harrison, Clear Lakes Conservancy*

Track 2: Water Resource Management

10:15am-10:45am The importance of freshwater mussels in Indiana; a look at unionid's function in an ecosystem, their decline, and plans for their future – *Sam Gradle, Muncie Sanitary District Bureau of Water Quality*
10:45am-11:15am Accelerating Water Resource Restoration – *Pamela J Dugan, EntroPHIX*
11:15am-11:45am Online Boater Led Check-In/Check-Out Alternative to In-Person Inspections: A COVID-19 Response Pilot – *Edgar Rudberg, Ph.D., CD3, General Benefit Corporation*

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12:00pm – 1:00pm
LUNCH (for all Registered Attendees in Salon I & II)

1:00pm – 1:30pm
Annual Membership Meeting (Salon III)

1:30pm – 3:00pm Concurrent Sessions
Track 1: Regulatory and Permitting (Salon I & II)
Track 2: Agricultural Impacts on Water Quality (Salon III)

Track 1: Regulatory and Permitting

- 1:30pm-2:00pm How to work with your local MS4 – *Kelsey Thetonia, Monroe County Highway Department*
- 2:00pm-2:30pm Indiana's Lake Preservation Act – *Alysson Olinger, INDNR*
- 2:30pm-3:00pm The NFIP and Local Permitting Considerations – *Doug Wagner, CFM, INDNR*

Track 2: Agricultural Impacts on Water Quality

- 1:30pm-2:00pm Land cover change reduces storm-driven sediment export in agricultural streams – *Abagael N. Pruitt*
- 2:00pm-2:30pm Mismatches between ammonium and nitrate losses from fields and stream export in two agricultural watersheds – *Anna Vincent*
- 2:30pm-3:00pm Agricultural conservation influences nutrient and pathogen dynamics at field and watershed scales – *Emma Thrift*

3:00pm – 3:20pm BREAK (Salon I & II)

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3:20pm – 5:20pm Concurrent Sessions

Track 1: Regulatory and Permitting (Salon I & II)

Track 2: Community Engagement (Salon III)

Track 1: Regulatory and Permitting

3:20pm-3:50pm Regulatory Changes to Wetlands, Lakes, and Streams – *Heather Parsons, IDEM*

3:50pm-5:20pm Regulatory and Permitting Roundtable

Track 2: Community Engagement

3:20pm-3:50pm Educating and Activating Community Members in the Lake Monroe Watershed
– *Maggie Sullivan, FLM*

3:50pm-4:20pm Variety Spices up our Education Programs – *Pam Schumm, WACF*

4:20pm-4:50pm Communication: Sharing Information and Creating Community – *Amy Matherly*

4:50pm-5:20pm Building Engaging Programs: Layer by Layer – *Sarah Baier, Lilly Center for Lakes
& Streams*

**5:30pm – 8:30pm Evening Activities
(Salon I & II)**

5:30pm-6:30pm Hors D’oeuvres, Drinks & Silent Auction

6:30pm-8:30pm Dinner & Awards

**8:30pm – 10:00pm Hospitality Suite
(Salon I & II)**

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Friday, April 8th, 2022

7:30am-9:00am **Registration Open and Full Breakfast (provided for all registered attendees – Salon I & II)**
Vendor Exhibits Open

9:00am – 9:50am
Welcoming and Plenary (Salon I & II)

Welcoming Remarks – *Sarah Powers, ILMS President*

Plenary: A Lake-related Update from the 2022 Indiana General Assembly
– *Indra Frank, Hoosier Environmental Council*

9:50am – 10:00am BREAK (Salon I & II)

10:00am – 11:30pm Concurrent Workshop/Field Trip
Track 1: Water Quality Tools (Salon III)
Track 2: Moon Tree Studios Field Trip (Salon I & II)

Track 1: Water Quality Tools

9:50am-10:30pm Harmful Algal Bloom (HAB) Identification and Management Tactics for Homeowners and Lake Associations – *Grace Gusler, Aquatic Control*
10:30am-11:00am Wetlands and Water Quality – *Will Robinson, IDEM*
11:00am-11:30am Native Plants and Healthy Shorelines – *Jason Fritz, Cardno*

Track 2: The Center at Donaldson Field Trip (*approx. 5 miles from conference facility*)

10:00am-11:30am Guided tour of the grounds to view a 30-acre kettle lake, a solar installation with pollinator underplanting, rain gardens, and other best management practices. MoonTree Studios staff will showcase their LEED® certified buildings and discuss their recent efforts to establish a county-wide cyanobacteria testing program. Please park at 9638 N Union Rd, Plymouth, IN 46563
Masks required indoors.

