29th Annual
Indiana Lakes Management Conference

March 2nd & 3rd, 2017
Fourwinds Inn & Marina
Bloomington, Indiana

29TH ANNUAL INDIANA LAKES MANAGEMENT CONFERENCE

March 2nd & 3rd, 2017 ❖Fourwinds Inn & Marina❖Bloomington, IN

Organized to "Promote and Encourage the Understanding and Comprehensive Management of Lakes and Reservoirs and Their Watershed Ecosystems."

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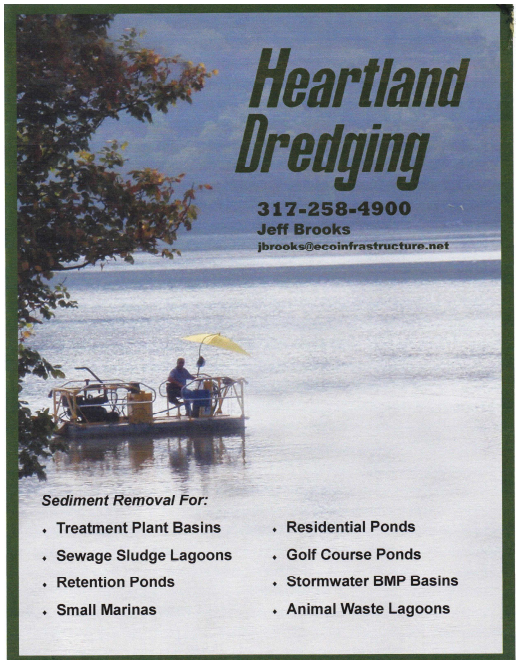

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AGENDA

Wednesday, March 1, 2017 – Early Arrivals

5:00pm-7:00pm Exhibitor Set Up – Admiral Room
7:00pm-10:00pm Hospitality Suite – Windjammer Bar
We encourage all to take advantage of this opportunity to meet and greet with attendees before the conference begins. Not to mention the chance to enjoy some great food and beverages.

Thursday, March 2, 2017

8:00am-9:00am Registration

9:00am – 9:50am
Welcome and Plenary (Admiral Room)

Welcoming Remarks; Logistics of the Conference – *Sara Peel, ILMS President*

Plenary: But What Will the Neighbors Think? Creating Native Shoreline Landscapes That Are Easy on the Eye and Great for the Environment! – *Bob Kirschner, Curator of Aquatic Plant & Urban Lake Studies, Chicago Botanic Garden, Glencoe, Ill.*

9:50am – 10:15am BREAK (Admiral Room)

10:15am – 11:55am Concurrent Sessions
Track 1: Outreach (Commodore A)
Track 2: Management Practices (Commodore B)

Track 1: Outreach

10:15am-10:45am Secchi Dip-In: Past, Present, and Future – *Vanessa Snyder, NALMS*
10:50am-11:20am Reversing the Tragedy of the Commons – *Ryan Workman, MS4 Coordinator, City of Warsaw*
11:25am-11:55am Saving the Island…again. – *Bridget Harrison, Executive Director, Clear Lake Twp. Land Conservancy*

Track 2: Management Practices

10:15am-10:45am Engineered Ecosystems, a Cyborg Approach to Lake Ecosystem Restoration-Grand Lake St. Marys – *Joseph Pfeiffer, Jr. PWS, KCI Technologies*
10:50am-11:20am What Works…What Doesn't – *Bill Jones, Professor Emeritus, School of Public & Environmental Affairs, Indiana University*
11:25am-11:55am Ongoing lake and pond management on the Hoosier National Forest – *Len Kring, Fish Biologist, U.S. Forest Service*

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12:00pm – 1:00pm
LUNCH (provided for all Registered Attendees in Admiral Room)

1:00pm – 1:30pm
Annual Membership Meeting (Admiral Room)

1:30pm – 3:05pm Panel Discussions

Commodore A

1:30pm-2:15pm **Watershed Protection –** Moderator: *Bill Jones*
Panelists: *Heather Parsons, Environmental Manager, IDEM*
Dana Wilkinson, Stormwater Inspector, Monroe County Stormwater Services
Sara Peel, Director of Watershed Projects, Wabash River Enhancement Corporation

2:20pm-3:05pm **Fundraising & Grants –** Moderator: *Joe Schmees*
Panelists: *Jessica Faust, Watershed Specialist, Watershed Assessment and Planning Branch, IDEM*
Ashlee Haviland, LARE Program Specialist, Lake and River Enhancement Program, IDNR
Heather Harwood, Landscape Architect
Meagan Niese, Development Director, Monroe County Community Foundation

Commodore B

1:30pm-2:15pm **Lake Monitoring** – Moderator: *Sarah Powers*
Panelists: *Greg Bright, Commonwealth Biomonitoring*
Melissa Laney, Director of the Indiana Clean Lakes Program
Lisa Borre, Senior Research Specialist, Cary Institute of Ecosystem Studies
Cyndi Wagner, Chief, Targeted Monitoring Section, Watershed Assessment and Planning Branch, Office of Water Quality, IDEM

