WISCONSIN WETLANDS ASSOCIATION'S

20th Anniversary
Wetland Science Conference

TELLING OUR STORIES

February 24-26, 2015

Madison, Wisconsin

www.wisconsinwetlands.org

ABSTRACTS & PRESENTER BIOGRAPHIES

WEDNESDAY, FEBRUARY 25, 9:00 AM - 9:30 PM

9:00 - 10:10 Plenary Session (Ballroom AB)

9:00 **Welcome & Opening Comments**

9:20 **Conference Keynote: *It's How You Tell the Story: Cueing Attitudes and Behaviors Using Social Norms***
Sharon L. Dunwoody, UW-Madison Journalism and Mass Communication

10:10 - 10:40 Break (Grand Terrace/Capitol Promenade) — Sponsored by Stantec

10:40 - 12:00 Concurrent Sessions

	Location: Hall of Ideas EH	Watershed Approaches to Wetland Conservation *Moderator: Gail Epping Overholt*	Location: Hall of Ideas FI	Applications of Wetland Science in Policy & Regulation *Moderator: Dave Siebert*	Location: Hall of Ideas GJ	Wetland Wildlife *Moderator: Dreux Watermolen*
10:40	**Shafer**	Greenseams at one hundred	**Powell**	Integrating state and federal wetland regulatory programs: The Minnesota example	**Matteson**	Wisconsin's Trumpeter Swan Recovery Program: A 27-year retrospective (1987-2014) on research, management, and collaboration
11:00	**Zerr**	A new citizen's Watershed Planning Guide for protecting and restoring our state's waters	**Kramasz**	Over two decades of protecting Wisconsin's wetlands: A history of wetland regulation in Wisconsin	**Reid**	A tale of three turtles: Conservation and genetics of wetland chelonians in Wisconsin
11:20	**Swearin-gen**	Generating spatial narratives: The impact of different management regimes in the Two Hearted River Watershed	**Kopka**	Compensatory wetland mitigation as part of the USACE regulatory program in Wisconsin	**Monagan**	Structure and diversity of aquatic macroinvertebrate communities along a coastal dune chronosequence
11:40	**Aten**	A twist for conservation plans: More doing and less planning in the 1700-ha Bay Shore Blufflands SNA	**Walther**	2015 Wetland Delineation Guidance: An evolution of science and regulation	**Church**	Ecological constraints on faunal communities in forested wetlands in west-central Wisconsin

12:00 - 1:30 Lunch (provided - Ballroom AB) — Sponsored by J.F. Brennan

12:45 - 1:30 Career Development & Continuing Education in Wetland Science (Hall of Ideas FI)

1:30 -3:10 Concurrent Sessions

	Location: Hall of Ideas EH	SYMPOSIUM: Modern Wetland Restoration & Management *Moderator: Andy Paulios*	Location: Hall of Ideas FI	Wetlands and People *Moderator: Travis Olson*	Location: Hall of Ideas GJ	Native Wetland Flora *Moderator: Sarah Johnson*
1:30	**Hames**	What was I thinking? On defining our approach to wetland restoration and management in Wisconsin	**Carter**	Navigating the waters: Women landowners and wetland conservation adoption	**Staffen**	Climate change vulnerability assessments for twenty-four wetland types in Wisconsin
1:50	**Larkin**	Restoring where to what, and how? Working together to achieve multiple objectives in wetland restoration	**Ashworth**	Wading right in: Using stories of wetland adventures as a gateway to understanding	**Little**	A tale of two summers: Ephemeral pond plant communities respond to interannual climate variability
2:10	**David**	Inching towards ecological and cultural recovery: Lessons from Lac Vieux Desert	**Linton**	Using poetry to tell our stories: "The sound of water"	**Bart**	The good and bad news about shrub encroachment in Wisconsin calcareous fens
2:30	**Glenzinski**	Shallow lakes management: Learning from the past and planning for success	**Kyte**	Talking about water ethics: Commons discourse for a commons resource	**Shackel-ford**	Thirty years of progress: How neighbors in Rock County became stewards of SNAs and orchids
2:50	**Ziegler**	Small scale wetland restoration: Big opportunity or waste of time?	**Lannoo**	Whither a wetland ethic?		

3:10- 3:40 Break (Grand Terrace/Capitol Promenade) — Sponsored by Ho-Chunk Nation

3:40-5:00 Concurrent Sessions

	Location: Hall of Ideas EH	SYMPOSIUM: Modern Wetland Restoration & Management *Moderator: Jason Fleener*	Location: Hall of Ideas FI	Wetland Mitigation: Approaches & Outcomes *Moderator: Pat Trochlell*	Location: Hall of Ideas GJ	Wetland Invasive Species *Moderator: Kelly Kearns*
3:40	**Hayden**	Using farming contracts as a management tool to reduce reed canary grass and increase native plant diversity	**Jernigan**	Wetland mitigation in Wisconsin: Defining the watershed approach	**Collins**	Achieving balance and success in a wetland complex infested with one million stems of reed canary grass
4:00	**VanBeek**	What the muck are we doing? The trials and tribulations of restoring wetlands on histosols	**Adrihan**	A comparative look at new wetland mitigation approaches: WisDOT, Northwest Region	**Granberg**	Prioritizing areas for invasive plant management: Mapping ecosystem integrity, services, and invasive pathways
4:20	**Kehrli**	Mud Lake: Better as a fishing lake? Challenges of managing a spring fed, cattail infested, aging impoundment	**Henderson**	Wetland restoration in organic peat/muck soil: DOT Barneveld mitigation site	**Lawrence**	*Typha x glauca* invasion increases soil methane flux
4:40	**Paulios**	Can I please flush the toilet? The challenges behind planning and executing restorations in the 21st century	**Stamer**	Establishing a forested wetland: Lessons learned	**Woods**	Status of efforts to eliminate non-native *Phragmites australis* in central and western Wisconsin

5:00 - 6:30 Poster Session & Cash Bar (Grand Terrace/Capitol Promenade) — Sponsored by Cardno

6:30 - 9:30 Banquet & Presentation (Ticketed event - Ballroom AB)

7:30 **Banquet Presentation: *Protect Our Future: Empowering Youth through Digital Storytelling***
Patty Loew, PhD, UW-Madison Life Sciences Communication

THURSDAY, FEBRUARY 26, 8:30 AM - 4:30 PM

8:30-9:20 Plenary Session (Ballroom AB)

8:30 Welcome

8:40 Plenary Address: ***Telling Our Stories: Time and Tempo in Wetlands and Wetland Science***
Cal Dewitt, UW-Madison Nelson Institute For Environmental Studies

9:20 - 9:30 Break (Grand Terrace/Capitol Promenade)

9:30 - 10:30 Concurrent Sessions

	Location: Hall of Ideas EH	SYMPOSIUM: Wetland Dragonflies and Damselflies I *Moderator: Mary Linton*	Location: Hall of Ideas FI	Wetland Assessment I *Moderator: Nick Miller*	Location: Hall of Ideas GJ	Wetland Restoration Case Studies I *Moderator: Art Kitchen*
9:30	**DuBois**	Diversity and status of Wisconsin's dragonflies and damselflies with emphasis on wetland species	**Mladenoff**	Estimating wetland loss in Wisconsin using the 1800s Public Land Survey data and current wetland mapping	**Artz**	The importance of hydrology and geomorphology in designing a wetland mitigation bank: A case study in Iowa
9:50	**Jackson**	Dragonflies that every Wisconsin wetlands enthusiast should know	**Bernthal**	How healthy are our wetlands? Preliminary results from the First National Wetland Condition Assessment	**Weinzinger**	An update to the ongoing story of coastal wetland community restoration in Lower Green Bay
10:10	**Garrison**	The damselflies: Suborder Zygoptera	**Haber**	Results of Wisconsin's intensification study as part of the National Wetland Condition Assessment	**Potter**	Wetland restoration to enhance sediment and phosphorus trapping

10:30 - 11:00 Break (Grand Terrace/Capitol Promenade) — Sponsored by Graef

	Location: Hall of Ideas EH	SYMPOSIUM: Wetland Dragonflies and Damselflies II *Moderator: Mary Linton*	Location: Hall of Ideas FI	Wetland Assessment II *Moderator: Nick Miller*	Location: Hall of Ideas GJ	Wetland Restoration Case Studies II *Moderator: Jim Ruwaldt*
11:00	**Tennessen**	Using exuviae searches to monitor Odonate diversity in Wisconsin wetlands	**Trochlell**	Comparison of vegetation monitoring techniques for evaluating wetland plant communities at restoration sites	**Stevens**	Wetland restoration for ecology and community in Nine Springs Corridor: The full potential of our first E-Way
11:20	**Callaghan**	Creating a successful odonate monitoring program: Experiences from the Urban Ecology Center, Milwaukee	**Fluet-Chouinard**	County fact sheets as a new tool for presenting data and analyses on Wisconsin's wetlands	**Mertes**	Restoration of Deer Creek wetland in Milwaukee
11:40		Wetland Dragonfly and Damselfly Panel Discussion	**Faust**	Developing a framework for prioritizing potential sites for wetland restoration in the Mullet River Watershed	**Curran**	The Ridges Sanctuary: Protecting Wisconsin's native orchids

12:00 - 1:30 Lunch (provided - Ballroom AB) — Sponsored by Hey & Associates

1:30 - 4:30 Field Trips, Working Groups, & Workshop

Working Groups / Workshop

Practitioners Working Group Location: Hall of Ideas EH *Moderator: Scott Taylor*	Ramsar Nomination Working Group for Lower WI River (by invitation) Location: Hall of Ideas FI *Moderator: Jean Unmuth*	Workshop: Communicating About Water to Engage Wider Audiences Location: Hall of Ideas GJ *Moderators: Jane Elder & Meredith Keller*
An opportunity for wetland practitioners – including consultants, federal, state, and local regulators, land managers, and others – to discuss current issues relevant to their daily work. The agenda will be set with the input of those who participated in a similar working group at recent WWA conferences.	This working group is for individuals who are collaborating to complete a nomination package for the designation of the Lower Wisconsin River as a Ramsar Wetland of International Importance.	This workshop is designed to help you communicate more effectively about water and wetlands, taking advantage of insights from social science and experience in the field on how people "hear" and think about messages related to water.

Field Trips
All field trips will depart from the Main Entrance, Level 4
Prior sign up required; check at registration desk for remaining availability.

Urban Wetlands at the UW-Madison Arboretum	Wetlands at the Pheasant Branch Conservancy	Wetlands in an Urbanizing World: The Story of Waubesa Wetlands

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We want your feedback!

Please complete the conference evaluation coming to your email inbox.

Thank you!

Adrihan, Amy, WisDOT
Nicole Staskowski, Cardno JFNew

A comparative look at new wetland mitigation approaches: WisDOT, Northwest Region

WisDOT is responsible for managing highway corridors across the state. In doing so, WisDOT has developed a coordinated policy to avoid and minimize wetland impacts while ensuring safe and efficient transportation routes. When wetland impacts are unavoidable, wetland mitigation is necessary. WisDOT's mitigation efforts now focus mostly on mitigation bank areas, rather than sites within or immediately adjacent to impact sites, as historically occurred. The development of mitigation sites within WisDOT has evolved along with the science of wetland restoration. In WisDOT's Northwest Region, two mitigation bank sites have been in the process of development and implementation over the last decade. Beaver Brook Site, in Washburn County, and Beartrap Creek Site, in Bayfield County, illustrate the wetland mitigation techniques WisDOT is using to create sustainable, diverse, and functioning wetland ecosystems. Beaver Brook Site is part of the WDNR Beaver Brook Wildlife Area and was historically a cranberry operation. The key component of hydrological restoration involved removing impoundments created at the turn of the century. Five years into the restoration, much of the seed bank is intact in this primarily peat-based substrate, increasing the diversity of the species composition on the site. Beartrap Creek Site lies in the Lake Superior Clay Plain Ecoregion and was historically farmed and hayed. Hydrological restoration included installation of over 100 ditch plugs. Due to its proximity to a local airport, wetland types with minimal open water had to be planned, with adaptive management strategies in place in case open water types begin to form.

Wetland Mitigation: Approaches & Outcomes, Wednesday, February 25, Hall of Ideas FI, 4:00 - 4:20 pm

Artz, Joe, EarthView Environmental, Inc.
Judith Joyce, EarthView Environmental, Inc.
Hollis Weber, EarthView Environmental, Inc.

The importance of hydrology and geomorphology in designing a wetland mitigation bank: A case study in Iowa

A constructed wetland must be designed to endure dry as well as wet years. Long-term sustainability is first and foremost a factor of hydrology and geomorphology. We advocate a detailed hydrological study early in the design process as the basis for setting restoration goals. Such studies should consider site-specific factors, but also the hydrology and geomorphology of the watershed that will contribute water to the site. Our firm designed and oversaw construction of a wetland mitigation site on the Iowa River in southeast Iowa. Design was based on a year-long geohydrological study that included monitoring wells and stratigraphic cross sections to identify sedimentary constraints on lateral and vertical groundwater movement. We collected data on flood heights, precipitation, and historic channel changes. We developed water budgets for PSDI-defined wet, dry, and normal years. The results revealed that the wetland's hydrology would be largely a response to factors beyond the site. An abandoned river channel isolates the site from water inputs other than the active channel. Groundwater and surface water responds primarily to outflow from a large reservoir 20 mi upstream, which is managed for flood control and recreation. In its first year, groundwater in the wetland bank has responded as expected, maintaining a water table at the designed-for depth. The overall success of the design will not be known until vegetation is established in 2015 and long term monitoring is conducted. The first year's performance is addressed in a poster at this conference by Weber and Artz.

Wetland Restoration Case Studies I, Thursday, February 26, Hall of Ideas GJ, 9:30 - 9:50 am

Ashworth, Sharon, Kansas Natural Resource Council
Catherine Koning, Franklin Pierce University

Wading right in: Using stories of wetland adventures as a gateway to understanding

The wetland literature is awash in textbooks, reference books, guidebooks, and philosophical treatises. Advocates, scientists, and consultants have numerous web-based tools and information at their fingertips. But the general public has few resources to turn to for a good wetland read – a rich story that makes the reader laugh, wonder, and learn. Recent studies have demonstrated that people are more moved by stories than by statistics so we are gathering stories from wetland scientists, explorers, and advocates to incorporate into a new book. Readers will learn about wetlands not from a checklist of characteristics but by immersion in a description of real events happening to real people. Each story becomes a portal through which the reader will visit a wetland and discover its secrets and features, while also learning important ecological lessons and wetland functions. We want our readers to view wetlands in a whole new way, to make an emotional connection with the creatures and currents within, and optimally, to commit to wetland protection. Through the art of storytelling we hope to put into the public's hands the science of wetland ecology and the passion of those who wade into the muck. In this presentation, we will discuss the philosophy of the book and what makes a good story. We will read selections from the book and solicit audience input about key ecological lessons, cool wetland features, and unforgettable stories that should be included.

Wetlands and People, Wednesday, February 25, Hall of Ideas FI, 1:50 - 2:10 pm

Aten, Nancy, Landscapes of Place
Dan Collins, Landscape of Place

A twist for conservation plans: More doing and less planning in the 1700-ha Bay Shore Blufflands SNA

The karst landscape in Door County's 1700-ha Bay Shore Blufflands State Natural Area follows seven miles of Niagara Escarpment with three significant wetland complexes and much groundwater interaction. The SNA is also largely privately owned. A one-year grant process for conservation master planning in this context presents a number of challenges. We ask how to explicitly accommodate, in conservation, our inhabited and working landscape. We assume the actions of people in this land mosaic are critical to conservation. In a short planning window, we: (1) plan by focusing on desired future conditions and work backward; (2) plan as if building a cathedral over generations; and (3) opt for more doing and less planning – we begin taking action while planning to fill knowledge gaps and test project ideas. Significant local ecology knowledge permits a relaxed planning framework. To fill gaps, surveys of herps, aquatic macroinvertebrates, breeding and migratory birds, and small mammals were conducted and hydrologic models built. Findings of note: *Hemidactylium scutatum* in a wetland not yet protected; cave-dwelling *Crangonyx* amphipods in road culverts and other surface waters. To test ideas, three community projects engaged 130 neighbors: dragonfly and bat workshops were conducted and *Amelanchier laevis* saplings were given away free for roadside planting on private lands. The completed plan describes fifteen "patterns" each describing what we picture, why it is important, issues, ideas, and anticipated progress. Each is a step in continuing to "build the cathedral" of Bay Shore Blufflands. The "anticipated progress" lists allow us to assess whether the steps, individually and together, over time, make useful progress toward conservation.

Watershed Approaches to Conservation, Wednesday, February 25, Hall of Ideas EH, 11:40 am - 12:00 pm

Bart, David, UW-Madison
Tara Davenport, UW-Madison

The good and bad news about shrub encroachment in Wisconsin calcareous fens

Shrub encroachment in Wisconsin calcareous fens is considered a serious management threat. A common theory is that land released from grazing and burning interacts with lowered water tables to encourage encroachment, but the evidence for this is spotty. If lowered groundwater influence encourages encroachment, plowed fens, which are drier, should have increased cover. However, other legacies associated with plowing (loss of *Carices* and gain in herbaceous invaders) might modify impacts of lowered saturation stress. Here we examined patterns of shrub encroachment in historically plowed and never plowed fens to determine whether saturation stress interacts with plowing history, *Carex* cover, and herbaceous-invader cover to predict shrub richness and cover. Contrary to expectations, shrub richness and cover were lower in plowed than in never -plowed plots. Furthermore, animal-dispersed shrub cover increased with *Carex* cover in never-plowed, highly saturated plots. Finally, shrub cover was generally lower with increasing invader cover, especially in never-plowed fens. It seems that *Carices* are allowing shrubs to overcome high saturation stress, while low saturation stress decreases cover by encouraging invasion of highly productive herbaceous species. These findings are discouraging, as frequent goals of fen restoration include invasive reduction and increased graminoid cover.