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Time	Thursday, April 7th, 2022	
8:00am-9:00am	Registration – Vendor Exhibits Open (Salon I &II)	
9:00am-9:40am	Salon I &II Welcome: <i>Sarah Powers, ILMs President</i> Plenary: What is not known: A new approach to fix broken Indiana lakes – <i>Jerry Sweeten, Ecosystems Connections Institute</i>	
9:40am-10:00am	Vendor Ignite for Stream, Lake, Watershed, and Basin	
10:00am-10:15am	BREAK –Vendor Exhibits Open (Salon I &II)	
	Track 1: Lake Project Spotlight (Salon I and II)	Track 2: Water Resource Management (Salon III)
10:15am-10:45am	Lake Galbraith: the triumphs and tribulations of watershed stewardship of a 30-acre kettle lake – <i>Adam Thada, The Poor Handmaids of Jesus Christ</i>	The importance of freshwater mussels in Indiana; a look at unionid’s function in an ecosystem, their decline, and plans for their future – <i>Sam Gradle, Muncie Sanitary District Bureau of Water Quality</i>
10:45am-11:15am	Using Moving Water as a tool in reducing Muck Through Oxidation – <i>Matt Rayle, American Lake and Pond Management</i>	Accelerating Water Resource Restoration – <i>Pamela J Dugan, EntroPHIX</i>
11:15am-11:45am	SET: Building a Sound Decision Process – <i>Bridget Harrison, Clear Lakes Conservancy</i>	Online Boater Led Check-In/Check-Out Alternative to In-Person Inspections: A COVID-19 Response Pilot – <i>Edgar Rudberg, Ph.D., CD3, General Benefit Corporation</i>
12:00pm-1:00pm	LUNCH for all registered attendees (Salon I &II)	
1:00pm-1:30pm	Annual Membership Meeting (Salon III)	
	Track 1: Regulatory and Permitting (Salon I and II)	Track 2: Agricultural Impacts on Water Quality (Salon III)
1:30pm-2:00pm	How to work with your local MS4 – <i>Kelsey Thetonia, Monroe County Highway Department</i>	Land cover change reduces storm-driven sediment export in agricultural streams – <i>Abagael N. Pruitt</i>
2:00pm-2:30pm	Indiana's Lake Preservation Act – <i>Alysson Olinger, INDNR</i>	Mismatches between ammonium and nitrate losses from fields and stream export in two agricultural watersheds – <i>Anna Vincent</i>
2:30pm-3:00pm	The NFIP and Local Permitting Considerations – <i>Doug Wagner, CFM, INDNR</i>	Agricultural conservation influences nutrient and pathogen dynamics at field and watershed scales – <i>Emma Thrift</i>
3:00pm-3:20pm	BREAK – Vendor Exhibits Open (Salon I &II)	

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	Track 1: Regulatory and Permitting (Salon I and II)	Track 2: Community Engagement (Salon III)
3:20pm-3:50pm	Regulatory Changes to Wetlands, Lakes and Streams – <i>Heather Parsons, IDEM</i>	Educating and Activating Community Members in the Lake Monroe Watershed – <i>Maggie Sullivan, FLM</i>
3:50pm-4:20pm	Regulatory and Permitting Roundtable	Variety Spices up our Education Programs – <i>Pam Schumm, WACF</i>
4:20pm-4:50pm	Regulatory and Permitting Roundtable	Communication: Sharing Information and Creating Community – <i>Amy Matherly</i>
4:50pm-5:20pm	Regulatory and Permitting Roundtable	Building Engaging Programs: Layer by Layer – <i>Sarah Baier, Grace St Clair Lilly Center for Lakes & Streams</i>
5:30pm - 6:30pm	Vendor Reception - Hors D'oeuvres, Drinks & Silent Auction (Salon I &II)	
6:30pm - 8:30pm	Dinner & Awards (Salon I &II)	
8:30pm -10:00pm	HOSPITALITY SUITE (Salon I &II)	