2:20pm-3:05pm **Lake Management**– Moderator: *Elizabeth Tompkins*
Panelists: *Adam Casey, District Manager, Lake Lemon Conservancy District*
Jade Young, Limnologist and Water Quality Team Lead, USACE Louisville District
David S. Kittaka, Fisheries Biologist, Indiana Department of Natural Resources

3:05pm – 3:25pm BREAK (Admiral Room)

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3:25pm – 5:40pm Concurrent Sessions
Track 1: Research & Technology (Commodore A)
Track 2: Fisheries (Commodore B)

Track 1: Research & Technology

3:25pm-3:55pm	National Lake Assessment Overview for Indiana and the United States-2012 results and future 2017 plans – *Melissa Laney, School of Public & Environmental Affairs, Indiana Universtiy*
4:00pm-4:30pm	Water Quality Monitoring with and EcoMapper Autonomous Underwater Vehicle (AUV) – *Justin Boldt, U.S. Geological Survey, Indiana-Kentucky Water Science Center*
4:35pm-5:05pm	Networked Lake Science: Challenges and Opportunities and Technology Development – *Lisa Borre, Senior Research Specialist, Cary Institute of Ecosystem Studies*
5:10pm-5:40pm	Starry Stonewort, *Nitellopsis obtuse*, in the Great Lakes Region, and in Lake Wawasee and Syracuse Lake from Date of Discovery to 2016 – *Dr. Jerry W. Riffle, Member of the Ecology Committee of the Wawasee Area Conservatory Foundation*

Track 2: Fisheries

3:25pm-3:55pm	Invaders from Underwater: Current and New Invasive Threats to Indiana Waterways – *Leif Willey, Ohio Valley Technical Specialist, SePRO Corporation*
4:00pm-4:30pm	2015 Angler Creel Survey at Monroe Reservoir – *Dave Kittaka, Fisheries Biologist, Indiana Department of Natural Resources*
4:35pm-5:05pm	Indiana's New Reservoir Enhancement Program – *Sandra Clark-Kolaks, Indiana Department of Natural Resources*
5:10pm-5:40pm	ILMS' Contribution to Development of an Index of Biotic Integrity (IBI) for Indiana Lakes – *Greg R. Bright, Commonwealth Biomonitoring*

5:45pm – 8:30pm Evening Activities
(Admiral Room)

5:45pm-6:45pm	Hors D'oeuvres, Drinks & Silent Auction
6:45pm-8:30pm	Dinner & Awards

8:30pm – 10:00pm Hospitality Suite
Windjammer Bar

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Friday, March 3, 2017

7:30am-9:00am **Registration Open and Full Breakfast (provided for all registered attendees)**

8:00am-9:00am **Volunteer Meet & Greet with Melissa Clark & Sarah Powers, Indiana Clean Lakes Program**

The Indiana Clean Lakes Program will be hosting a breakfast meet and greet with volunteer lake monitors. Melissa Clark and Sarah Powers will be present to meet with volunteer lake monitors in a casual setting to chat, discuss the program, and explore new opportunities of how we can better serve one another in the drive to collect data critical to protecting and managing Indiana's lakes. Any present or past volunteer, and anyone interested in becoming a volunteer is welcome.

9:00am – 9:30am
Legislative Update (Admiral Room)

9:00am-9:30am Legislative Update – *Indra Frank, Hoosier Environmental Council*
Every year, out of hundreds bills introduced at the Indiana General Assembly, there are bills about water and 2017 is no exception. This update will be an overview of water-related bills at the mid-point of the 2017 legislative session.

9:35am – 12:00pm Field Trip & Education Sessions

Commodore A:

9:35am-10:05am US Army Corps of Engineers Louisville District Water Quality Program Overview – *Jade Young, Limnologist and Water Quality Team Lead, USACE*

10:10am-10:40am Lake Lemon: A lesson in *un*-Natural Resource Conservation – *Adam Casey, District Manager, Lake Lemon Conservancy District*

10:45am-11:15am Muck Munching II: results and insights from two years of in-lake organic sediment management, Upper Fish Lake, Indiana – *Javan Miner, Northwater Consulting*

11:20am-11:50am Pokemon Go for Science! Augmented Reality apps to better visualize monitoring networks and models – *Jeff Frey and Pete Cinotto, USGS IN-KY WSC*

Commodore B:

9:35am-10:05am Stormwater BMPs & Waste Water Wetland Systems – *Spencer Goehl, EcoLogic, LLC*

10:10am-10:40pm Travel to EcoLogic Site – *on your own*

10:40am-12:00pm Tour of EcoLogic Site – *Spencer Goehl, EcoLogic, LLC*

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Agenda at a Glance:

