

Poster Descriptions & Presenter Information

Friday, April 25, 2014 3:30 – 5:00pm
Holiday Inn Convention Center Commons

TOPIC: Aquatic Invasive Species

A Citizen-Driven Volunteer-Based Biological Control Program for Purple Loosestrife in Waupaca County

Jim Hlaban, Friends of the Little Wolf Headwaters /
Fox Valley Trout Unlimited
(920) 244-7456 / wiscpr@wolfnet.net

Kaycie Stushek, Golden Sands RC&D
(715) 343-6278 / kaycie.stushek@goldensandsrcd.org

Purple loosestrife threatens many wetlands, streams and lakes in Wisconsin. There are multiple approaches to diminishing this threat, with efforts ranging from state-wide initiatives to individual volunteers. An example of a more localized approach is a Waupaca County initiative begun by Jim Hlaban. He partnered with the Department of Natural Resources, and organized a volunteer-based program to raise a biological control agent for purple loosestrife. In 2011, Kaycie Stushek with Golden Sands RC&D collaborated with Jim to expand the volunteer base even further, by collaborating with Waupaca County Land and Water Conservation Department.

Aquatic Invasive Species (AIS) Monitoring

Kaci Baillies, UW-Oshkosh
(608) 617-3316 / baillk04@uwosh.edu

Pat Miller, UW-Oshkosh
(920) 344-1248 / millep26@uwosh.edu

Lake Winnebago waters are a significant location for transfer of aquatic invasive species to inland water bodies. Presently there are no citizen-based AIS monitoring programs on the Winnebago system shorelines as well as no consistent, statewide standard for this type of monitoring. The Clean Boats Clean Waters interns and citizen volunteers sometimes have idle time at boat launches based on weather conditions, time of day, and location. As a secondary job duty, inspectors who have extra time and are already working on a boat launch can follow a simple shoreline monitoring procedure for early detection and rapid response for new invasive species. We modified the shoreline monitoring protocol written by Paul Skawinski, and 15 UW-Oshkosh interns tried out the new protocol during two sampling events, once in July and August. Based on our trials and feedback from local DNR we have created a protocol fit for statewide use of monitoring.

Aquatic Plants in the Trade: Reducing the Retail Availability of Invasives in Wisconsin

Kelly Wagner, Wisconsin Department of Natural Resources (WDNR)
(608) 441-3280 / Kelly.wagner@wi.gov

Most new invasive aquatic plant species discovered in Wisconsin water bodies are species that are readily available through the live plant trade. To address this introduction vector, the Wisconsin Department of Natural Resources surveyed Wisconsin horticulture and aquarium vendors to quantify the availability of invasive plants regulated under Wisconsin's Invasive Species Rule (NR 40). We then conducted an educational outreach program on Wisconsin's invasive species regulations with retailers during summer of 2012. Follow-up surveys were conducted in 2013 to assess pre-post changes in invasive species availability and the effectiveness of the personal educational visits in gaining compliance with invasive species regulations. We also evaluated whether retail availability affects presence on the landscape by surveying close to 150 ponds in southeastern Wisconsin for the presence of invasive aquatic plants of trade. This poster summarizes results of both the vendor and pond surveys.

Capturing a Decade of Aquatic Plant Research in Wisconsin

Michelle Nault, Bureau of Science Services, WDN
(608) 221-6359 / michelle.nault@wisconsin.gov

Martha Barton, Bureau of Science Services, WDNR
(608) 221-6350 / martha.barton@wisconsin.gov

Research scientists from the Wisconsin DNR Bureau of Science Services have been actively conducting science-based studies over the past decade, and the state has been recognized as being a leader in developing a better understanding of emerging aquatic plant research questions. We organized the current and ongoing research projects being conducted, and developed four major themes within our research that have helped us answer pertinent questions about aquatic plants communities. These major themes are: develop and test a standard observation system, macrophytes, invasive species, and education and outreach. Many of the themes are interconnected over time and by the needs of lake managers and various public and private stakeholders. By organizing this body of work in this manner, our next focus is to make our research deliverables readily available to all our partners and collaborators through the WDNR website and other readily accessible media outlets.

Curly-leaf Pondweed Turion Response to a Reservoir Draw Down

Jim Kreitlow, WDNR
(715) 365-8947 / james.kreitlow@wisconsin.gov

Timothy Plude, WDNR
(715) 365-8905 / timothy.plude@wisconsin.gov

A proposed draw down on Musser Flowage, Price County in 2013 was a good opportunity to assess any implications of Curly-Leaf Pondweed (CLP) turion responses. The WDNR, with the help of the Musser Lake Association and Onterra, LLC will complete the project in 2014. The initial work on Musser in 2013 included mapping beds of CLP, surveying the entire aquatic macrophyte community and conducting a survey of turion distribution and density. Presented here is the initial survey information and we will have to wait until the Lakes Convention 2015 to present the final results of CLP turion response to the draw down.