Time	Friday, April 8th, 2022	
7:30am-9:00am	Breakfast - Registration open - Vendor Exhibits Open (Salon I &II)	
9:00am-9:50am	Salon I &II Welcome: <i>Sarah Powers, ILMS President</i> Plenary: <i>Indra Frank, Hoosier Environmental Council</i>	
9:50am-10:00am	BREAK	
	Track 1: Water Quality Tools (Salon III)	Field Trip: (Salon I and II)
10:00am-10:30am	Harmful Algal Bloom (HAB) Identification and Management Tactics for Homeowners and Lake Associations – <i>Grace Gusler, Aquatic Control</i>	The Center at Donaldson (approx. 5 miles away) from the conference facility. We will tour the grounds to view a 30-acre kettle lake, a solar installation with pollinator underplanting, rain gardens, and other best management practices. MoonTree studios staff will showcase their LEED® certified buildings and discuss recent efforts to implement a county-wide cyanobacteria monitoring program.
10:30am-11:00am	Wetlands and Water Quality – <i>Will Robinson, IDEM</i>	
11:00am-11:30am	Native Plants and Healthy Shorelines – <i>Jason Fritz, Cardno</i>	

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Thursday, April 7th

Session: Plenary

What is not known: A new approach to fix broken Indiana lakes

Jerry Sweeten, Ph.D.

Ecosystems Connections Institute

jesweeten@ecosystemsconnections.com

260-901-0561

Herb Manifold, Melinda Sweeten, Mike Jarvis

Abstract: The last glacier that passed by this part of the world over 12,000 years before now left a band of glacial lakes in northern Indiana endowed with a spectrum of attributes. While it is well known these lakes are dynamic ecosystems with an ecological beginning and ecological end that moves in the realm of geologic time, what we don't know well is the trajectory of this dynamic lake life expectancy and the full extent of how humans have accelerated the lake aging process. Indiana lakes are important ecosystems for themselves, and at this point in time a significant economic driver for northern Indiana. Northern Indiana lakes are suffering from chronic nutrient and sediment pollution, and they are the forgotten and neglected "dead zones". We suggest at the base of describing the extent to which Indiana lakes are experiencing shifts in trophic state is the need for a more robust scientific experimental design that quantifies a water budget along with nutrient and sediment external and internal loadings. We also advocate for an increase in funding to address lake restoration. Data at the correct resolution to understand patterns and trends is missing in action. We suggest a new study design that provides accurate data for load reductions necessary to bring a lake into ecological compliance, serve an ecological line in the sand for future comparisons, and to serve as the foundation for conservation partnerships across a lake basin.

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Session: Lake Project Spotlight

Lake Galbraith: the triumphs and tribulations of watershed stewardship of a 30-acre kettle lake

Adam Thada

Director, Ecological Relationships
The Poor Handmaids of Jesus Christ
9601 Union Rd
Plymouth, Indiana 46563
athada@poorhandmaids.org
574-936-9936

Abstract: Lake Galbraith is a public, 30-acre kettle lake in West Township, Marshall County. The entirety of its 196-acre watershed is currently owned by Ancilla Domini Sisters Inc. (The Poor Handmaids of Jesus Christ). Over the decades, the lake has been the subject of many studies and watershed improvement efforts in coordination with I-DNR, IDEM, and private entities. A local watershed group has been in operation since 2003, assisting with water quality monitoring and stewardship efforts. Although many best management practices have been implemented, Lake Galbraith continues to suffer from poor water quality. This presentation will take a long-term view of the promises and pitfalls of lake stewardship in watersheds affected by agriculture and development.

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Using Moving Water as a tool in reducing Muck Through Oxidation

Matt Rayle

Owner, American Pond & Lake Management

Matt@mattrayl.com

Abstract: We, as managers, have been taught that oxygen at the sediment-water interface reduces the accumulation of muck, but could it reduce the volume of organics in the abundance of oxygen? This question has been inferred but rarely tested. Therefore an experiment was composed to quantify this hypothesis using two circulators in a small older, highly organic pond. The goal was to keep the entire pond surface moving. This talk will explain our methods, some unforeseen challenges while discussing surprising results.

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SET: Building a Sound Decision Process

Bridget Harrison

Clear Lake Township Land Conservancy

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Fremont, IN 46737

bridget.harrison@clearlakeconservancy.org

260-667-0350

Abstract: In 2021, the Clear Lake Township Land Conservancy (CLTLC) faced an alarming Eurasian watermilfoil (EWM) infestation in Clear Lake and Round Lake. The two lakes total 800-acres and support a diverse plant, animal and fish population. Both are widely used for recreation and fishing. The decision to treat the 100+ acre infestation was easy. Deciding how to treat the infestation to ensure safety, control and cost effectiveness called for a new process.

The team gathered extensive information on EWM location, extent, growth habits, options for treatment, safety of treatment options, effectiveness of treatment options, costs, and funding approaches. An interactive spreadsheet the team called SET (Safe and Effective Treatment) was developed and refined to measure the three key decision principles—safety, control effectiveness, cost to achieve control—for a variety of treatment options.

