

33rd

33rd Annual Conference



March 22nd - 24th
2018

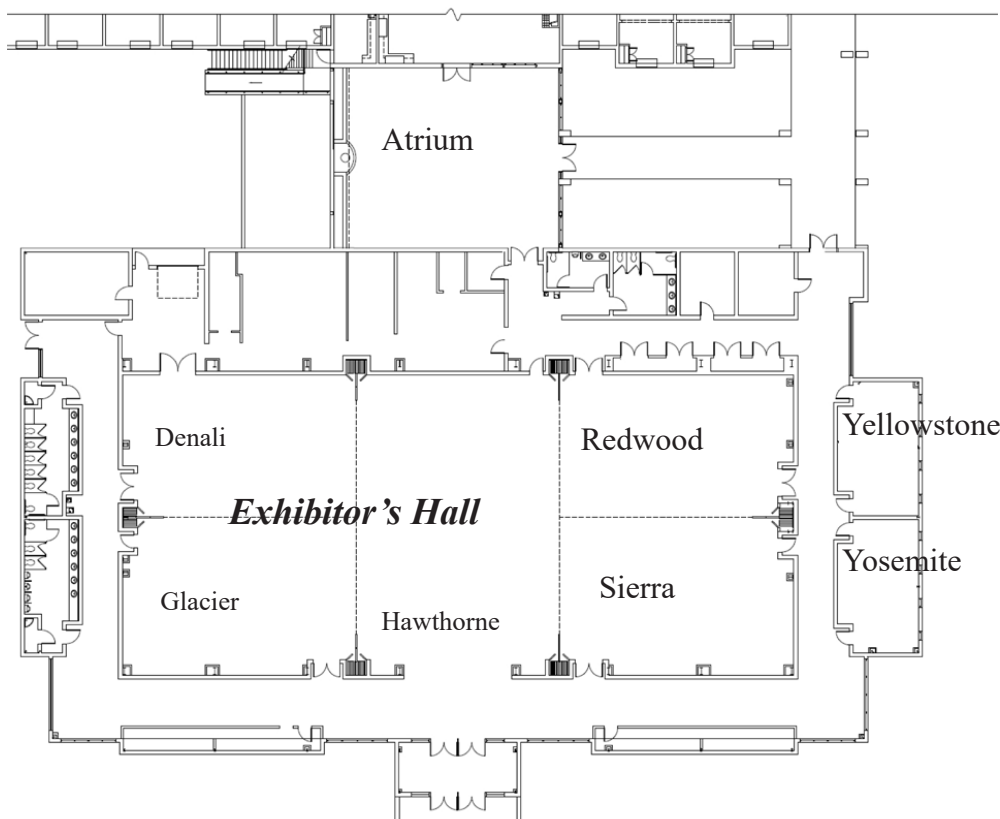


Parke Hotel & Conference Center
1413 Leslie Dr.
Bloomington, IL



[REMINDERS]

1. **Nametags:** Be sure to wear your nametag during the conference. Your nametag is both a ‘ticket’ for conference meals and events, and helpful for sparking conversations with faces you don’t know. Should you lose your nametag simply visit the registration desk and we’ll be happy to print off a new one.
2. **Exhibitor Hall:** All breaks and meals will be held in the Exhibitor Hall (combined Denali / Glacier / Hawthorne Ballrooms). Be sure to visit with the exhibitors to discuss aquatic plant management, water quality enhancement, laboratory testing, monitoring equipment, and much more.
3. **Auction Raffle Items:** An auction raffle will be held in the Exhibitor Hall all day Thursday and close at noon on Friday. Simply place as many tickets in the basket of the items you can’t bear to leave the conference without. It only takes one ticket to win, but your odds only get better with more tickets! All proceeds go towards the ILMA scholarship fund, so splurging is beneficial to the minds of the next generation of scientists. You must be present at the drawing to win.
4. **Photo Contest:** Don’t forget to cast your vote for the 2018 ILMA photograph of the year. Photos are on display in the Exhibitor Hall. The ballots and ballot box are located with the display. The winner will receive \$50 and will be featured on the 2019 conference program.



All conference sessions will be held in the Redwood and Sierra Ballrooms. Following the exhibitor's reception and dinner in the Denali / Glacier / Hawthorne Ballrooms (Exhibitor's Hall) Thursday evening, the festivities will continue into the Atrium where ILMA will host a trivia game night. Hang out and enjoy yourself while catching up with old friends and maybe making some new ones.



2018 Overview Agenda



Thursday March 22nd

Registration is open from 8:00am – 5:00pm

9:30-11:00	Concurrent Sessions.....	Redwood / Sierra
11:00-11:30	Break.....	Exhibitor Hall
11:30-12:00	Pre-Lunch Session.....	Exhibitor Hall
12:00-1:30	Lunch.....	Exhibitors Hall
1:30-3:00	Concurrent Sessions.....	Redwood and Sierra
3:00-3:30	Break.....	Exhibitor Hall
3:30-5:00	Conference Keynote.....	Redwood and Sierra
5:00-6:00	Exhibitors Reception / Poster Viewing.....	Exhibitor Hall
6:00-7:00	Dinner.....	Exhibitor Hall
7:00-7:30	Annual ILMA Member Meeting.....	Exhibitor Hall
7:30-9:30	Open Social.....	Exhibitor Hall/Atrium