Dissipation of 2, 4-D BEE Herbicide in Bughs Lake, Waushara County, Wisconsin Following Treatment of Hybrid Watermilfoil

Chad Cason, Cason & Associates, LLC
(920) 361-4088 / info@casonassociates.com

In order to provide more information on this subject, a detailed study of herbicide dissipation was conducted on Bughs Lake, Waushara County, Wisconsin, following a treatment of hybrid watermilfoil (*Myriophyllum spicatum* x *sibiricum*) with granular 2, 4-D BEE herbicide. Bughs Lake is a nearly round, 23 acre seepage lake having a maximum depth of 18 feet. The lake's characteristics serve to eliminate many of the confounding variables, such as current and wind-driven effects, that have compromised earlier dissipation studies. The results from the study suggest that the granular formulation of 2, 4-D BEE was absorbed by the target plants, resulting in nearly complete control, and that relatively low concentrations of herbicide were available in the water column at any given time.

Distinguishing *Myosotis*: Native *Myosotis laxa* from non-native *Myosotis* species and Managing the Invasives

Reesa Evans, Adams County Land & Water Conservation Dept.
(608) 339-4275 / revans@co.adams.wi.us

Both *Myosotis scorpioides* (found in nearly 60 Wisconsin counties) and *Myosotis sylvaticum* (found in 12 Wisconsin counties), invasive non-natives, are becoming more common in Wisconsin and are proposed to be added as restricted throughout the state under NR 40. There is a native species, *Myosotis laxa*, found in only 12 Wisconsin counties in the state and has a "special concern" status. Distinguishing the invasives from the native species is very difficult; this poster will include some "tips" for making that call. In addition, it will explore barriers to options for managing the invasive *Myosotis*.

Early season 2, 4-D herbicide and harvesting treatment effects on Eurasian watermilfoil in Turville Bay Lake Monona, Dane County

Martha Barton, Bureau of Science Services, WDNR
(608) 221-6350 / Martha.barton@wisconsin.gov

Michelle Nault, Bureau of Science Services, WDNR
(608) 221-6359 / michelle.nault@wisconsin.gov

The Turville Bay Research project was designed at the request of the Dane County Aquatic Plant Management Committee to evaluate the efficacy of early season herbicide treatments and early season mechanical harvesting on aquatic plant control. We sought to scientifically evaluate treatment impacts while increasing selectivity of non-native target species and minimizing negative effects on native species. The herbicide 2,4-D (2,4-Dichlorophenoxyacetic acid) is believed to be semi-selective, targeting dicots like Eurasian watermilfoil (EWM), coontail and water marigold, and mechanical harvesting is considered non-selective. Analysis of results show that both management methods can be effective in reducing EWM over the short-term with minimal impacts to native species, but also indicate that managing invasive species is a long term commitment which requires adaptive management and quality data collection.

Economic costs of Eurasian watermilfoil invasion in Wisconsin's Northern Highland Lake District

Ben Beardmore, Center for Limnology, UW-Madison
(608) 890-1443 / abeardmore@wisc.edu

Eurasian watermilfoil (*Myriophyllum spicatum*) is an invasive aquatic plant that has become a major nuisance in the lake country of the northern U.S. and Canada. While the impact of milfoil varies from lake to lake, it has been associated with rapid growth leading to dense mats of floating vegetation that have been blamed for "clogging" infected lakes, interfering with a lake's ecology and with recreation activities. As a follow up to studies in 2006 and 2008 focusing on shoreline property owners, we estimated owners in 2012-13, and for boaters in 2011-12, using a contingent valuation approach. As in the earlier studies, welfare loss for property owners was substantial. In contrast, welfare loss associated with invasion of their favorite lake was considerably lower for boaters, reflecting their mobility and the abundance of uninvaded lakes in the region.

Economics of Eurasian Watermilfoil (EWM) Invasion in Lakes of Northern Wisconsin

Katherine Zipp, UW-Madison
(330) 835-7179 / kzipp@wisc.edu

Ben Beardmore, Center for Limnology, UW-Madison
(608) 890-1443 / abeardmore@wisc.edu

Aquatic invasive species are among the top natural resource concerns for the public in lake-rich places, requiring substantial and ongoing commitments to address. The first part of this presentation highlights some recent studies that assess economic welfare losses for shoreline property owners and boaters from EWM invasions in northern Wisconsin. We will also look at social factors related to recreational and other values that drive patterns of human use. Understanding and predicting how boaters move among lakes adds another layer of insights into assessments of lake vulnerability to invasion.