The SET decision tool produced a sound and objective basis for CLTLC to approve a timely, safe and effective aquatic vegetative management plan for the EWM infestation affecting the Clear Lake community.

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Session: Water Resource Management

The importance of freshwater mussels in Indiana; a look at unionid's function in an ecosystem, their decline, and plans for their future

Sam Gradle

Macroinvertebrate Biologist, Muncie Sanitary District Bureau of Water Quality

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Abstract: Freshwater mussels are regarded as a very important group of organisms in local aquatic ecosystems. They filter the water they reside in, provide habitat for other organisms and they are good indicators of water quality. Unfortunately, these mollusks are one of the most endangered groups of animals in North America. Many native freshwater mussel species in the U.S. are listed as federally endangered or need some level of protection. This is due to a variety of factors which include but not limited to water pollution and habitat loss. One other threat to native freshwater mussels is the spread of invasive species, specifically zebra mussels (*Dreissena polymorpha*). Since their introduction, zebra mussels have invaded waterways across the U.S. This species is problematic because they compete with native mussels and are a direct nuisance to humans. Despite all these issues facing native freshwater mussels, steps are being taken by organizations across the U.S. to preserve and restore their populations. Such efforts are currently being performed by the Muncie Bureau of Water Quality. These efforts include population surveys and a collaborative project involving mussel propagation. Endeavors like these along with other conservation efforts will help protect and preserve freshwater mussels for future generations.

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Accelerating Water Resource Restoration

Pamela J Dugan

EutroPHIX

11550 North Meridian Street

Carmel, IN46032

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317-495-5657

Scott Shuler

Abstract: Water Quality in the United States is significantly impaired driving increasing frequency and severity of harmful algal blooms (HABs). Approximately 48,000 lakes in the United States are impaired for phosphorus pollution, the primary cause of HAB events. As the primary limiting nutrient for productivity of freshwater systems, a single pound of phosphorus can drive the growth of up to 500 pounds of algae. HABs can cause acute water quality issues, toxin production, taste and odor issues, aesthetic impacts, as well as impacts to recreational uses and property values. Harmful algal toxins can have significant acute impacts to pets, wildlife, and human health. The Clean Water Act has worked to improve the condition of lakes since it was enacted in 1972 and has significantly reduced point source pollution over the last 50 years. Additional efforts are improving watersheds and curtailing non-point source pollution. A relatively small effort has been made for in-lake water quality improvement. Given the investment needed to restore watersheds and the time required for implementation and positive water quality impacts at the lake level, additional in-lake management should be considered to accelerate water quality improvement. Phosphorus internal-load mitigation and external-load filtration technologies are viable management strategies to restore waterbodies and improve designated uses. Case studies will be provided along with a summary of technologies used in these restoration projects.

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Online Boater Led Check-In/Check-Out Alternative to In-Person Inspections: A COVID-19 Response Pilot

Edgar Rudberg

CD3, General Benefit Corporation
1865 Ashland Avenue
Saint Paul, MN55104
ed@cd3systems.com
952-212-6576

Mark Apfelbacher

Abstract: Due to the high cost of high pressure, heated water decontamination, reducing the spread of aquatic invasive species (AIS) often relies upon the adoption of best management practices at the individual level. This is especially needed during a pandemic. This presentation will outline a pilot project in Minnesota in adopting a digital alternative to in-person inspections. In addition, the presentation will go over the biological efficacy for doing so.

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Indiana Lakes Management Society Annual Business Meeting

Salon III

Agenda:

- a. Roll call. (conducted at the door)
- b. Reading of minutes of last preceding membership meeting.
- c. Report of president.
- d. Report of secretary.
- e. Report of treasurer.
- g. Election of Officers.
- h. Election of Directors.
- i. Adjournment

ILMS Board Elections 2022

Election Slate

Treasurer:

Sara Peel: Sara Peel owner and senior environmental consultant for Arion Consultants works on stream and watershed projects throughout Indiana helping more than 100 lakes and communities over the past 20 years. Sara is one of the states only Certified Lake Manager and has served on the ILMS board in various capacities since 2004. This will be Sara's second term as the treasurer. Additionally, Sara coordinates the Indiana Watershed Leadership Academy and has served on the North American Lake Management Society board serving as president in 2019 and on the Indiana and National Water Quality Monitoring Councils.