Friday March 23rd

Registration is open from 8:00am – 12:00pm

8:30-10:00	Concurrent Sessions.....	Redwood and Sierra
10:00-10:30	Break.....	Exhibitors Hall
10:30-12:00	Concurrent Sessions.....	Redwood and Sierra
12:00-1:30	Lunch (Bucket Raffle Drawing).....	Exhibitors Hall
1:30-3:00	Closing Session.....	Redwood
3:00-3:15	Conference Closeout / Drawing for Winner of the Kayak Package.....	Exhibitors Hall

Saturday March 24th

8:00-12:00	Midwestern Waterfowl and Shorebirds Workshop.....	Redwood*
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**Attendees will meet here prior to leaving for the site*



Thursday Morning March 22nd

9:30-11:00 Concurrent Sessions Redwood & Sierra

Redwood [Algae Part 1]
 Moderator – Jeff Boeckler

9:30
 Why Does Algae Always Get a Bad Rap... a Brief Primer on Algae
 Rick Twait, City of Bloomington

10:00
 Spatial Patterns of Algae Blooms in Lake Bloomington
 Gare Ambrose-Igho, Illinois State University

10:30
 Lakes After Hours: Continous Monitoring of Lake Bloomington and Evergreen Using a Buoy
 Jill Mayes, City of Bloomington

Sierra [Nutrients]
 Moderator – Karen Clementi

9:30
 Diurnal and Seasonal Variation in Nitrate-Nitrogen Concentrations of Groundwater in a Saturated Buffer Zone
 Eric Peterson, Illinois State University

10:00
 Developing Numeric Nutrient Criteria for the State of Illinois - Nutrient Science Advisory Committee (NSAC) Activities
 Paul Terrio, U.S. Geological Survey

10:30
 Tower Lakes Bioswale/Raingarden Project
 Andy Hay, Tower Lakes Association

11:00-11:30 Break Exhibitor Hall

11:30-12:00 Pre-Lunch Session..... Exhibitor Hall

Inspiring awareness to Empower Action: McHenry County Schools Environmental Education Program

In 1987 the McHenry County Schools Environmental Education Program or MCSEEP began as a recycling education program. Since then, we have grown into a countywide provider of diverse, comprehensive environmental education. MCSEEP PreK-12 presentations address the environmental issues facing today’s students and their families. We have taught over 22,000 students each year and attend over 60 schools in the county. MCSEEP also sponsors two county groundwater festivals which provide middle school students with hands-on activities with water professionals in the field.

William Donato, McHenry County



McHenry County
Schools Environmental Education Programs

2017-18
 SCHOOL YEAR:

INSPIRING AWARENESS
to
EMPOWER ACTION

12:00-1:30 Lunch (*Scholarship Awards*)..... Exhibitors Hall

Thursday Afternoon March 22nd

1:30-3:00 Concurrent Sessions Redwood & Sierra

Redwood [Algae Part 2]

Moderator – Tim Gardner

1:30

Utilizing Microalgae for Nutrient Recovery from Wastewater
Kumar Kuldip, Metropolitan Water Reclamation District

2:00

BloomWatch, the App, and other Assorted Updates in the Volunteer Lake Monitoring Program (VLMP)
Teri Holland & Greg Ratliff, Illinois EPA

2:30

Campus Lake as a Living Laboratory to Address the Worldwide Problem of Cyanobacterial Harmful Algal Blooms (CyanoHABs)
Marjorie Brooks, Southern Illinois University

Sierra [Watershed Management]

Moderator – Peter Berrini

1:30

The Practical Application of Fishing Regulations
Mike Mounce, Illinois DNR

2:00

Transport and Fate of Chloride from Road Salt within a Mixed Urban and Agricultural Watershed: Assessing the Influence of Chloride
Eric Peterson, Illinois State University

2:30

Unique Approaches to Traditional Natural Areas Management
Debbie Budyak, Integrated Lakes Management

3:00-3:30 Break Exhibitor Hall

3:30-5:00 Keynote Session Redwood

Threats and Opportunities facing the Great Lakes



The Alliance for the Great Lakes works across the region to ensure that the Great Lakes are healthy for all people and wildlife, forever. More than 40 million people depend on the Great Lakes for their drinking water and the Lakes provide recreational opportunities, jobs and quality of life for people across the region. Molly will provide an overview of some of the biggest threats and opportunities currently facing the Great Lakes. She will highlight the Alliance’s work to support the federal Great Lakes Restoration Initiative, which has provided more than \$2 billion in more than 3,000 projects to clean up Great Lakes Areas of Concern. These projects are crucial for preventing and controlling invasive species, reducing nutrient runoff that contributes to harmful algal blooms and restoring habitat to protect native species. She will also talk about the Alliance’s policy work to stop the introduction of aquatic invasive species like Asian carp into the Great Lakes and prevent toxic algal blooms from poisoning drinking water and spoiling recreational pursuits.

Molly Flanagan, Great Lakes Alliance



Where are we Headed? Policy and Funding Questions and Answers

Following the keynote presentation the ILMA Board will host a panel discussion covering local challenges to managing lakes and watersheds in Illinois on the level of HOAs, municipalities, and volunteer organizations.

5:00-6:00 Exhibitor Reception (Poster Session)..... Exhibitors Hall

6:00-7:30 Dinner and ILMA Annual Meeting (Lake Awards) Exhibitors Hall

7:30-9:30 Open Social (Includes a Trivia Night Special!) Atrium/Exhibitors Hall



Friday Morning March 23rd

8:30-10:00 Concurrent Sessions Redwood & Sierra

Redwood [Dredging]

Moderator – Joe Bartletti

8:30

Does My Lake Need Dredging?