	Thursday, March 2, 2017	
8:00am-9:00am	Registration	
9:00am-9:50am	Welcome: *Sara Peel, ILMS President* Plenary: But What Will the Neighbors Think? Creating Native Shoreline Landscapes That Are Easy on the Eye and Great for the Environment! – *Bob Kirschner, Curator of Aquatic Plant & Urban Lake Studies, Chicago Botanic Garden*	
9:50am-10:15am	BREAK	
	Track 1: Outreach	**Track 2: Management Practices**
10:15am-10:45am	Secchi Dip-In: Past, Present, and Future – *Vanessa Snyder, NALMS*	Engineered Ecosystems, a Cyborg Approach to Lake Ecosystem Restoration-Grand Lake St. Marys– *Joseph Pfeiffer, Jr. PWS, KCI Technologies*
10:50am-11:20am	Reversing Tragedy of the Commons – *Ryan Workman, MS4 Coordinator, City of Warsaw*	What Works…What Doesn't – *Bill Jones, Professor Emeritus, School of Public & Environmental Affairs, Indiana University*
11:25am-11:55am	Saving the Island…again. – *Bridget Harrison, Executive Director, Clear Lake Twp. Land Conservancy*	Ongoing lake and pond management on the Hoosier National Forest – *Len Kring, Fish Biologist, U.S. Forest Service*
12:00pm-1:00pm	LUNCH for all registered attendees	
1:00pm-1:30pm	Annual Membership Meeting	
	Roundtable Discussions	**Roundtable Discussions**
1:30pm-2:15pm	Watershed Protection	Lake Monitoring
2:20pm-3:05pm	Fundraising and Grants	Lake Management
3:05pm-3:25pm	BREAK	
	Track 1: Research & Technology	**Track 2: Fisheries**
3:25pm-3:55pm	National Lake Assessment Overview for Indiana and the United States-2012 results and future 2017 plans – *Melissa Laney, School of Public & Environmental Affairs, Indiana University*	Invaders from Underwater: Current and New Invasive Threats to Indiana Waterways – *Leif Willey, Ohio Valley Technical Specialist, SePRO Corporation*
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5:45pm-6:45pm	Hors D'oeuvres, Drinks & Silent Auction	
6:45pm-8:30pm	Dinner & Awards	
8:30pm-10:00pm	HOSPITALITY SUITE	

Time	**Friday, March 3, 2017**	
7:30am-9:00am	BREAKFAST - Registration open	
9:00am-9:30am	Legislative Update – *Indra Frank, Hoosier Environmental Council*	
9:35am-10:05am	US Army Corps of Engineers Louisville District Water Quality Program Overview – *Jade Young, Limnologist and Water Quality Team Lead, USACE*	Stormwater BMPs & Waste Water Wetland Systems – *Spencer Goehl, EcoLogic, LLC*
		Field Trip
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Session: Plenary

But What Will the Neighbors Think? Creating Native Shoreline Landscapes That Are Easy on the Eye and Great for the Environment!

Bob Kirschner
Curator of Aquatic Plant & Urban Lake Studies
Chicago Botanic Garden, Glencoe, Ill.

Lake shorelines and their buffers face an onslaught of stressors that threaten their ecological integrity as well as their natural beauty. Fortunately, a partnership is emerging between aquatic ecologists, landscape architects, and horticulturists to revisit traditional societal pressures to have neatly manicured turf shorelines, and to offer property owners environmentally sensitive approaches to enhance both an aesthetic appeal and diversity of habitat along their lakeshores. Within a residential setting in particular, native plantings are sometimes viewed as being unorganized and "messy"—as compared to a typical home garden landscape where plant height and texture, color of foliage, abundance of flowers, and seasonal interest are often considered in plant selection and placement. Thoughtful integration of such "gardening" aesthetics into native shoreline landscapes, together with defining hardscape features such as pathways and edging, combine to create visual "cues to care" that reinforce the landscape's intention while still providing considerable ecological benefit.

This presentation will examine key considerations for designing, executing, and maintaining a shoreline planting project, using as a case study the Chicago Botanic Garden's 17-year lakeshore rejuvenation project that has utilized over ½-million native shoreline plantings. We'll explore choosing the "right plants for the right places" (e.g., factors such as inundation tolerance, sun/shade preference, root structure, resistance to wildlife grazing, etc.), selecting high quality plant stock, planting bed soil preparation, options for short- and long-term structural armoring from wave energy, planting "do's and don'ts," watering, mulching, herbivory protection, weeding, seasonal trimming, and more.

