Wisconsin Wetlands Association's 18th Annual Conference

February 12-14, 2013
Sheboygan, Wisconsin

Abstracts & Presenter Biographies

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Special thanks to this year's Exclusive Lead Sponsor

Forest County Potawatomi FOUNDATION

WEDNESDAY, February 13, 9:00 am - 9:00 pm

9:00 - 10:10 Plenary Session (Salon ABCD)

9:00 Welcome & Opening comments

9:20 Conference Keynote: ***Our Landscape, Wetland, and Water Legacy***
Patrick Robinson, Environmental Resources Center Co-Director, UW-Madison and UW-Extension, and adjunct faculty, UW-Green Bay

10:10 - 10:40 Break (Lakeside Terrace)

10:40 - 12:00 Concurrent Sessions

	Location: Salon E	SYMPOSIUM: Wetlands and Watershed Planning & Protection *Moderator: Beth Markhart*	Location: Salon F	Historical Perspectives *Moderator: Jim Ruwaldt*	Location: Salon G	Mitigation & Design *Moderator: Sarah Majerus*
10:40	**Correll**	Brown's Creek Watershed District: a 15-year history of understanding and protecting surface water-groundwater interactions	**Erickson**	Lead contamination in water and biota at the site of a former trap shooting range	**Anderson**	Wetland mitigation: Good for the environment and good for business
11:00			**Davenport**	Investigating the relationships between land-use histories and current vegetation in Southern Wisconsin fens	**Salas**	Application of stream and floodplain restoration for protection of electric utility infrastructure
11:20	**Magyera**	Lessons from supporting local wetland protection	**Kuhns**	Natural history of the Cedarburg Bog, Saukville, Wisconsin: Insights into post-glacial wetland formation	**O'Leary**	Eight keys to successful urban wetland design
11:40	**Miller**	The challenges and opportunities of local wetland conservation: Door County's experience				

12:00 - 1:00 Lunch (provided - Salon ABCD)

1:00 - 2:40 Concurrent Sessions

	Location: Salon E	SYMPOSIUM: Wetlands and Watershed Planning & Protection *Moderator: Beth Markhart*	Location: Salon F	Wetland Invasive Species I *Moderator: Kelly Kearns*	Location: Salon G	Wetlands as Wildlife and Fish Habitat *Moderator: Mary Linton*
1:00	**Miller**	Modeling the Pelican Lake restoration project	**Patti**	Effects of two popular herbicides on the control of the invasive *Glyceria maxima* (reed manna grass) in Southeast Wisconsin	**Mushinski**	Northern pike habitat restoration project in Green Bay
1:20			**Rios**	Intra- and inter-population variability in microsatellite markers for cattail plant species	**Badje**	Overwintering habitats, spring dispersal, and status of the Northern Cricket Frog (*Acris crepitans*) in Wisconsin
1:40	**McGinley**	Modeling wetlands in the watershed: Some challenges to simulating wetland hydrology, hydraulics, and nutrient transport	**Wilkinson**	Wisconsin invasive species rule and planned revisions	**Paloski**	WDNR species guidance documents
2:00			**Schreck**	Invasive species in trade: Coming to a wetland near you?	**Cutright**	Migratory birds respond to wetland creation at Forest Beach Migratory Preserve, a former golf course
2:20	**Bernthal**	WDNR's watershed level wetland status data and applications	**Jensen**	WISDOT invasive control program: Large scale invasive plant control across transportation corridors and mitigation sites		

2:40- 3:10 Break (Lakeside Terrace)

3:10-4:50 Concurrent Sessions

	Location: Salon E	SYMPOSIUM: Wetlands and Watershed Planning & Protection *Moderator: Beth Markhart*	Location: Salon F	Wetland Invasive Species II *Moderator: Chrystal Schreck*	Location: Salon G	Case Studies of Wetland Restoration *Moderator: Stacy Hron*
3:10	**Minahan**	Wisconsin's Healthy Watersheds Initiative	**Kearns**	Japanese Hop: A rapidly spreading riparian invasive	**Gumtow**	The Ridges Sanctuary ridge and swale restoration project
3:30	**Elston**	Incorporating wetlands into watershed planning: A new EPA Region 5 supplement to watershed planning handbook	**Motquin**	Rapid response and control of policeman's helmet (*Impatiens glandulifera*)	**O'Reilly**	Use of enhanced ditch plugs and riparian wetlands to reduce nitrogen and phosphorus export from small agricultural watersheds
3:50	Watershed Planning & Protection Discussion & Working Group Moderated by Erin O'Brien		**Ward**	Response to an outbreak of giant hogweed (*Heracleum mantegazzianum*), a dangerous noxious weed	**David**	Progress and setbacks over two decades of wild rice management in the Wisconsin ceded territory
4:10			**Boos**	Developing best management practices to slow the spread of unwanted invasive species in wetlands	**Fevold**	Ashland Chequamegon Bay Shoreland Restoration Project: Evaluating the ecological benefits of a constructed wetland
4:30					**Redlinski**	Practical climate change adaptations: What does TWI do to restore with climate change in mind

4:50 - 6:30 Poster Session & Cash Bar (Lakeside Terrace)

6:30 - 9:00 Banquet & Presentation
(Ticketed event - Salon A).