Peter Berrini, Berrini & Associates

9:00

Lake Decatur Dredging: Can We Dig It? Yes We Can!

Keith Alexander, City of Decatur

9:30

Beneficial Use of Dredged Material: Can Soil Sales Save Illinois Lakes?

Charles Theiling, U.S. Army Corps of Engineers

Sierra [Invasive Species]

Moderator – Mike Adam

8:30

Monitoring and Response Actions Following the Discovery of Starry Stonewort (*Nitellopsis obtusa*) in Wisconsin

Michelle Nault, Wisconsin DNR

9:00

Illinois Needs Heroes: Aquatic Invasive Species Prevention Programs

Greg Hitzroth, Illinois/Indiana Sea Grant

9:30

Understanding the Ecology and Management of Eurasian and Hybrid Watermilfoils in Inland Temperate Lakes

Michelle Nault, Wisconsin DNR

10:00-10:30 Break Exhibitor Hall

10:30-12:00 Concurrent Sessions Redwood & Sierra

Redwood [Developing and Sustaining HOAs]

Moderator – Keith Gray

10:30-12:00

Panel Discussion

Establishing Committees, Engaging Resources, Partnering, Overcoming Challenges

Representatives from:

Bangs Lakes

Tower Lakes

Timberlake

Lake Barrington

Sierra [Fish Habitat]

Moderator – Leonard Dane

10:30

Types of Natural & Artificial Fish Habitat

Leonard Dane, Deuchler

Trent Thomas, Illinois DNR

11:00

The Need for Fish Habitat Enhancement

Mike Garthaus, Illinois DNR

11:30

What Makes Aquatic Habitat Projects Successful?

Mike Mounce, Illinois DNR

12:00-1:30 Lunch (Part I of Raffle Items, *must be present to win*) Exhibitors Hall

Friday Afternoon March 23rd

1:30-3:00 Closing SessionRedwood

Redwood [Climate Impacts]

Moderator – Holly Hudson

1:30

Climate Impacts on Surface Inflow into Evergreen Lake and Lake Bloomington Watersheds

Joseph Honings, Illinois State University

2:00

What Does Climate Change Look Like?

Bryan Cross, Prairie Engineers

2:30

Temporal Effects of Heat Waves on Sex Ratios and Gene Expression in a Freshwater Turtle

Anthony Breitenbach, Illinois State University

3:00-3:15 Conference Closeout Exhibitor Hall
(Part II of Raffle Items, 50/50 and Canoe Drawing - *must be present to win*)

Saturday Workshop March 24th

8:00am-12:00

Midwestern Waterfowl and Shorebirds

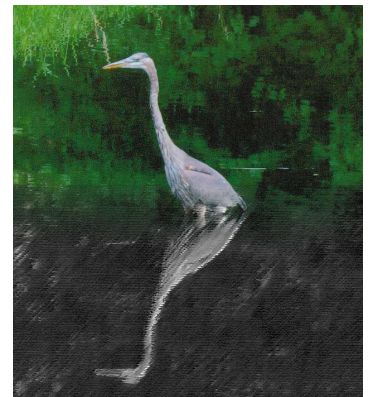
Michael Bowers of the Audubon Society of Illinois will share his decades of experience on bird watching to help increase the chances of checking off those species on your birding bucket list. This workshop will focus on waterfowl and shoreline birds, but will provide a wide expanse of knowledge on bird identification and where to find them.

Morning in-class portion [Redwood]:

Class instruction will highlight bird watching techniques on the ‘when’, ‘how’, and ‘what’ to do in the field to maximize your bird observing skills

Field trip:

Following the classroom session, an optional field trip will visit Lake Bloomington to practice bird identification





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Conference Abstracts

Algae Part 1Redwood Ballroom 9:30-11:00, March 22nd

Why Does Algae Always Get a Bad Rap.... a Brief Primer on Algae

Rick Twait, City of Bloomington

Email: rtwait@cityblm.org

When algae find their way into the news, or as the subject of talks at lake management or waterworks conferences, these small plants are usually cast in a bad light. While algae can, and often do, cause problems in our lakes and water supplies they serve as the base of the food chain for all the other aquatic life to thrive. This talk will describe the different algal groups, where and when you might find them, how they can be measured and how they fit in with the other living things in the lake system. We will cover factors that promote or limit growth, and provide some references for you to use to assess algae in your lake.

Spatial Patterns of Algae Blooms in Lake Bloomington

Gare Ambrose-Igho, Illinois State University

Email: gambro1@ilstu.edu

Fresh water is one of our most vital resources and when our water is polluted, it is not only devastating to the environment but also to human health. Algal blooms are an accumulation in the concentration of algal species in a water body, and this is recognized by discoloration in the water. Algal blooms can cause harmful effects to freshwater ecosystems, such as pollution of beaches, taste and odor problems in drinking water, and depletion of oxygen levels causing fish kills. They can have negative effects on the health of humans as well as other animals who use them for drinking or recreation. Lake Bloomington and Evergreen Lake at Comlara Park are the two reservoirs from which Bloomington city draws its water. The Bloomington water-supply system currently supplies about 62,000 people in the city of Bloomington, Hudson and Towanda Townships and half of the population of Dale and Dry Grove townships. We are studying algal blooms and their spatial patterns, as well as their effect on water quality, in these lakes. This study explores the use of satellite remote sensing technology to assess algae abundance in these lakes and compare data from both lakes. We are also collecting samples, from different points in the lakes, to test for various water properties. Results have shown that blooms occur at different times of the year in each lake e.g. August for Evergreen Lake, October for Lake Bloomington. Using Landsat 8 images, we expect to see spatial patterns in water quality.