Native Wetland Flora, Wednesday, February 25, Hall of Ideas GJ, 2:10 - 2:30 pm

Bernthal, Tom, WDNR
Greg Serenbetz, USEPA

How healthy are our wetlands? Preliminary results from the First National Wetland Condition Assessment

In the field season of 2011, the USEPA and cooperating states conducted sampling for the first ever survey of the "health," or biological condition, of the Nation's wetlands in the "lower '48." Similar condition assessments have been conducted for lakes, rivers, streams, and coastal waters. Over 1,000 wetlands were sampled and 961 sites were used in the statistical analysis for the National Wetland Condition Assessment (NWCA). Preliminary results are expected to be available for this talk while the report is undergoing peer review. Results were calculated for four very broad wetland types: estuarine or freshwater wetlands with woody or herbaceous cover. Nine Omernik Level III regions were aggregated into four large regions of the conterminous US, resulting in 10 reporting categories (8 freshwater and 2 estuarine). Data were gathered on soils, water chemistry, algae, vegetation, and buffer condition, along with a qualitative evaluation of hydrology and stressors. In addition, a new rapid assessment methodology, USA-RAM, was carried out at each site. New multi-metric indices of biological condition and stress were created from this dataset. Results for each wetland type across the country will be presented, with a focus on our ecoregion: the Eastern Mountains and Upper Midwest. The survey will be repeated every 5 years to assess trends in wetland condition, with the next field season set for 2016.

Wetland Assessment I, Thursday, February 26, Hall of Ideas FI, 9:50 - 10:10 am

Budyak, Amanda, Integrated Restorations, LLC
Craig Annen, Integrated Restorations, LLC
David Cordray, Integrated Restorations, LLC
Sean Longabaugh, Integrated Restorations, LLC

Effects of selectively-targeted imazapyr applications on *Typha angustifolia* L. in species-rich wetlands

Narrow-leaved cattail (*Typha angustifolia* L.) is an aggressive invader of wetland communities in North America. Substantial litter accumulation, prolific seed production, and rhizomatous expansion enable *T. angustifolia* to displace indigenous species assemblages and rapidly become the dominant species in a vegetation stand. Much of the previous research on suppression and eradication of this species has focused on well-established monotypic stands and there is a need to develop techniques for reversing invasions in mixed vegetation stands. We conducted a feasibility study to evaluate the efficacy of using selectively-targeted applications of the broad-spectrum herbicide imazapyr to reverse a *T. angustifolia* invasion in a species-rich sedge meadow remnant in southeastern Wisconsin. In our initial surveys *T. angustifolia* was rapidly expanding in area but with a diverse variety of remnant vegetation. We applied directed cut-surface treatments of 3.85% imazapyr to one out of every four *T. angustifolia* stems in July, when rhizome carbohydrate reserves were at a minimum. To curtail collateral damage, we added a biodegradable sticking agent at 4% to the imazapyr mixture and also employed a small-capacity compression sprayer modified with a drip guard attachment. Directed cut surface applications of imazapyr reduced *T. angustifolia* stem density greater than 90% without reducing indigenous species density or diversity. We conclude that this treatment protocol was effective at selectively suppressing *T. angustifolia* in mixed vegetation stands. We have done post-treatment surveys since the presentation last year and would like to update people on our new findings such as an increase in purple loosestrife in treated areas.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Callaghan, Jennifer, Urban Ecology Center

Creating a successful odonate monitoring program: Experiences from the Urban Ecology Center, Milwaukee

The Urban Ecology Center is a community-based environmental education Center in Milwaukee, Wisconsin with branches in three unique neighborhoods each surrounded by a large urban park. In 2013, the Center coordinated with members from the Wisconsin Dragonfly Society (WDS) to pilot a citizen science odonate monitoring program at the Riverside Park Center branch. WDS sought community involvement in Milwaukee because of the low number of surveys that had been run in the area previously and the potential for new species identification in a largely understudied area. Research and Citizen Science department staff and 22 invertebrate enthusiasts worked with key members of WDS to create a monitoring plan that engaged new odonate-loving members and identified a species list of 16 odonates for Riverside Park. First-year success and a great deal of enthusiasm from the public led to the development of odonate survey routes at the other two Urban Ecology Center branches in 2014. The second season ended with another 20 odonate monitoring volunteers, 16 public surveys, a total species list of 27 odonates, and a few citizen volunteers whose skills grew so notably that they were able to conduct odonate surveys on their own outside of the Center. Obstacles encountered during 2013-14 included engaging volunteers during less-than-ideal weather, establishing a regular survey time that worked for most volunteers, and occasional disconnectedness with volunteers in the field while survey leaders struggled with identification. Notable highlights included hosting a Wisconsin Lutheran drawing class during a late-summer 2014 survey and adding three young families to the Urban Ecology Center's odonate monitoring citizen science family.

SYMPOSIUM: Wetland Dragonflies and Damselflies II, Thursday, February 26, Hall of Ideas EH, 11:20 - 11:40 am

Campbell, Christal, UWEX,and WDNR
Patrice Eyers, WDNR
Diane Schauer, Calumet County
Kaycie Stushek, Golden Sands RC&D

Expanding aquatic invasive species outreach to waterfowl hunters in Wisconsin

WDNR and its partners have been actively engaging boaters and anglers on aquatic invasive species (AIS) prevention efforts for more than a decade. As a result, awareness of AIS prevention steps within the boating and angling population is very high (96% from the 2013 Clean Boats, Clean Water Survey); however is the AIS prevention message reaching other audiences that frequently use our precious waters and wetlands, such as waterfowl hunters? This question prompted the Wisconsin AIS program and its partners to develop a survey to start looking at waterfowl hunter understanding of the AIS laws and their potential for spreading AIS. In fall 2014, we surveyed 400 Wisconsin waterfowl hunters. Of these, more than half hunt in multiple locations within a 5 day period of time. 70% are aware that the Wisconsin AIS laws applied to waterfowl hunters. These results confirm suspicions that waterfowl hunters are a potential vector for spread of AIS to area waters and wetlands and efforts to educate this audience on AIS prevention should be increased. The proposed poster will focus on the results of the AIS Waterfowl Hunter Survey (Fall 2014) and potential next steps to engage this audience in AIS prevention. New AIS waterfowl hunter outreach materials/sign templates will also be available for partners and agency staff.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Carter, Angie, Iowa State University
Rebecca Christoffel, Iowa State University

Navigating the waters: Women landowners and wetland conservation adoption

Women are an important demographic for conservation outreach. Women own or co-own approximately half of the farmland in the United States, yet rent this farmland to tenants at higher frequencies than their counterparts. How women farmland owners understand wetlands and water quality conservation has important influences upon their relationships with their tenants, co-owners, and, ultimately, the implementation of conservation on the landscape. We collected data in Iowa through a series of Women, Food and Agriculture Network-sponsored Learning Circles and Field Days focusing on wetlands as well as from a series of in-depth interviews with women farmland owners and a statewide survey of male and female agricultural landowners' management related to wetlands. In this presentation, we discuss our analysis of 1) the potential impact of women farmland owners in implementing conservation on the landscape, and 2) women farmland owners' attitudes and beliefs about wetlands. Knowledge and understanding of the barriers to wetland restoration and management on land owned or co-owned by female agricultural landowners can be used by conservation professionals to better address this under-served audience and to increase the number of wetlands restored and/or managed in the Midwest.

Wetlands and People, Wednesday, February 25, Hall of Ideas FI, 1:30 - 1:50 pm

Carter, Daniel, Southeastern Wisconsin Regional Planning Commission

Occurrences of NR-40 Wetland Invasive Plants in Southeastern Wisconsin

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) has catalogued known locations for vascular plant species in its seven-county region since the introduction of its Natural Areas Plan in 1991. These records include vouchered herbarium specimens as well as all vascular plants identified during natural area inventories and wetland delineations. This poster presents occurrences of wetland plant species (FAC, FACW, or OBL in either the Northcentral – Northeast or Midwest Regions) that WDNR regulates under the invasive species rule (Wis. Adm. Code. Ch. NR40) and discusses the severity of their invasions, where known. These include the first known occurrence of Java waterdropwort (*Oenanthe javanica*) and range expansions of seaside goldenrod (*Solidago sempervirens*) and hairy willow-herb (*Epilobium hirsutum*) in SE Wisconsin. Increased awareness of the distributions of invasive species, some of which are new and unfamiliar, informs efforts for early detection and control. Invasive species that are presently common and widespread in SE Wisconsin are unlikely to be eradicated regionally, though local eradication from sensitive areas may be achievable.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Church, James, UW-Stout
Amanda Little, UW-Stout

Ecological constraints on faunal communities in forested wetlands in west-central Wisconsin

Assessing ecological constraints on biological community structure has interested ecologists for several decades. The effects of ecological constraints such as environmental characteristics, interspecific interactions, and dispersal through the upland landscape on community membership in ephemeral wetlands remains understudied with few general and repeatable patterns aside from the importance of wetland duration. Understanding these constraints is particularly important as environmental change at a wetland and landscape-level is likely to have differential effects on the species inhabiting the wetland communities. We investigated aquatic macroinvertebrate and amphibian communities in 39 ephemeral and 17 permanent wetlands in west-central Wisconsin. We used a pluralistic approach to assess ecological constraints on macroinvertebrate and amphibian communities by modeling the effects of wetland-level environmental characteristics on these communities, local community-assembly models to assess interspecific associations, and a meta-community approach which assesses the role of dispersal in structuring the biological community. Results highlight the relative influence of different ecological constraints on individual taxa as well as on the community as a whole. Implications for conservation are addressed.

Wetland Wildlife, Wednesday, February 25, Hall of Ideas GJ, 11:40 am - 12:00 pm

Cocking, Grace, Northeastern Illinois University
Jennifer Slate, Northeastern Illinois University

Freshwater sponges as paleolimnological indicators in Volo Bog

Volo Bog Nature Preserve has one of northeastern Illinois's most unique wetlands, containing naturally acidic water with pH ranging from 5.7-6.2. The wetland originated as a kettle lake and is now ringed by a floating mat of *Sphagnum* moss. To investigate how the wetland developed, we collected an 8.5-m sediment core and analyzed siliceous spicules of sponges preserved in the sediment. Three types of spicules (skeletal support structures) were well preserved throughout the sediment core. Megascleres (large supportive structures) were most common, but microscleres (smaller structures), and gemmoscleres (spicules coating reproductive cell masses) which can be used to identify species, were also present. *Anheteromeyenia ryderi* and *Spongilla lacustris* were present at all sediment depths analyzed. *Anheteromeyenia ryderi* is an indicator of acidic water, suggesting that the wetland was acidic throughout the entire ~6300 years spanned by the sediment core. In continuing research, spicules of *A. ryderi* and *S. lacustris* will be quantified to determine if relative abundances changed over time. Sponge spicules are thicker and thus more resistant to dissolution than are diatoms, allowing sponge spicules to be used as paleolimnological indicators when diatoms are absent.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Collins, Dan, Landscapes of Place
Nancy Aten, Landscapes of Place

Achieving balance and success in a wetland complex infested with one million stems of reed canary grass

Landscapes dominated by reed canary grass (RCG, *Phalaris arundinacea*) are notoriously vexing restoration candidates. The methods and observations outlined in this presentation might be of interest to wetland restoration practitioners and funders. Coastal wetland complexes within the 1700-ha Bayshore Blufflands State Natural Area vary from high quality habitats to RCG monocultures. A persistent cyclical approach of observation, experimentation, and implementation has led to economical and demonstrable success in the restoration of several RCG-dominated components of this landscape. Central to this success is shifting program goals from invasive species eradication to acting as RCG "predators." This shift requires some alternate thinking about methods, timing, metrics, and consequences of success. A keen understanding of the localized behavior of RCG has been important in hypothesizing high impact pressures on reproduction and expansion of these monotype populations. For the methods tried, the scope of overall effort required is quantified through field surveys, and the pace of implementation is estimated through ongoing time-and-motion studies. Methods, or 'modes of predation;' used on this site include life-cycle-timed cutting and removal of seedheads, life-cycle-timed herbicide, hand pulling stems and roots, bulk removal of stems/roots, and nitrogen management. One-half million flowering stems of RCG within targeted zones on this site have been addressed, resulting in renewed ecological balance and native species resurgence. As control protocols continue and evolve, we expand lands under this regime, monitor native species recovery, collect and disperse native seed, and attend to second wave invasive species.

Wetland Invasive Species, Wednesday, February 25, Hall of Ideas GJ, 3:40 - 4:00 pm

Curran, Melissa, The Ridges Sanctuary, and Stantec
Steve Leonard, The Ridges Sanctuary

The Ridges Sanctuary: Protecting Wisconsin's native orchids

The Ridges Sanctuary in Baileys Harbor, Wisconsin is coordinating an orchid restoration program to repopulate specific species in a part of the Sanctuary that was once used for grazing. The Ridges Sanctuary was founded in 1937 to protect 40 acres which was home to 25 of the 40 native orchids of Wisconsin. 77 years later, the Sanctuary has protected over 1500 acres but land protection alone hasn't been able to sustain the orchid populations. Orchid populations have declined for several reasons and now The Ridges Sanctuary is working with multiple partners to reintroduce the ram's-head lady's slipper (*Cypripedium arietinum*), showy lady's slipper (*Cypripedium reginae*), yellow lady's-slipper (*Cypripedium parviflorum*) and grass pink (*Calopogon tuberosus*) to help sustain their populations. Steve Leonard, Executive Director of The Ridges Sanctuary, and Melissa Curran, biologist for Stantec consulting firm, will present The Ridges Sanctuary's story and the many components and goals of this restoration project, which has lead up to this unprecedented initiative to help protect Wisconsin's native orchids.

Wetland Restoration Case Studies II, Thursday, February 26, Hall of Ideas GJ, 11:40 am - 12:00 pm

David, Peter, Great Lakes Indian Fish and Wildlife Commission

Inching towards ecological and cultural recovery: Lessons from Lac Vieux Desert

It would be difficult to find a more socially challenging place to attempt manoomin (wild rice) restoration than Lac Vieux Desert (LVD), the headwater of the Wisconsin River and a lake that straddles the Wisconsin/Michigan line. The rice beds historically found on Lac Vieux Desert once provided for generations of non-human and human beings, including members of the Lac Vieux Desert Band of Ojibwe, who requested lands on this lake be included in their reservation so they would have access to this critical subsistence resource. However LVD's rice beds had largely disappeared by the 1950's in response to dam-induced changes in the lake's hydrology. In the late 1990's, a multi-agency effort began to restore some of the historic abundance of rice on LVD. This effort included incorporating an experimental, 10 year condition in the license issued to the dam owner by the Federal Energy Regulatory Commission, which reduced the maximum operating depth of the lake by 10in. It was hoped this change would provide an area of suitable growing depths on Rice Bay, which once held the largest rice beds on the lake. This presentation will summarize some of the social, ecological, and legal challenges faced in the effort, document how the rice bed and local communities responded to the change, highlight some of the lessons learned in the process, and discuss the yet-to-be determined ultimate outcome of this ecological and cultural restoration effort.

SYMPOSIUM: Modern Wetland Restoration & Management I, Wednesday, February 25, Hall of Ideas EH, 2:10 - 2:30 pm

DuBois, Robert, WDNR

Diversity and status of Wisconsin's dragonflies and damselflies with emphasis on wetland species

Wisconsin has a diverse assemblage of 165 species of Odonata (within nine families and 39 genera); of these, about 70 species (42%) breed in wetlands. Wisconsin has four species of odonates that are state-listed as endangered, and one that is state-listed as threatened; three of these – Hine's Emerald (*Somatochlora hineana*, also federally endangered), Incurvate Emerald (*S. incurvata*) and Spatterdock Darner (*Rhionaeschna mutata*) – may be considered wetland species. Wetlands provide habitat for a larger percentage of Wisconsin's rare species of odonates than most other habitats. Fifteen of the 70 wetland species (21%) are on the Wisconsin Natural Heritage Working List of species known or suspected to be rare in the state, whereas 18% of all other species are on the list. Wetland species show rich variation in life history strategies including many special adaptations to habitats that are highly variable in water permanence, in richness of prey, and in presence or absence of fish predators. The life history strategies of many wetland species are poorly known and are urgently in need of study.