7:30 Banquet Presentation: ***Seven Wetlands, Seven Watersheds: Connecting Landscapes for Cranes, People, and Our Biological Heritage***
Dr. Richard Beilfuss, President & CEO, International Crane Foundation

THURSDAY, February 14, 8:30 am - 4:30 pm

8:30-9:20 Plenary Session (Salon ABCD)

8:30 Welcome

8:40 Plenary Address: ***Keeping Wetlands in the Watershed: EPA's Healthy Watershed Initiative and Other Priorities for Wetlands Integration***
Michael McDavit, Chief of the Wetland Strategies and State Programs Branch, Wetlands Division, U.S. EPA

9:10 Symposium Keynote: ***Say it Together One More Time: All Water is Connected***
Dr. George Kraft, Director, Center for Watershed Science & Education; Director, Central Wisconsin Groundwater Center, UW-Stevens Point

9:50 - 10:00 Break (Lakeside Terrace)

10:00 - 12:00 Concurrent Sessions

	Location: Salon E	SYMPOSIUM: Healthy Wetlands & Groundwater: the Other Watershed *Moderator: Mary Linton*	Location: Salon F	Assessment & Planning for Wetland Conservation *Moderator: Travis Olson*	Location: Salon G	Watershed Approaches to Wetland Conservation *Moderator: Peter Pittner*
10:00	**Loheide**	Groundwater influences on wetland health and ecosystem services provided by stormwater treatment wetlands		(break continues)		(break continues)
10:20	**Bahr**	Subsurface heterogeneity as a control on wetland vegetation and biogeochemistry	**Macleod**	Semi-automated wetland mapping techniques: A pilot project in Wisconsin	**Fowler**	Economic and ecological benefits of Iowa's Middle Cedar River watershed
10:40	**Gotkowitz**	Groundwater-induced flooding of lowland areas in Spring Green, Wisconsin	**Hlina**	Setting floristic quality assessment benchmarks for non-forested wetlands of the Lake Superior basin	**Melchior**	Restoration of riverine wetland habitat as part of the Sheboygan Area of Concern Project
11:00	**Bradbury**	Hydrogeology of the Mink River Estuary, Door County, WI: Groundwater flow and chemistry	**Trochlell**	Wisconsin Rapid Assessment Methodology, v.2.0	**Crane**	Post-Development isolated waters of Lake County and the 80% - 150% wetland hydrology design criteria
11:20	**Muldoon**	Hydrogeology of the Mink River Estuary, Door County, WI: Geologic controls on spring locations	**Salas**	Developing a tool for prioritizing resources of concern in habitat conservation	**Martinka**	Healthy watersheds: Changing the rules and the roles to improve our chances
11:40	**Hart**	Hydrogeology of the Cedarburg Bog	**Smail**	Wisconsin's water withdrawal inventory and reporting progam	**Malott**	Wisconsin's Watershed Adaptive Management Option and opportunities for wetland restoration

12:00 - 1:30 Lunch (provided) and Presentation (Salon ABCD)

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

Working Groups

Practitioners Working Group Location: Salon E *Moderators: Heather Patti & Alice Thompson*	Ridge & Swale Communities Working Group Location: Salon F *Moderator: Steve Leonard and Vicki Medland*	Opportunities for Reaching Private Wetland Landowners Working Group Location: Salon G *Moderator: Katie Beilfuss*
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 will begin with a short presentation on the Ridge and Swale complex on the Ridges Sanctuary and Toft Point in Door County to begin a discussion of our current state of knowledge. Our goal is to provide participants with an opportunity to explore strategies and opportunities to better manage these unique communities in the face of habitat fragmentation, invasive species, and increasingly variable hydrology due to climate change and modification of surrounding watersheds.	In 2012, WWA began assessing programs and resources available to support private wetland landowners in their efforts to protect, restore, and manage wetlands. We conducted interviews with partner agencies and organizations to understand what resources they currently offer and promote. We are also talking with landowners themselves to better understand the wetland questions and problems they have. We will present the preliminary results of this work, gather further information from participants, and discuss the best opportunities to pursue in the near future in order to better meet the needs of Wisconsin wetland landowners.

Field Trips

Prior sign up required; check at registration desk for remaining availability.	*Prior sign up required; check at registration desk for remaining availability.*	*Prior sign up required; check at registration desk for remaining availability.*
* Sheboygan River AOC Restoration Project (departs from the conference center entrance)	* Sheboygan Marsh State Wildlife Area (departs from Hotel Door 4)	* Kohler-Andrae State Park (departs from Hotel Door 3)

GREAT wetlands HEALTHY watersheds

We want your feedback!

Please complete the conference evaluation coming to your email inbox.

Thank you.