Lakes After Hours: Continuous Monitoring of Lakes Bloomington and Evergreen Using a Buoy

Jill Mayes, City of Bloomington

Email: jmayes@cityblm.org

Have you ever wondered what your lake is doing after you get out of the boat and aren't looking? Or wonder what's happening when the lights go out? Ever wonder if an algal bloom might be imminent? Continuous monitoring can add a level of understanding for your lake that help "connect the dots" of your lake monitoring trips. This talk will describe the first year results after deploying monitoring buoys equipped with water quality sondes in Lakes Bloomington and Evergreen. We will show the progression of algal blooms and crashes, and how data from routine monitoring trips and lab results help to make a more complete picture of the lake. We will discuss plans to improve our monitoring program. We will also discuss how the data from continuous monitoring in a regional lake might help lake managers decide when to increase manual monitoring in their own lakes.

Nutrients **Sierra Ballroom 9:30-11:00, March 22nd**

Diurnal and Seasonal Variation in Nitrate-Nitrogen Concentrations of Groundwater in a Saturated Buffer Zone

Eric Peterson, Illinois State University

Email: ewpeter@ilstu.edu

Surface water pollution by nitrate (NO₃⁻) is a critical problem in agricultural land-use areas causing eutrophication and hypoxia in near-shore marine waters. Diversion of agricultural runoff into saturated buffer zones (SBZ) reduces NO₃⁻ loading. To understand diurnal and season [NO₃⁻] variability in a SBZ, weekly groundwater collections were completed. For each collection, samples were collected hourly for 24-hours from an unconfined aquifer 1.5 m below the surface in a SBZ. Each sample was analyzed for nitrate as nitrogen (NO₃⁻-N). Mean daily [NO₃⁻-N] ranged from 2.18 mg/L in the fall to 4.63 mg/L in the summer and varied by a statistically significant difference for spring-fall (t(15.90)=2.70, p=0.02) and summer-fall (t(10.91)=4.83, p=0.00) combinations. The differences between 24-hour maximum and minimum [NO₃⁻-N] were statistically significant within spring (t(12)=2.76, p=0.01), summer (t(8)=6.83, p=0.00), fall (t(4)=4.34, p=0.01), and winter (t(5)=3.33, p=0.01). Vegetation uptake was identified as a process controlling 24-hour [NO₃⁻-N] variability by the presence of a sinusoidal trend and daily timing of maximum and minimum [NO₃⁻-N] that coincide with photoperiod. NO₃⁻ leaching, ET, and nitrification were identified as processes controlling [NO₃⁻-N] increases by NO₃⁻-N:Cl⁻ rates of increase over 24-hours and change in water column height. There were no statistically significant differences between the magnitude of mean difference between daily maximum and minimum [NO₃⁻-N] among seasons, indicating the amount of NO₃⁻ available does not influence the magnitude of change over 24-hours. The results show [NO₃⁻] variation exists on both the seasonal and diurnal scale.

Developing Numeric Nutrient Criteria for the State of Illinois - Nutrient Science Advisory Committee (NSAC) Activities

Paul Terrio, U.S. Geologic Service

Email: pjterrio@usgs.gov

The Nutrient Science Advisory Committee (NSAC) was formed in 2015 as one of the working groups for the Illinois Nutrient Loss Reduction Strategy. The NSAC is charged with recommending numeric water-quality criteria for nitrogen and phosphorus in Illinois water bodies based upon the best available data and science. Currently, the only nutrient standards for general-use water bodies in Illinois are for total ammonia and for phosphorus in any reservoir or lake with a surface area of 8.1 hectares (20 acres) or more, or in any stream at the point where it enters any such reservoir or lake and for total ammonia. The NSAC has reviewed and assessed pertinent available data and has evaluated many new data analyses based upon a biological stressor-response conceptual model. The committee is also reviewing nutrient criteria and scientific literature from other states as well as considering combined criteria that include both causative and response parameters. This presentation will review the membership of the NSAC, the approach and activities of the committee and the current status of candidate numeric nutrient criteria for the State of Illinois.

Tower Lakes Bioswale/Raingarden Project

Andy Hay, Tower Lakes

Email: haya@sysmex.com

Tower Lakes is a small, mature community in Lake County, centered around a ~70 acre man-made lake. It is a relatively shallow lake, and can be prone to algae blooms and abundant weed growth. The active lake committee works hard to maintain the health of the lake, and was very interested in any options to improve the quality of water running directly into the lake. The village itself also has old and inadequate stormwater drainage which is often overwhelmed. In 2015, a joint venture between the homeowners association “Tower Lakes Improvement Association” together with the municipality “Village of Tower Lakes” decided to take advantage of grant opportunities to address both the management of stormwater in the community and to improve the quality of run off. A grant application was submitted to IL EPA to access federally funded 319h grant monies, in combination with a request to Lake County Stormwater Management, which together were sufficient to embark on a three-phase project to build two large Bioswale/Raingarden project, tied to stormwater drains in two strategically chosen parks, and restore turf area back to its native wetland. In total this is a 4 year, \$250k project, representing best management practices for reducing non-point source pollution, and detaining stormwater, increasing infiltration, and relieving pressure from the aging stormwater infrastructure. To-date we have complete one >7,500 sqft bioswale/raingarden project, which was thoroughly tested to the limits of its engineering by the heavy rains in June/July. We plan to complete the project in 2018/19.