SYMPOSIUM: Wetland Dragonflies and Damselflies I, Thursday, February 26, Hall of Ideas EH, 9:30 - 9:50 am

Evans, Bryn, UW-Madison
Timothy Van Deelen, UW-Madison
Shawn Crimmins, UW-Madison

Semi-aquatic mammal populations in the St Louis EPA designated Area of Concern

The St Louis River Estuary was designated an Area of Concern in the Great Lakes Water Quality Agreement of 1987. The estuary enters Lake Superior at the dense urban complex of Duluth, Minnesota and Superior, Wisconsin and has historically experienced physical modification, industrial pollution, and chemical spills. Degraded wildlife habitat and wildlife populations were included among the Beneficial Use Impairments to be addressed, and while several remediation projects have been completed, there is no clear picture of the recovery of semi-aquatic mammals in the area. Using a combination of remote cameras and aerial surveys, we are quantifying semi-aquatic mammal populations throughout the estuary as well as in two unimpaired reference sites; Boulder Lake Reservoir in eastern Minnesota and the St Croix River near Danbury in northwestern Wisconsin. Data collection began in November 2014, focusing on the occurrence of mink (*Neovison vison*), river otter (*Lontra canadensis*), beaver (*Castor canadensis*), and muskrat (*Ondatra zibethicus*) in these systems with varying degrees of anthropogenic influence. These data will be used in an occupancy modeling framework to assess differences in abundance between the estuary and unimpaired sites and to determine habitat relationships for these species, including water quality, documented historic disturbances, and reclamation activities. Additionally, our work will provide a means of validating current aerial survey methods for semi-aquatic mammals in this region by comparing aerial survey results to intensive field monitoring.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Faust, Bridget, Association of State Floodplain Managers

Developing a framework for prioritizing potential sites for wetland restoration in the Mullet River Watershed

In 2010, Wisconsin Administrative Codes regarding allowable phosphorus levels in surface waters as well as performance standards that farmers must comply with were made more stringent. These changes have motivated rural counties to more effectively reduce phosphorus discharge from major non-point source contributors like agricultural fields. One example of how these changes in phosphorous regulations are motivating action on the local level is in the City of Plymouth, Wisconsin. The city was interested in identifying and prioritizing sites for wetland restoration based on their potential to filter pollution out of upstream tributaries and to reduce flood risk. To address this need, the Association of State Floodplain Managers, The Nature Conservancy, and NOAA Coastal Services Center, partnered with the Sheboygan County Planning and Conservation Office and the City of Plymouth to develop a framework for identifying and prioritizing locations for wetland restoration that have the potential to capture nutrients and reduce flooding within the Mullet River watershed. In this presentation, participants will be walked through a case study describing how this framework was developed and implemented as well as how other communities in the region can apply this resource and achieve similar results. This case study is just one of many available on the Great Lakes Coastal Resilience Planning Guide (GLCRPG), an online tool designed to connect practitioners with geospatial data, visualizations, decision support tools, and policy and regulatory solutions through succinct, community-authored case studies. From this presentation, participants will also learn about the GLCRPG approach and the content it features.

Wetland Assessment II, Thursday, February 26, Hall of Ideas FI, 11:40 am - 12:00 pm

Fehling, Anna, Montgomery Assocates: Resource Solutions
Steve Gaffield, Montgomery Associates: Resource Solutions
Joseph Britt, Sand County Foundation

Enhancing wetlands for nitrogen removal in an agricultural landscape

Excess nitrogen in the Mississippi River Basin, particularly from agricultural runoff, is associated with the Gulf of Mexico hypoxic zone and other environmental problems. This Sand County Foundation demonstration project at the Leopold Memorial Reserve in south-central Wisconsin evaluates wetland enhancement as an agricultural nutrient management practice. The wetland enhancement, located in an unused section of agricultural property dominated by invasive *Phalaris arundinacea*, entails two shallow scrapes covering four acres adjacent to a drainage ditch. The scrapes capture overbank flow and slowly release it back to the ditch or to groundwater via infiltration. Monitoring of TKN, Nitrate + Nitrite, and Ammonium over the past three years has characterized the nutrient load from the upstream watershed and nutrient removal performance of the wetland. After two overflow events in 2013, nitrate in each scrape was reduced from 3.5 mg/L to non-detectable levels within two to four days. Nitrate in monitoring wells remained low, suggesting that the primary nitrate reduction mechanism was denitrification rather than transfer to groundwater. The scrapes removed an estimated 100 lbs N/ac of wetland from the watershed in 2013. Similar nitrate reductions were observed after two events in 2014. This simple wetland enhancement on inactive farmland has resulted in a measurable nitrogen load reduction. It has also increased topographic and vegetation diversity. We therefore support the continued exploration of wetland enhancement and restoration on private agricultural land as a relatively simple, low-cost practice to reduce nutrient inputs to the Mississippi River and other water bodies.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Fluet-Chouinard, Etienne, UW-Madison
Justin Chenevert, UW-Madison

County fact sheets as a new tool for presenting data and analyses on Wisconsin's wetlands

Wetlands provide essential ecosystem services in Wisconsin landscapes such as flood mitigation, sediment retention, and wildlife habitat. Despite the many public benefits that wetlands provide, they remain a poorly understood and under-valued resource. To increase the awareness and change the perception of the role of wetlands, we worked with WWA to develop county-level fact sheets for the state of Wisconsin. These fact sheets increase the accessibility of a new database from WDNR on the geographical area covered by current and historical wetlands. By providing summary statistics of wetlands in each county, the fact sheets present the information at a relevant scale for land planning management operations. Moreover, the factsheets present maps of wetlands within their broader hydrological context to highlight the importance of considering entire river catchment units in managing our state's wetlands. By presenting information on wetlands in a concise and digestible format, these fact sheets will aid WWA and other users in raising awareness of the societal importance of Wisconsin's wetlands. In addition to the fact sheets, we used the WDNR data in a state-wide analysis of the role wetlands play in buffering high and low flows in several Wisconsin watersheds.

Wetland Assessment II, Thursday, February 26, Hall of Ideas FI, 11:20 - 11:40 am

Forest, Brian, The Ridges Sanctuary

The Ridges Sanctuary: Protection of wetland biodiversity through citizen science and volunteerism

The Ridges Sanctuary, established in 1937, is Wisconsin's first land trust. It was formed when Albert Fuller, Curator of Botany at the Milwaukee Public Museum at that time, recognized the tremendous biodiversity on the original 40 acres and spearheaded a movement to protect the area. The grassroots spirit lives on through the guiding mission of protection, education, and research. The Ridges wetland ridge and swale formations represent paleo shoreline beach deposits from fluctuations in Lake Michigan lake levels over the past 3,000 years. Successional vegetation of the dune-capped ridges, ground and surface water connectivity, and the refrigerative effects of off-shore winds have resulted in tremendous biodiversity. The sanctuary is comprised of fifteen plant communities, 475 vascular plants, a glacial relict Boreal Forest, twenty-five native orchids, the federally threatened Dwarf Lake Iris, and the federally endangered Hine's Emerald Dragonfly. Research flourishes through partnered-research of The Ridges watershed, the Dwarf Lake Iris populations, and citizen science-based collection of data on Northern Flying Squirrels, sucker migration, and local stream parameters. All of the information gathered and practiced in the protection and research has helped design The Ridges Sanctuary's new interpretive center. 2015 will mark the 78th year of the Sanctuary and the opening of the Cook-Albert Fuller Interpretive Center, a LEED-certified facility. Learn about the diversity and unique geology of The Ridges Sanctuary, pressing issues of water quality, and best management practices implemented in the building site to be used as educational tools to help protect its future.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Galleguillos, Nicolas, UW-Madison
Isabel Rojas, UW-Madison
Michael Healy, Adaptative Restoration LLC
Joy Zedler, UW-Madison

A graminicide (clethodim) harmed reed canary grass more than the native awlfruit sedge

Attempts to control reed canary grass (*Phalaris arundinacea*, Pa), where it co-occurs with an expanding population of native awlfruit sedge (*Carex stipata*, Cs), might be effective using a graminicide (grass-specfic herbicide) other than sethoxydim (Vantage: previously shown ineffective) in the UW-Madison Arboretum. We hypothesized that an application during July of the graminicide clethodim (Intensity One) could control Pa without harming Cs in a mixed stand, but would be less effective than the broad-spectrum, systemic herbicide glyphosate (Ranger) in a monotype of Pa. In the mixed stand, clethodim did not harm Cs. Maximum leaf lengths of Cs were similar with and without the graminicide (47+5.0 and 49+5.0 cm, resp.). As hypothesized, clethodim reduced growth of Pa, without harming Cs. Clethodim was not as effective on Pa as glyphosate, however. In the Pa monotype, clethodim killed Pa shoots within 5 weeks, while glysophate took only 3 weeks. Also, Pa treated with clethodim regrew after 3-9 weeks in 4 of 8 treatment plots. In contrast, shoots sprayed with glysophate turned brown and did not regrow. The effectiveness of clethodim on Pa was site dependent; Pa resprouted in 4 monoculture plots but in all 8 mixed plots. The two sites differed in soil moisture, time between mowing and herbiciding, and Pa height when herbicided. Further research is needed to assess the need for a second, late-season application of clethodim. This graminicide offers promise for attempts to control Pa without harming Cs.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Garrison, Marla, McHenry County College

The damselflies: Suborder Zygoptera

This talk will be a visually intensive introduction to the damselflies (suborder Zygoptera) of the Upper Midwest. Close-up photography will be used to illustrate the natural history of these diminutive odonates that are sometimes overlooked in the presence of their more robust counterpart, the dragonflies (suborder Anisoptera). Their life cycle, behavior, and species distribution will be discussed.

SYMPOSIUM: Wetland Dragonflies and Damselflies I, Thursday, February 26, Hall of Ideas EH, 10:10 - 10:30 am

Glenzinski, Brian, Ducks Unlimited
Josh Kavenaugh, Ducks Unlimited

Shallow lakes management: Learning from the past and planning for success

Wisconsin has tremendous wetland resources with abundant shallow lakes making up a significant component of them. However, social, political, and environmental factors have limited the production and quality of this resource. Several shallow lakes have gone through successful restoration efforts, but none without controversy and many teaching moments. Taking lessons from these projects and applying them to future shallow lakes restorations will be critical for successful implementation. A look back a the history of shallow lakes management can guide restoration ecologists as they tap into the vast potential for wetland habitat improvement. Rush Lake and Big Muskego Lake are two relatively recent projects that provide these lessons and can offer a framework for successful shallow lakes restorations around the state. Water quality, fisheries, wildlife, and recreation concerns make any shallow lakes project a challenge. Proper planning, education, and implementation can increase the chance of success.

SYMPOSIUM: Modern Wetland Restoration & Management I, Wednesday, February 25, Hall of Ideas EH, 2:30 - 2:50 pm

Granberg, Jason, WDNR
Tom Bernthal, WDNR
Pat Trochlell, WDNR
Kelly Kearns, WDNR
Brock Woods, WDNR

Prioritizing areas for invasive plant management: Mapping ecosystem integrity, services, and invasive pathways

Invasive species negatively impact the integrity of global ecosystems. Their presence has a cascading effect on biodiversity, ecosystem functioning, and on the ecosystem services these areas provide. Early Detection and Rapid Response (EDRR) programs have focused on locations of interest, species invasiveness, and spreading pathways. New Hampshire has recently created a model for prioritizing areas for invasive plant management. Their model was developed by compiling spatial data of these listed features and importance levels determined by local experts and practitioners. The intent of this model was to plan for longer-term restoration, to use proactive planning over opportunistic planning, and to make the best strategic use of available resources. However, such mapping efforts have yet to be replicated for Wisconsin. The modelling presented represents the first phase towards creating statewide strategic maps similar to the New Hampshire model. Since the ecological landscapes between New Hampshire and Wisconsin vary, it is hoped that regional wetland practitioners will contribute recommendations to the future of this model's development.

Wetland Invasive Species, Wednesday, February 25, Hall of Ideas GJ, 4:00 - 4:20 pm

Haber, Elizabeth, WDNR
Tom Bernthal, WDNR

Results of Wisconsin's intensification study as part of the National Wetland Condition Assessment

In 2011, the USEPA orchestrated the first ever national survey of wetland condition. Detailed information about wetland plants, soils, hydrology, water quality, stressors, and buffer condition were collected for over 1,000 sites across the country. To accompany this project, Wisconsin selected to sample the eastern part of the state more intensively. Using the same methods as in the national survey, WDNR sampled 50 sites within the study area in order to gain a better picture of the health of wetlands in that part of the state. Several striking results emerged from this study: 1) despite the intensive land use practices in the study area, wetlands that are in pristine or near-pristine condition still remain, 2) reed canary grass (*Phalaris arundinacea*) is a serious problem in many wetlands, and 3) much of the study area is covered by hardwood swamps dominated by ash trees (*Fraxinus pennsylvanica* and *Fraxinus nigra*), which are susceptible to the Emerald Ash Borer. I will report on the condition of wetlands in the study area based on floristic quality benchmarks set during a previous study. I will also present soils and water quality data in relation to floristic quality and disturbance. These data show a detailed picture of the structure and condition of wetlands in eastern Wisconsin. The USEPA plans to do another national survey of wetlands in 2016. The data collected in Wisconsin can serve as a benchmark for future wetland condition assessments.

Wetland Assessment I, Thursday, February 26, Hall of Ideas FI, 10:10 - 10:30 am

Hames, Tracy, Wisconsin Wetlands Association

What was I thinking? On defining our approach to wetland restoration and management in Wisconsin

The way we think about wetland restoration and management has evolved over the years. A century ago, reclamation ruled the day. Wetlands were seen as wastelands, resulting in large scale efforts to drain, fill and convert them to "productive" conditions. Half of Wisconsin's original wetland acreage was lost due to these activities. By the 1930's and onward, while wetland removal was still very common, wetlands were gaining acceptance for their importance to migratory birds and other game species. State and federal wildlife areas were being established to increase waterfowl numbers and provide hunting opportunities. Restoration and management activities during these years were aimed at game production. Wetland property goals often emphasized hemi-marsh conditions. Establishment of non-native vegetation was common. Today, the science of wetland restoration and management is moving toward more watershed-based approaches, emphasizing the return of pre-disturbance hydrology and vegetative communities. A major challenge we face today involves addressing the sheer scale of wetland acreage that needs to be restored to effectively return health to watersheds damaged by historic wetland removal. Other challenges involve addressing the extensive issues related to aging wetland management infrastructure on state, federal and private lands, and conducting restoration and management activities in a manner that will provide the benefits we desire while minimizing the expense and effort needed for long-term management. This symposium is designed to begin a dialog to help coordinate approaches to realizing ecologically-appropriate and cost-effective large scale wetland restoration and management.

SYMPOSIUM: Modern Wetland Restoration & Management I, Wednesday, February 25, Hall of Ideas EH, 1:30 - 1:50 pm

Haserodt, Megan, UW-Madison, and Foth

Roads, fish, and peat: The underlying groundwater story to road development in wetland habitats

As the human population expands, so does the road network and the number of wetland-road crossings. These crossings can potentially alter the shallow groundwater flow system. Groundwater is an important habitat feature in wetlands, regulating water levels and influencing water chemistry. Changing wetland hydrology can alter plant communities and adjacent, hydrologically-connected systems, such as streams. This study integrated physical and chemical hydrogeologic methods to assess road impacts on shallow groundwater movement in a wetland and on baseflow reaching an adjacent stream. This research focused on two Alaskan peatlands, but the results are applicable to other wetland settings, including peatlands in Wisconsin. Two wetland sites, one with a road perpendicular to a stream and one with a ditched road parallel to a stream, were instrumented with water table wells, piezometers, and a stilling well. From this monitoring network regular water level measurements, field chemistry sampling, and δ18O and δ2H stable isotope analyses were utilized to assess hydrogeologic processes and flowpaths. This research showed that the presence of ditches strongly influenced water levels: ditched roads had significantly lowered water tables at the road crossing while non-ditched roads showed slight ponding of water on the upgradient side of the road. Ditches also increased the temperature of intercepted groundwater prior to stream entry. These field results were used to develop a conceptual model and constrain a numerical model of groundwater flow through the study section. Understanding these groundwater impacts from road development allows for improved road designs that minimize hydrogeologic impacts.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Hayden, Natanya, WDNR
Richard Nikolai, WDNR

Using farming contracts as a management tool to reduce reed canary grass and increase native plant diversity

Reed canary grass (*Phalaris arundinacea*) in moist soil vegetation communities has become increasingly difficult to control due to its tenacity and ecological cycle. Native wetland vegetation seems to vanish as its grasses, sedges, rushes, and forbs are overridden by this invasive. Wildlife managers are constantly trying to find cost effective ways to cause disturbance and reset the successional clock. Marsh hay, a valuable commodity in agricultural communities, can be cut through a leasing agreement with local farmers. This process provides revenue for the landowner and achieves a manipulatable mowing regime. Through long-term experimentation with cutting dates and frequency, an increase in native vegetation has been documented, with a subsequent decrease in the competitive edge of reed canary grass. Nesting bird habitat has improved along with plant diversity and varying vegetation height, providing waterfowl production areas and opportunity for upland songbird nests.

SYMPOSIUM: Modern Wetland Restoration & Management II, Wednesday, February 25, Hall of Ideas EH, 3:40 - 4:00 pm

Henderson, Richard, WDNR
Pat Trochlell, WDNR
Ken Wade, Self-employed

Wetland restoration in organic peat/muck soil: DOT Barneveld mitigation site

In spring 2012, a wetland mitigation restoration was begun on a 5-acre deposit of peat/muck in the Driftless Area of southwestern Wisconsin. The site is supplied with groundwater under artesian pressure. Approximately 85% of the peat deposit had been tile-drained starting in 1950 (or earlier) and was cropped until 1980, when tile failure began to occur. Since then, much of the upper soil layer had remained dry for extended periods, facilitating oxidation over time. In 2011, six ground-water monitoring wells and a vegetation sampling grid were established across the site. In March 2012, the tiles were removed. As the tiles were pulled, the trenches filled with water. Within hours, all low areas had standing water. Within 12 months, the soil was completely re-hydrated. In April 2012, the site was planted with 118 pounds of seed (54 species) and 1,070 root-plugs (16 species). By 2014, the number of native species within quadrats had doubled and the site's mean non-weighted Coefficient of Conservatism (CC) value for all species increased from 3.03 to 3.52. The weighted mean CC had improved from 2.29 to 3.53. Reed canary grass is the greatest challenge to recovery. It is slowly declining; its Importance Value (IV) went from 19% to 11%, but it is still the second most prevalent species. On the upside, the IV of all sedges increased 3% to 10%, and the IV of indicators of oxidation disturbance, such as stinging nettle and giant ragweed, have decreased from 7-9% to 3%. In the first year of the restoration, several species of dragonflies, 8 species of toads and frogs, 4 species of waterfowl, 6 species of shorebirds, and a pair of sandhill cranes made regular use of the site and have continued to do so.