Effects of Invasive Cattail spp. (Typha) in Lake Winnebago System Wetlands

Andrew Sabai, UW-Oshkosh

(920) 203-1270 / sabaia29@yahoo.com

Robert Pillsbury, UW-Oshkosh

(920) 424-3069 / pillsbur@uwosh.edu

Invasive Cattail species (Typha spp.) are a major problem for native sedge meadow wetlands and threaten shallow water wetlands associated with lakes. After cattails invade, they suppress and replace native vegetation and reduce the quality of fish and wildlife habitat. Prior to 1850, tens of thousands of acres of sedge meadow wetlands surrounded the Lake Winnebago System. More than half of these have been lost due to reservoir construction, drainage for agriculture, and invasive species. To evaluate the current status of the wetlands, we mapped the extent of the cattail invasion and native sedge meadow marshes, surveyed the different plant communities, and have begun to use the data to measure how the communities have changed over time. We found that 66% of the remaining marsh was dominated by invasive cattails, 8 % other invasive species, and only 26% remains as sedge meadow.

Front Page News: AIS Alphabet

Robert Wakeman, WDNR

(262) 574-2149 / robert.wakeman@wisconsin.gov

Aquatic invasive species (AIS) continues to be front page news in Wisconsin, the Midwest and nationally. Take a look at Wisconsin's AIS Partnership and learn how Wisconsin continues to lead in the fight against AIS. The AIS alphabet includes A for the dreaded Asian carp and Z for Zebra mussels and everything in between. The P for partnership is front and center in the state's efforts to prevent, contain and control AIS. Never has the importance of individual behavior played such a stake in the protection of the state's water quality.

Herbicides and Aquatic Invasive Plants in the Northwoods

Timothy Plude, WDNR

(715) 365-8905 / timothy.plude@wi.gov

Carol Warden, Center for Limnology, UW-Madison

(715) 356-9494 / carol.warden@gmail.com

How much herbicide are we using in our lakes? Is it effective? What are the repercussions? This poster gives an objective perspective, showing how much of what herbicides we are utilizing and it illustrates the amount of treated acres through time. These data cover 6 counties outlined from 2006-2013.

Ice Angler AIS Outreach in Oneida County, WI

Michele Sadauskas, Oneida County Land & Water Conservation Dept.

(715) 365-2750 / msadauskas@co.oneida.wi.us

In 2012, Oneida County Land & Water Conservation Dep. (LWCD) debuted their 'Ice Angler AIS Outreach' project. In 2013, LWCD was awarded a Wisconsin Environmental Education Board (WEEB) grant for the continuation of their Ice Angler AIS Outreach Project. This grant funded an 'AIS Shack' (with heater), two outreach lags, employee wages and mileage. For seven winter weekends an AIS team member traveled to ice fishing tournaments and/or area lakes that experience heavy ice fishing pressure. Along with receiving AIS outreach material, ice anglers were asked to participate in an eleven-question survey to help the Oneida County LWCD understand this demography. This poster details the 2012-2014 project, survey results, and the future of ice angler outreach in Oneida County.

Long-term Trends in Statewide Eurasian Watermilfoil Populations

Paul Frater, Bureau of Science Services, WDNR
(608) 221-5370 / Paul.Frater@wisconsin.gov

Michelle Nault, Bureau of Science Services, WDNR
(608) 221-6359 / michelle.nault@wisconsin.gov

Although Eurasian watermilfoil (*Myriophyllum spicatum*; EWM) was first reported in the U.S. in the 1940s, and discovered in Wisconsin in the 1960s, there is still very little quantitative information available regarding the distribution, ecology, and management of this non-native species on a statewide scale. This poster will examine Wisconsin's ongoing multi-year EWM research project tracking both established and newly discovered EWM populations, as well as unmanaged and actively managed lakes. By better understanding the roles that management, establishment time, and environmental factors contribute to variation in EWM frequency and abundance, we seek to provide future management recommendations and continue to improve our ability to control invasive aquatic plants over the long-term, while minimizing adverse effects to native species and water quality.

Management of Eurasian Watermilfoil Using Diver Assisted Hand Removal

Barb Gajewski, Many Waters, LLC
(715) 617-4688 / barb@manywatersconsulting.com

Diver assisted hand removal is a method used to control the aquatic invasive species Eurasian watermilfoil. Specifically this tool is a form of hand removal utilizing divers, however, instead of a diver coming to the surface to dispose of invasive plants that he or she has hand removed, plants are hand fed into a hose and the entire plant is vacuumed from the diver's hands to the surface. In 2013, this system was piloted on several Northern Wisconsin Lakes. This poster will provide a background on what diver assisted hand removal is, highlight results and share our experiences.

Management of Hybrid Watermilfoil Using a Combination of Granular Triclopyr and Granular 2, 4-D: A Michigan Lake Case Study

Chad Cason, Cason & Associates, LLC
(920) 361-4088 / info@casonassociates.com

Runkle Lake, an 80.2 acre lake in Iron County Michigan, experienced an infestation of hybrid watermilfoil that dominated the littoral zone of the lake. 28.1 acres of hybrid milfoil were mapped in 2009. Treatment of this infestation using granular 2, 4-D at rates that effectively controlled Eurasian watermilfoil in the past failed to control the hybrid. In May 2010, 14.7 acres of hybrid watermilfoil were treated with a combination of granular triclopyr at 136 lbs/acre and granular 2, 4-D at 60 lbs/acre. It was felt that this combination of auxin-mimic herbicides would provide better control of hybrid milfoil. The remaining acreage of hybrid watermilfoil (13.4 acres) was treated in May 2011. The treatments produced 100% control. A survey conducted in September 2011 found no surviving hybrid watermilfoil (13.4 acres) was treated in May 2011. The treatments produced 100% control. A survey conducted in September 2011 found no surviving hybrid watermilfoil or Eurasian watermilfoil. Multiyear control was achieved from the treatment as well. A survey conducted in September 2012 found only 0.4 acres of hybrid watermilfoil, while only 3.5 acres were mapped in 2013.