Conference Abstracts

Algae Part 2Redwood Ballroom 1:30-3:00, March 22nd

Utilizing Microalgae for Nutrient Recovery from Wastewater

Kumar Kuldip, Metropolitan Water Reclamation District

Email: kumark@mwrdd.org

Municipal wastewater reclamation plants are facing challenge on nutrients, especially nitrogen (N) and phosphorus (P) in effluent to meet more stringent National Pollution Discharge Elimination System (NPDES) Permits issued by United States Environment Protection Agency (USEPA). The aim of this work is to evaluate a pilot-scale Revolving Algal Biofilm (RAB) reactors of two heights (0.9-m and 1.8-m tall) to treat a wastewater side stream (supernatant from sludge sedimentation) at Metropolitan Water Reclamation District of Greater Chicago (MWRD) for removing nutrients (N and P). Continuous operation for 180-days demonstrated a superior performance of RAB system in N and P removal as compared to control raceway pond reactors. Among 180-days continuous operation, RAB reactors demonstrated a superior N and P removal performance. At 7-day HRT, total P (TP) and Total Kjeldahl N (TKN) removal efficiency reached to 80% and 87%, respectively, while ortho-P and ammonia removal efficiency reached to 100%. Decreasing HRT led to an increasing TP and TKN removal rate, with 3.7 mg TP/L/day and 16 mg TKN/L/day being removed at 1.3-day HRT. The N and P removal capacity (based on footprint area) of the RAB reactors was also evaluated. At HRT of 1.3-day, the TP removal per footprint of 1.8-m tall RAB reactors was around 7-times higher than the open pond system. The N and P content in the algal biomass from the RAB reactors were in the range of 55-72 mg/g, and 13-21 mg/g, respectively. Taller 1.8 m RAB reactors performed better than 0.9 m tall RAB reactors in terms of total nutrient removal and algal biomass productivity. The study demonstrated that RAB-based treatment process may be an effective method to recover nutrients from municipal wastewater.

BloomWatch, the App, and other Assorted Updates in the VLMP Program

Greg Ratliff, Illinois Environmental Protection Agency

Email: greg.ratliff@illinois.gov

Teri Holland, Illinois Environmental Protection Agency

Email: teri.holland@illinois.gov

The bloomWatch app was first launched in the Northeastern United States in 2016 as part of a multi-tiered approach to citizen-science-based cyanobacteria monitoring. Field data and images of cyanobacteria blooms are sent via the app to a central database for documentation. The app has now been made available for nationwide use. For 2018, Illinois EPA plans to use the bloomWatch app as one way for Illinois citizens to report blooms to the Agency. Illinois EPA will be notified by email when data are submitted to the central database from Illinois. This presentation will provide information about the bloomWatch app, along with a summary of 2017 VLMP monitoring activity and updates to the Program for 2018.

Campus Lake as a Living Laboratory to Address the Worldwide Problem of Cyanobacterial Harmful Algal Blooms (CyanoHABs)

Marjorie Brooks, Southern Illinois University

Email: mlbrooks@siu.edu

Southern Illinois University is using Campus Lake as a living laboratory to address the worldwide problem of cyanobacterial harmful algal blooms (CyanoHABs). After draining and dredging in 2016, Campus Lake shifted from hyper-eutrophic conditions and consistent closure from CyanoHABs to moderate nutrients and healthy conditions. Instead of the business-as-usual practice that water quality declines when people use water resources, we established "Sustainable Eco-Recreation" in fall 2017. To maintain lake health, student teams are designing new forms of recreation using only renewable energy to aerate, cool, and otherwise discourage CyanoHABs. The 2016 dredging radically changed nutrient levels, cyanotoxin levels (i.e. microcystin), and lake ecology overall. From Sustainable Eco-Recreation program, we link predictions for suppression of CyanoHABs to improved human health and current innovations in environmental technology. With the added benefit of professional training of students tackling a global concern, Southern Illinois University is demonstrating that when ecosystems thrive, people thrive.

Watershed Management.....Sierra Ballroom 1:30-3:00, March 22nd

The Practical Application of Fishing Regulations

Mike Mounce, Illinois Department of Natural Resources

Email: mike.mounce@Illinois.gov

Numerous studies indicate that fishing quality and fish harvest are the primary concerns of fishermen. In order to address these needs Illinois Department of Natural Resource Fisheries Biologists utilize a wide variety of management tools to improve fishing quality, including: lake design, habitat and water quality improvements, initial stocking assemblages, structuring harvest through regulations, and supplemental stocking if needed. After initial construction and stocking of a water body, the application of fishing regulations is the most widely used management tool of fisheries biologists. There are a variety of regulations which can be used to structure sportfish harvest. The two general categories are creel (number) and size (length) limits. Fisheries management research has determined that each type of regulation has specific applications and will only be successful if certain criteria are met. Regulations applied to a specific species may be intended to improve the fishing quality for that individual species, or may be intended to improve the fishing quality or change population dynamics of other species of fish. When properly applied, with consideration for ecological variables, regulations can help maximize each individual body of water’s unique sport fishing potential for quality and harvest. In Illinois the most commonly utilized length limits are minimum and slot-length limits. Maximum length limits are less commonly utilized in Illinois and are being applied with great success. In addition, creel or number limits can be applied on a biological or sociological basis. The application of size and creel limits will be discussed with advantages and disadvantages of each to assist in the development of quality fishing opportunities.