Wetland Mitigation: Approaches & Outcomes, Wednesday, February 25, Hall of Ideas FI, 4:20 - 4:40 pm

Jackson, Dan

Dragonflies that every Wisconsin wetlands enthusiast should know

Odonata can be important indicators of the health of Wisconsin's wetlands. Some species require very specific water conditions and therefore an ability to identify them can be very helpful for the wetlands enthusiast. This presentation will be a brief introduction to the dragonflies of Wisconsin. It will include a quick introduction to six families of Anisoptera found in Wisconsin and will also explain how to identify some of the representatives of each of those families.

SYMPOSIUM: Wetland Dragonflies and Damselflies I, Thursday, February 26, Hall of Ideas EH, 9:50 - 10:10 am

Anthony Jernigan, USACE St. Paul District Regulatory Branch
Graser, Rebecca, USACE St. Paul District Regulatory Branch

Wetland mitigation in Wisconsin: Defining the watershed approach

The concept of a watershed approach is well understood but challenging to make tacit. In 2008, USACE and USEPA issued a final rule regarding compensatory mitigation that articulated a clear desire for projects to use an analytical process to make compensatory mitigation decisions that support the sustainability or improvement of aquatic resources in a watershed (the watershed approach). This approach involves consideration of watershed needs and how locations and types of compensatory mitigation projects address those needs. The rule articulates that a landscape perspective should be used to identify the types and locations of compensatory mitigation projects. Additionally, mitigation should benefit the watershed and offset losses of aquatic resource functions and services caused by activities authorized by USACE permits. The watershed approach may involve consideration of landscape scale, historic and potential aquatic resource conditions, past and projected aquatic resource impacts in the watershed, and terrestrial connections between aquatic resources. This presentation will discuss the requirements in the rule as well as examples of watershed plans developed to meet these requirements.

Wetland Mitigation: Approaches & Outcomes, Wednesday, February 25, Hall of Ideas FI, 3:40 - 4:00 pm

Kawaguchi, Jennifer, Northeastern Illinois University
Olivia Choi, Northeastern Illinois University

Transmission of Strigeidae (Platyhelminthes: Trematoda) in Wisconsin and Illinois freshwater ponds

Freshwater communities comprise many species interactions, including predator-prey and parasite-host relationships. For trematodes, or parasitic flatworms, the life cycle is dependent on trophic interactions, which led to the proposal of parasites as indicators of predator-prey interactions, host diet range, and of species occurrence at the landscape level. During field surveys of wetlands (N=4) in Southeastern Wisconsin and Northeastern Illinois, we observed free-living infective stages and encysted stages of a trematode (Strigeidae) in *Lymnaea* sp. (snails). We tested their association across all sites, but could show no relationships due to the limited number of sites (chi-square analysis, p=0.2774). Based on the field observations, we hypothesized that these life stages were the same species. We conducted laboratory experiments where we exposed uninfected *Lymnaea* snails to the free-living trematode stage. After five weeks fully formed encysted stages were present (mean=6.33), confirming the transmission pathway. Our future research includes using DNA analysis to compare our samples to other members of Strigeidae, either confirming them as a known species or discovering a new species of trematode in these wetlands. We can then distinguish if similar trematode species occur in each wetland site. Once positively identified, this species could potentially serve as an indicator of the presence of migratory waterfowl. This technique may have applications to investigating food web functions in wetland restoration. These parasites would serve as good indicators of waterfowl because they are not major factors to morbidity and require less effort to survey.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Kehrli, Sara, WDNR

Mud Lake: Better as a fishing lake? Challenges of managing a spring fed, cattail infested, aging impoundment

Mud Lake Wildlife Area has three linked impoundments, the largest known as "Mud Lake." Historically, wildlife use of this area has been high, particularly by dabbling ducks. The site remains one of the most popular duck hunting spots in the area having been purchased by WDNR for its importance to waterfowl. Water level management has been an issue for many years, particularly following major flooding in 2008. Mud Lake has been getting deeper even with no boards in the water control structures. Research projects in the area have demonstrated that ducks are no longer raising broods in the main marsh. Meanwhile, cattails continue to encroach in all three of the impoundments, with the middle impoundment nearly choked out by this aggressive plant. This talk will focus on efforts to manage this site as a waterfowl marsh rather than as a deep water community, and will discuss the constraints posed by site conditions and the continued challenges managing this site.

SYMPOSIUM: Modern Wetland Restoration & Management II, Wednesday, February 25, Hall of Ideas EH, 4:20 - 4:40 pm

Kopka, Marie, USACE St. Paul District Regulatory Branch

Compensatory wetland mitigation as part of the USACE regulatory program in Wisconsin

The St. Paul District, USACE regulatory program frequently requires compensatory wetland mitigation as a permit condition, which appreciably influences wetland restoration and protection efforts across the state. In Wisconsin, the USACE regulatory program processes approximately 1,500 Clean Water Act (Section 404) permit decisions annually. Section 404 permits authorize discharges of dredged and fill material into “waters of the United States,” many of which are wetlands in Wisconsin. Yet the USACE compensatory wetland mitigation program is not well known or understood by the public. This presentation focuses on the main processes and requirements of the USACE’s compensatory mitigation program in Wisconsin. Specifically, this presentation will touch upon the fundamental principles behind the federal requirements for compensatory mitigation and how the USACE regulatory program considers mitigation throughout the permit application review process. It will also cover federal application of a watershed approach to evaluating compensatory mitigation, USACE regulatory program consideration of wetland function and value, the federal role in wetland bank establishment and in-lieu fee program development, and methods for providing compensatory wetland mitigation in Wisconsin.

Applications of Wetland Science in Policy & Regulation, Wednesday, February 25, Hall of Ideas FI, 11:20 - 11:40 am

Kramasz, Kathi, WDNR

Over two decades of protecting Wisconsin's wetlands: A history of wetland regulation in Wisconsin

Since the implementation of the Clean Water Act in the 1970's there have been several changes to wetland laws in Wisconsin. Find out the fundamental ways that wetland protection rules have changed in those years and hear how, in many cases, today's procedures are not much different than those used in years past. This talk will include a discussion of the 2012 Wisconsin wetland laws and some of the misunderstandings surrounding that most recent change.

Applications of Wetland Science in Policy & Regulation, Wednesday, February 25, Hall of Ideas FI, 11:00 - 11:20 am

Krzywicka, Adrianna, University of Illinois at Urbana-Champaign
Edward Price, University of Illinois at Urbana-Champaign
Geoffrey Pociask, Illinois State Geological Survey
Jeffrey Matthews, University of Illinois at Urbana-Champaign

Tree establishment in response to hydrology at IDOT wetland mitigation sites

Compensatory mitigation wetlands need to meet required site -specific performance standards approved by USACE but often fail to achieve these standards due to poor survival of planted trees. Planted individual tree survival, along with overall species composition and diversity, is determined primarily by hydrology in floodplain forests; even so, trees in mitigation wetlands are often planted without regard to site's hydrologic context. Explicitly considering the site's hydrologic regime and establishing realistically achievable performance criteria within its hydrologic context are both critical to successful reforestation. We obtained tallies of planted trees at 12 IDOT mitigation wetlands (each over 10 years old) from the Illinois Natural History Survey (INHS) as well as hydrology data from the Illinois State Geological Survey (ISGS). We revisited these sites in 2014 to perform comprehensive searches for planted trees and then evaluated the relationship between long-term rates of planted tree survival and site hydrologic regime. Overall, the results show that all of the sites had a decrease in proportion of planted tree survival from the end of monitoring period until 2014, but the sites that had the most extreme flooding events had severely diminished proportions of planted trees surviving. This research will help provide policy recommendations for establishing appropriate wetland mitigation performance standards related to tree planting in floodplain areas.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Kukulski, Joseph, UW-La Crosse
Roger Haro, UW-La Crosse
Nadia Carmosini, UW-La Crosse
Daniel Gerber, UW-La Crosse
Eric Strauss, UW-La Crosse

Is reed canary grass altering the quantity and quality of allochthonous carbon delivery from floodplain forests?

Reed canary grass (*Phalaris arundincea*, RCG) is an invasive grass that reduces the diversity of plant communities in wetland ecosystems. Dense monocultures formed by RCG outcompete floodplain forest plant communities along the upper Mississippi River (UMR). These forests provide particulate and dissolved carbon, the latter being an important substrate for microbial activity. I compared the breakdown of leaves from native floodplain trees to that of RCG litter. Dissolved organic carbon (DOC) concentrations exuded from swamp white oak (*Quercus bicolor*, SWO), river birch (*Betula nigra*, RB), and silver maple (*Acer saccharinum*, SM) were compared to DOC concentrations exuded from RCG litter. Litter from each plant type was submerged in well water, with and without a sodium azide treatment, and subsamples were taken on various days to determine the concentration of DOC being exuded from the litter over time. Dissolved organic carbon quality was determined by quantifying decomposition of leachate from RB, SWO, SM and RCG over time. Mesh bags filled with plant litter from RB, SWO, SM and RCG were placed in a stream and retrieved on various days to determine the loss of leaf mass over time. Initial results suggest SM and RB litter breaks down more quickly and exudes higher concentrations of DOC than SWO and RCG litter. The displacement of native trees by RCG may be altering the quantity and quality of DOC delivery from floodplain forests to the UMR.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Kyte, Richard, Viterbo University

Talking about water ethics: Commons discourse for a commons resource

Aldo Leopold warned us of the dangers of relying on a single mode of ethical reasoning to ground conservation efforts. Indeed, he went so far as to claim, “I doubt if there exists today a more complete regimentation of the human mind than that accomplished by our self-imposed doctrine of ruthless utilitarianism." Yet, too often environmental scientists and agency spokespersons rely solely on utilitarian justifications to explain their support for essential wetlands policies and protections. This presentation will provide a brief overview of the four basic modes of ethical reasoning (truth, consequences, fairness, and character), illustrating the ways in which we usually talk about water policies and then suggesting an expanded moral discourse that can appeal to a broader constituency. For it is not simply that we need wetlands for health or recreation or to preserve places for the experience of beauty; we need wetlands because we need healthy land in order to know ourselves, to provide us with opportunities to see how rocks, and streams, plants, animals and humans may live in order, harmony, and stability. We need such places as starting points for developing the virtues, for without the right starting points, our ideas about utility, rights, and duty will be distorted. If the people who care about wetlands protection wish to engage a broad audience in support of essential policies, they need to use all four modes of ethical reasoning to develop a water ethics discourse common to all.

Wetlands and People, Wednesday, February 25, Hall of Ideas FI, 2:30 - 2:50 pm

Lannoo, Michael, Indiana University
Rochelle Stiles, Indiana State University

Whither a wetland ethic?

Because of their diversity of types and often transitory nature—positioned somewhere between uplands and lakes—wetlands have been difficult to define. And in part because they have been difficult to define, they have been difficult to appreciate, either ecologically or aesthetically (as "duck factories" and upland reservoirs to prevent flooding, yes; for other ecological roles, not so much). We offer a functional definition of Upper Midwestern wetlands—bodies of water that, over the course of a year or decadal hydrological cycle, will dry, go hypoxic, are isolated, and/or are fishless—that has served as a starting point for both an ecological and aesthetic appreciation of these ecosystems. Wetlands, indeed, are separate ecosystems from lakes, supporting a different but complementary flora and fauna and accommodating different ecological processes. While historic swampbusting has taken its toll on wetland numbers, wetland loss in a functional sense has also been taking place through subtler mechanisms that compromise ecosystem integrity such as connecting wetlands and lakes (through culverts or ditches), deepening wetlands for fish stocking, and by hosting invasive species such as carp and American Bullfrogs. We have been arguing for a wetland ethic that recognizes the distinct functions and unique ecology of wetlands, systems that supply necessary and important ecological processes and services, upon which humans depend.

Wetlands and People, Wednesday, February 25, Hall of Ideas FI, 2:50 - 3:10 pm

Larkin, Daniel, Chicago Botanic Garden

Restoring where to what, and how? Working together to achieve multiple objectives in wetland restoration

Wetland restoration is motivated by many goals. Biodiversity support, recreational opportunities, carbon sequestration, floodwater storage, and water quality are among the wetland services we value highly. But research shows that not all goals are mutually compatible. For example, wetlands that serve as workhorses for nutrient removal are unlikely to support diverse plant communities. Thus, restoration goal-setting requires prioritizing among a menu of worthy objectives and choosing realistic targets that account for constraints such as landscape position and disturbance history. All of this must be done within a context of uncertainty about how the restoration will perform and what the future will bring in terms of climate, hydrology, environmental policy, etc. This makes restoration planning a complex, multi-objective problem. As a community of wetland managers, researchers, and enthusiasts, we need to work together to answer challenging questions: What is possible where? Which goals should be prioritized for a given site? Which should not? How high should we aim?—knowing that we can come up short by being too ambitious or not ambitious enough. Making progress on these issues requires collaboration among stakeholders to facilitate collective learning and diffusion of innovation.

SYMPOSIUM: Modern Wetland Restoration & Management I, Wednesday, February 25, Hall of Ideas EH, 1:50 - 2:10 pm

Lawrence, Beth, DePaul University
Shane Lishawa, Loyola University Chicago
Nancy Tuchman, Loyola University Chicago

Typha X glauca invasion increases soil methane flux

Plant invasion by monotypic dominant species can alter soil physical and biological properties to promote methane emissions, a potent greenhouse gas. We tested the effects of *Typha X glauca* invasion on soil methane flux using controlled mesocosm and laboratory incubation experiments. *Typha* invasion of native plant-dominated mesocosms increased methane emissions three-fold (*Typha*: mean: 45.9 ± 16.7 mg C m^{-2} h^{-1}; native: 15.0 ± 10.5 mg C m^{-2} h^{-1}). Methane emissions were positively correlated with soil carbon, nitrogen, and aboveground biomass, all of which were greater in *Typha*-invaded mesocosms. Soils collected from three Midwestern wetlands invaded by *Typha* also had greater methane production potential during laboratory incubation than did soils collected from wetlands dominated by native sedge meadow vegetation. Together, our data suggest that replacement of large tracts of native wetlands with monocultures of invasive *Typha* could alter regional methane emissions.

Wetland Invasive Species, Wednesday, February 25, Hall of Ideas GJ, 4:20 - 4:40 pm

Linton, Mary, Snapping Linton Ecology
Mike Mossman, WDNR
Alice Thompson, Thompson and Associates Wetland Services

Using poetry to tell our stories: "The sound of water"

We reprise our poetry reading with new material. You protect what you love. Human relationship to wetlands is certainly about good science. It is also an affair of the heart – the lift of ducks off the surface of Horicon Marsh, a canoe through a riverside maple swamp, memory of being bitten by a toad bug at pond edge. Other forms of appeal may be more effective than a well-crafted scientific paper at moving the heart. We will present poetry by various authors, and may include Mary Oliver, Seamus Heaney, Mary Rose O'Reilly, Halvor Skavlem, Lorine Niedecker, Dan Gerber, Wendell Berry, and other Haiku and Tanka masters. Handouts with wetland poetry will be available. "At the ancient pond/a frog plunges into/the sound of water" by Bashō (1644-1694).

Wetlands and People, Wednesday, February 25, Hall of Ideas FI, 2:10 - 2:30 pm

Little, Amanda, UW-Stout
James Church, UW-Stout

A tale of two summers: Ephemeral pond plant communities respond to interannual climate variability

Ephemeral pond communities are often defined more by their animals than by their plants, and their plant communities remain understudied. We collected two growing seasons of data (2013 and 2014, part of a five year project) on ephemeral pond plant communities in the Chippewa Moraine using both permanent plots and whole-wetland transects. 2013 was characterized by a late and compressed spring, but otherwise fairly average precipitation. Most ponds dried by late August. 2014 had a late and compressed spring and above average precipitation, to the extent that many ephemeral ponds did not dry before the first frost. We determined factors driving ephemeral pond plant community organization in both 2013 and 2014 and examined whether the plant communities themselves and these factors were dependent upon seasonal precipitation differences. During 2014, many emergent perennials were fully submerged for the entire season or began growing as the wetlands dried, dying back when they reflooded due to heavy August rain. Many emergent annuals only grew on woody debris within the wetland, never germinated, or likewise died when wetlands reflooded. The net result was reduced vegetation cover during the 2014 growing season. Additional results will be presented. This research has implications for ephemeral pond conservation because climate change is predicted to cause more "flashy" atypical precipitation patterns in the future. Diminished live biomass in the wetlands may lead to a decrease in plant diversity, grazer macroinvertebrate groups, and food for ducks and amphibians.

Native Wetland Flora, Wednesday, February 25, Hall of Ideas GJ, 1:50 - 2:10 pm

Longabaugh, Sean, Integrated Restorations, LLC.