Secretary:

Brendan Hastie: Brendan Hastie is an Aquatic Biologist at Aquatic Control, Inc. He was born in Waukegan, IL. He graduated from Upper Arlington High School, OH in 1993. In December of 1998, he received a BS degree in natural resources, water option from The Ohio State University. Brendan has been employed with Aquatic Control Since 1998. While attending The Ohio State University, Brendan participated in a Lake Erie area wetland seed bank study. His responsibilities included daily maintenance of the project, field collection, plant identification, and data collection. Aquatic Control, Inc. employed Brendan in 1998. His responsibilities include aquatic plant management, lake management consulting, fisheries surveys, and aquatic plant surveys. In 2003, he was assigned to the position of office manager and field applicator at the Valparaiso, IN satellite office. Brendan was reassigned to a full time biologist position at the Seymour, IN office in February of 2007. He also assists with aeration and fountain maintenance, installation, and repair. Mr. Hastie has presented talks regarding lake management and aeration at many clinics, lake owner association meetings, and trade meetings. Brendan is a member of the Indiana chapter of the American Fisheries Society, Indiana Lake Management Society, and the Midwest Aquatic Plant Management Society. Brendan Hastie is a licensed aquatic applicator in the states of Illinois, Indiana, Kentucky, Michigan, Tennessee, and Ohio. He is also a certified PADI Open Water SCUBA diver.

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Board Members (4):

Janel Meyer: Janel Meyer joined the Steuben County Soil and Water Conservation District (SWCD) in April 2015 as the Resource Conservationist, stepping into her current role, Administrative Coordinator, in August 2015. She previously worked for the Indiana Department of Natural Resources' Pokagon State Park (2013 – 2015) and as the Assistant Lake Michigan Fisheries Biologist for the Division of Fish and Wildlife (1994 – 2012). She began her career as a Fisheries Technician with Duke Energy (formerly PSI Energy in Plainfield, Indiana) in 1993 after receiving a Bachelor of Science Degree in Fisheries and Aquatic Science and Wildlife Science from Purdue University in West Lafayette, Indiana. A Northwest Indiana native, she enjoys outdoor recreational activities including hiking, kayaking, and bird watching; she also enjoys spending time with family, gardening, and cooking.

Alysson Oliger: Alysson Oliger serves as the Compliance Coordinator for the Indiana Department of Natural Resources, Division of Water. In this role, she aims to increase compliance with floodplain, public freshwater lake, and other water-related regulations through public education and outreach, and by increasing coordination with other groups and government agencies. Working in the Division since 2003, she has served on teams to update their database, develop a permitting inquiry tool for the public, create a story map highlighting floodplain information in the state, and helped to develop multiple guides for the public. She holds a Bachelor of Science degree in Public Affairs from IUPUI.

Debbie Palmer: Received a BS in Horticulture from Purdue University. Worked as District Coordinator for Marshall County Soil & Water Conservation District (SWCD) prior to becoming President of Lake Maxinkuckee Environmental Fund (LMEF). Responsible for outreach presentations, monitoring the lake and its wetlands, project manager for restoration and research projects, and acts as a community resource for all things related to the well-being of Lake Maxinkuckee and its surrounding watershed. Completed Indiana Watershed Leadership Academy, volunteer with the Indiana Clean Lakes Program, Hoosier River Watch and Marshall County Lakes and Waters. ILMS Board Member since 2019.

Kristi Todd: Kristi Todd currently serves as a watershed specialist for the Indiana Department of Environmental Management Watershed Planning and Restoration Section. Her territory is northeast Indiana and she serves as the lake liaison for her office. She received a Masters from the Ball State Natural Resources and Environmental Program. Kristi sits on the legislative committee and heads the education and outreach committee for ILMS currently. In her free time she likes to bird watch and can be seen on Lake James in the summer.

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April 7th & 8th, 2022 ❖ Swan Lake Resort ❖ Plymouth, IN

Session: Regulatory and Permitting

How To Work With Your Local MS4

Kelsey Thetonia

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Abstract: Have you ever wondered how you can work with your local stormwater program, but not sure where to start? Stormwater and lake management certainly go hand-in-hand, but figuring out how to implement partnerships can be tricky. This presentation will cover MS4 regulations and program structure, from basic concepts to creative examples. It's a great time to learn about stormwater regulations, and how they can enhance your lake management efforts!

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Indiana's Lake Preservation Act

Alysson Oliger

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Abstract: The purpose of this presentation is to educate the audience about Indiana's Public Freshwater Lake Act (IC 14-26-2) and the DNR Division of Water's jurisdiction on public freshwater lakes. I will explain the Lake Preservation Act including activities that require a permit from the DNR Division of Water. I will also provide an overview of some of the Division of Water's online tools including a research map, access to our database, and a permit inquiry tool called Waterways.