Transport and Fate of Chloride from Road Salt within a Mixed Urban and Agricultural Watershed: Assessing the Influence of Chloride

Eric Peterson, Illinois State University

Email: ewpeter@ilstu.edu

In a typical winter season, approximately 471,000 tons of road salt are deposited along Illinois roadways. An estimated 45% of the deposited road salt will infiltrate through the soils and into shallow aquifers. Transported through shallow aquifers, chloride associated with the road salts has the potential to reside within groundwater for years based on the pathway, the geologic material, and the recharge rate of the aquifer system. Utilizing MODFLOW and MT3D, simulations employing various road salt application rates were conducted to assess the net accumulation of chloride and the residence times of chloride in an agricultural dominated watershed that originates in an urban area. A positive-linear relationship was observed between the application rate of chloride and both the maximum chloride concentration and total mass accumulated within the watershed. Simulated recharge rates along impacted surfaces ranged from 1,000 mg/L to 10,000 mg/L. After 60 years of application, simulated chloride concentrations ranged from 197 mg/L to 1,900 mg/L. For all application rates, chloride concentrations within the groundwater rose at an annual rate greater than 3 mg/L. While concentrations increase throughout the system, the majority of chloride accumulation occurs near the roads and the urban areas. Model simulations reveal a positive relationship between application rate and residence time of chloride. The residence time chloride varied from 1,123 to 1,288 days based on application rate. The models indicate the continued accumulation of chloride in shallow aquifers can be expected, and methods that apply less chloride but effectively, need to be examined.

Unique Approaches to Traditional Natural Areas Management

Debbie Budyak, ILM

Email: dbudyak@ilmenvironments.com

Sometimes traditional natural areas management techniques, such as herbicide control for undesirable vegetation, aren’t the best option. Are there effective alternatives that might also provide added benefits? This session will explore unique approaches for two popular restoration services, cattail control and shoreline stabilization. We’ll outline the goals (including water quality and habitat improvement), discuss the specific management approaches, review early conclusions and offer pros and cons of stepping outside of the box to achieve your desired results.



Conference Abstracts

Invasive Species.....Redwood Ballroom 8:30-10:00, March 23rd

Monitoring and Response Actions Following the Discovery of Starry Stonewort (*Nitellopsis obtusa*) in Wisconsin

Michelle E. Nault, Wisconsin Department of Natural Resources

Email: michelle.nault@wisconsin.gov

Starry stonewort (*Nitellopsis obtusa*; SSW) is a non-native plant-like macroalgae that was first reported in the U.S. in 1970s, and has since been documented in portions of the eastern Great Lakes, as well as more recently in several inland lakes in Michigan, Indiana, and Minnesota. In September 2014, Wisconsin DNR staff conducting a routine aquatic plant survey on Little Muskego Lake, Waukesha Co. discovered a small established population of SSW, marking the first time this aquatic invasive species had been reported in Wisconsin. SSW is currently verified in seven inland lakes in southeast Wisconsin, and recently has been confirmed in portions of Green Bay and northern Lake Michigan. This presentation will highlight what is known about the ecology and habitat of this species, the response actions taken in lieu of these unfortunate findings, and the steps which have occurred to prevent further spread of this non-native species.

Illinois Needs Heroes: Aquatic Invasive Species Prevention Programs

Greg Hitzroth, Illinois-Indiana Sea Grant

Email: hitzroth@illinois.edu

Aquatic invasive species (AIS) can harm ecosystems, economies and threaten the health of humans and livestock. Once a species is established, impacts grow over time and space, and are usually irreversible. AIS can cost millions of dollars to control and are often impossible to eradicate. Prevention of introductions of new AIS is more cost effective than control or management of already established populations and may be the best way to reduce their impacts. Illinois-Indiana Sea Grant and Illinois Natural History Survey have aimed to interdict the introduction and spread of AIS through outreach to boaters and anglers as well as aquarium hobbyists and water gardeners. Current and future work includes aquatic pet take back networks, designated AIS removal zones at boat ramps, and an invasive crayfish collaborative spanning the Great Lakes Basin. This presentation will focus on the Be A Hero outreach campaigns and ways in which lake management associations can become involved in AIS prevention. It will also cover some AIS that have been introduced through the aquarium and water garden trades.

Understanding the Ecology and Management of Eurasian and Hybrid Watermilfoils in Inland Temperate Lakes

Michelle E. Nault, Wisconsin Department of Natural Resources

Email: michelle.nault@wisconsin.gov

In the early 1990s, Eurasian watermilfoil (*Myriophyllum spicatum*) was described in a report to the Wisconsin legislature as: "A super weed capable of stopping a speeding boat [which] has a chokehold on Wisconsin lakes". In order to better understand the impacts of non-native watermilfoils on inland lakes, Wisconsin DNR staff compiled and analyzed a decade's worth of quantitative data collected on hundreds of waterbodies across the state. Specifically this presentation will discuss the current statewide distribution, abundance, and genetics of non-native milfoil in WI, the results of a long-term watermilfoil monitoring project, as well as a discussion on the efficacy and selectivity of currently utilized management techniques. The results may surprise you, and challenge some commonly-held beliefs about this invasive aquatic plant species.

Dredging **Sierra Ballroom 8:30-10:00, March 23rd**

Does My Lake Need Dredging?