Anderson, Troy, Applied Ecological Services

Wetland mitigation: Good for the environment and good for business

In its Seneca Meadows Wetland Preserve project, Applied Ecological Services (AES) demonstrates how landfill expansion and wetland mitigation can work together as good for both business and the environment. In 2004, the largest landfill in New York state, Seneca Meadows, sought expansion. The preferred alternative involved impacts to 70 wetland acres. An initial AES natural resource inventory revealed opportunities for restoration of 1200 adjacent acres. Subsequently, Seneca Meadows committed to restoring over eight times the required mitigation. AES developed detailed hydrological and ecological restoration plans and facilitated all permits. The "canvas" was huge and involved extensive reconfiguring of agricultural land (700,000 cubic yards of soil) to create emergent wetlands, wet prairie, wet mesic prairie, and forested wetlands. Upland buffers of oak savanna and mesic prairie were designed, providing an integrated wetland/upland ecological landscape, an aspect that is often given short-shrift in wetland mitigation projects. Plantings were extensive, involving installation of 169,750 herbaceous plugs, and 9,487 woody plants. In addition, brush was cleared from 260 acres and 421 acres were seeded with 3000 lbs of a customized native seed mixture. Long-term monitoring of the project is underway. Current species tallies (2012) stand at 5 reptiles, 10 amphibians, and 187 bird species (one-third of the species in New York state). A new nature center and trails were opened to the public in 2010. The scale of the project set a precedent in New York state. At a national level, the USEPA called the project a model of using large-scale mitigation to address large wetland impacts. The project has received numerous awards.

Wetland Mitigation & Design, Wednesday
February 13, 2013, 10:40 am
Salon G

Badje, Andrew, WDNR
Tara Bergeson, WDNR
Tyler Brandt, WDNR
Rori Paloski, WDNR
Joshua Kapfer, UW-Whitewater

Overwintering habitats, spring dispersal, and status of the northern cricket frog (*Acris crepitans*) in Wisconsin

Severe declines of northern cricket frog populations along their northern boundaries have led to an endangered status and concerns of extirpation throughout Wisconsin. WDNR has been studying northern cricket frog overwintering habitats, spring dispersal abilities, and population trends to provide more efficient monitoring and protection of cricket frogs. We performed visual encounter surveys and inspected possible overwintering sites, which led to documentation of cricket frogs overwintering communally in crack hibernacula on sloughing river banks. A combination of marking and photographic identification of individuals showed spring migrations of up to 0.4 miles from river corridors to wetland breeding sites. Breeding call surveys produced 73 locations of cricket frogs from 644 monitoring sites, of which four were new county occurrences outside the current known range. Breeding call survey trends from 35 long term sites appear to show stable populations. WDNR's research has provided up-to-date knowledge of the northern cricket frogs' current range, spring dispersal, and overwintering habitat locations in Wisconsin. Results of these studies provide additional information for active management strategies, and implementation of the next revision of Wisconsin's Wildlife Action Plan (2015).

Wetlands as Wildlife & Fish Habitat
Wednesday, February 13, 2013, 1:20 pm
Salon G

Bahr, Jean, UW-Madison

Subsurface heterogeneity as a control on wetland vegetation and biogeochemistry

Plant communities and nutrient cycling in wetland ecosystems can exhibit a high degree of spatial variability. While some of that variability can be attributed to surface features such as topography and proximity to streams or springs, heterogeneity of the underlying aquifers, and associated variations in subsurface flow paths, also contribute to this spatial variability. Results of field studies of hydrogeologic and biogeochemical conditions at three wetland sites in southern Wisconsin will be used to illustrate the importance of characterizing subsurface hydrostratigraphy and flow paths in order to better understand wetland vegetation patterns and potential for denitrification. At the first site, in a forested floodplain along the Lower Wisconsin River, conditions conducive to denitrification extend from the shallow peat soils into the underlying sand aquifer as a result of subtle variations in topography and temporal variations in recharge which promote mixing of water from local, intermediate, and regional flow systems. In an area of Cherokee Marsh, near Madison, transitions from fen communities to sedge meadow and to shallow marsh vegetation occur over a short distance with minimal topographic relief. These vegetation changes are the result of a complex subsurface distribution of peat and till sediments that focus groundwater discharge in the fen area but restrict groundwater discharge to the shallow marsh. A third study focused on a riparian wetland and aquifer adjacent to Dorn Creek, also near Madison, identified two subsurface "hot spots" for denitrification that correlate with zones of groundwater mixing induced by sediment heterogeneity.

Symposium: Healthy Wetlands & Groundwater: The Other Watershed
Thursday, February 14, 2013, 10:20 am
Salon E

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

Abiotic and land-use legacy predictors of invasion resistance in Wisconsin fens

Increasingly, calcareous fens are being invaded by suites of woody and herbaceous plants. However, some fens remain relatively invasion free, and some areas of invaded fens remain uninvaded. This study examined which combination of abiotic conditions and land-use legacies best predicted low invasive-species richness and cover. We determined cover of all invasive species in 220 plots split among 11 fens. We measured hydrologic and soil-nutrient data, and gathered site histories for each site. Major groups of invasives were determined using two-way cluster analysis, and the cover of each of these groups as well as each individual species was modeled using mixed-model regression. Preliminary results suggest 1) stable saturated root zones, 2) low nutrients, 3) high conductivity, and 3) no history of plowing predict resistance to weedy-mesic species and *Phalaris arundiancea*. Woody-invasion resistance may be predicted by stable saturated root zones in combination with inconsistent or low-frequency burning. Our preliminary results suggest that maintaining strong groundwater influence may provide resistance to most invasions, although site history factors may contribute to invasibility even under these conditions.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Baum, Mary Kay, forMemory, Inc. & Alzheimer's & Dementia Alliance of WI
Dave Clutter, Driftless Area Land Conservancy

Empowering exploration: Providing a cooperative and user-friendly model for photo-journaling local wetlands