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The NFIP and Local Permitting Considerations

Doug Wagner

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Abstract: This session will highlight rules and regulations of the National Flood Insurance Program and how it may affect local permitting requirements for development in near or adjacent to lakes. I will provide an overview of what is required by the local communities and FEMA. The session is intended to provide the attendees a brief overview of the permitting that may be required for development near lakes.

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Session: Agricultural Impacts on Water Quality

Land cover change reduces storm-driven sediment export in agricultural streams

Albagael N. Pruitt

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Jennifer L. Tank, Shannon L. Speir, Ursula H. Mahl, Anna E.S. Vincent, Todd V. Royer (School of Public and Environmental Affairs-Indiana University)

Abstract: Agricultural land use can increase erosion thereby increasing sediment export in streams. Land cover change, by planting cover crops during the winter fallow period, may protect soils and reduce storm-driven erosion and soil loss to waterways. To quantify cover crop impacts on sediment export, we measured continuous turbidity at the outlets of two agricultural watersheds (Indiana, USA) for four water years. We related turbidity to total suspended solid (TSS) using grab samples, generating a multiyear record of daily TSS loads. In the Kirkpatrick Ditch Watershed (KDW), 12-32% of croppable acres were cover cropped, while coverage was ~68% in the Shatto Ditch Watershed (SDW). Despite 25% lower runoff, average annual TSS export from KDW was ~7x higher (1140 kg/ha/yr) than from SDW (170 kg/ha/yr) and was 10x higher when we partitioned TSS losses for the top 10% of flows. TSS export was positively correlated with runoff in KDW ($R = 0.88$). In contrast, we did not see this relationship in SDW, likely due to infrequent overland flows combined with higher cover crop coverages. Overall, we show that cover crops may limit sediment loss during vulnerable periods when fields are bare.

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Mismatches between ammonium and nitrate losses from fields and stream export in two agricultural watersheds

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Jennifer L. Tank, Abagael N. Pruitt, Shannon L. Speir (University of Alabama), Matthew T. Trentman (Flathead Lake Biological Station, University of Montana), Ursula H. Mahl, Todd V. Royer (Indiana University)

Abstract: Nitrogen (N) fertilizers maximize crop yields across agricultural landscapes, but runoff can degrade water quality in adjacent freshwaters. The signature of ammonium-based fertilizers is often as nitrate contamination in streams, given the prevalence of soil/sediment nitrification. Cover crops reduce nitrate losses to streams during winter/spring, but less is known about how they impact ammonium. We used long-term, biweekly data from the Shatto (SDW) and Kirkpatrick Ditch Watersheds (KDW) to compare the form of N losses, and the impact of cover crops, at field- and watershed-scales. From 2016-2021, we quantified losses from fields with and without cover crops (via tile drains), and export from watershed outlets. Watershed ammonium and nitrate export was highest during the top 10% of flows, and varied among years, but average ammonium yields ($0.002 \text{ kg ha}^{-1} \text{ d}^{-1}$) were consistently two orders of magnitude lower than nitrate yields ($0.1 \text{ kg ha}^{-1} \text{ d}^{-1}$). We also saw watershed-specific seasonal variation. Spring ammonium yields were higher than nitrate in winter at SDW, while spring nitrate yields were higher than winter at KDW (ANOVA; $P < 0.001$). Cover crops did not change field-scale ammonium losses, but nitrate losses were 35-86% lower with cover crops in winter and 19-88% lower in spring (ANOVA; $P < 0.001$). Tile flows controlled interannual variation in nitrate losses, but not for ammonium, suggesting that patterns in field-scale losses were solute-specific and decoupled due to different drivers. Given the linkage between ammonium availability and nitrification rates, understanding controls on field- and watershed-scale losses will be critical for managing water quality in agricultural landscapes.