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Session: Outreach

Secchi Dip-In: Past, Present, and Future

Vanessa Snyder

North American Lake Management Society, Madison, Wisconsin
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309-472-5148

Abstract: The Secchi Dip-In is a water-monitoring program where volunteers submit water clarity measurements to an online database allowing multiple stakeholders to have data access for examination of temporal and regional patterns on a variety of scales (regional through international). When the first Secchi Dip-In was proposed in 1994, it was hoped that the project would make it past one or two years. Thanks to the support of volunteer programs, volunteers, the North American Lake Management Society (NALMS), and the Environmental Protection Agency, the Dip-In database has grown to more than 41,000 records on more than 7,000 separate waterbodies. In February 2015, Dr. Robert Carlson (Kent State University) transferred management of the Secchi Dip-In program to the North American Lake Management Society (NALMS). Volunteers may use the program to begin monitoring efforts and to increase awareness of water quality issues within their communities. At Secchi Dip-In's peak in 2001, over 3,800 entries were submitted from nearly 200 programs representing 45 U.S. States and Canadian provinces. However, the Secchi Dip-In program has experienced a decrease in volunteer participation in recent years. In order to maintain long-term data for future analyses, NALMS is actively working to increase participation in the Dip-In by increasing educational opportunities to lake stakeholders on the importance of good water quality. NALMS plans to increase educational opportunities to lake stakeholders by broadening outreach efforts throughout North America.

Reversing Tragedy of the Commons

Ryan Workman

MS4 Coordinator, City of Warsaw
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Abstract: The exponential growth of the human population has a negative impact on the efforts of conservation. To elaborate, as the human population grows, tragedy of the commons becomes more prevalent. "Tragedy of the commons," was a concept coined by a professor for UC, Garrett Hardin. It denotes that "in nonregulated areas (the 'commons') individual rationality and self-interest leads to disaster" (Pojman, p. 272). The concept can manifest in the form of pollution. For instance, a rational individual perceives discharged trash as a small cost to the whole ecosystem. However since each individual tends to have this mindset, it evolves into civilians "fouling our own nest" (Pojman, p. 272). Whether surface waters or the temperate evergreen forests of the U.S., this is a common issue conservationists face regardless of the resource. The City of Warsaw has multiple environmental assets, the greatest of these stems from surface waters. Kosciusko County's economy is heavily influenced by the natural surface waters with an annual economic impact of $313 million (Bingham, p. 1). In light of this, it is integral to conserve the environmental assets of the City of Warsaw. To conserve the local environmental assets, the City of Warsaw Stormwater Utility has partnered with a non-profit volunteer based organization, Paddlers For Conservation, that has dedicated its efforts on the Tippecanoe River within Kosciusko County. Together, we have altered the individualistic tendencies of locals in efforts to improve the water quality of a nonregulated area, the Tippecanoe River.

Saving the Island…again.

Bridget Harrison

Executive Director
Clear Lake Twp. Land Conservancy
111 Gecowets Drive I Fremont, IN 46737
260-316-1397
clearlakeconservancy.org

Abstract: Kasota Island, located on a developed ski lake in northeastern Indiana, is shrinking at a rate of 2-4 in/yr from wave action caused by wind and boats. Discussion will focus on what is working and what is not from our multi-faceted fundraising approach to save this 1.9 acre island. Fundraising efforts include events, Facebook, mailings, matching fund opportunities, and a pledge drive. Details of the restoration project will be discussed also.

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Session: Management Practices

Engineered Ecosystems, a Cyborg Approach to Lake Ecosystem Restoration – Grand Lake St. Mary's

Joseph Pfeiffer, Jr. PWS

Ecosystem Dynamics Practice Leader
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Abstract: Grand Lake St. Marys is a 21 square mile lake supported by a 52 square mile watershed in north western Ohio that historically supported 2,500 acres of littoral fringe wetlands. Nutrient loading from the contributing watershed, complete loss of the littoral wetland system through anthropogenic actions and invasive species (carp) created hypertrophic conditions. Radical swings in water clarity and temperature fueled massive blue green algae blooms that created a cascade of impacts to system processes, disrupting biological, chemical, and societal services provided by the lake. The frequency and severity of the blooms indicated the system was on the verge of ecological collapse. In 2010 algal blooms were of such a magnitude and duration that the Ohio EPA was forced to close the lake to all recreational activity. As a component of the developed Critical Response Actions and Conceptual Ecosystem Revitalization Model established by the Strategic Plan for the lakes restoration, Engineered Ecosystems were established to target water quality degradation. The created "cyborg system" served the greater good of the objective by establishing seeds of stable processes that become the foundation for self-sustaining ecosystem restoration. These systems remove nutrients via a series of interlinked engineered, bio-technical, and natural treatment systems. The improvement in water quality provides the conditions needed for natural regeneration of littoral wetlands beyond the influence of the engineered systems. Two Engineered Ecosystems have been placed into operation since June of 2013 treating over 6 MGPD. Water quality monitoring of the systems document an average removal efficiency of 31% and 71% for nitrogen and phosphorus respectively, resulting in a localized complete shift in water quality and trophic state and resurgence of natural vegetation.