Most landowners and neighbors do not have access to the tools and information available to document and more fully appreciate their local wetland. Yet many would love to participate in such a meaningful effort. This model puts cutting-edge time-lapse photography techniques in the hands of local lovers of nature for their own health and well-being and for good of a healthy watershed. The focus of this model is empowering the private person who has regular access to a wetland with carefully chosen GPS photo points, stable tripods, equipment, and know-how. Such empowerment of local residents to explore and digitally document seasonal and environmental changes is important in many ways. Hands-on, personal connections with the land and its species are strengthened. Years of species inventory and phenology are developed. Much base-line documentation for conservation easements and WDNR projects is generated. This model emphasizes cooperative arrangements with photography clubs, area land trusts, naturalists, governmental staff, Prairie Enthusiast volunteers, senior citizen groups, disability advocates, civic clubs, public health promoters, schools, congregations, etc. Ideally the exploration becomes inter-generational and long lasting. Seeing a beautiful four season showing of video time-lapse photography (supplemented with appropriate sound by season) will instill new appreciation in the extended family and local community. And extending the project throughout intensive climate change and experimental adjustment efforts can bring new wisdom and practical ways to help preserve our wetlands, especially more ephemeral wetlands. Discussion is encouraged around suggestions for date collection.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Bernier, Callie, UW-Stout
Amanda M. Little, UW-Stout

Effects of glyphosate and sod removal on plant species richness and native transplant survival

Urbanization and modification of landscapes has led to a decrease in native wet prairies and caused a decline in species diversity due to competitive, invasive plant monotypes. We investigated site preparation and native transplant species diversity treatments on plant species richness and transplant survival in a small degraded wetland in Menomonie, Wisconsin. We used three site preparation methods: glyphosate, mechanical removal of surface sod, and a control; and two planting treatments: fourteen species and three species mixes. Our hypotheses were that native species richness would be highest in plots with mechanical sod removal, and that transplant survival would be highest in high diversity, glyphosate treatments. Transplant survival was lowest in glyphosate compared to sod removal plots, although this difference was not significant. There was also no significant difference in transplant survival rates between high and low diversity planting treatments. Overall plant species richness was significantly higher in sod removal plots, although with many non-native species. Our research suggests that sod removal is more effective than glyphosate in fostering native species diversity and transplant survival. However, it also may have promoted invasive species growth, mediated by soil moisture, pH, and organic matter. This short-term experiment displays promising solutions for restoring wet prairies, but further research needs to be performed focusing on long-term management.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Bernthal, Tom, WDNR
Christopher J. Smith, WDNR
Alex Martin, WDNR

WDNR's watershed level wetland status data and applications

WDNR's Wetland Assessment and Monitoring program has developed several GIS data sets that can be of use to wetland professionals. This talk will guide you through how the data was created, how WDNR is using it in watershed projects, what other uses it could support and some important caveats. The data sets are: 1) Potentially Restorable Wetlands; 2) Wetland Activity Tracking: Restoration Gains, Enhancements, Losses, Disturbances; 3) Wetlands Dominated by Reed Canary Grass; 4) Potential Ephemeral Pond Mapping in Southeastern WI. Short examples of current projects using this data will be given, including EPA's Healthy Watersheds Initiative, WDNR Integrated Watershed Plans, the revised WI Rapid Assessment Methodology for Wetland Function and Condition version 2.0, the Duck - Pensaukee Watershed Approach, and others. A discussion on future applications and directions for watershed scale wetland data is encouraged.

Symposium: Wetlands and Watershed Planning & Protection
Wednesday, February 13, 2013, 2:20 pm
Salon E

Boos, Thomas, WDNR

Developing best management practices to slow the spread of unwanted invasive species in wetlands

Invasive species play a major factor in overall wetland health. What can each of us do to ensure that wetlands don't become invaded by unwanted plants? To help answer this question for landowners, consultants, recreational users, hunters/anglers, and other individuals whose work or play in wetlands might spread invasive species, a small group of wetland professionals, including staff from WDNR, consulting firms, non-profit organizations, and federal agencies, have worked over the past two years to create Best Management Practices (BMPs) for Invasive Species that apply to all who work or play in wetlands. BMPs recently created to limit the introduction and spread of invasive plants in forests provided a framework for the development of wetland BMPs for invasive plants. This presentation will discuss the process of developing wetland invasive BMPs as well as the current status of this BMP manual. It will also cover the general activities to which the BMPs in this manual apply. Lastly, the presentation will discuss how the BMPs apply to everyone who enters a wetland and will outline several BMPs for limiting the introduction and spread of invasive species in wetlands.

Wetland Invasive Species II
Wednesday, February 13, 2013, 4:10 pm
Salon F

Bradbury, Kenneth, WGNHS, UW-Extension
Maureen A. Muldoon, UW-Oshkosh
Kylie Larson-Robl, UW-Oshkosh
Aaron Pruitt, UW-Madison

Hydrogeology of the Mink River Estuary, Door County, WI: Groundwater flow and chemistry

The Mink River Estuary is one of the most pristine freshwater estuaries in the United States, and is dominated by groundwater discharge to a large wetland complex through springs and seeps in its upper reaches. The Estuary contains diverse native vegetation and the springs are known habitat for the endangered Hine's emerald dragonfly. Groundwater quantity and quality are critical to the health of the Mink River, but prior to 2010 there had been little investigation of the groundwater system. With support from the Wisconsin Coastal Management Program, our team installed groundwater monitoring wells into the carbonate bedrock along the Estuary, and collected an extensive suite of geologic and geophysical data from each well. Local groundwater is Ca-Mg-HCO3 dominated, with low concentrations of Cl and NO3. Environmental isotopes indicate that the groundwater discharging to the estuary is relatively young and originates from local terrestrial recharge. Minipiezometer data in the upper Mink River wetlands show that complex hydraulic gradients exist there. Currently we are developing a groundwater flow model for the Estuary, contiguous wetlands, and surrounding watershed. The model integrates all the groundwater and surface water data collected at the site and will be a tool for informing management and land-use decisions in and around the Estuary.