Mass Rearing of Milfoil Weevils by Volunteers

Amy Thorstenson, Golden Sands RC&D

(715) 346-1264 / amy.thorstenson@goldensandsrcd.org

Biological control studies are underway in Wisconsin to improve the science of biological control of Eurasian watermilfoil (EWM) using the native milfoil weevil, *Euhrychiopsis lecontei*. Lake groups are eagerly awaiting the results of those studies and are interested in applying biological control in their lake. However, there is currently no supplier offering weevils for purchase in Wisconsin. As we move forward in our understanding of biological control, this mass rearing pilot study moves us forward in making milfoil weevils a potential option for lake groups. While the concept is similar to volunteers rearing their own *Galerucella pusilla* beetles for biological control of purple loosestrife, the process for mass rearing milfoil weevils is more complicated. The mass rearing method is labor intensive and must be strictly followed. This poster provides results of our pilot study and evaluates the capability of volunteer groups to successfully produce weevils on a mass scale.

Proposed to Changes to the Invasive Species Rule (NR40)

Jennifer Feyerherm, WDNR

(608) 266-6437 / jennifer.feyerherm@wisconsin.gov

The Wisconsin Department of Natural Resources is revising Wisconsin's Invasive Species Rule (ch. NR 40, Wis. Adm. Code). The proposed revisions include revising and clarifying the rule language, listing additional species as prohibited and restricted, delisting currently regulated species, and updating scientific names of species. The poster will describe the rule revision process, highlight some of the proposed changes, and outline upcoming public involvement opportunities.

Pulling Together to Get to the Root of the Problem

Stephanie Boismenu, Squash Lake Association

(715) 493-0008 / stephboismenu.squashlake@hotmail.com

Without using a single herbicide, the Squash Lake Association has been extremely successful at significantly reducing and managing Eurasian water milfoil from Squash Lake. Eurasian water milfoil was discovered in the pristine waters of Squash Lake, located in Oneida County, in 2009. After a Eurasian water milfoil survey was completed, the Squash Lake Association reviewed the management and treatment options and voted to hire scuba divers to hand-harvest each plant by its root mass rather than use herbicides. This poster presentation will walk you through each step of the Association's thriving Eurasian water milfoil hand-harvesting project and explain how the combined efforts of 1) an efficient and diligent crew of scuba divers and 2) dedicated Volunteer Milfoil Monitors, have made this project a success. The Squash Lake Association hopes to inspire your lake group to "Pull Together to Get the Root of the Problem" and say No to herbicides!

Scientific Evaluation of Efficacy and Selectivity of Herbicide Treatments in Wisconsin Lakes

Michelle Nault, Bureau of Science Services, WDNR
(608) 221-6359 / michelle.nault@wisconsin.gov

John Skogerboe, U.S. Army Corps of Engineers
jskogerboe@comcast.net

For the past several years, the Wisconsin DNR has worked in collaboration with various stakeholders (lake groups and lake management professionals), as well as academic and agency scientists and resource managers to develop and implement plans for strategic and efficient control of Eurasian watermilfoil (*Myriophyllum spicatum*, EWM). In order to evaluate the efficacy, selectivity, and potential non-target effects associated with chemical herbicide treatments, we conducted intensive water sample collection and aquatic plant community monitoring following herbicide applications on a diverse subset of lakes and flowages. This poster will examine results from several case studies evaluating the effectiveness of both large-scale and small-scale chemical herbicide treatments to control EWM. By systematically measuring actual in-lake herbicide concentration and exposure times, as well as subsequent aquatic plant community responses under varying operational conditions, we hope to develop future management recommendations and continue to improve our ability to control invasive aquatic plants while minimizing adverse effects to native species and water quality.