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Agricultural conservation influences nutrient and pathogen dynamics at field and watershed scales

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Emma M. Thrift, Jennifer L. Tank, Anna E.S. Vincent, Ursula H. Mahl, Alan F. Hamlet

Abstract: Fertilizer runoff from farm fields can contribute excess nutrients and pathogens to agricultural streams while resulting in eutrophication of downstream ecosystems. Agricultural conservation practices, such as winter cover crops (CCs) and drainage water management (DWM; regulating water release from fields) can reduce nutrient losses to streams. However, their influence on pathogen transport remains understudied. We examined nutrient and pathogen loss in the Paw Paw River Basin (MI). At the field-scale, we compared grab samples against nutrient sensor measurements from tile drains from farm fields with and without DWM. From 2018-2021, tiles draining the field with DWM were 2-84% lower in *Escherichia coli* (*E. coli*) compared to a field without DWM. At the watershed-scale, we sampled three watershed outlets biweekly to quantify the effects of CCs on nutrient and *E. coli* export. In water year (WY) 2019, mean daily nitrate export from the subwatershed with CCs (0.02 kg ha⁻¹d⁻¹) was 20% lower than subwatersheds without CCs (0.03 kg ha⁻¹d⁻¹) (Kruskal-Wallis; $P < 0.001$), and 15% lower in WY2021 (0.012 kg ha⁻¹d⁻¹ vs. 0.015 kg ha⁻¹d⁻¹) (Kruskal-Wallis; $P < 0.05$), while there was no difference with CCs in WY2020. For *E. coli*, concentrations were 73% lower with CCs in WY2020 during the winter fallow period, with no consistent reductions in WY2019 or WY2021. Finally, there were no consistent soluble reactive phosphorus (SRP) reductions with CCs, a result potentially influenced by a nearby dairy. Results suggest that while CCs consistently reduce nitrate, additional strategies to prevent *E. coli* and SRP losses from farm fields may be necessary.

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Session: Regulatory and Permitting

Regulatory Changes to Wetlands, Lakes and Streams

Heather Parsons

Indiana Department of Environmental Management (IDEM)

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Abstract: IDEM will provide an update on state and federal regulatory changes involving Section 404/401 of the Clean Water Act (CWA) and the state's Isolated Wetland Law. Changes have occurred beginning in 2020 with changes to the definition of Waters of the U.S. (WOTUS) and some changes to the regulation of certain activities in Isolated Wetlands. Those changes were followed by some major changes during the 2021 Indiana Legislative Session affecting state regulations. A brief history of WOTUS and the State Isolated Wetland Law will be given followed by where the changes have left regulation of wetlands, lakes, and streams now.

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Round Table Discussion: Regulatory and Permitting

Moderator

Joe Schmees
Executive Director
Indiana Association of Soil and Water Conservation Districts (IASWCD)

Panel

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Abstract: This will be a panel of experts answering audience questions about water regulations and permitting in Indiana.

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Session: Community Engagement

Educating and Activating Community Members in the Lake Monroe Watershed

Maggie Sullivan

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Abstract: Friends of Lake Monroe worked from 2019 to 2022 to develop a Watershed Management Plan for Lake Monroe. A big piece of the planning process was engaging the community. Learn about the variety of outreach strategies that we used including community forums, volunteer water sampling, road signs, bus tours, art events, public service announcements, classroom presentations, and more. The pandemic caused us to pivot in ways we could never have predicted, some surprisingly successful and some less so. We will discuss lessons learned, opportunities for improvement, and plans for the future.

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Variety Spices up our Education Programs

Pam Schumm

Wawasee Area Conservancy Foundation
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574-518-1146

Abstract: From scavenger hunts to Native Plant Sales; Bug Catches to S.S. Lily Pad Cruise; Cheerio Bird Feeders to Canoe Trips... our Education team presents a wide variety of programs during the spring, summer and fall season to help individuals understand about the watershed and water quality. The programs are informational, interactive and fun for all ages. Come see how a variety of programming can bring water education to over 2,000 people per year. Presented by members of the Education Team at WACF

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Communication is the Key

Amy Matherly

Simonton Lake Area Homeowners' Association
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Abstract: Communication, done in a deliberate fashion on a regular basis with great attention to accuracy, provides the means to get accurate information to your lake residents and establishes the foundation for building a sense of community. Today communication can come in many forms: a regularly produced newsletter or magazine, a social media presence, an up-to-date website, a lake resident email group.

At a lake, residents share a common backyard. It's good to know your neighbors, to share their successes, retirements, and birthdays. It's essential to know what is happening with the lake. We are guardians of that common backyard, and we are fortunate to live along the shorelines.

Great communication can be the key to success in lake projects and programs. Whether it be weed control or the time and date of lake events, people appreciate being informed. We also find that information shared by our communication team combats gossip or false information. We like to get the real story out before people get upset about something that isn't true.

Founded just a few years ago, our "Lake Alert" email group is a valuable tool in getting out safety information, closures, road damage and information about lost items and pets. Many a watercraft have been located after a storm through this email system.