Symposium: Healthy Wetlands & Groundwater: The Other Watershed
Thursday, February 14, 2013, 11:00 am
Salon E

Correll, Camilla, Emmons & Olivier Resources, Inc.

Brown's Creek Watershed District: A 15-year history of understanding and protecting surface water-groundwater interactions

The Brown's Creek Watershed District (BCWD), located in the eastern portion of the Twin Cities Metropolitan Area, has one of the few remaining trout streams in this highly urbanized and urbanizing portion of Minnesota. Since its inception in 1997, the BCWD has been developing protection measures to allow for the restoration and management of this unique and potentially threatened groundwater-dependent natural resource. Over the course of the last 15 years, the BCWD has come to better understand the relationship between the creek and its other surface water and groundwater resources. As planning, rulemaking, and permitting tools have been developed to protect the creek from increasing development pressure, so too have cutting edge tools for the protection of the wetlands of the District. This presentation will discuss the history and the tools that have been developed by the BCWD for the protection of all of its groundwater-dependent natural resources, thereby facilitating a more sustainable approach to development and re-development in the watershed.

Symposium: Wetlands and Watershed Planning & Protection
Wednesday, February 13, 2013, 10:40 am
Salon E

Crane, Juli, Lake County Stormwater Management Commission

Post-development isolated waters of Lake County and the 80% - 150% wetland hydrology design criteria

Since mid-August 2001, the Lake County, Illinois, Stormwater Management Commission (SMC) has regulated Isolated Waters of Lake County (IWLC) under the Watershed Development Ordinance (WDO). Such waters include all lakes, ponds, streams, farmed wetlands, and wetlands no longer under U.S. Army Corps of Engineers jurisdiction. The WDO requires permit applicants to demonstrate, through modeling, that the proposed development design maintains between 80% and 150% of the pre-development, 2-year, 24-hour stormwater runoff volume to preserved IWLC on the development site. This study evaluates the effectiveness of the "80%-150% wetland hydrology requirement" in maintaining preserved IWLC function and quality. Soil, vegetation, and hydrology data were collected from 87 preserved IWLC wetlands during summer seasons 2003, 2007, 2008, and 2012. We compared results for the overall wetness range and for three wetness cohorts with pre-development baseline data from permit submittals. Local rainfall and temperature data for the study period provided information on climatic trends. Despite exceptional climatic conditions (e.g., the unusually hot, dry summer of 2012), the studied IWLC wetlands showed a statistically significant trend towards improved floristic quality and preservation of 'wetness.' Study results confirm the efficacy of the wetland hydrology design requirement at the 80% to 150% range, and SMC recommends this requirement continue to be enforced. We also recommend future monitoring efforts include control sites and larger sample sizes for each wetness cohort. Adjustments to the study design will help more readily distinguish between changes in the preserved IWLC wetlands resulting from development and those resulting from exceptional climatic conditions.

Watershed Approaches to Wetland Conservation
Thursday, February 14, 2013, 11:00 am
Salon G

Cutright, Noel J., Western Great Lakes Bird and Bat Observatory
Bill Mueller, Western Great Lakes Bird & Bat Obs.
Shawn Graff, Ozaukee Washington Land Trust

Migratory birds respond to wetland creation at Forest Beach Migratory Preserve, a former golf course

Wetland basins were created in September 2009 at the former Squires Golf Course (now the Forest Beach Migratory Preserve - FBMP) in eastern Ozaukee County to enhance the diversity and abundance of feeding and resting areas (i.e. stopover habitat) used by migratory bird species. The 27 wetland basins on the 116-acre site were designed to create a matrix of shallow marshes, wet meadows, mudflats, and open water habitat. Wetland management activities include water level management using water control structures for each basin, mowing, invasive species management, native seeding, and plug planting. Guidelines were prepared to provide a flexible, adaptive approach to wetland management and enhancement with recommendations on specific hydrologic regimes for each basin. The site's heavy clay soils were used to construct dikes with a 5:1 upstream and 3:1 downstream slopes, with a 10-foot top width. Wetland acreage now totals 14.4 acres, ranging in size from 0.2-3.0 acres and in water depths from 1.4-4.9 feet. In little more than three years, 232 bird species have been recorded on the property. Of these, 77 can be considered wetland-dependent. In addition to conducting point counts, we have enhanced the site's bird list through organized raptor watches, Lake Michigan beach watches, field trips, and especially through visits by many birders as the site's reputation as a good birding location has grown. All of you are invited to visit the FBMP and the Western Great Lakes Bird and Bat Observatory that is housed in the former Squires clubhouse.