Strategizing to control non-native *Phragmites australis* in Wisconsin

Brock Woods, UW Extension / WDNR
(608) 266-2554 / brock.woods@wi.gov

Stacy Schumacher, WDNR
(608) 264-8955 / stacy.schumacher@wi.gov

Non-native *Phragmites australis* is advancing west into Wisconsin since invading Great Lakes shores in the 1980s. It is starting to dominate interior wetlands and shorelines where it greatly reduces biodiversity. Many small pioneer populations have gotten into the middle of the state, but only a few scattered infestations are known in most western counties. The DNR/UWEX Wetland Invasive Species Team hopes to stop its spread to many interior lakes and wetlands by eliminating as many advancing pioneer populations as possible. The plan also targets small infestations threatening high priority wetlands. DNR received a USFWS (GLRI) *Phragmites* control grant for \$200,000 to initiate this strategy by eliminating pioneer populations within western Lake Michigan basin counties where many leading edge infestations exist. Simultaneously, early detection/rapid response grants are available to suppress scattered stands in the western counties. As part of the GLRI project, an ongoing mapping effort is underway with all partners who may have, or can collect, non-native *Phragmites* location data to build an accurate map of its populations across the state. A site selection protocol has been developed, and the goal is to treat at least 200 acres of non-native *Phragmites*. Treatments are to start in the summer of 2014 with follow up through fall 2015. Come to comment on this strategy, learn how to participate, or contact the presenters to learn more. All possible partners are needed to ensure success!

Testing the Efficacy of Milfoil Weevils at Controlling Eurasian Water Milfoil (EWM)

Susan Knight, UW Trout Lake Station and WDNR
(715) 356-9494 / seknight@wisc.edu

John Havel, Missouri State University
(417) 836-5308 / johnhavel@missouristate.edu

Nuisance levels of Eurasian water-milfoil (EWM) are often treated with herbicides, but bio control using milfoil weevils is an enticing alternative treatment. We are testing the effectiveness of milfoil weevils for control of EWM under natural lake conditions. In 2013 we began a field experiment in 4 lakes, stocking weevils in 2 beds and leaving 2 additional beds as controls in each lake. Background weevil densities were highly variable among EWM beds and were often greater than the densities were highly variable among EWM was common and correlated to weevil density. However, growth of EWM was independent of weevil density and the biomass of native plants and EWM were independent of stocking treatment. Although further weevil stocking is no longer feasible, we will continue sampling these 16 EWM beds in 2014 and 2015 in order to answer specific questions about weevil population dynamics and the growth of EWM and native plants.

Wisconsin's Newest Invasive Animal

Susan Graham, WDNR

(608) 275-3329 / susan.graham@wisconsin.gov

Jeanne Scherer, WDNR

(608) 275-3283 / jeanne.scherer@wisconsin.gov

Come learn about Wisconsin's newest invasive animal! New Zealand mudsnails were recently discovered in Black Earth Creek, a popular trout stream in southern Wisconsin. These tiny (up to 1/8 inch) snails are prolific reproducers and can alter food chains. Their small size makes them easily transported and a "trap door" over their shell opening allows them to live out of water for up to 26 days and resist most disinfectants. Following their discovery, a rapid response team was formed to revise the state's equipment cleaning guidance and determine the local and statewide distribution. The monitoring strategy includes a combination of winter sampling, citizen scientists, and testing water for eDNA. This presentation will provide background on the snails, and share what YOU can do to help.

Wisconsin's Rapid Response Framework for New Populations of Aquatic Invasive Species

Erin Vennie-Vollrath, WDNR

(608) 266-9252 / Erin.VennieVollrath@wisconsin.gov

There have been many successes in rapid responses to newly discovered populations of aquatic invasive species (AIS) around Wisconsin. Using our experiences with AIS such as New Zealand mudsnails, Eurasian watermilfoil, and red swamp crayfish, we have developed a statewide rapid response framework for AIS. See how this plan lays out a framework to assist managers in responding thoroughly, professionally, and effectively to the many challenges that result from new invasions. The process is flexible to allow for case-specific facts to guide the responses, while ensuring that managers address all the necessary components of an effective response.

Yellow Floating Heart Removal, Gordon Lake, Forest County, WI

John Preuss, Lumberjack RC&D

(715) 369-9886 / johnpreuss@frontier.com

Chris Hamerla, Golden Sands RC&D

(608) 296-2815 / chris.hamerla@goldensandsrccd.org

Yellow floating heart is prohibited in Wisconsin but is sold elsewhere as an ornamental aquatic plant. During a 2013 AIS Early Detection Survey, it was found in Gordon Lake, Forest County. Gordon Lake is a fifty acre lake located within the Nicolet National Forest, northeast of Crandon. Two sites of this non-native, highly invasive plant were discovered. Good communication, quick planning, and multiple partner involvement made a rapid response possible. Favorable site conditions and the reasonable size of the infested areas made manual removal of the plants a timely and productive control option. This poster will cover yellow floating heart identification and the removal of these two sites including removal procedures, time of project, follow up, and other considerations.

TOPIC: Climate Change

Examining Adult Public Opinion on Climate Change in the United States and China

Emy Marier, UW-Eau Claire (Economics)
(612) 267-6745 / marierel@uwec.edu

Wesley Meives, UW-Eau Claire (Economics)
(608) 513-8996/ meiveswl@uwec.edu

The United States and China are of particular interest in the discussion on climate change because they are the world's two largest emitters of greenhouse gases. Meaningful global action to address climate change must involve both countries, and thus a better understanding of how Chinese and Americans view climate change is of great interest. We conducted surveys of US (n=1,306) and Chinese (n=2,047) adults to broaden our understanding of public opinion on climate change in these two important countries. Our results show Chinese respondents are more likely to believe human caused climate change is happening and are also less likely to see disagreement among climate scientists regarding anthropogenic climate change. Additionally, the Chinese show greater support for joining an international agreement to address climate change compared to Americans and are also more willing to support policies to address climate change that would result in a higher cost of living.