Our quarterly lake magazine, "Simonton Says", supported by advertising and delivered by volunteers, is so important to residents that our volunteer delivery people occasionally get calls to make sure they weren't missed with the latest delivered issue. Articles and pictures are sent in by lake residents as well as county officials. We also include topics from the Indiana DNR and our local newspapers that we think will be of interest. In addition to being a printed and delivered magazine, each issue is also available online at our website.

Our lakers love what we do, and we love doing it. It's work but the results make it worth the effort. At our presentation we will have copies of our magazine and examples of how our team works as well as examples of our Lake Alert system, web contents and social media.

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Building Engaging Programs: Layer by Layer

Sarah Baier
Education Program Specialist
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Lilly Center for Lakes & Streams

Grace St Clair
Education Coordinator
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Lilly Center for Lakes & Streams

Abstract: Creating outreach programs that not only inform, but move the needle on behavior change, is at the core of what we do at Lilly Center for Lakes & Streams. If you have struggled with student or community engagement in your educational programs, you are in good company! We have all been there. Join us for an interactive session that will give you a taste of the "layer by layer" approach Lilly Center uses to create engaging programs from pre-K through adults. Don't miss this fun time of sharing ideas!

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Friday, April 8th

Session: Plenary

A Lake-related Update from the 2022 Indiana General Assembly

Dr. Indra Frank

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Abstract: The Hoosier Environmental Council is an environmental not-for-profit organization based in Indiana. One of our most important annual tasks is tracking bills going through the Indiana General Assembly looking carefully at how they will impact the state's air, land, and water. The General Assembly will be in session from January through the beginning of March. This presentation will summarize this year's bills that have the potential to impact Indiana's lakes.

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Session: Water Quality Tools

Harmful Algal Bloom (HAB) Identification and Management Tactics for Homeowners and Lake Associations

Grace Gusler

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8129461004

Abstract: Harmful algal blooms (HABs) in lakes and ponds can lead to severe issues such as health risks to people and animals, declines in property values, disruption to recreational and boating activities, adverse impacts on fisheries, and taste and odor production. However, there are ways that homeowners and lake managers can identify potential risks to themselves and pets as well as identify the signs of HABs before they become too severe to mitigate. By showing real world examples of various types of algae and how they present on lakes and ponds, homeowners can begin to learn the basics of identifying HABs on their property as well as what risks are associated with various divisions and species of algae. Additionally, common management techniques will be discussed in terms of their advantages and limitations. By better understanding the risks associated with HABs and detecting algal growth early, homeowners and lake associations can be better equipped to respond and intervene before blooms become unmanageable.

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Wetlands and Water Quality

Will Robinson

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Abstract: IDEM will present on the functions and values wetlands provide including the impacts to water quality. IDEM will discuss what can be done to manage wetlands to help protect and enhance those functions leading to greater water quality in and around lakes.

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Native Plants and Healthy Shorelines

Jason Fritz
Nursery Business Development Manager
Principal – Ecology
Cardno
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Jason.fritz@cardno.com

Abstract: Jason Fritz of Cardno, now Stantec Native Plant Nursery, will briefly cover the various aquatic planting zones and their importance in lakeshore health. Mr. Fritz will also review several native plant species that are recommended for planting in each zone and their characteristics.

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Session: The Center at Donaldson Field Trip

Five Ministries, one location focused on art, earth, education and spirit.

Ancilla Beef & Grain Farm ~ Ancilla Domini College ~ Catherin Kasper Life Center ~ Lindenwood Retreat and Conference Center ~ MoonTree Studios

Tour Guides: The Center at Donaldson/MoonTree Studios Staff

Visitors to The Center can: Pray, buy natural beef, attend college classes, retire to an independent living apartment, receive long term nursing care and rehabilitation, learn to care for the Earth, participate in a retreat or conference and learn to weave or create with clay.

MoonTree Studios, a ministry of the Poor Handmaids of Jesus Christ, located at the Center at Donaldson, challenges people to experience mindfulness as they fearless explore the interconnectedness of art, nature and the Spirit within.

Abstract: The Center at Donaldson is located approximately 5 miles away from the conference facility. Guided tour of grounds to view a 30-acre kettle lake, a solar installation with pollinator underplanting, rain gardens, and other best management practices. MoonTree Studios staff will showcase their LEED® certified buildings and discuss recent efforts to implement a county-wide cyanobacteria monitoring program.

Please park at 9638 N Union Rd, Plymouth, IN 46563
Masks required indoors.

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THANK YOU!

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Indiana Lakes Management Conference
March/April 2022



Indiana Lakes Management Society
207 S. Wayne Street, Suite B
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