Eastern prairie fringed orchid: The possibility of recovery

In 2007, Integrated Restorations, LLC, began a project to establish a viable satellite population of Eastern Prairie Fringed Orchid (Orchidaceae: *Platanthera leucophaea* (Nutt.) Lindley, hereafter EPFO) at the Swamplovers Nature Preserve in Cross Plains, Wisconsin, by transplanting dormant EPFO plants from the highly viable population of the Jon and Connie van Altena property (Koshkonong Corners State Natural Area), located near Milton, Wisconsin. EPFO is a Wisconsin-endangered (federally-threatened) species. Conversion of habitat to agriculture, invasions by exotic species, poaching/over-collecting, and the absence of wildfires have all been implicated as causes of EPFO's decline and at-risk status. Because of these factors, human intervention may be needed to maintain, as well as expand, existing populations. Simply transplanting plants was not a sufficient approach. Although the plants were caged for protection, they would only show up randomly each year… why? How long do they live, what soil type do they thrive in, are they reproducing? These were all questions requiring answers. Because transplanting alone was not giving us a stable/viable population, we decided to try to hand pollinate the existing EPFOs in 2013. This summer we found dozens of plants that were clearly the result of our pollination efforts. We found numerous plants outside the cages for the first time. We conclude that satellite populations of this precious and beautiful plant can be created fairly easily and with great success.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Marek, Mike, Marek Landscaping, LLC

Floating islands: Surrogate fish habitat in the Milwaukee river estuary

An estimated 80% of native Great Lakes fish rely on wetlands for part of their lifecycle. Due to industrialization, large areas of the Milwaukee River Estuary in Milwaukee no longer support the wetlands that the fish rely on. The Gateway to Improve Long-term Spawning (GILS) project in the Milwaukee Estuary seeks to improve fish habitat and spawning patterns within the Milwaukee River Area of Concern by creating habitat where none exists, along the steel and concrete walls of the estuary. Marek Landscaping, LLC, in association with Groundwork Milwaukee, Milwaukee Metropolitan Sewerage District, and WDNR, have placed four wetland islands in the Milwaukee, Menomonee, and Kinnickinnic River portions of the estuary, thereby reducing barriers between upstream spawning/ nursery habitat and Lake Michigan. Funding for the project comes from the Great Lakes Restoration Initiative and the Fund for Lake Michigan. The islands are an innovative technology with a wide variety of uses for water quality and fishery enhancement by bio-mimicking wetlands. They use a blend of synthetic and natural floating media from which plants grow and form paraphytic organisms and biofilms, creating food sources for fish and zooplankton. Marek brought the floating island technology to Milwaukee, co-authored grant applications, and developed a design and anchoring system specific to the estuary. The firm also assisted with the fabrication and installed two floating islands in 2013 and two in 2014. The presentation will address initial floristic results and observations of the installations made in 2013 and 2014 and how returning habitat to the estuary will improve spawning.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Matteson, Sumner, WDNR
Patricia Manthey, WDNR (retired)
Mike Mossman, WDNR
Lisa Hartman, WDNR (retired)
Ed Diebold, Riverbanks Zoo and Gardens, South Carolina

Wisconsin's Trumpeter Swan Recovery Program: A 27-year retrospective (1987-2014) on research, management, and collaboration

The Wisconsin Trumpeter Swan Recovery Program, which had a recovery goal of establishing a breeding and migratory population of at least 20 pairs by the year 2000. The program employed four techniques during 1987-2005: 1) cross-fostering 35 avicultural Trumpeter Swan eggs under feral Mute Swans, 1987-1988 only; 2) decoy-rearing cygnets hatched from eggs collected in Alaska at the Milwaukee County Zoo, imprinting them on life-sized decoys, and flying the cygnets to remote wetland sites in northern and central Wisconsin, where they followed floating decoys maneuvered by camouflaged University of Wisconsin interns in float-tube blinds; the cygnets flew free and migrated; 3) captive-rearing cygnets hatched from Alaskan eggs at the Milwaukee County Zoo, then maintaining them for two years at the GE Medical Systems facility near Pewaukee before releasing them in pairs at selected wetland sites in northern and central Wisconsin; and 4) captive parent-rearing cygnets at the facilities of selected cooperators; cygnets remained with pinioned pairs until 11 months of age, when they were released at selected sites in northern Wisconsin. Cross-fostering proved ineffective and was discontinued. The other three techniques were productive and together helped establish a breeding population that reached a record high of 253 breeding pairs and 455 young in 2014. The major hurdles of lead poisoning (only 1-2 spent lead pellets can sicken or kill a Trumpeter Swan) and accidental/intentional shootings were overcome—the latter through vigorous educational efforts. Power line collisions pose a growing threat. Collaboration between several private and public organizations along with hundreds of citizen monitors has proved key to program success. Programmatic lessons/ implications: a) Identify clear, obtainable research and management objectives; b) identify/implement funding strategy early on and pursue partnering opportunities as they arise; c) remain open to new/different approaches and adjust course as necessary; d) celebrate successes and learn from failures; and e) be patient and persist through early years of disappointment: visualize reaching your goal.

Wetland Wildlife, Wednesday, February 25, Hall of Ideas GJ, 10:40 - 11:00 am

Mertes, OSF, Sr. Helene, Sisters of St. Francis of Assisi
Jan Parrott, Sisters of St. Francis of Assisi

Restoration of Deer Creek wetland in Milwaukee

The campus of the Sisters of St. Francis of Assisi is located on 26 acres on the south side of Milwaukee (St. Francis) adjacent to Bay View Park and the shore of Lake Michigan. In October 2009, an Environmental Resource Assessment was conducted to determine how we could use our land resource in a sustainable way at present and into the future. Given our Franciscan heritage, maintaining respect for all creation and striving to do what is possible to preserve our natural resources is an important value to the Sisters. We first looked at campus sites that did not have buildings as they were accessible for immediate action. Three areas were surfaced for review: the open areas suited to growing food (orchard/gardens), our unused athletic field (now developed into an urban forest), and 2.5 acres of wetland, remnants of the Deer Creek river bed. Restoration of the wetlands, with goals to create better habitat for wildlife and to enhance the aesthetic and spiritual nature of our campus, became a priority. The biggest challenge was the presence of invasive species, in particular Japanese Knotweed and reed canary grass, which covered a large section of the valley. WDNR provided a grant of $20,000. A combination of methods has been used to eliminate most of the invasives in the valley. We are now introducing native plantings and developing trails adjoining the wetlands. It is a work in process, and we are committed to constant monitoring and development. We believe this will add to the many efforts around the world to make a better quality of life for all beings.

Wetland Restoration Case Studies II, Thursday, February 26, Hall of Ideas GJ, 11:20 - 11:40 am

Mladenoff, David, UW-Madison
Hayden Elza, UW-Madison

Estimating relative wetland loss in Wisconsin using the 1800s Public Land Survey data and current wetland mapping

Estimating wetland loss since before widespread Euro-American settlement has been difficult because of a lack of spatial data on the status of wetlands in the 1800s. Because of the coarseness of the data and the increased recognition of additional wetland types in our current day, any estimate based on historical records is likely to under-estimate the historical amount of wetland. We have used notes recorded by surveyors of the original US Public Land Survey in Wisconsin that took place from the 1830s in the south to the 1860s in the north. Surveyors recorded section corner information on wetlands as well as other ecosystem types, including marsh, swamp, bottom, low wetland, slough, and wet prairie. Using these data requires addressing several problems, including the accuracy and consistency of their classes, quality of current wetlands for comparison, and the spatial error of each data set and in combination. Nevertheless, if the PLS corners described as wetlands are used as a point sample against which to measure change, the data can provide a qualified estimation of wetland loss that may be helpful in understanding where in the state the greatest wetland loss has taken place. Across all classes, these data show that northern Wisconsin has experienced a loss of approximately 10% of its wetlands and southern Wisconsin a loss of approximately 38%. We will present and these results and discuss what these estimates may mean, based on the data source, and how this may be useful.

Wetland Assessment I, Thursday, February 26, Hall of Ideas FI, 9:30 - 9:50 am

Monagan, Ivan, University of Michigan, Ann Arbor

Structure and diversity of aquatic macroinvertebrate communities along a coastal dune chronosequence

Despite the global ubiquity of coastal dune ecosystems, relatively few studies have addressed the wetland component of dunes (i.e., the swales), and even fewer have examined the relationship of swale biodiversity to the conditions of the surrounding landscape. To determine if patterns of freshwater faunal biodiversity change as a function of regional landscape succession, I assessed communities of swale macroinvertebrates and the abiotic and biotic features of swales to estimate the relative influence of local environmental variables on species spatial and temporal diversity in coastal dune ecosystems. I used a series of three consecutive coastal swales on the coast of Lake Michigan, representative of pioneer, primary, and secondary succession, to test the hypothesis that swale age and size (surface area) are primary drivers of species diversity and abundance. I recorded a total of thirty-six families of aquatic macroinvertebrates along the chronosequence, resulting in consistent richness values and 44-68% compositional variance (beta diversity) between swales. Species diversity varied significantly among swales ($P = 0.010$), with a positive correlation between biodiversity and increasing swale area, and a negative relationship for decreasing pH, both of which correlate with increasing stage of succession. The results of this study highlight the relative importance of several environmental variables on patterns of diversity and may serve as a foundation for the monitoring, management and conservation of biodiversity in regions of coastal development.

Wetland Wildlife, Wednesday, February 25, Hall of Ideas GJ, 11:20 - 11:40 am

Nick, Sydney, USFWS
Jeff Ingebritsen, USFWS

Surface waters and wetlands inventory of Wisconsin

The USFWS's new Surface Waters and Wetlands (SWI) dataset identifies the distribution and location of Wisconsin's 854,402 acres of lake habitat, 39,654 acres of river habitat, 1,113,686 acres of emergent wetland habitat, 4,287,881 acres of forest/shrub wetland habitat and 112,019 acres of pond. Often referred to as version 2.0 of the National Wetlands Inventory (NWI), the SWI dataset provides more inclusive geospatial data of all wetlands and surface water features. It stems from the need to represent all these features as polygons in a geospatial dataset to facilitate accurate area calculations and provide consistent, standardized ecological classification to allow for adaptive management, geospatial summaries, and modeling. The SWI has been created by retaining the wetland polygons from the NWI and Wisconsin Wetlands Inventory (WWI) datasets and the deepwater polygons from NWI and the WDNR Hydro Layer, which were converted to NWI wetlands standards. Additionally, the data were supplemented with linear hydrography data, buffered to become polygonal features, as a secondary source for any single-line stream features not mapped by the NWI or WWI, and to complete segmented connections. There are many opportunities to apply SWI data to assist in resource management, planning, and strategic habitat conservation efforts. Applications include various geospatial analyses, tracing contaminant pathways, quantifying flood water retention, identifying habitat restoration opportunities, examining continuity or dissection of habitat corridors, quantifying aquatic and wetland resource types, and facilitating ecological modeling. For additional information or to download the data visit: http://www.fws.gov/wetlands/.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Nieset, Julie, Illinois Natural History Survey
Susan Vonderhaar, Dater Montessori Nature Center
George Hardebeck, Arts Restoring Culture for Healing Earth

The Dater Montessori School wetland construction story

We coordinated and helped construct a small wetland at Dater Montessori Elementary School in Cincinnati, Ohio, completed in September 2012. This wetland serves as an educational tool for students at the school and residents in the community. Financial and in-kind donations were received from numerous federal and state agencies, community groups, and other volunteers to completely cover the costs of the project as well as the purchase of educational supplies for teachers and students. During the day of construction, students rotated between five stations, one of which was the wetland. Fourteen classes, preschool through 6th graders, cycled through the rotations. At the wetland construction site, participants watched the excavation process, learned about surveying tools and techniques, assisted with raking of the soil, helped with the laying of the liner and geotextile, spread wheat seed and straw for erosion control, planted and watered the wetland plants and seeds, and learned about wetland plant and soil characteristics. Wetland plant establishment was robust by summer 2013. Transplants had a higher survival rate than seeds. Thus far, invasive plant species have not been a problem. Macroinvertebrate indicator species are pollution tolerant, indicative of a newly constructed environment. Ongoing studies include students conducting surveys over successive seasons and years to compare plant and macroinvertebrate species over time. The wetland has become an integral part of the schools' nature center, offering teachers an alternative classroom setting and a place to immerse students in nature-based learning.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Paulios, Andy, WDNR

Can I please flush the toilet? The challenges behind planning and executing restorations in the 21st century

Wetland managers often inherit older restorations, mitigation sites, or restorable basins that are now constrained by factors that make the original intent of the restoration challenging and likely will prohibit development of historical ecological and hydrological conditions. Brazee Lake (Patrick Marsh), once a high-functioning deep marsh, is an older wetland mitigation site that is now challenged by persistent high water post-restoration. Hwy 151 and future development in Sun Prairie and in the watershed will likely continue to alter the hydrology of the Lake, further challenging the mitigation site. This talk will build upon the previous talks in the symposium to explore the process of selecting appropriate objectives for the future restoration of the wetland. Audience participation is expected as we use this mitigation site and others from the session as case studies for how the wetland restoration field collectively moves forward with management actions in the 21st century.

SYMPOSIUM: Modern Wetland Restoration & Management II, Wednesday, February 25, Hall of Ideas EH, 4:40 - 5:00 pm

Peter, Matt, UW-Green Bay
Mathew Dornbush, UW-Green Bay

When genotype matters: Ecological implications of native and exotic *Phragmites australis* genotypes in northeastern Wisconsin

Invasion by non-native species often results in undesired effects to recipient ecosystems, but the general mechanisms driving these changes remain poorly understood. In select cases, such as with dominance of the pandemic common reed (*Phragmites australis*), differences between exotic and native genotypes alone appear to produce divergent ecosystem states. This study sought to improve mechanistic linkages between dominant plant traits and ecosystem properties by evaluating differences between genotypes and recipient ecosystems, while holding species identity and geographic region constant. Specifically, we compared stands of native and exotic *P. australis* at three wetland sites in northeastern Wisconsin. Within and adjacent to both native and exotic stands, we applied litter removal and seed addition treatments to evaluate the effects of litter accumulation and propagule limitation on native plant diversity, while simultaneously measuring light levels and soil properties. We expected greater litter biomass, enriched soil nutrient levels, higher *P. australis* abundance, and lower native plant richness in areas supporting exotic genotypes. Preliminary analyses from two growing seasons provided mixed results, suggesting that the strength of negative effects associated with exotic *P. australis* invasion may depend upon the characteristics of the wetlands. In those wetlands affected by exotic *P. australis*, we expect significant increases in native richness following both seed addition and litter removal. This study enhances our understanding of the mechanisms by which ecosystem characteristics and genotypes interact to elicit ecosystem change, thereby facilitating the design and implementation of improved management strategies.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Potter, Ken, UW-Madison

Wetland restoration to enhance sediment and phosphorus trapping

Riverine wetlands in agricultural watersheds have commonly accumulated sediment, reducing the frequency of overbank flow and hence the capacity to trap sediment and associated nutrients. Removal of this sediment would enable restoration of these water quality functions. But is it appropriate to restore a wetland for the primary purpose of trapping sediment and nutrients? A case study of a small wetland on Dorn Creek in Dane County (Wisconsin) provides an opportunity to explore this issue.

Wetland Restoration Case Studies I, Thursday, February 26, Hall of Ideas GJ, 10:10 - 10:30 am

Powell, Ken, Minnesota Board of Water and Soil Resources

Integrating state and federal wetland regulatory programs: The Minnesota example

Many states have both state and federal wetland regulatory programs as well as numerous local regulatory authorities, ordinances, and rules. Minnesota created a state regulatory program in 1991 just as USACE increased efforts to regulate wetlands and other water resources in the state. Integration of these overlapping programs has been and continues to be challenging. There is currently significant pressure to better integrate state and federal programs for the benefit of the regulated public. Integration efforts in Minnesota continue to focus on reducing redundancy for the regulated public while preserving the safety net provided by overlapping wetland protections. Four strategies are being pursued to integrate programs, including developing interagency memorandums of understanding, hiring joint agency employees, using interagency teams, and using exemptions/general permits that reduce the need for dual agency approval under certain circumstances. All of these strategies involve particular challenges resulting from differing agency approaches to regulation, differing agency structures, and differing regulations. There remains an overall challenge of integrating programs while maintaining wetland protections. Recognizing the challenges of program integration and learning from Minnesota's efforts may benefit other states attempting to integrate their wetland regulatory program with the federal program.

Applications of Wetland Science in Policy & Regulation, Wednesday, February 25, Hall of Ideas FI, 10:40 - 11:00 am

Reid, Brendan, UW-Madison
M.Z. Peery, UW-Madison

A tale of three turtles: Conservation and genetics of wetland chelonians in Wisconsin

Turtles (order Chelonia) are considered to be one of the most endangered groups of vertebrates globally, and North American turtles have experienced declines in recent decades due to wetland loss, road mortality, and other factors. Blanding's turtle, an iconic Wisconsin wetland species, has a complicated history in terms of legal and conservation status. In 2013 this species was removed from the state threatened species list in spite of ongoing population declines. To inform conservation efforts directed at this sensitive species as well as other Wisconsin turtles, we conducted turtle surveys throughout the state from 2010-2013. We collected demographic and genetic data for Blanding's turtle as well as for two more common species, the painted turtle and the snapping turtle. Our results indicate differential responses to changes in the landscape among the three species, with Blanding's turtles showing evidence of population declines associated with areas of greater road density. Each species demonstrates an individualistic pattern of spatial genetic variability as well. Blanding's turtles throughout the state can be divided into several genetically distinct populations, some of which correspond to natural features (e.g. the lower Wisconsin River) while others correspond to isolated populations embedded within human-dominated landscapes. The other two species follow an isolation-by-distance pattern, with snapping turtles exhibiting greater resistance to gene flow in human-altered landscapes than painted turtles. These results indicate that maintaining genetically diverse and viable populations of wetland species will require mitigation of upland threats and barriers to gene flow in addition to the preservation of wetland habitats.