Examining College Student Public Opinion on Climate Change in the United States and China

Elora Leene, UW-Eau Claire (Economics)
(262) 751-0509 / leeneev@uwec.edu

Wesley Meives, UW-Eau Claire (Economics)
(608) 513-8996/ meiveswl@uwec.edu

The United States and China are of particular interest in the discussion on climate change because they are the world's two largest emitters of greenhouse gases. Meaningful global action to address climate change must involve both countries, and thus a better understanding of how Chinese and Americans view climate change is of great interest. We conducted surveys of US (n=2,335) and Chinese (n=1,670) college students to broaden our understanding of public opinion on climate change in these two important countries. Our results show Chinese respondents are more likely to believe human caused climate change is happening and are also less likely to see disagreement among climate scientists regarding anthropogenic climate change. Additionally, the Chinese show greater support for joining an international agreement to address climate change compared to Americans and are also more willing to support policies to address climate change that would result in a higher cost of living.

TOPIC: Eutrophication & Nonpoint

Hypolimnetic iron: phosphorus ratio considerations in the management of Lake Desair, Wisconsin

Jordan D. Bauer, UW- Stout
(715) 651-1918 / bauerjor@my.uwstout.edu

William F. James, UW-Stout
(715) 338-4395/ jamesw@uwstout.edu

Lake Desair exhibits hypereutrophic conditions and severe summer algal bloom development. A monitoring program was conducted in 2013 to examine P and chlorophyll dynamics in relation to internal and tributary P loading. The lake strongly stratified and concentrations of both Fe and P increased substantially in the anoxic hypolimnion during summer. Internal P loading, estimated by mass balance, was high at 10 mg/m² d and accounted for 32% of the annual P load to the lake. However, physical entrainment of hypolimnetic P into the epilimnion was not detected due to a high hypolimnetic Fe:P ratio (> 5:1 wt: wt), which resulted in complete precipitation and adsorption of P during chemical oxidation rather than algal uptake. Unless motile algae can directly access hypolimnetic P gradients, internal P loading, although high, probably does not contribute to the epilimnetic P budget of this lake.

TOPIC: Fisheries/ Fish Biology

New Tools and Messages for Reaching Wisconsin Fish Consumers

Meghan Williams, WDNR

(608) 267-9665 / meghan.williams@wisconsin.gov

Candy Schrank, WDNR

(608) 267-7614/ candy.schrank@wisconsin.gov

Although the Wisconsin Departments of Natural Resources (DNR) and Health Services (DHS) have analyzed fish tissues for contaminants (mercury, PCBs) and issued warnings about eating fish since the 1970s, DHS recently received a Great Lakes Restoration Initiative grant for improving fish consumption advice. This grant allowed DNR to make several changes and additions to their Fish Consumption Advisory website (<http://dnr.wi.gov/topic/Fishing/Consumption/>) and produce new hardcopy publications. New features include a redesigned query tool which allows anglers to receive fish consumption advice unique to their fishing spot, an online cookbook titled "Healthy Dishes with Wisconsin Fishes", a "Choose Wisely" YouTube video, and a Wisconsin Wildcard that provides at-a-glance statewide fish consumption advice. The grant also allowed DNR to analyze 200 fillets (representing 15 sport fish species from 23 locations) for beneficial omega-3 fatty acid content. These new tools and information will be presented along with current fish consumption advice for Wisconsin waters.

TOPIC: Lake Habitat & Biology

Little St. Germain Lake Sediment Pore Water Sampling for Herbicide Residue

Jim Kreitlow, WDNR

(715) 365-8947 / james.kreitlow@wisconsin.gov

No work has been done in Wisconsin to determine the fate of herbicides in lake sediment. This study was tasked with trying to answer questions that arise when determining the fate of herbicides in lakes: Do these herbicides bio-accumulate in sediment over the long term? How quickly do they breakdown or dilute after treatment? Do granular herbicides settle in the sediment (sediment pore water) before they dissolve in the water column? Are herbicide concentrations high enough in pore water to be another route of exposure through root system (efficacy of treatment). Are sediment toxicity problems possible?