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What Works…What Doesn't

Bill Jones

Professor Emeritus
School of Public & Environmental Affairs (SPEA), Indiana University, Bloomington, IN.
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Abstract: The field of lake and watershed management is ever-changing and continues to advance with each passing year. Published articles in the scientific literature reveal new approaches to addressing old as well as new problems facing lakes and their watersheds. The lake manager must stay current with this literature to insure application of the most appropriate method(s), to address their specific problem(s), in the most cost-effective way. For example, remarkable advances in aeration technologies, especially with Hypolimnetic Oxygenation Systems (HOS), have shown great results in keeping deep waters of stratified lakes oxygenated – providing improved fish habitat and reduced internal phosphorus loading. In another example, a variety of watershed best management practices (BMPs) have been used successfully in countless cases to reduce the amount of nutrients, sediments, and other pollutants entering lakes in surface runoff. Such efforts have demonstrated great success in many instances but the scientific literature is largely devoid of evidence in which watershed management has reversed eutrophication - caused a eutrophic lake to become mesotrophic. If improved lake trophic state is the management goal, perhaps some of the millions of dollars spent in watersheds should be diverted to in-lake treatments? A more balanced approach in allocating public and private funds to both in-lake and watershed treatments might better serve our lakes and our citizens. These and other examples will be presented during this talk.

Ongoing lake and pond management on the Hoosier National Forest

Len Kring

Fish Biologist
Forest Service, Hoosier National Forest, Tell City Ranger District
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Abstract: This presentation will provide updates on the USFS lake drawdown program, adding large wood to fishing ponds, managing woody vegetation on pond dams, managing native nuisance species, and installation of catfish spawning boxes.

Session: Research & Technology

Water Quality Monitoring with an EcoMapper Autonomous Underwater Vehicle (AUV)

Justin Boldt, Zach Martin

Justin Boldt
U.S. Geological Survey
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Zach Martin
U.S. Geological Survey
Indiana-Kentucky Water Science Center
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Abstract: An EcoMapper Autonomous Underwater Vehicle (AUV) is a one-person deployable system (robotic submarine) that is able to collect high-resolution, geo-referenced water quality, velocity, bathymetry, and sonar imagery data at much denser time and spatial scales than traditional monitoring techniques. This talk with describe how the EcoMapper operates and highlight a few case studies of water quality surveys in various reservoirs and rivers in Kentucky and Indiana.

Networked Lake Science: Challenges and Opportunities for Global Collaboration and Technology Development

Lisa Borre, Kathleen C. Weathers

Cary Institute of Ecosystem Studies
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Abstract: Many of the 500+ members of the Global Lake Ecological Observatory Network (GLEON) work in close partnership with local lake associations and citizen science volunteers to leverage GLEON's three networks: lakes, data, and people. Some GLEON research sites rely on local citizen partners for sample collection and maintenance of data buoys. Likewise, lake managers and citizen scientists recognize the value of sharing and interpreting high-resolution data and are eager to participate in the broader GLEON network. GLEON is working to bring research questions and data about lakes into the public sphere. Further, GLEON members are developing tools, such as a mobile app (Lake Observer), to create opportunities for citizens to participate in scientific research. Partnerships between volunteers and researchers have advanced science about, for example, the impact of large storm events on lakes and their watersheds and the impact of cyanobacterial blooms within lakes that are public water supplies. Experience from GLEON's global network demonstrates how citizens contribute to the formulation of new research questions as well as how research scientists embrace citizen science to help understand, predict, and communicate the role and response of lakes in a changing global environment.

Starry Stonewort, *Nitellopsis obtuse,* in the Great Lakes Region, and in Lake Wawasee and Syracuse Lake from Date of Discovery to 2016

Dr. Jerry W. Riffle

Member of the Ecology Committee of the Wawasee Area Conservatory Foundation
6086 E. George Street, Syracuse, IN 46567
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Abstract: Starry Stonewort (SSW) is a nonindigenous submerged aquatic plant species of the Characeae plant family. It can be spread by oocytes, plant fragments, star-shaped bulbils, and various vectors such as aquatic animals, ballast water, boats, and trailers. SSW is established in seven states in the Great Lakes Region.

Ecologically, SSW reduces the diversity of plants, and impacts fish spawning habitat by forming a thick mat that eliminates fish nest development and growth habitat for fish. SSW was first detected in Lake Wawasee in summer of 2008 in the channels on the west side of Johnson Bay, and in Syracuse Lake in 2011 in the 4.5 acre access channel adjacent to Henry Ward Park. It was determined by others that using Cutrine Ultra at the rate of 2.4 gallons per acre-foot in combination with Hydrothol 191 at the rate of one quart per surface acre was the most effective chemical treatment for suppressing SSW in Lake Wawasee and Syracuse Lake.

Despite large scale efforts to control SSW, its acreage has increased steadily each year since 2009. Chemical applications have temporarily suppressed SSW, but no long term control of the alga has been observed.

Bar graphs document the number of acres, the percent of total surface acres, and the number of acres of SSW treated each year since its discovery in Lake Wawasee and Syracuse Lake.