Wetlands as Wildlife & Fish Habitat
Wednesday, February 13, 2013, 2:00 pm
Salon G

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

Investigating the relationships between land-use histories and current vegetation in Southern Wisconsin fens

We present results of a study describing associations among past land-use, edaphic conditions, and current vegetation in southern Wisconsin fens. Our goal was to use this information to provide practical management strategies for fen restoration. Species cover and composition for herbaceous and woody species were recorded from 20 plots within 11 fens (220 plots total). We measured water table, vertical hydrological gradient, and soil moisture. Root-zone N and P availability were determined in each plot. Site histories were reconstructed using air photos, management records, and oral histories. The following land-use variables were included: 1) whether a plot was ever plowed, 2) distance from nearest drainage feature, and 3) burn history. Associations among predictor variables and current vegetation cover were determined using bi-plot overlays on Non-Metric Multidimensional Scaling ordination. Root-zone moisture and nutrient availability explained most of the variation in community composition among and within fens. Plowed plots were generally drier and more nutrient rich than never-plowed plots, and had higher relative cover of weedy-mesic and invasive species. The fact that a history of plowing predicts dry and nutrient-rich plots as well as increased invasive species composition suggests the possibility that biotic or abiotic legacies of plowing continue to influence species composition. However, whether these associations are causal cannot be addressed by this study. This study also suggests that saturated, nutrient-poor root zones predict desirable assemblages of wetland generalists and fen specialists. These results suggest that maintaining strong ground-water influence and low nutrients are essential goals in managing and restoring fens.

Historical Perspectives on Wetland Conservation
Wednesday, February 13, 2013, 11:00 am
Salon F

David, Peter, Great Lakes Indian Fish and Wildlife Commission

Progress and setbacks over two decades of wild rice management in the Wisconsin ceded territory

The reaffirmation of tribal off-reservation treaty rights in Wisconsin served as a catalyst for expanded wild rice restoration and management efforts. Over the last two decades, a highly cooperative, interagency restoration program has added well over a thousand of acres of rice stands to the Wisconsin ceded territory, and about a fourth of the wild rice harvest in the state now comes from sites that have been seeded. These figures suggest rice restoration is taking place at a landscape-significant level. While these seeding efforts have provided a number of ecological and cultural benefits, future restorations will face new challenges. Some of the easiest seeding opportunities have been accomplished, and many remaining opportunities are likely to prove more challenging socially as well as ecologically, requiring different skill sets and time commitments from managers. Concurrently, growing impacts from climate change, invasive species and other factors are increasing the need for management while presenting managers with situations not previously faced. This presentation will provide an overview of previously successful restoration strategies and an introduction to the new challenges facing rice managers using specific site examples from Wisconsin and Minnesota, and will suggest areas where additional research could help address management needs.

Case Studies of Wetland Restoration
Wednesday, February 13, 2013, 3:50 pm
Salon G

Doherty, James, UW-Madison
Jeff F. Miller, UW-Madison
Stephanie G. Prellwitz, UW-Madison
Anita M. Thompson, UW-Madison
Steve P. Loheide, UW-Madison
Joy B. Zedler, UW-Madison

Hydroperiod dictated ecosystem services in stormwater treatment wetlands

Ours is the first detailed and interdisciplinary study of ecosystem services in created wetlands in response to three hydroperiods (flooded, intermittent, and relatively dry). The hydroperiods relate to differential subsurface drainage of otherwise identical wetlands at the UW-Madison Arboretum. Despite identical plantings, the vegetation of each wetland developed substantially different composition. The flooded wetland was dominated by cattails, which decreased richness and increased cover, height, and productivity; the opposite was true in the relatively dry wetland. We also found major differences in removal of Total Nitrogen, Total and Dissolved Phosphorus, and Total Suspended Solids, based on automated sampling of in- and out-flowing runoff during 13 storms. Overall, we found significant differences in six services (water storage, peak-flow attenuation, erosion control, nutrient removal, primary productivity, and diversity support). Contrary to widespread assumption, no single measure (including net primary productivity) was a consistent indicator of these services. For example, the wettest hydroperiod was associated with the highest primary productivity but the lowest nutrient removal; whereas, the most well-drained hydroperiod was associated with the lowest primary productivity but high erosion control and highest TSS removal. High cover was associated with high primary productivity but with low levels of five assessed services. It is clear from our integrated study that the services provided by created wetlands need to be assessed directly and holistically. Watersheds will be healthier when treatment wetlands are managed for their ecosystem services, not just their structure and appearance. We thank US EPA-Great Lakes Restoration Initiative for funding our research.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Elston, Sue, USEPA

Incorporating wetlands into watershed planning: A new EPA Region 5 supplement to watershed planning handbook

USEPA Region 5 has recently completed a supplement to the EPA Watershed Planning Handbook. The purpose of the supplement is to encourage the inclusion of wetland protection and restoration activities in watershed management plans. Wetlands play an integral role in maintaining a healthy watershed. The supplement promotes using a watershed approach to both protect wetland resources as well as finding opportunities to enhance or restore wetlands to help address watershed problems. The supplement provides information on recently developed approaches for assessing both wetland function and condition. This information can be incorporated into watershed plans to evaluate where wetland restoration activities would best be located to improve water quality and support other watershed plan management goals. The supplement also provides information on wetland restoration, enhancement, and creation techniques and discusses factors that need to be considered when deciding how best to incorporate a wetland project into a watershed management plan.