Peter Berrini, Berrini & Associates

Email: pberrini@comcast.net

If you have been thinking that your lake may need to be dredged, and you wonder what you should do, then you have come to the right place! Lake dredging is often one of the most significant and costly management efforts that a Lake Association, Park District or Municipality will be required to undertake. Therefore, it is important to gather the right information to determine if a dredging project is needed; and if so, what to do next. The reasons for initiating a planning effort for dredging may include observations of excessively shallow water depths, navigational hazards, increased turbidity and algae blooms, vegetation growth in shallow bars and emerging deltas near tributary inflow points, or excessive populations of common carp. A successfully completed lake dredging project can provide long lasting benefits such as increased water depths and storage capacity, enhanced aquatic habitat, a more balanced fish population, and reduced internal nutrient recycling for improved water quality and clarity. This presentation will summarize the various planning requirements, implementation options, anticipated project costs and benefits, and an overview of the current regulatory permit process. Representative photographs and images will be included in order to highlight various aspects of a lake dredging project. A brief question and answer period will follow..

Lake Decatur Dredging: Can We Dig It? Yes We Can!

Keith Alexander, City of Decatur

Email: kalexander@decaturil.gov

Lake Decatur, a 2,850 surface acre reservoir constructed in 1920-1923, is the primary source of potable and process water for the City of Decatur, the Village of Mt. Zion and the Archer Daniels Midland Company. In 2014 the City began an ambitious dredging project to remove 10.7 million cubic yards of sediment from Lake Decatur. The primary purpose is to reclaim lost water storage needed during drought conditions. Secondary benefits include reclaiming large areas of the lake that have literally filled up with sediment, improved water quality, boating, fishing and swimming opportunities and enhancing adjacent property values. The City entered into a 6 year contract with Great Lakes Dredge & Dock Company of Oak Brook, Illinois to perform the dredging and rebuild an existing 450 acre sedimentation basin. A cutter head suction dredge hydraulically removes and pumps Lake Decatur accumulated sediment to the City’s sedimentation basin. Gravity causes the sediment to settle to the bottom of the basin. Clean lake water is then returned from the sedimentation basin to Lake Decatur via an intermittent stream. Sediment traps were dredged in the three main lake tributaries to capture incoming sediment before it reaches the main body of the lake. Areas of the lake that have been dredged are 3.5 to 6 feet deeper than before. Lake Decatur’s storage capacity will be increased by up to 30% or 52 days of additional water supply. This is equivalent to the volume of 60 Willis Tower skyscrapers located in downtown Chicago!

Beneficial Use of Dredged Material: Can Soil Sales Save Illinois Lakes?

Charles Theiling, U.S. Army Corps of Engineers

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Sediment transport is a fundamental issue in watershed management because of the significant downstream impacts from watershed development. Sediment sinks like water supply reservoirs, floodplains, backwater lakes, stream and river channels throughout Illinois are highly impacted by sedimentation. The Upper Midwest, and Illinois Valley in particular, are glacial landscapes with high sediment transport potential. Dredged material from watershed sinks has traditionally been stockpiled as a waste product that must be managed at great expense. Sustainability concerns and costs for material management in Minnesota developed new uses for “waste” products that integrate municipal/commercial tree waste management, Corps of Engineers dredging, and large highway construction projects. River sand, compost, and native soil are custom blended to create highway shoulder topsoil that manages runoff and contaminants. The technical approach is well established for transfer to other regions, but custom soil market development is required for new sites. There is great potential to create a “better product at a better price” using readily available material inputs like dredged sand, municipal compost, and fine sediment. The Corps of Engineers is working on several projects for beneficial use of Illinois Waterway dredged material and is planning implementation of a demonstration project that could reduce the cost for municipal yard waste management and consume existing sand and compost stockpiles. The objective will be to demonstrate a dredged material management model that can be scaled and replicated in many water projects to reduce operational cost across several economic and environmental sectors.



Conference Abstracts

Developing and Sustaining HOA Committees**Redwood Ballroom 10:30-12:00, March 23rd**

Panel Notes:

Fish Habitat **Sierra Ballroom 10:30-12:00, March 23rd**

Types of Natural and Artificial Fish Habitat for Lakes and Streams

Leonard Dane, Deuchler

Email: ldane@deuchler.com

Trent Thomas, Illinois Department of Natural Resources

Email: trent.thomas@illinois.gov

This presentation will highlight the types of natural and artificial fish habitats that can be implemented in lakes and streams to enhance fish habitat. There are many types of fish habitat that can be used to enhance fish habitat around your lake. In this presentation Leonard will discuss the types most commonly used. Habitat enhancement work in the flowing waters of rivers and streams can be a tricky undertaking, mainly because anything you do instream on your property has the potential to impact adjacent and downstream landowners. Therefore, there is typically a significant amount of planning, engineering, permitting, and stakeholder engagement involved with any habitat work in flowing waters. However, such habitat projects have the potential for tremendous benefits for aquatic life that transcends the boundaries of the project by great distances. In this talk, Trent will present case studies of recent stream habitat projects implemented in Central Illinois and discuss observed changes in the fish populations that have occurred following completion of the various projects. An array of potential habitat enhancement options and their applications will be presented for discussion.

The Need for Fish Habitat Enhancement

Mike Garthaus, Illinois Department of Natural Resources

Email: mike.garthaus@illinois.gov

Quality fish habitat is often lacking in lakes, especially reservoirs, because of removal during construction, decomposition over time, lack of suitable material available during construction, sedimentation, and lack of recruitment potential from the riparian zone. Installing supplementary habitat is a common habitat management activity amongst fisheries management personnel. Many habitat projects are undertaken to create new fishing sites, improve angling efficiency, provide more food for fish, improve reproductive success, improve juvenile survival, provide protection from predators, and improve fish production. Many habitat projects have been implemented without clear objectives or realistic expectations about the benefits of the project. Justification of any habitat program is the foundation for all habitat projects. This presentation will cover various needs for fish habitat enhancement and provide information to make better habitat management decisions.