Wetland Wildlife, Wednesday, February 25, Hall of Ideas GJ, 11:00 - 11:20 am

Rowland, Freya, University of Missouri
Raymond Semlitsch, University of Missouri

Components of pond canopy cover differentially affect tadpoles and salamander larvae

Frogs and salamanders are dominant consumers in wetlands. They are important in nutrient cycling, structuring food webs, and as an energy source to other consumers. There has been debate about whether open canopy or closed canopy wetlands are the best for larval amphibian growth and development. The majority of canopy cover studies have focused on algae-consuming frogs and concluded open canopy is better; but for predatory salamanders, sometimes canopy has no effect and sometimes closed canopy is best. In summer 2014, we conducted an experiment in 1000L cattle-tank experimental wetlands to separate the role of canopy cover on amphibians. We manipulated four variables: light supply (low/high), nutrients (low/high), Southern leopard frog (*Lithobates spenocephalus*) tadpoles (presence/absence), and larval spotted salamanders (*Ambystoma maculatum*; presence/absence). These species are often found in the same wetlands and occupy different feeding niches, so investigating the effect of each species alone versus together provides insights into food web dynamics. Our results suggest the components of canopy cover affect anurans and salamanders differently. For frogs, nutrients were the most important predictor, but for salamanders, light is more important. Interestingly, when both species were present in the same wetland, both performed worse. This research highlights that separating out light and nutrients from 'canopy cover' can explain more variation in amphibian response. It also highlights the need for a better understanding of trophic dynamics within wetlands.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Sandusky, Charles, Northeastern Illinois University
Jennifer Slate, Northeastern Illinois University

Is there evidence of eutrophication in Volo Bog Nature Preserve? A paleolimnological study with diatoms

Volo Bog Nature Preserve in northeastern Illinois is threatened by increasing suburban sprawl encroaching on its borders. To determine if the *Sphagnum* wetland has become more eutrophic, we collected a sediment core and analyzed diatoms preserved over time. Diatom species composition showed no apparent patterns from the bottom to the top of the core, which is estimated by radiocarbon dating to span several hundred years. The most common diatom species throughout the core, *Gomphonema gracile* and *Encyonema silesiacum*, thrive at low to moderate nutrient levels. Thus, we did not find evidence of recent eutrophication. In continuing research, diatoms will be analyzed in a sediment core spanning the past 6300 years to determine if longer trends in eutrophication occurred as the bog developed over time.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Shackelford, Penny
Connie Brouillette
Gary Shackelford
John Van Altena

Thirty years of progress: How neighbors in Rock County became stewards of SNAs and orchids

Fair Meadows and Koshkonong Corners are privately owned SNAs in Rock County that are home to one of the largest populations of eastern prairie fringed orchids (EPFO) in Wisconsin. The properties, located within one mile of each other, contain diverse habitats ranging from open water marsh to sedge meadows, oak savannas, and oak woodlands. This is our story of neighbors became fast friends through efforts to improve their lands for hunting, birdwatching, and photography. Shared labor, experience, and equipment allowed brush removal, herbicide application, and prescribed burns. Along the way, we were inspired by consultants in the WDNR, NRCS, USFWS, WDOA, The Prairie Enthusiasts, and private restoration companies. After about 10 years, a rich diversity of plants appeared in the sedge meadows, crowned one summer by 3 blooming EPFO. We continued to work together to monitor the EPFO populations, study the hydrology of their habitat and pollination, and adapt our management of brush, reed canary grass, and deer to allow the EPFO and its habitat to prosper. In recent years, hundreds of blooming plants have been recorded. Research continues on the potential to transplant the EPFO. Conservation easements were placed on the properties and each was named a SNA. We continue to restore all of the habitat types on our lands.

Native Wetland Flora, Wednesday, February 25, Hall of Ideas GJ, 2:30 - 2:50 pm

Shafer, Kevin, Milwaukee Metropolitan Sewerage District
Peg Kohring, The Conservation Fund

Greenseams at 100

The Greenseams Program, a flood management and water quality program of the Milwaukee Metropolitan Sewerage District (MMSD), focuses on wetland restoration and land conservation to reduce flooding and nutrients in the Greater Milwaukee Region. In 2015, the program will celebrate the 100th acquisition and will expand geographically as well as programmatically. You will hear what made the program successful from Kevin Shafer, Executive Director of MMSD, and Peg Kohring, Midwest Director of The Conservation Fund, as well as how MMSD has formed new partners to address nutrients on a watershed-wide scale.

Watershed Approaches to Conservation, Wednesday, February 25, Hall of Ideas EH, 10:40 - 11:00 am

Skawinski, Paul, UWEX Lakes Program

WANTED: Be on the lookout for these new wetland invaders

Early detection of invasive species is crucial to the likelihood of eradication. People who can identify wetland invasive species in early stages of colonization are valuable assets in our fight to preserve native species diversity and habitat quality of our wetlands. Unfortunately, we know that wetlands have long been used as disposal sites for everything from tires to aquatic pets. Yellow floating heart and water hyacinth are popular aquatic plants sold through the aquarium and water garden trades, and these species have been illegally released into Wisconsin wetlands in recent years. Red swamp crayfish have long been imported to Wisconsin through distributors servicing science classrooms, and these have also been found dumped into local wetlands. Come learn about each of these species and how to identify them so you can be one of the "eagle eyes" watching for these harmful invaders.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Staffen, Amy, WDNR
Ryan O'Connor, WDNR

Climate change vulnerability assessments for 24 wetland types in Wisconsin

Climate scientists are projecting significant changes in Wisconsin's temperatures and precipitation patterns in the future; these projections vary spatially across the state. In October and November of 2014, the Bureau of Natural Heritage Conservation convened eight workshops around the state to develop climate change vulnerability assessments for 24 wetland types such as open bog, floodplain forest, and wet prairie. Fifty-one workshop participants considered how changes in temperature and precipitation would affect dominant species as well as major ecosystem drivers such as water budgets, fire regimes, flood regimes, and freeze-thaw cycles. Synergies with current stressors such as invasive species, storm water runoff, and nutrient loading were also considered. Participants also identified factors that contribute to each natural community's ability to adapt to a changing climate. Wetland types with the highest vulnerability included southern communities such as southern sedge meadow and calcareous fen due to anticipated impacts such as more intense storms exacerbating nutrient and sediment runoff. In addition, highly specialized northern communities such as boreal rich fen and shore fen were also ranked highly vulnerable due to anticipated high temperatures and potentially changing hydrology. Communities with low vulnerability included those that were highly adaptable to variable hydrology and/or altered conditions such as emergent marsh and alder thicket. A future electronic survey will delve into possible actions in response to climate change impacts (early results may be shared at conference). Resulting recommended actions and vulnerability rankings will be tied to each wetland type in Wisconsin's 2015 Wildlife Action Plan update.

Native Wetland Flora, Wednesday, February 25, Hall of Ideas GJ, 1:30 - 1:50 pm

Stamer, Reid, EarthView Environmental Inc.

Establishing a forested wetland: Lessons learned

Permanent impacts to forested wetlands require a minimum in-kind compensatory mitigation ratio of 2.5:1 for created wetlands in Iowa and 1.7:1 in Wisconsin. Section 404 permits often specify explicit survival rates, tree size, and diversity requirements. Carefully selected trees must meet permit provisions and also be well-suited for the mitigation area with respect to soils, climate, and hydrology. For large projects, this entails the planting of hundreds of trees within the newly created site. On smaller scales, each individual tree becomes (relatively) more important. High costs associated with labor and materials, limited budgets, and environmental unknowns require tough decisions on where best to allocate resources to have a satisfactory outcome. Should larger trees be purchased instead of higher quality tree protection? Is it more feasible to water trees or simply replant? What landscape position will lead to optimal survival rates? Can species X be substituted for species Y? Case studies will be presented to address forested wetland creation: what works, what doesn't, and other possible alternatives.

Wetland Mitigation: Approaches & Outcomes, Wednesday, February 25, Hall of Ideas FI, 4:40 - 5:00 pm

Stevens, Andy, UW-Madison
Andrew Mangham, UW-Madison

Wetland restoration for ecology and community in Nine Springs Corridor: The full potential of our first E-Way

Nine Springs Creek is a spring fed stream that runs through the Lewis Nine Springs E-Way in Dane County, Wisconsin and is part of the larger Rock River Basin. The stream begins as an intermittent outlet near Dunn's Marsh and flows east until it discharges into the Yahara River above Upper Mud Lake. Large portions of the 6.16 mile stream are channelized and are subject to surface water runoff from surrounding urban and agricultural areas. Despite being added to the 303 (d) impaired waters list by WDNR in 2004, this system offers a suite of community engagement opportunities including educational areas, kayaking, biking, and birding. The 2014 Water Resources Management Program, led by Ken Potter, identified the potential benefits this system would have to multiple stake holders, the community, and wildlife upon undergoing restoration. After collecting field data, water quality measurements, historical data, modeling designs, and gathering opinions from the many interested parties, a final design is proposed that includes re-establishing a natural meander in a portion of the stream. Among the many benefits this restoration offers, none are more important than re-connection to the surrounding wetland. By allowing natural inundation, the wetland will promote improvements to bird habitat, amphibian and reptile habitat, northern pike spawning habitat, and the chain of lakes' overall health through water quality improvements via sediment trapping. This presentation offers a summation of our work and proposed future directions and benefits this restoration offers members of the community, interested parties, and wildlife itself.

Wetland Restoration Case Studies II, Thursday, February 26, Hall of Ideas GJ, 11:00 - 11:20 am

Swearingen, Amanda, UW-Madison
Jessica Price, UW-Madison

Generating spatial narratives: The impact of different management regimes in the Two Hearted River Watershed

In the Midwest and many other locations, wetlands are often embedded in a mosaic of land cover types, especially forests. This spatial context means that successful land management and conservation efforts must ensure the ecological integrity of both forest and wetland ecosystems while meeting a variety of goals, including timber harvest. The Two Hearted River watershed in Michigan's Upper Peninsula is an example of a working landscape in which managers face the challenge of applying management and conservation strategies across multiple forest and wetland cover types. To help managers compare the potential outcomes of various strategies and develop more resilient conservation practices, the Forest Scenarios Project has simulated four alternative management scenarios for the Two Hearted River watershed. Rather than static maps of projected land cover and summary statistics, we are using an interactive web interface to connect land managers, conservation professionals, and other users to the modeling results. The potential outcomes of each scenario for land cover and species composition are summarized as spatial narratives, or storylines illustrating how these landscapes might function under alternative land management strategies. For example, users can explore a spatial narrative and accompanying interactive map that illustrates the finding that conservation strategies aimed at blending ecological and economic goals may be less effective at conserving late succession land cover in wetlands than in forests. Here, we share the results of the four scenarios, specifically focusing on wetlands, and describe the process of generating and sharing spatial narratives for the Two Hearted River watershed.

Watershed Approaches to Conservation, Wednesday, February 25, Hall of Ideas EH, 11:20 - 11:40 am

Taylor, Scott, Taylor Conservation LLC

Identifying actually restorable wetlands in the watersheds of Horicon Marsh and Lake Sinissippi

Horicon Marsh and Lake Sinissippi occupy the headwaters region of the Rock River Basin. Although they are premier wildlife habitats, these waters are surrounded by agricultural landscapes and therefore suffer from excessive inflow of sediment and nutrients. While improved tillage and livestock management are the ultimate solutions to polluted runoff, the sediment and nutrient retention capacity of restored wetlands can be harnessed to cleanse runoff as well. Using soil and land cover maps, WDNR created the Potentially Restorable Wetland map for the Rock River Basin to identify wetland restoration sites. However, many PRWs are difficult to restore since they are large and span multiple properties. The objective of this project was to overlay property boundaries onto the PRW map in a Geographic Information System in order to find PRWs in the sub-watersheds draining into Horicon Marsh and Lake Sinissippi that were mostly contained within single properties. Ninety-nine PRW basins larger than 15 acres and thought restorable based on property boundaries were identified within the 470-square-mile project area. The PRWs were field inspected from the nearest vantage point on a public road. Eighty-one of 99 (82%) PRW basins were judged restorable to some degree based on the presence of artificial drainage that could be disabled without impacting a neighboring property. We plan to share the field-confirmed PRWs with all public and private parties involved in wetland restoration in the study area.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Tennessen, Ken, University of Florida

Using exuviae searches to monitor Odonate diversity in Wisconsin wetlands

Determining the species composition of Odonata (dragonflies) and monitoring their populations for conservation and management concerns is a challenging task, especially taking into account the variation in aquatic habitat types. Various methods for data collection are available based on the adult and/or immature stage. Adult dragonflies are extremely mobile insects. Generating inventory and population density data using capture-mark-release studies on the adult stage is time and labor intensive work. Other difficulties include the fact that adult dragonflies often frequent habitats that are not specific breeding sites, and that mark-recapture efforts often yield scant data. Collecting Odonate exuviae (the larval exoskeleton that remains after emergence of the adult insect) presents an alternative method for generating survey data. Such studies have been used with good success, at least with dragonflies (Anisoptera), along river banks and lake shores due to the following advantages: 1) exuviae can be identified to species and sexed, 2) exuviae are cast exoskeletons, therefore no living part of the insects' life cycle is sacrificed or harmed, 3) exuviae can be easily quantified, and 4) they are good indicators that the species found use the habitat for breeding. However, exuviae are rather fragile and do not remain intact under certain conditions for long periods, being destroyed by physical factors such as rain and wind. Also, searching for exuviae in some types of wetlands is a difficult practice. Examples of exuviae studies and the types of data generated will be presented.

SYMPOSIUM: Wetland Dragonflies and Damselflies II, Thursday, February 26, Hall of Ideas EH, 11:00 - 11:20 am

Trochlell, Patricia, WDNR
Tom Bernthal, WDNR
Richard Henderson, WDNR

Comparison of vegetation monitoring techniques for evaluating wetland plant communities at restoration sites

Wetland restoration has been ongoing in Wisconsin for decades but, until a wetland mitigation program was implemented, plant community response was not consistently evaluated to measure success. In order to measure plant community response to restoration, consistent, comparable, and meaningful monitoring methods are needed. We evaluated mitigation site monitoring techniques at a range of mitigation sites of various sizes. We compared results obtained from timed meander vs. plot methods for floristic quality assessment variables. Recommendations for sampling techniques and survey design will be presented.

Wetland Assessment II, Thursday, February 26, Hall of Ideas FI, 11:00 - 11:20 am

VanBeek, Kelly, WDNR

What the muck are we doing? The trials and tribulations of restoring wetlands on histosols

Restoring wetlands on previously farmed muck soils has been a cornerstone of conservation programs in southeast Wisconsin. Extreme alteration of hydrology in order to farm a site, significant organic matter loss and buildup of an invasive species seed bank can make managing these sites difficult in the long term. Wetland design considerations such as berm construction and water control structure placement are significantly impacted by unique soil characteristics and the typically flat, agriculturally-dominated landscapes these sites are found in. This presentation will review the successes, challenges, and future management strategies of several large restored muck farms in Walworth and Waukesha counties while incorporating comments from property managers in other areas of Southern Wisconsin. These sites vary in age from 15 to 1 year post restoration. Common themes such as invasive species control of the "big three" (hybrid cattail, giant ragweed, and stinging nettle) and dike maintenance will be highlighted along with site conditions believed to contribute to a successful seed catch. Finally, future management strategies such as conservation farming to "reset the clock" on previously restored areas that have become significantly degraded must be addressed to meet the management needs of these wetlands into the future.

SYMPOSIUM: Modern Wetland Restoration & Management II, Wednesday, February 25, Hall of Ideas EH, 4:00 - 4:20 pm

Vosen, Grace, Northland College
Sarah Johnson, Northland College

Reading the seed bank at the Beartrap Creek Wetland mitigation bank site

Investigating the seed bank is one approach to characterizing current and historical plant communities at a site and can be used to determine if the re-seeding of native species will be necessary for restoration. At the DOT's proposed Beartrap Creek Wetland Mitigation Bank Site (Bayfield County, Wisconsin), we collected soil samples from 26 locations in and between drainage ditches installed by a former landowner. We maintained the homogenized samples in the Northland College greenhouse throughout the summer and fall of 2014. To promote seed germination, we placed soil samples on both potting soil and sand substrates and provided both moist and flooded water regimes for each sample. Plants that emerged were transplanted and allowed to grow until they could be more easily identified and counted. We will use these data to assess the diversity, floristic quality, wetland indicator status, and ratio of native to non-native species within the seed bank at this 190-acre site. Preliminary results indicate that at least 25 species have germinated, with the majority of species germinating from the moist soil rather than the flooded soil treatment.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Walther, Barbara, USACE
Tom Nedland, WDNR

2015 Wetland Delineation Guidance: An evolution of science and regulation

Much has changed with wetland delineation in the nearly 30 years since publication of the 1987 USACE Wetland Delineation Manual (87 Manual). Significant improvements to the science behind wetland and aquatic resource identification have been made since 1996, the last time that written guidance was posted for delineators in Wisconsin. Regional supplements have been developed in response to the National Academy of Science's recommendation for regionalization; we have updated field indicators for soils and hydrology as well as a new regularly updated plant list. Despite these improvements, misinterpretations and misapplications of the science behind wetland delineation remain, leading to protracted regulatory reviews that cost taxpayers and project applicants additional time and money. The 2015 Guidance was developed to address common misunderstandings in application of wetland science and to provide consistency in reporting to aid in the regulatory review process. This presentation will introduce the 2015 Guidance and highlight lesser-known issues with some of the field indicators.

Applications of Wetland Science in Policy & Regulation, Wednesday, February 25, Hall of Ideas FI, 11:40 am - 12:00 pm

Weber, Hollis, EarthView Environmental, Inc.
Joe Artz, EarthView Environmental, Inc.