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Session: Fisheries

Invaders from Underwater: Current and New Invasive Threats to Indiana Waterways

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Abstract: Indiana waterways provide many benefits to the residents of our State. Some of those benefits include uses as recreational space, drinking water and income. Other benefits include habitat, flood control, and runoff filtration. In recent years and decades our waterways and the benefits received from them are becoming increasingly threatened by the rise and spread of aquatic invasive species (AIS). This presentation will focus on current, new and potential threats to Indiana waters in the form of aquatic invasive plants, the biology of those plants, reviews of current studies and current management tools.

Fisheries Management and an Angler Creel Survey at Monroe Reservoir Monroe County 2015

David Kittaka

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Abstract: Monroe Reservoir is 10,750 acre multi-use impoundment. Monroe Reservoir supports a diverse fish community, of which almost half the fish species are commonly sought after game fish. In 2015, an angler creel survey was conducted to measure; fishing pressure, fish harvested and evaluate angler interest. Two creel clerks were employed to conduct fishing interviews at eight different boat ramps. An estimated 32,731 anglers fished 149,692 hours at Monroe Reservoir between March 30 to October 29, 2015. Anglers caught an estimated 66,601 fish, of these, 32,028 fish (weighing 22,697.22 pounds) were harvested. Largemouth Bass was the most sought after species. Anglers fishing for "anything" was the second most sought after category and crappie was the third most sought after species followed by catfish, Bluegill, Hybrid Striped Bass, and Walleye. Angler interest in our Walleye and Hybrid Striped Bass stocking program has not grown since the last survey in 2007.

Indiana's New Reservoir Enhancement Program

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Abstract: In many Midwest states, including Indiana, large reservoirs are highly utilized by anglers. Also, similar to most reservoirs in the Midwest, reservoirs in Indiana are aging and aquatic habitat is deteriorating or nonexistent. Indiana Department of Natural Resources (DNR) is working to create a reservoir aquatic habitat enhancement program similar to other Midwest states using artificial structures: crib structures, rock piles, Georgia cubes, brush piles, and felled shoreline trees. General recommendations of the number of structures to place in a complex (i.e. 20 cribs per acre) are widely available but the question of how much aquatic habitat is needed is still unanswered. Indiana DNR is attempting to use a quantitative measure of habitat enhancement by calculating a Habitat Enhancement Zone (HEZ). The HEZ is the surface area for the portion of the lake with adequate oxygen levels for fish but deep enough not to obstruct boats. The HEZ is calculated using detailed bathometric maps which are created using Lowrance HDS depth finder and BioBase software. All artificial structures will be placed within this HEZ. We created an impact acreage for structure complexes (i.e. 20 cribs per acre) based on an area slightly greater than the complex surface area due to habitat created along the edges of the structures. Other structures, like brush piles and felled shoreline trees; where documentation of surface area is not available, the best estimate of the area of habitat created was based on an area slightly larger than the structure (length of tree, etc.). Based on these individual structure impact acreages, Indiana DNR hopes to increase available habitat by 5% to 20% in the Habitat Enhancement Zone in project lakes.

ILMS' Contribution to Development of an Index of Biotic Integrity (IBI) for Indiana Lakes

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Abstract: The Index of Biotic Integrity (IBI) is a way to use biological data to measure the environmental health of rivers and lakes. Twelve different measurements (metrics) are typically evaluated. Each metric is assigned a value of 1, 3, or 5, (5 is best) based on comparison to "reference" conditions (what might be expected in the healthiest rivers or lakes). The metrics are summed to give a total IBI score. The higher the score, the better the ecological condition of the site evaluated.
In 2001, ILMS applied for a 319 grant to develop this type of measurement for Indiana lakes. ILMS received funding for this project from the Indiana Department of Environmental Management and hired Dr. Thomas Simon to conduct the study and write the report. Dr. Simon collected fish from 100 lakes in central and northern Indiana. The information he obtained was used to develop an IBI using fish data for Indiana lakes.
Some of the lakes examined were in poor ecological condition. They had few fish, a low variety of fish, were dominated by tolerant species that were "omnivores" and were often diseased. Palestine Lake (Kosciusko County), Cedar Lake (Lake County), and Lake George (Lake County) fell into this category.
In contrast, some of our lakes were quite healthy. Among the best of these were Lake Wawasee (Kosciusko County), Jimmerson Lake (Steuben County), and Hoffman Lake (Kosciusko County).
This presentation will review what kinds of fish community characteristics make up a healthy Indiana lake.