Long-term Study Shows Shift in Species Distribution of Submerged Macrophytes in Green Lake, Wisconsin

Benjamin Murphy, UW-Oshkosh

(262) 496-8791 / benjamin.murphy85@gmail.com

Dr. Robert Pillsbury, UW-Oshkosh

(920) 424-3069 / pillsbur@uwosh.edu

Submerged macrophytes are important to freshwater lake ecology. Littoral zone macrophytes impact ecosystem nutrients, sediments and the distribution of other species present. Monitoring temporal shifts in macrophyte species is critical for lake conservation planning and invasive species management. Green Lake, in Green Lake County, WI is the deepest lake in the state and is both a valuable fishing and recreational body of water. Surveys of macrophytes in this lake were performed by H.W. Rickett and M.J. Bumby. Aquatic plant samples were collected from 30 littoral zone stations. This survey was performed five times between 1921 and 2001. Observations included a total biomass decrease and a shift in the macrophyte species distribution, an increase in five species and a decrease in eight. *Myriophyllum spicatum* went from 11.6% of total biomass in 1921 to 46% in 1971. In 2014, these sites will again be monitored to contribute to this historical record.

Stevens Point Flowage Bathymetric and Recreational Map: A Partnership for Thriving Communities

Christine Koeller, UW-Stevens Point GIS Center
(715) 346-2677 / christine.koeller@uwsp.edu

Douglas Miskowiak, UW-Stevens Point GIS Center
(715) 346-4789 / doug.miskowiak@uwsp.edu

The Stevens Point flowage map project is a cooperative partnership between the University of Wisconsin Stevens Point (UWSP) Geographic Information Systems Center (GIS Center) and local non-profit organizations, communities, businesses, and individuals. In 2013 the UWSP GIS Center students and faculty/staff completed a 13-day bathymetry survey covering over 2800 acres. This flowage is a prime fishery impounded on the Wisconsin River, also known as “the nation’s hardest working river”. Over 120,000 data points were collected along approximately 75 miles of the transect lines. Students and faculty/staff donated over 100 hours surveying and continue to donate time to craft the final map. Our community partners are supporting the printing and distribution of 5000 flowage maps to the public. The final map will be a colorful, two-sided, fold-out printed on tear-proof, waterproof paper (23X35 inches). We hope you agree this map will be a useful tool for our thriving community.

Virtual Watershed Tour for Green Lake

Stephanie Prellwitz, Green Lake Association
(920) 294-6480 / stephanie@greenlakeassociation.com

Ted Johnson, WDNR
(920) 424-2104 / tedM.johnson@wisconsin.gov

Situated in Green Lake County as the deepest natural lake in Wisconsin, Big Green Lake (“Green Lake”) is truly a unique lake. Results of a citizen survey indicated the need for more education about the watershed, upstream impacts to the lake, and opportunities and efforts for water quality improvement. The Green Lake Association partnered with its members and lake partners to develop a virtual watershed tour. This interactive, web-based application incorporates interviews, aerial video and scuba footage to explore Green Lake and its tributaries. The tour is a creative way to reach a large audience of viewers, including the elderly or disabled who have mobility difficulties, youth who have a preference for online content, lake residents who only periodically visit, and residents that are unaware that they live in the Green Lake watershed. Learn more about this project and experience Green Lake as you have never seen it before!

TOPIC: Native Plants and Animals

Citizen-based Post-Restoration Monitoring at Zeloski Marsh, Lake Mills SWA

Patricia Cicero, Rock River Coalition
(920) 723-2728 / patricia@rockrivercoalition.org

Jeanne Scherer, WDNR
(608) 235-3602 / jeanne.scherer@wisconsin.gov

People understand there is some mysterious value to wetlands and want to know more, but they aren’t sure where to start. The Rock River Coalition (RRC) provides citizens opportunities and tools to explore wetland ecology. Citizen monitoring is a successful method to satisfy the need to learn while providing valuable data to scientists, managers, and the public. Data collected is vital to assessing successes and ongoing management needs. Thanks to DNR Citizen-based Monitoring Partnership Program grants, the RRC introduced people to birds, frogs, toads, dragonflies, plants and more at Zeloski Marsh, Lake Mills State Wildlife Area. In 2006, the 1,500 acre property was restored to wetland conditions after being drained for farming for decades. Led by a wetland monitoring coordinator and experienced naturalists, RRC volunteers conducted pre- and post-restoration surveys. A DNR grant was also used to produce nine Wetland Monitoring Fact Sheets (<http://wetlandmonitoring.uwex.edu/>) which describe monitoring protocols.

Native clam conservation: evidence that small efforts can have a big impact on the persistence of native clam populations

Dr. Robert Pillsbury, UW-Oshkosh
(920) 424-3069 / pillsbur@uwosh.edu

Zebra mussels (*Dreissena polymorpha*) negatively impact native clams by competing for the same resources and impeding their movement by attaching themselves in large numbers to the shells of the native clams. In Douglas Lake, Michigan (USA) we compared over several years the size, mass and numbers within native clam populations (mainly *Lampsilis siliquoidea*) in a bay where zebra mussels were periodically removed from their shells to populations in a similar bay with no removal. We found a significantly higher mass:length ratio in areas where zebra mussels were removed compared to other areas. Our study suggests that a minimal amount of effort from lake associations could have a significant impact on the biodiversity of native clam in lakes invaded by zebra mussels.