Post-construction hydrological performance of a groundwater-controlled wetland: A case study in Iowa

In 2011, our firm began investigating a potential conversion of two low-lying agricultural fields to emergent/forested wetland. Construction started in the fall of 2013 and grading was finished by early summer 2014. A pre-construction hydrological study verified that this site's hydrology relies heavily on groundwater levels, which are directly connected to the river, which in turn is controlled by an upstream reservoir, and has less climate-controlled seasonal variability in stream discharge. How did this atypical hydrology affect the site's design? Historical stream gauge and precipitation data, monitoring wells, and water budgets were employed to calibrate the model to determine the site's 2-year flood elevation. This allowed us to establish what elevation the floor of the wetland should be. After removing over 100,000 cubic yards of soil, the wetland took shape. Soon after final grading, a large flood event inundated the site. Since construction, the site has been monitored through monitoring wells, weekly visits, and time lapse photography. This poster highlights how the design criterion performed through the first season since construction; what we have learned, what we would do differently, how we are meeting wetland hydrology goals, and how the site endured a flood. As permanent vegetation becomes established, we will see how species composition reflects the site's hydrology. Our hydrological approach seeks to guarantee the long-term sustainability of the wetland. Our design goals provides our client, River Products, Inc., with increased mitigation options and the ability to sell credits to partially recoup a portion of the associated costs.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Weinzinger, Jesse, UW-Green Bay
Chelsea Gunther, UW-Green Bay
Patrick Robinson, UW-Green Bay

An update to the ongoing story of coastal wetland community restoration in Lower Green Bay

The restoration of coastal and near shore lacustrine wetlands in the lower Green Bay system has been an ongoing effort spanning more than four decades. Most recently, those efforts have been highlighted by the $18 million dollar Cat Island Chain Restoration and Dredge Material Disposal Facility project. Our project collected and analyzed wetland vegetation data in the 1400-acre area behind the wave barrier. The data we collected in 2013 and 2014 were compared to data collected in 2010 by WDNR. Species occurrence, in general, is low across years, with the most abundant aquatic macrophyte, *Spartina pectinata*, only occurring at just over 15% of the sites in 2013 and 2014. The analysis from the three years of monitoring suggests that both the Dead Horse Bay and Duck Creek Delta littoral areas have limited macrophyte distribution. Overall macrophyte distribution appears to be concentrated in areas with depths ranging from zero to four feet. Water levels play an important role in plant colonization. The aquatic vegetation in the Duck Creek Delta in 2014 likely had a deeper colonization depth because of water level increases of approximately 13 inches (33 cm) from the 2013 to 2014 sampling periods. Given more time with the same increased water levels, aquatic vegetation may revert back to a maximum colonization depth of three to four feet. The results of the comparisons between 2010 (pre-wave barrier) and 2013-2014 (post-wave barrier) do not provide clear evidence that, to date, the wave barrier is promoting an increase in macrophyte abundance.

Wetland Restoration Case Studies I, Thursday, February 26, Hall of Ideas GJ, 9:50 - 10:10 am

Winfield, Anna, UW-Stout
Clayton Olson, UW-Stout
Collin Schulte, UW-Stout
Shawn Moen, UW-Stout
Anna Basill, UW-Stout
James Church, UW-Stout
Amanda Little, UW-Stout

Chippewa Moraine Ephemeral Ponds: Prospects and undergraduate projects

Ephemeral ponds are temporary wetlands common in northern Wisconsin. These seasonally drying ponds host a wide variety of biota. Depending on variables such as water source and seasonality, these ponds dry at different rates during the summer. Crews sampled macroinvertebrates, amphibians, plants, water chemistry, hydrology, and soils in 39 ephemeral ponds and 18 more permanent wetlands over the 2013 and 2014 field seasons in the Ice Age National Scientific Preserve near New Auburn, Wisconsin. As the second year of the five year study draws to a close, undergraduates will share research on the following topics: 1) Peat accumulation in relation to ephemeral pond hydrology and canopy cover; 2) Ephemeral pond seed bank germination and plant growth and diversity in microcosms in response to experimental manipulation of water levels; 3) Response of zooplankton productivity to ephemeral pond canopy cover; and 4) Biotic and environmental constraints on crustacean community structure and assembly. The larger aims of the project are to investigate metacommunity dynamics of macroinvertebrates, amphibians, and plants in ephemeral and permanent wetlands over a five-year time period. Additional results will be shared.

Poster Session, Wednesday, February 25, Grand Terrace/ Capitol Promenade, 5:00 - 6:30 pm

Woods, Brock, UWEX, and WDNR
Jason Granberg, WDNR

Status of efforts to eliminate non-native *Phragmites australis* in central and western Wisconsin

Non-native (NN) *Phragmites* has advanced pioneer stands into Wisconsin since invading along the state's Great Lakes shorelines in the 1980s. To stop its spread, WDNR received a GLRI grant to treat all NN *Phragmites* stands in the western counties of the Lake Michigan basin where elimination seems practical. Work began in 2013 to identify stands and obtain landowner permission to treat them. 252 stands were sprayed with imazapyr in 2014. Follow-up treatments in 2015 are planned in these counties. Work will also expand into four northwest Lake Superior basin counties. Locations of NN *Phragmites* stands in all other western counties have also been noted, and we will help local agencies eliminate the few found there. Ideally, this effort will eventually cleanse 52 western and interior counties of this invasive subspecies while recruiting local interests to monitor, report, and control any new stands that appear in the future. Please attend to learn more about work done, lessons learned, and future plans for NN *Phragmites* elimination and prevention over three quarters of Wisconsin, as well as how you can help these efforts succeed!

Wetland Invasive Species, Wednesday, February 25, Hall of Ideas GJ, 4:40 - 5:00 pm

Zerr, Daniel, UWEX
Gail Epping-Overholt, UWEX

A new citizen's Watershed Planning Guide for protecting and restoring our state's waters

Wisconsin is rich with water resources. Having such abundant resources can sometimes cause us to take them for granted. Many of Wisconsin's waters are in trouble, officially designated as impaired due to one or many different pollutants. Wetlands play an important role in protecting and restoring the water quality of our rivers and lakes. They are a natural filter or sink for many pollutants, they provide groundwater recharge in times of low precipitation, and provide additional storage in times of heavy precipitation and melting. Protecting and restoring our state's impaired waters is becoming a higher priority as we see more threats to their integrity. However proper planning to protect and restore impaired waters can sometimes be overwhelming for citizens who lack professional training in this field. Currently, government resources for such work are even more limited, and many of the grant programs for this work are tied to having a USEPA-approved watershed plan in place. Natural resource educators with UWEX have teamed with other professionals to create guidance for citizens and local governments to help them in creating a watershed plan for their local water bodies. The "Citizens Guide to Watershed Planning in Wisconsin" is now available along with a companion website that offers other tools and assistance to help in the process of writing and implementing a watershed plan to protect or restore your local water body. This presentation will discuss these tools, how they can be used, and the roles that wetlands can play in protecting and restoring impaired waters in Wisconsin.

Watershed Approaches to Conservation, Wednesday, February 25, Hall of Ideas EH, 11:00 - 11:20 am

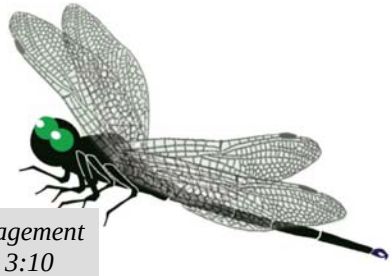
Ziegler, Peter, Wisconsin Waterfowl Association, Habitat Restoration Partners

Small scale wetland restoration: Big opportunity or waste of time?

The unsung heroes of habitat and wildlife sustainability, small scale wetland restorations may not make the headlines, but they play a crucial role on the landscape. These small wetlands are the easiest to disturb and are the most overlooked, posing big problems for the role they play in the ecosystem. Small wetlands provide great opportunities for restoration as 75% of restorable wetlands are privately owned. We will look at various scenarios from around Wisconsin and break down the decision-making process behind why select restorations were completed. We will see how small restorations have transformed larger landscapes with respect to watersheds and wildlife. We will talk about the challenges of working within confined areas defined by differing land uses, the struggles to meet landowner objectives while maintaining wetland restoration integrity, and the environmental conditions that drive the approach and sometimes the outcome.

Key to Common Agency Abbreviations Used in Abstracts and Bios

USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UWEX	University of Wisconsin - Extension
USFWS	U.S. Fish and Wildlife Service
UW	University of Wisconsin
WDNR	Wisconsin Department of Natural Resources
WisDOT	Wisconsin Department of Transportation



SYMPOSIUM: Modern Wetland Restoration & Management I, Wednesday, February 25, Hall of Ideas EH, 2:50 - 3:10 pm

PRESENTER BIOGRAPHIES

Amy Adrihan (amy.adrihan@dot.state.wi.us) is an Environmental Coordinator for the WisDOT in the Northwest Region. She serves a liaison between WisDOT engineering staff and regulatory agencies on transportation projects. She has assisted or led site design and restoration for a number of wetland projects, and oversees management of wetland sites within the northern ten counties of the region.

Joe Artz (EVE01Judy@gmail.com) is a Geomorphologist/Geoarchaeologist who specializes in the interpretation of stratigraphy and geomorphology of archaeological sites and the landscapes in which they occur. His research interests include fluvial processes, soil genesis, and buried archaeological site potential.

Sharon Ashworth (sharonashworth97@gmail.com) is a science professor turned writer and specializes in making science accessible and engaging for the general reader. She also manages a non-profit organization, the Kansas Natural Resource Council, where she is currently directing a public education documentary project titled "The Waters of Kansas."

Nancy Aten (nancyaten@landscapesofplace.com) is a landscape architect whose work encompasses ecological restoration planning and implementation. She has an MLA from University of Georgia and MS from Stanford. Current multi-year projects in eastern Wisconsin are most often in wetlands. She advocates for participatory restoration, strengthening the relationship of people with nature to the sustained benefit of both.

David Bart (dbart@wisc.edu) received a PhD in Ecology, Evolution, and Natural Resources from Rutgers University in 2003. He is currently an Assistant Professor of Landscape Architecture at UW-Madison. His research interests include invasion resistance in high quality wetlands and the impact of land-use legacies on current wetland plant communities.

Tom Bernthal (thomas.bernthal@wisconsin.gov) is the Wetland Monitoring and Assessment Coordinator for WDNR. He supports wetland restoration and protection efforts by developing and implementing methods to assess the health, function, and restorability of wetlands at a variety of scales, from intensive site assessments to watershed-scale assessments using GIS data.

Amanda Budyak (ajbudyak@uwalumni.com) graduated from UW-Madison in May of 2008 with a BS in Forestry and Recreation Resource Management. After graduation she obtained a position as a Madison Audubon Summer intern. She is currently the land manager at Pleasant Valley Conservancy and works as a restoration ecologist for Integrated Restorations, LLC.

Jennifer Callaghan (jcallaghan@urbanecologycenter.org) graduated in 2007 from UW-Milwaukee with a BS in Conservation and Environmental Sciences. In 2010 she became the Research and Citizen Science Coordinator at the Urban Ecology Center in Milwaukee. She has worked with many taxa including small mammals, herptiles, birds, and invertebrates. Jennifer has a special interest in birds and a deep appreciation for the connection of art and science.

Christal Campbell (christal.campbell@wisconsin.gov) is an Aquatic Invasive Species (AIS) Education Specialist with the WDNR and UWEX. She works with citizens and statewide partners on AIS outreach and education efforts with a focus on stopping the spread of AIS through prevention.

Angie Carter (carter@iastate.edu) is a PhD candidate in Sociology and Sustainable Agriculture at Iowa State University. Her dissertation studies how women farmland owners make conservation decisions about their farmland, specifically related to water quality improvements such as wetlands.

Daniel Carter (dcarter@sewrpc.org) received his Bachelor's in Biology from Grinnell College in Iowa. He earned his PhD in Biology from Kansas State University, with research focused on plant ecology and restoration ecology in grasslands. He came to SEWRPC in 2013 after working for The Nature Conservancy in Oregon. Dan presently serves as regional natural areas biologist, botanist, and wetland delineator.

James Church (churchjam@uwstout.edu) is a Lecturer at UW-Stout. He received a PhD in Ecology and Evolutionary Biology from Iowa State University, an MS in Zoology from North Dakota State University, and received his BS at UW-Stevens Point. His research currently focuses on ephemeral pond metacommunity dynamics, with an emphasis on aquatic macroinvertebrate and amphibian communities.

PRESENTER BIOGRAPHIES

Grace Cocking (g-demers@neiu.edu) is close to finishing her BS in biology at Northeastern Illinois University and plans to attend graduate school, focusing on aquatic ecology. She is currently working as a media technician at Avon Cosmetic Laboratories in Chicago, Illinois, where she prepares microbiological materials and conducts quality control.

Dan Collins (danjcollins@earthlink.net) is an ecological restoration practitioner for Landscapes of Place and a licensed Professional Engineer. In addition to formal restoration methods, Dan uses a broad range of non-traditional tools to understand, engage, and act on landscapes. Restoration tools sometimes include silent observation, historical records research, poetry, printmaking, and policy engagement.

Melissa Curran (melissa.curran@stantec.com) is a biologist for Stantec. She has a BS from UW-Madison in forest ecology. For the past eight years, her work has been focused on wetland restoration and monitoring rare species.

Peter David (pdavid@glifwc.org) originally hailed from a northeastern Wisconsin community best known as Titletown USA. After receiving his BS and MS in Wildlife Ecology from UW-Madison, he headed north to work for the Great Lakes Indian Fish & Wildlife Commission, which was only in its third year of existence at the time. At GLIFWC he has been fortunate to focus on several resources, especially manoomin or wild rice.

Robert DuBois (robert.dubois@wisconsin.gov) is a scientist with WDNR who does research in aquatic science including many topics about dragonflies. He leads field trips, gives talks and teaches classes about them. He founded the Wisconsin Dragonfly Society, manages the Wisconsin Odonata Survey and is president-elect of the Dragonfly Society of the Americas. He has written two books and many research articles about odonates.

Bryn Evans (bevans4@wisc.edu) is a first year MS Candidate in the Department of Forest and Wildlife Ecology. Her background is in carnivore and ungulate research and conservation in California, with an emphasis in camera trapping and telemetry studies. Her thesis will evaluate the recovery of semi-aquatic mammals in the St Louis Estuary of northwestern Wisconsin.

Bridget Faust (bridget@floods.org) joined the Association of State Floodplain Managers in January 2014 as a Project Research Specialist. At ASFPM, her responsibilities include research, outreach, and composition of content for the Great Lakes Coastal Resilience Planning Guide, planning and coordinating workshops on ASFPM's No Adverse Impact approach to floodplain management, and research on federal programs and policies.

Anna Fehling (anna@ma-rs.org) is a Water Resources Engineer with Montgomery Associates: Resource Solutions. She received her BS in Geological Engineering from UW-Madison. Her consulting experience includes a wide range of groundwater and surface water studies, stormwater and erosion control, and nonpoint source nutrient monitoring and loading analysis.

Etienne Fluet-Chouinard (fluetchouina@wisc.edu) represents an interdisciplinary team of 11 graduate students from UW-Madison. The work presented is the outcome of a client based IGERT seminar taught by Prof. Peter McIntyre during fall 2014, with the collaboration and guidance of Erin O'Brien and Tracy Hames of WWA.

Brian Forest (brian@ridgessanctuary.org) is a native of Door County and has spent his academic and professional career supporting the environmental and conservation ethic with which he was raised. Brian graduated from UW-Green Bay with a BS in Geology. Brian worked as a Conservationist with the Door County Soil and Water Conservation Department before joining The Ridges Sanctuary in 2014.

Nicolas Galleguillos (galleguillos@wisc.edu) obtained a MS in Botany at UW-Madison last summer. Currently, he is in his first semester of the Environment and Resources program, at the Nelson Institute for Environmental Studies. Last summer he worked at the UW Arboretum as part of the practicum for his Botany MS.

Marla Garrison (mgarrison@mchenry.edu) is an instructor of microbiology at McHenry County College, Crystal Lake, Illinois. She sits on the Executive Council of the Dragonfly Society of the Americas and is the author of Damselflies of Chicagoland, a local area photo field guide available online for free download through Chicago's Field Museum of Natural History at http://fieldguides.fieldmuseum.org/guides/guide/388

PRESENTER BIOGRAPHIES

Brian Glenzinski (bglenzinski@ducks.org) received his BS in Wildlife Biology from UW-Stevens Point in 1995. He has worked extensively on ecological restoration throughout Wisconsin on private and public lands from Federal and State perspectives. His work at WDNR had focused primarily on wetland, grassland, and savanna restoration in Southern Wisconsin and now covers all of Wisconsin in his role as Regional Biologist for Ducks Unlimited.

Jason Granberg (jason.granberg@wisconsin.gov) was recently hired by WDNR to serve as a project manager for an invasive species control grant. He formerly served as the Restoration Ecologist & Biologist at the Capital Area Regional Planning Commission. He has received postgraduate degrees in ecology and conservation. He has over 18 years of experience in Upper Midwest ecosystems.

Elizabeth Haber (Elizabeth.Haber@wi.gov) received her BS in plant biology from the University of Michigan in 2008. She then went on to pursue a MS from Michigan focusing on molecular phylogenetics of Madagascan Croton (Euphorbiaceae). After graduating in 2011, Elizabeth moved to Wisconsin where she got a job with WDNR's lakes section. She has been working in WDNR's wetlands section since January of 2014.

Tracy Hames (wwa222@wisconsinwetlands.org) became Executive Director of WWA in November 2011. From 1989 to 2011 he was employed as a Waterfowl Biologist with the Yakama Nation Wildlife Resource Management Program and was the lead biologist in the Yakama Nation's Wetlands and Riparian Restoration Project in Washington state. He received a BA in Biology and Environmental Studies from Macalester College, St. Paul, Minnesota in 1984, and a MS in Natural Resources from UW-Stevens Point in 1990.