Symposium: Wetlands and Watershed Planning & Protection
Wednesday, February 13, 2013, 3:30 pm
Salon E

Erickson, Sara, UW-La Crosse
Colin Belby, UW-La Crosse
Ryan Perroy, UW-La Crosse
Cody Mertens, UW-La Crosse
Melissa Goldade, UW-La Crosse

Lead contamination in water and biota at the site of a former trap shooting range

The La Crosse River Marsh is a 1,077 acre wetland in La Crosse, WI. From 1932 to 1963, the La Crosse Gun Club resided on the shores of the marsh; during this period, large quantities of lead shot were projected in and around the area, making lead contamination a concern, especially for the many species of fish, waterfowl, and plants living in the marsh that could be susceptible to lead poisoning. It is important to monitor the levels and effects of lead on the La Crosse River Marsh because this urban wetland is a major flyway for migrating waterfowl and contains abundant species of plants and other aquatic organisms. A 2011 analysis of surface sediment from the marsh (0-5 cm) discovered lead concentrations as high as 22,950 parts per million (ppm), with the greatest concentrations found in the shot fall zone 180-300 m from the former trap stations. Due to the high levels of lead in the sediment, water and duckweed (*Lemna sp.*) samples from the areas of highest sediment lead concentration were collected and analyzed during July 2012. In addition, temperature, conductivity, dissolved oxygen, pH, and turbidity measurements were collected at 23 sites across the contaminated zone. Results showed that water quality exhibited a decrease in pH and highly variable turbidity through space and time. Dissolved lead concentrations in the water column ranged from 0-5.2 µg/L while total lead concentrations ranged from 0-1,240 µg/L. Analysis of duckweed determined that levels ranged from 4.87-248.45 ppm.

Historical Perspectives on Wetland Conservation
Wednesday, February 13, 2013, 10:40 am
Salon F

Fevold, Brick M., WDNR
Michael W. Meyer, WDNR

Ashland Chequamegon Bay Shoreland Restoration Project: Evaluating the ecological benefits of a constructed wetland

The biological retention basin (i.e., engineered or constructed wetland, retention wetland, bio-cell) is considered "green infrastructure," effective in reducing total annual deposition of surface-water-transported sediment and nutrients and other non-point source pollutants to local and regional surface waters. Reductions in sediment and nutrient loading are attributed to a process known as "phyto-remediation" and sediment deposition that allows for microbial decomposition where plants and other organisms utilize soluble nutrients for growth (i.e. storage) in tissue. This reduces total effective annual deposition into local surface waters. The cost associated with designing and installing a bio-retention basin is often justified qualitatively by the attributed, though un-quantified, benefits they provide in protecting water quality and other natural resources. The Ashland Chequamegon Bay Shoreland Restoration Project (CBSRP) (www.ashlandshorerestore.org), with funding support through the Great Lakes Restoration Initiative is conducting long-term monitoring to quantify the ecological benefits and environmental services provided by "green infrastructure" installed along Ashland's post-industrial waterfront. A project objective is to quantify the performance of green infrastructure in reducing non-point source pollution discharge into Lake Superior. In this presentation, we briefly describe the CBSRP project with an emphasis on study design and methods used to evaluate the effectiveness of a bio-retention basin installed in 2008 by the City of Ashland to manage increased volumes of storm-water and nutrient runoff into Chequamegon Bay. The presenter will also share preliminary results from a study monitoring surface-water runoff of adjacent upland, and insights on the emerging natural history of a maturing constructed wetland.

Case Studies of Wetland Restoration
Wednesday, February 13, 2013, 4:10 pm
Salon G

Fowler, David, Earth Economics
Maya Kocian, Earth Economics
David Batker, Earth Economics

Economic and ecological benefits of Iowa's Middle Cedar River watershed

Wetlands provide valuable ecosystem services such as flood management, water quality and availability, habitat, recreation, and increased property values. Working with public, private, and NGO agencies, Earth Economics' Ecosystem Services Valuation (ESV) studies quantify the value of nature's benefits to humans. This type of economic valuation justifies the shift of investment toward wetland restoration and management. The concept of ecosystem services has proven effective for understanding the linkages between ecosystems and human well-being. Earth Economics recently completed a study, "Valuing Nature's Benefits: An Ecological Economic Assessment of Iowa's Middle Cedar Watershed," to provide critical economic information to help select and prioritize flood control projects that maximize ecosystem services. This study supports a comprehensive approach to sustainable watershed management. Additionally, it identifies geographic areas of greatest economic value and supports future investment in natural capital by informing policy and decision-makers. Although wetlands and riparian habitat cover less than 3% of the Middle Cedar River drainage area, they provide the highest value for flood-risk management, valued at a maximum of $3,651 and $4,073 per acre annually, respectively. This presentation will describe the methodology used to calculate economic values for ecosystem services provided by wetlands and floodplains within the Middle Cedar Watershed and will highlight the recent release of the ecosystem valuation toolkit (EVT). The Cedar River report will serve as a case study to support future flood-risk management and wetland restoration in agriculture-dominated watersheds throughout the Midwest.