What Makes Aquatic Habitat Projects Successful?

Mike Mounce, Illinois Department of Natural Resources

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Many anglers and fisheries biologists attempt to improve fishing with fish attractors. The success of fish attractors is based on design and placement, and results are widely varied. Complexity and durability are key components of successful fish attractors. Placement can be variable, depending on the lake use and species targeted. Fish attractors are rarely constructed and deployed in high enough numbers to constitute significant changes in habitat. Desirable species of aquatic vegetation can provide significant aquatic habitat, curb shoreline erosion, and improve water quality, resulting in enhanced aesthetics and improved angling quality. Illinois has many species of aquatic plants and some are very well suited to providing habitat in small impoundments as well as large. The identification, habits and benefits of several desirable species of aquatic plants will be presented, focusing on methods to enhance establishment.



Conference Abstracts

Climate Impacts **Redwood Ballroom 1:30-3:00, March 23rd**

Climate Impacts on Surface Inflow into Evergreen Lake and Lake Bloomington Watersheds

Joseph Honings, Illinois State University

Email: jhonings@ilstu.edu

Understanding the response of water cycle dynamics to climate change and human activity is essential for best management of water resources. This study used the USDA Soil-Water Assessment Tool (SWAT) to measure and predict major water balance variables including stream discharge, potential aquifer recharge, and surface storage in a small-scale watershed in the Bloomington-Normal area. The watershed is predominantly tile-drained agricultural land, which controls the nutrient dynamics and hydrology. Two reservoirs, Evergreen Lake and Lake Bloomington, and the Mahomet Aquifer in the watershed are used for public water supply. To assess how the watershed is affected by future climate change, this study used high-resolution climate projection data (~12 km) in a calibrated and validated SWAT hydrologic model. Using General Circulation Models, four (4) representative concentration pathways (RCPs) developed by the IPCC Coupled Model Intercomparison Project Fifth Assessment Report (CMIP5) were used for prediction of precipitation and temperature for the watershed. Precipitation and temperature are predicted to increase by mid-century for all scenarios. Percentage of precipitation lost as ET decreases for all RCPs, with the exception of RCP 8.5, by 2050. Total aquifer recharge remains consistent temporally. An increase in surface runoff and tile flow is predicted for each RCP by 2050. Total water yield of the watershed increases with each scenario by mid-century. Results indicate continued nutrient loading of the surficial reservoirs that are used for public water supply and recreation. Nutrient management measures will need to remain in place and be enhanced.

What Does Climate Change Look Like?

Bryan Cross, Prairie Engineers

Email: bcross@prairieengineers.com

There has been an on-going conversation about global warming for decades. Generally, the public debate has been held as a conversation regarding a problem to worry about in the future. So what happens when the future is here? The rebranding of global warming as climate change has often been perceived as a political move; however, change better describes the situation than warming. This presentation will focus on discussing some of the foundational drivers of weather in an attempt to connect the dots between our experiences of weather and our experience of climate..

Temporal Effects of Heat Waves on Sex Ratios and Gene Expression in a Freshwater Turtle *Sandy Kubillus,*

Anthony Breitenbach, Illinois State University

Email: atbreit@ilstu.edu

As climate change progresses, average global temperatures are predicted to continue to increase as a result of longer, more frequent heat waves. This thermal variability arising from climate change has the potential to threaten thermally sensitive ectotherms, such as reptiles with temperature-dependent sex determination (TSD). In many turtle species with TSD, cooler temperatures produce males and warmer temperatures produce females by inducing the expression of testis and ovary associated genes, respectively. *Dmrt1* is one such gene associated with testis development while aromatase is associated with ovary development. I hypothesized that the timing of when embryos experience a heat wave during development will affect their propensity to develop as males or females by affecting the expression of *Dmrt1* and aromatase. Using ecologically relevant fluctuating temperature treatments, I varied the timing to which red-eared slider (*Trachemys scripta*) embryos were exposed to 15-day heat waves during incubation and analyzed resulting sex ratios. I also collected embryonic tissues during heat waves of 15 and 20 days to analyze *Dmrt1* and aromatase expression. I found that heat waves that at least partially occurred during days 20-40 of development produced mostly females, with a heat wave applied during days 24-38 resulting in 89% females. A heat wave applied during days 38-52 of development only produced 6% females, despite it occurring during the predicted window over which sex determination should still be sensitive to temperature. I also found that aromatase was up-regulated in response to a heat wave of 20 days while *Dmrt1* was up-regulated in the absence of a simulated heat wave. Overall, these results provide insights on the timing and length of the period over which sex determination is sensitive to temperature, and suggest that the window of sensitivity is likely to vary depending upon the thermal conditions experienced during development. These results also clarify the timing of up-regulation of certain sex determining genes and further our understanding of how sex ratios in species with TSD might respond to climate change.



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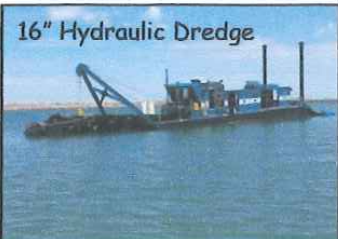


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