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Indiana Lakes Management Society Annual Business Meeting
Admiral Room

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.
f. Transaction of other business as mentioned in the notice.
g. Election of Officers.
h. Election of Directors.
i. Adjournment

ILMS Board Elections 2017
Election Slate

President:
Elizabeth Tompkins: Elizabeth Tompkins is the Natural Resources Coordinator with the City of Bloomington Parks and Recreation Department. She began her current position in June 2009, but has worked for the department since 2005. Elizabeth holds a Bachelor of Science degree in Outdoor Recreation and Resource Management from Indiana University. She has been a member of ILMS since 2010 and has been on the ILMS board since 2012.
As Natural Resources Coordinator, Elizabeth organizes environmental education programs and manages the 109-acre Griffy Lake and its seasonal boathouse operations. She continues the department's history of participation in the Clean Lakes Program each summer by gathering data at Griffy Lake and is passionate about maintaining a the lake as a thriving recreational and natural resource. She is excited to continue to contribute to ILMS and feels she brings the perspective of municipal government and small, public lake management to the board.

Vice President:
Joseph Schmees: Joe is employed by the Indiana Department of Environmental Management (IDEM) as the watershed specialist and Section 319 grant project manager for northeast Indiana. He has worked for IDEM since 2007, originally sampling rivers and streams for biology, bacteria, algae, and chemistry. Joe graduated from Wittenberg University in Springfield, Ohio, with dual bachelor degrees in biology and chemistry. Joe currently lives in Fishers with his wife Lauren and their dog Grace, and loves to read, run, hike, and fish. Joe also likes to spend time in his kayak on the White River and nearby Geist Reservoir, and translates his love for the outdoors and water resources into his professional life. He is currently the President-elect for the Indiana Water Resources Association (IWRA), and looks forward to continued involvement in ILMS.

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Board Members (5):

Adam Casey: Adam Casey is currently entering his third year as the District Manager for the Lake Lemon Conservancy District (LLCD). This position was quite an achievement and homecoming of sorts for Adam. Mr. Casey was the acting District Biologist for the LLCD from 2009-2012 during graduate school and for some time after. Between stints with the LLCD, Adam served multiple roles with the Indiana Department of Environmental Management. When initially hired by IDEM, Adam primarily focused on biological and chemical monitoring of streams and rivers around the state of Indiana as a staff environmental scientist. His last position held with IDEM was as an Environmental Manager responsible for the management of The Environmental Stewardship Program and Partners for Pollution Prevention. Both programs focused on reducing pollution and environmental impacts from major manufacturers around the state of Indiana. Adam graduated undergrad from The University of Maine in 2008, where he studied Marine Science. In 2011 Adam graduated from IU's School of Public and Environmental affairs, where he obtained two masters degrees, A Master's of Science in Environmental Science with a focus on water resource management, and a Masters of Public Affairs. Adam has recently purchased a home near Lake Lemon and looks forward laying down roots in Bloomington Indiana.

Diana Castell: Diana Castell has volunteered with Wawasee Area Conservancy Foundation for ten years and chaired the Ecology/Education Committee for seven years. She started an educational outreach program to help lake residents and the local community to understand how their actions affect their watershed. The program, Lake Talk and Eats, takes place first Saturday in June, July and August. Topics range from local fish to grandkids and grandparents catching water critters and learning how water quality effects insects. Their committee is full of positive, committed people, which makes their programs possible. They continue to look for new ways to education our residents in order to protect our lakes. Next summer they will start a Cool Wake program to keep skiers and wake boarder in the deep part of the lakes.

Bridget Harrison: Bridget Harrison is the Executive Director of the Clear Lake Township Land Conservancy located in the northeast corner of Indiana. Prior to taking this position, she was working for an environmental restoration and consulting firm in the Chicagoland area. Bridget earned her Bachelor's Degree in 2007 from Southern Illinois University, majoring in Biological Sciences and minoring in Environmental Studies. After graduation, Bridget worked aboard commercial fishing vessels in the Bering Sea as an Observer for the National Marine Fisheries Service. After completing a six month contract in Alaska, she went back to southern Illinois. She received a Master's degree in Forestry with an emphasis on Watershed Management from Southern Illinois University in 2011. After graduate school, Bridget volunteered with the AmeriCorps for two years at the Shasta Land Trust, in Redding California. Here, she enjoyed working with volunteers and began to understand the role of nonprofit land trusts in land and water conservation. Earlier this year, Bridget completed the Indiana Watershed Leadership Academy. In her free time she enjoys the outdoors with her dogs and husband.

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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.

Jade Young: Jade L. Young currently serves as Team Leader and Limnologist for the Water Quality Team of the Environmental Branch, Engineering Division for the Corps of Engineers, Louisville District. She oversees the management and execution of the District's Water Quality program and assures that the program is structured, staffed and managed to be responsive to program and project requirements.
Her experience includes study of freshwater systems ranging from small streams to large rivers and reservoirs. Her areas of expertise include freshwater algal and macroinvertebrate ecology, as well as assessment of chemical and physical properties within aquatic environments.
In her career with the Louisville District, Jade has worked extensively on the Water Quality Team in both a technical and a supervisory capacity. Her ability to initiate and engage in partnership efforts with other governmental and non-governmental stakeholders has helped in the development of holistic watershed approaches to evaluate and address concerns associated with Louisville District water resources.
Jade began her professional career with the Louisville District Corps of Engineers in August 2009. She has a M.S. in Biology with emphasis on benthic macroinvertebrate assessment from Tennessee Technological University. She also has a B.S. in Environmental Biology from Tennessee Technological University.