TOPIC: People, Policy, & Politics

Boater perceptions of environmental issues affecting lakes in Northern Highlands of Wisconsin: A latent class model

Ben Beardmore, Center for Limnology, UW-Madison
(608) 890-1443 / abeardmore@gmail.com

Understanding stakeholder perceptions of issues affecting lakes is critical for ensuring support for management activities. Given the predominantly recreational use of Wisconsin's lakes, boaters are an important stakeholder group. Using a survey of boaters intercepted at landings throughout Vilas and Oneida counties, we applied a maximum-difference conjoint approach to assess the perceived importance of 16 issues related to the social and ecological character of lakes in the region. Latent-class analysis identified five markedly different subgroups of respondents. Public perceptions of issues pertaining to lakes are heavily moderated by their interactions with the lake environment. While anglers were most concerned about fishing quality, sightseers were concerned about lakeshore development and loss of natural habitat. Not only do these results provide insights into public perceptions of ecologically relevant issues, but they identify potential research and outreach opportunities for LTER scientists.

Lake Tides Reader Survey: Insights into Our Stakeholders

Kristin Floress, UW-Stevens Point College of Natural Resources
(715) 346-4135 / kfloress@uwsp.edu

Eric Olson, UWEX Lakes
(715)346-2192 / eric.olson@uwsp.edu

We surveyed *Lake Tides* readers to gauge their knowledge and insights into lake issues and measure their satisfaction with the newsletter. We also compared *Lake Tides* readers to non-readers to measure what effect readership has on knowledge and actions regarding lake health.

TOPIC: Watersheds & Groundwater

An analysis of bathymetric model accuracy from data collected by two digital systems on inland lakes; Marathon County, WI

Sam Thomas, UW-Stevens Point
(920) 242-9474

Two small lakes in Marathon County were mapped in mid-summer 2012 using a 12-foot jon boat, a Sonar Mite sounder with Trimble R6 GPS and Trimble TSC2 data collector utilizing WIS CORS real-time GPS correction, a Lowrance HDS5 fishfinder GPS with sounder, and ESRI ArcMap 10 GIS software. ANOVA analysis showed no significant difference ($p > 0.05$) between the Sonar Mite depth, the Lowrance HDS5 depth, and the manual depth, at randomly-generated sites. Both sounders will reliably predict known depth ($R^2 > 0.95$). The models built using Trimble data can reliably predict known depth (Mission Lake: $R^2 = 0.68$, Mayflower Lake: $R^2 = 0.79$). The models built using Lowrance data will not predict known depth as well as the Trimble models (Mission Lake: $R^2 = 0.66$, Mayflower: $R^2 = 0.66$). Significant differences were found at both lakes between the Lowrance data models and the Trimble data models (paired t-tests: $\alpha = 0.05$, $p < 0.001$). The digital models built using Lowrance data produced total lake volumes that were greater than models built using Trimble data by 1.2% at Mayflower Lake and 3.6% at Mission Lake.

Minimum transect spacing and appropriate GPS/Sonar equipment for fluvial lake mapping

Mason Johnson, UW-Stevens Point
(651) 283-0995 / mjohn206@uwsp.edu

Christine Koeller, UW-Stevens Point
(715) 252-2819 / ckoeller@uwsp.edu

Bathymetric lake mappers are inconsistently employing survey techniques and GPS/Sonar equipment. Determining minimum transect spacing and appropriate GPS/Sonar equipment for fluvial lake mapping is needed. A bathymetric survey was conducted on the Stevens Point Flowage in 2013 from Bukolt Park north to the Highway 10 overpass. The survey was completed with two methods including 1) a Trimble R6 GPS receiver, TSC2 data collector, Sonarmite depth sounder, cellular device with WIS CORS instantaneous corrections applied and 2) a Lowrance HDS5 GPS/Sonar. Transects were initially spaced 300 feet apart and perpendicular to flow direction. All Trimble and Lowrance XYZ points that occurred within 30 feet of each other were used to create separate lake models for each technique. Subsequent models were built after manually removing every other transect (600 foot spacing). Flowage models from both survey techniques and varying transect spacing scenarios were built and compared using ESRI ArcGIS 10.2 software at randomly generated locations (two-way, paired T-test). Total volume variations are also presented.

Prioritizing Wetlands in Lake Management Planning

Melis Arik, Center for Watershed Science and Education, UW-Stevens Point
(612) 384-4122 / marik794@uwsp.edu

Sarah Hull, Center for Watershed Science and Education, UW-Stevens Point
shull971@uwsp.edu

Danielle Rupp, Center for Watershed Science and Education, UW-Stevens Point
drupp@uwsp.edu

Wetlands are an important part of the lake basin or watershed. However, strategies for protection of wetlands adjacent to or near lakes are left out of lake management planning. This poster presents considerations for including wetlands into this process. The focus is on approaches for prioritizing wetlands within a lake watershed and educating citizens about the value of wetlands to overall lake habitat.