Megan Haserodt (megan.haserodt@gmail.com) recently completed a MS at UW-Madison where she focused on groundwater in wetlands. Megan currently works as a hydrogeologist in Duluth, Minnesota. From a childhood frog enthusiast to a young scientist, she has gravitated toward water and loves rivers, lakes, and wetlands.

Natanya Hayden (Natanya.Hayden@wi.gov) received a MS in Wildlife and Fisheries Sciences from Texas A&M University, where her thesis research focused on mitigating invasive species in aquatic ecosystems. Natanya served as a Wetland Biologist for The Nature Conservancy in Oregon, as well as an Avian Ecologist for USGS in North Dakota. She currently is a Wildlife Biologist for WDNR.

Richard Henderson (richard.henderson@wisconsin.gov) received BS & MS degrees in conservation from UW-Madison. From 1983 to present he has been a research ecologist with the WDNR Bureau of Science Services. He has 37 years of experience in natural area inventory, assessment, and management, and is an active volunteer with The Prairie Enthusiasts land management program since 1992.

Dan Jackson (DanJackson@LBWhite.com) is a nature photographer, birder, and the current president of the Wisconsin Dragonfly Society. He has been a contributor to the Wisconsin Odonata Survey, the Minnesota Odonata Survey, and the Odonata Central Survey since 2009. He has spent hundreds of hours surveying and taking photos of odonata in Wisconsin, Minnesota, North Dakota and other states during that time.

Anthony Jernigan (anthony.d.jernigan@usace.army.mil) is a Project Manager for USACE, St. Paul District Regulatory Branch in the Waukesha, Wisconsin field office. Mr. Jernigan implements the USACE Regulatory program in Sheboygan, Ozaukee, Washington, and Milwaukee Counties. Prior to this role, Mr. Jernigan worked for the USACE Savannah District in both the Regulatory and Geology Sections subsequent to employment in the private sector.

Jennifer Kawaguchi (jkawaguc@neiu.edu) is a senior undergraduate biology major at Northeastern Illinois University. She likes birding in wetland communities and is interested in the restoration of these habitats. Jennifer plans to attend graduate school to pursue her research interests in disease ecology, community ecology, parasitology, and infectious diseases.

Sara Kehrli (saras.kehrli@wisconsin.gov) obtained a BS from UW-Madison in 2002 majoring in both Zoology and Psychology. She received her MS from UC-Denver in Environmental Sciences in 2004. Sara has been working for WDNR as a wildlife biologist since 2006. Her duties include all aspects of habitat management, but focuses primarily on grasslands/wetlands work on WDNR owned properties in Columbia Co.

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Marie Kopka (Marie.H.Kopka@usace.army.mil) serves as the Lead Project Manager for the Waukesha Field Office with the USACE, St. Paul District Regulatory Branch. She started with USACE in 2000 and has been with the Regulatory Branch since 2008, working in both Minnesota and Wisconsin. Kopka has extensive experience with community outreach and interpretive education.

Kathi Kramasz (kathleen.kramasz@wisconsin.gov) has been with WDNR Water Regulation and Zoning section for 25 years and was a staff member when NR 103 was initially passed. She has a BS in Biological Aspects of Conservation from UW-Milwaukee.

Adrianna Krzywicka (krzywic1@illinois.edu) is currently working on her MS in Dr. Jeffrey W. Matthews' lab at University of Illinois at Urbana-Champaign. She is investigating the survival and growth of planted trees and the recruitment of naturally colonizing trees in a restored floodplain forest. She is also exploring the potential for using soil magnetic susceptibility as a proxy for soil moisture when planting restored wetlands.

Joseph Kukulski (kukulski.jose@uwlax.edu) received a BS in Geography with a minor in Biology from UW-La Crosse, and currently is working on a MS in Biology with an Aquatic Science Concentration.

Richard Kyte (rlkyte@viterbo.edu) is Director of the D.B. Reinhart Institute for Ethics in Leadership at Viterbo UW-La Crosse where he teaches a variety of ethics courses dealing with issues in business, politics, and the environment. He received his PhD in philosophy from The Johns Hopkins University in 1994. He is the author of “An Ethical Life” published by Anselm Academic Press.

Michael Lannoo (mlannoo@iupui.edu) received BS and MS degrees from Iowa State University and his PhD from Dalhousie University. He is the author of 7 books, including "Okoboji Wetlands," "Leopold's Shack and Ricketts's Lab," "Amphibian Declines," "Status and Conservation of Midwestern Amphibians," and "Malformed Frogs," as well as > 130 papers. He is the U.S. Coordinator for IUCN's Amphibian Specialist Group.

Daniel Larkin (dlarkin@chicagobotanic.org) is the David Byron Smith Family Curator of Native Habitats at the Chicago Botanic Garden and an adjunct assistant professor at Northwestern University, where he teaches and mentors students through the Graduate Program in Plant Biology and Conservation. He conducts research in restoration ecology and invasion biology, primarily in wetland and terrestrial habitats of the upper Midwest.

Beth Lawrence (blawren6@depaul.edu) is an assistant professor in the Environmental Science and Studies Department at DePaul University. She received her PhD from UW-Madison in 2011. Her post-doctoral work with hybrid cattail investigated how the species affects greenhouse gas flux and tested alternative restoration treatments.

Steve Leonard (steve@ridgessanctuary.org) is the executive director of The Ridges Sanctuary. Since 2006, he has worked with the membership and greater community to develop a long-term plan for the Sanctuary.

Mary Linton (snappinglinton@gmail.com) is a certified ecologist (ESA) and wetland biologist with expertise in wetland ecology, reptiles, and amphibians. A published poet, she brings her passion for poetry and wetlands to this conference.

Amanda Little (littlea@uwstout.edu) is an Associate Professor at UW-Stout. She received a PhD in Botany from UW-Madison and her BS at UW-Stevens Point. Her research currently focuses on ephemeral pond metacommunity dynamics, with an emphasis on vegetation, water chemistry, and soils.

Sean Longabaugh (seanlongabaugh@yahoo.com) is an employee for Integrated Restorations, LLC. He has six years of experience in the field of restoration ecology. Two years ago Sean moved from Illinois to Wisconsin. He originally started his career mainly doing native woodland and prairie reconstruction, but now focuses on remnant restorations as well as wetland recovery.

Mike Marek (mike@mareklandscaping.com), of Marek Landscaping, LLC, has 18 years of experience working as an ecological landscape designer/builder and urban forester. Mike’s commitment to providing sustainable design and installation services using low impact development techniques in Milwaukee and its surrounding area prompted him to start Marek Landscaping in 1996, which has now grown to a firm of 16 employees.

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Sumner Matteson (sumner.matteson@wisconsin.gov) MS, UW-Madison, has worked as a nongame biologist, conservation biologist, and avian ecologist for the WDNR since 1981, specializing in endangered and threatened waterbird and wetland bird species. He has directed the Wisconsin Trumpeter Swan Recovery Program since 1987. He also works closely with the Natural Resources Foundation on state and international bird programs.

Sr. Helene Mertes, OSF (hmertes@lakeosfs.org) grew up in a rural area that had an abundance of wetland and prairie where she learned the love for the land that has always been foremost in her life. She is a member of the Sisters of St. Francis of Assisi and received an Associate Degree in Food Service Management from William Rainey Harper College, Palatine, Illinois and later a BS in Horticulture from UW-Madison.

David Mladenoff (djmladen@wisc.edu) received a PhD in forest ecology in 1985. He has worked for The Nature Conservancy in the western region and at the University of Minnesota. He has been a professor in the Dept. of Forest & Wildlife Ecology since 1994. His work is focused on forest change, conservation, management, and climate change in the northern Lake States, especially Northern Wisconsin.

Ivan Monagan (ivanvm@umich.edu) received his BS in Biology from Virginia State University (2014) and is currently a first year MS student in Ecology and Evolutionary Biology at the University of Michigan. His current research interests include the role of biodiversity and agriculture in wetland ecosystems, human-wildlife conflict mitigation, and herpetofauna conservation.

Sydney Nick (snick@usgs.gov) earned a Bachelor of Science in environmental science from Allegheny College and is a GIS contractor for USFWS. She is currently working on her MS in coastal ecosystem science, management, and policy at the University of New Hampshire. Sydney also volunteers at the Wells National Estuarine Research Reserve where she assists with ongoing research projects.

Julie Nieset (jenieset@illinois.edu) started her wetland career as a Student Conservation Association intern studying prairie pothole wetlands in North Dakota. From there she earned her MS in Biology and has worked in environmental consulting. She is a Wetland Plant Ecologist with the Illinois Natural History Survey and serves as Secretary/Treasurer for the North Central Chapter of Society of Wetland Scientists.

Andy Paulios (Andy.Paulios@wisconsin.gov) is a graduate of Luther College (BA) and UW-Green Bay (MS). He is a wildlife biologist for WDNR covering the Dane County area. Andy hails from Rochester, Minnesota and still maintains his heritage each year by cheering for the Twins, Vikings, and Gophers. Andy wants to stress that he has almost zero wetland experience but does like to talk a lot!

Matt Peter (petemj31@uwgb.edu) is currently a graduate student in the Environmental Science and Policy program at UW-Green Bay.

Ken Potter (kwpotter@wisc.edu) is a professor of Civil & Environmental Engineering at UW-Madison. He received a BS in Geology from Louisiana State University and a PhD in Geography and Environmental Engineering from the Johns Hopkins University. His current teaching and research interests include flood risk management, stormwater modeling, management and design, and adaptation of hydrologic design to climate change.

Ken Powell (ken.powell@state.mn.us) is the State Wetland Banking Coordinator for Minnesota. Ken previously held positions as a wetland specialist with a watershed district, as an environmental consultant and as a biologist with the USFWS. He holds a BS in Wildlife from UW-Stevens Point and an MS in Biology from Kansas State University.

Jessica Price (jmprice2@wisc.edu) is an Environment and Resources PhD candidate in the Nelson Institute for Environmental Studies at UW-Madison. In a collaborative research project, she is working with local and regional experts to build and model landscape scenarios to characterize and compare the possible outcomes of various conservation strategies under varying climate change conditions.

Brendan Reid (bnreid@wisc.edu) is a PhD candidate in UW-Madison's Department of Forest and Wildlife Ecology. He joined the Peery Conservation Biology Lab (http://labs.russell.wisc.edu/peery/) in 2010 after receiving a MS in Conservation Biology from Columbia University, where he evaluated techniques for genetic barcoding of turtles.

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Freya Rowland (ferowland@mail.missouri.edu) is a PhD student at the University of Missouri – Columbia. She has a BS in Biology from UW-Madison, a MS in Aquatic Ecology from Miami University, and three years experience working in water resources at the local government level. The focus of her research is integrating limnology and amphibian ecology to assist policy and conservation.

Charles Sandusky (ccsandusky90@gmail.com) conducted research in Volo Bog as part of his undergraduate research project at Northeastern Illinois University. His favorite aspects of the research were learning to identify diatom species and using the scanning electron microscope. Charlie has a strong interest in aquatic ecology and plans to pursue a graduate degree.

Penny Shackelford (shackelfordp@centurylink.net) with Gary Shackelford and their neighbors, John Van Altena and Connie Brouillette, are private landowners who own and manage over 500 acres of land in northern Rock County that is home to several endangered and threatened species, including stable populations of eastern prairie white fringed orchids. Both properties have been designated State Natural Areas. In 2014, these neighbors were recipients of the Henry C. Greene Leopold Restoration Award for Innovative Approaches in Restoration.

Kevin Shafer (kshafer@mmsd.com) became executive director at the Milwaukee Metropolitan Sewerage District (MMSD) in 2002. Prior to this, he served as MMSD's director of technical services since 1998. As executive director, he is responsible for the overall management, administration, leadership and direction for MMSD in meeting short and long-term goals and objectives and strategic objectives.

Paul Skawinski (Paul.Skawinski@uwsp.edu) coordinates the Citizen Lake Monitoring Network for the UWEX Lakes Program, and teaches Aquatic Plant Biology at UW-Stevens Point. He is also the author of the popular field guide Aquatic Plants of the Upper Midwest. Paul received his BS in Soil & Waste Resource Management and MS in Watershed Management from UW-Stevens Point.

Amy Staffen (amy.staffen@wisconsin.gov) has worked in the Natural Heritage Conservation Program (formerly Endangered Resources) at WDNR since 2009. She has a MS from the UW-Madison Landscape Architecture Program with a focus in Restoration Ecology. She specializes in inventory of native plant and bird communities.

Reid Stamer (earthview05@gmail.com) holds a BS in Geography from the University of Iowa, with an emphasis in GIS and environmental science, and has worked for EarthView Environmental since 2009. As a Restoration Ecologist, Reid's professional focus is on invasive species management, habitat restoration, woodland management, and conservation practices.

Andy Stevens (alstevens2@wisc.edu) is currently finishing the Water Resources Management graduate program at UW-Madison and will be starting the Freshwater and Marine Sciences graduate program in the Spring of 2015 under Dr. Peter McIntyre. Specifically, he will be reviewing fish consumption advisory programs and investigating mercury concentrations and isotope signals in white suckers from Lake Michigan.

Amanda Swearingen (aswearingen@wisc.edu) is a MS candidate in Conservation Biology and Sustainable Development (CBSD) in the Nelson Institute for Environmental Studies at UW-Madison. The focus of her research is in developing and modeling spatially explicit landscape scenarios to provide insight into possible landscape futures and their outcomes for ecosystem services.

Scott Taylor (sotaylor@taylorconservation.com) is a consulting ecologist and owner of Taylor Conservation LLC. Scott specializes in wetland services but also practices land stewardship planning, native restoration, and forest management. He is a past board member and president of the Rock River Coalition. Scott holds a MS in Forest Ecology & Management from UW-Madison.

Ken Tennessen (ktennessen@centurytel.net) graduated from UW-Madison with a BS in 1968 and from University of Florida with a PhD in 1975, majoring in entomology. He has conducted research for 45 years on dragonfly systematics, phylogeny, behavior and conservation. He has published 70 technical papers, including naming 12 new species; three species are named after him. He is currently studying nematode parasites of nymphs.

Patricia Trochlell (patricia.trochlell@wisconsin.gov) is a wetland ecologist with WDNR working on wetland issues including wetland identification and delineation, training, assessment, invasive species, monitoring, mitigation and restoration. Her background is in wildlife biology, soil science, and wetland ecology.

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Kelly VanBeek (Kelly.vanbeek@wisconsin.gov) has a BA from UW-Stevens Point and a MS from University of Illinois at Urbana-Champaign. He is a wildlife biologist for WDNR covering Waukesha and Walworth counties. Kelly grew up in Mayville, Wisconsin in the Horicon Marsh area. Kelly's wetland management experience mostly stems from private lands management, including time with NRCS, USFWS, and now WDNR in public lands management.

Grace Vosen (feathers.and.such@gmail.com) is a junior at Northland College in Ashland, Wisconsin. She is majoring in natural resources with an emphasis in ecological restoration. Grace grew up in Cross Plains and is intrigued by the wetland and tallgrass prairie communities of her native Driftless Area. She plans to study botany in graduate school and to play a role in ecological restoration projects around the state.

Barbara Walther (barbara.l.walther@usace.army.mil) began delineating wetlands in New England in 1985 and moved to Minnesota in the early 90s. After starting at the Dakota SWCD, she headed to the Minnesota BWSR where she served as Wetland Specialist. Throw in a few years as a wetlands consultant, and Barbara is now Senior Ecologist with USACE in St. Paul, where she provides technical support, training and outreach in Minnesota and Wisconsin.

Hollis Weber (earthview02@gmail.com) holds a MS in Rangeland Ecology and Watershed Management with a Water Resources emphasis from the University of Wyoming. As a hydrologist, Hollis is trained in various water modeling techniques, water sampling, wetland delineation, stream mitigation/restoration design/implementation and SWPPP Plans. He coordinates and performs wetland and construction monitoring.

Jesse Weinzinger (weinjj04@uwgb.edu) is a graduate student and research assistant in the department of Environmental Science and Policy at UW-Green Bay. Along with Chelsea Gunther, Jesse was awarded the opportunity to continue restoration analysis of the Cat Island site under the supervision of Dr. Patrick Robinson, Co-Director, UW Environmental Resources Center.

Anna Winfield, Clayton Olson, Collin Schulte, and Shawn Moen (winfielda0355@my.uwstout.edu, schultec0590@my.uwstout.edu, olsonc0733@my.uwstout.edu, moens@my.uwstout.edu) are undergraduate students at UW-Stout studying Environmental Science. All are working on the Chippewa Moraine Ephemeral Ponds Project as well as in other areas of science. Many will be graduating soon and continuing their studies in graduate school.

Brock Woods (brock.woods@wisconsin.gov) has worked with WDNR on invasive wetland plants, most notably biocontrol of purple loosestrife, for almost 20 years, and has been with UWEX since 2001. He oversees WDNR's Wetland Invasive Plant Control program. He received his MS in Plant Ecology from UW-Madison.

Daniel Zerr (daniel.zerr@ces.uwex.edu) works as a regional Natural Resource Educator for UWEX, and is based in Eau Claire. He has a BS in biology from Northern State University in Aberdeen, South Dakota, and an MS in Environmental Science from Indiana University, Bloomington, Indiana. He previously worked as an environmental scientist for the Kansas Dept of Health and Environment, and as a researcher at the University of Missouri.

Peter Ziegler (wwawetlands@gmail.com) has been the Project Director for Wisconsin Waterfowl Association since 2007. Peter works in both the private and non-profit worlds, focusing on natural area management, habitat restoration, and consulting around Wisconsin. Peter has 14 years of natural resource management and received his BA in Biology and Environmental Studies from Luther College in 2001.

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