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Session: Friday

Wetlands for Water Quality

Spencer Goehl and Mark Harrison

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The PowerPoint presentation will give an overview of various types of restored and constructed wetlands to improve water quality. Spencer Goehl from Eco Logic will discuss the low impact development approach they used to manage stormwater at the Eco Logic headquarters, which will include information on the best management practices utilized on site. Challenges in the design, implementation and management of stormwater wetlands, and the importance of using native plants will also be covered in this review.
Mark Harrison a professional engineer at KCI & Associates will discuss the use of constructed wetlands as an important technology for solving many wastewater treatments needs from single family homes to entire cities. Constructed wetlands have become a very sustainable & green approach to wastewater treatment and have proven to be a cost-effective way to reduce pollutants in wastewater & stormwater systems.
Mark's presentation will look at the use of constructed wetland as a solution for a relatively small on-site treatment and disposal system for the EcoLogic headquarters facilities and for the treatment of combined sewer overflows for the City of Washington Indiana.

Following this talk, Spencer will lead an onsite tour of Eco Logic headquarters reviewing green infrastructure practices including three different types of wetlands:

- Stormwater Bio-retention Wetland & Bio-swales
- Wastewater Wetland
- Wetland to Treat Ag Runoff

The tour will also highlight the use of pervious pavers, specific green building features and Eco Logic's new native plant nursery.

Lake Lemon: A lesson in un-Natural Resource Conservation

Adam Casey

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Abstract: There has never been a doubt about the need for conservation organizations to protect our natural resources from both natural change and anthropogenic degradation. This is especially true when looking at manmade systems such as reservoirs. During operation as the primary water supply for Bloomington Indiana, Lake Lemon was managed by the City of Bloomington Utilities. However, once no longer in use, lake Lemon was left to the whims of mother nature. In manmade environments, the rate of degradation and reclamation by nature is greatly exaggerated. This presentation will focus on the grassroots effort that resulted in the formation of the Lake Lemon Conservancy District (LLCD), major accomplishments of the LLCD, future needs, and challenges. Along the way we will get a glimpse of lessons learned about managing not only the reservoir itself, but the people who rely on this local "Un-Natural" resource for livelihood and recreation.

Muck munching II: results and insights from two years of in-lake organic sediment management, Upper Fish Lake, Indiana

Javan Miner, Jeff Boeckler, James Adamson

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Abstract: Accumulation of sediment is a primary concern of residents and recreational users of Fish Lake, Indiana. An in-progress dredging study determined that between 1990 and 2016 up to 6 feet of sediment accumulation occurred, primarily of organic composition. Sedimentation has led to the expansion of weed beds, and a decline in water quality, fish populations and diversity. Low dissolved oxygen concentrations at the sediment interface were recorded in the fall of 2015, suggesting an unhealthy benthic environment unable to digest accumulating organic material. In this context, a two year pilot study was executed to evaluate the effectiveness of aeration technology and microbial augmentation at managing organic sediment accumulation. Study zones were established to monitor dissolved oxygen and sediment conditions over the 2015 and 2016 growing seasons; these zones included microbial augmentation only, aeration with and without microbial augmentation and a control zone. A SolarBee™ mechanical circulating aerator was installed and Biodyne® Environoc 301 was injected monthly into the sediment to introduce benthic microbes. Data loggers were installed to measure dissolved oxygen and monthly monitoring of sediment was performed. The results from both years suggest that microbial augmentation as a sole practice had limited effectiveness due to the poor dissolved oxygen conditions. The aerator was effective at improving dissolved oxygen concentrations early in the season, but it effective radius significantly declined as macrophyte growth occurred. Over the two years, the most definitive measurements of sediment reduction occurred where both aeration and microbial augmentation were applied.

Pokemon Go for Science! Augmented Reality apps to better visualize monitoring networks and models

Jeff Frey and Pete Cinotto

USGS IN-KY WSC

Abstract: Augmented Reality (AR) technology adds information to the surrounding world (locations, images, objects, etc.). Augmented Reality includes both Vision and Geo layers. Vision layers are tied to an image and geo layers are tied to a location such as stream gage sites. These powerful apps made for smart phones allow for the visual representation of valuable monitoring networks or mobile flood inundation maps.

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THANK YOU!

We look forward to seeing you next year!

Please mark your calendars for next year's conference at Pokagon State Park, Angola, Indiana.

30th Annual Indiana Lakes Management Conference

Thursday, March 22 – Friday, March 23, 2018

Indiana Lakes Management Society
207 S. Wayne Street, Suite B
Angola, IN 46703-9315

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