Watershed Approaches to Wetland Conservation
Thursday, February 14, 2013, 10:20 am
Salon G

Goldade, Melissa, UW-La Crosse
Colin Belby, UW-La Crosse
Ryan Perroy, UW-La Crosse
Sara Erickson, UW-La Crosse
Cody Mertens, UW-La Crosse

Analysis of pH in lead contaminated sediment and water in the La Crosse River Marsh

The sediments of the La Crosse River Marsh contain high levels of lead as a result of former activities of the La Crosse Gun Club. Lead shot can remain in sediment for hundreds of years and still have negative effects on environmental health. The corrosion of lead shot poses a problem for the further distribution and mobility of lead in sediment. The sediment pH is an important indicator of lead corrosion. Lead in acidic sediment exhibits more weathering than lead in neutral or alkaline sediments. By testing the pH of sediment containing lead shot, it may be possible to determine if the shot is corroding. The likelihood of future lead mobility can be better understood by analyzing and mapping the spatial variability of sediment and water pH. Preliminary results show that sediment pH is generally acidic (range = 4.9 to 7.0; average = 5.6), indicating the possibility of lead mobility. The acidic sediment likely increases the rate of lead shot corrosion and helps explain the shot-free sediment lead concentrations of up to 31,100 ppm that have been found. The water pH is neutral to basic (range = 6.9 to 10.4; average = 8.2). Due to the high water column pH, lead that reaches the water column likely precipitates out of solution, which decreases the mobility of small lead particles.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Gotkowitz, Madeline, WGNHS

Groundwater-induced flooding of lowland areas in Spring Green, Wisconsin

Following heavy rain in June 2008, floodwaters inundated over 4,380 acres in the town of Spring Green, Wisconsin, on a terrace a mile north of the Wisconsin River floodplain. Antecedent conditions included the wettest month on record in August 2007 followed by a winter with twice the normal amount of precipitation. In the shallow sand and gravel aquifer in Spring Green, the water table elevation rose by 5.0 feet in response to spring recharge. An additional 3.4 feet of water table rise was recorded after the June storms. Field observations and results of a groundwater flow model support the conclusion that the water table rise to the ground surface caused extensive and long-lasting (more than 5 months) flooding. Groundwater flooding can occur in areas with poorly developed surface drainage when climatologic and hydrogeologic conditions result in a water table rise above land surface. Where high water table conditions persist for several years or are a frequent occurrence, the area may be regarded as an isolated wetland or pond. However, in Spring Green, where groundwater flooding is relatively rare, extensive property and crop loss occurred. The Spring Green flooding demonstrates that even high-permeability aquifers can be vulnerable to rapid water table rise and groundwater flooding under some climatologic conditions. Based on recent experience across southern Wisconsin, areas susceptible to groundwater inundation could be identified based on physical characteristics, such as soil type and depth to the water table.

Symposium: Healthy Wetlands & Groundwater: The Other Watershed
Thursday, February 14, 2013, 10:40 am
Salon E

Gumtow, Jon, Stantec Consulting Services Inc.

The Ridges Sanctuary ridge and swale restoration project

The Ridges Sanctuary is one of Wisconsin's wetland wonders. This 1,600 acre State Natural Area preserves one of the rarest wetland types in the state, the ridge and swale habitat. This 1,400 year old landscape is a complex interaction between groundwater and surface water discharge within an ever changing Lake Michigan alluvial environment. The goal of this project is to restore a highly functional ridge and swale system in a previously disturbed area with linkage to the existing ridge and swale complex. Site restoration includes understanding hydrologic contributions and restoring habitat for rare plants. The project will serve as an interpretive opportunity to educate the public about wetland formation and functions. The approach to this project was to understand the hydrologic, vegetation, and physical geology/soils and use site specific data and local resources in the restoration design. One year of site-specific data collection was completed and supplemented with previous research data from The Ridges Sanctuary. Data included groundwater level monitoring to understand seasonal variations; vegetation surveys to understand plant diversity and opportunities to transplant rare species; and soil descriptions to restore the optimal topsoil and subsoil conditions similar to adjacent wetlands. This information was used to develop a restoration design and revegetation plan. The results demonstrate that understanding site specific conditions is critical to developing a high quality wetland restoration project., especially in alluvial settings where soils vary greatly. At this site, proximity to dolomite bedrock outcrops and groundwater discharge greatly influences soil and vegetation composition.

Case Studies of Wetland Restoration, Wednesday February 13, 2013, 3:10 pm
Salon G

Hart, David, WGNHS
Joanne Kline, WDNR

Hydrogeology of the Cedarburg Bog

Cedarburg Bog in Ozaukee County is a 2500-acre wetland complex of many plant communities that support a wide diversity of plants and animals. As at true bogs, rainwater received directly is an important part of the Cedarburg Bog's water supply. However, the Cedarburg Bog also receives groundwater. This groundwater contribution is what drives the uniqueness and diversity of the wetland community types and the species that depend on them. Our study looked at the hydrogeology of the bog; the contributions from groundwater and the geology that helped formed the bog. Groundwater at the bog originates when local recharge as rain and snowmelt infiltrate up-gradient of the bog. We used well construction reports, constructed additional wells, and collected data from previous studies to delineate the area contributing groundwater to the bog. The well construction reports, surface geophysics, and maps of the glacial geology of the region were used to reconstruct the geology that formed the bog and continues to play a role in the groundwater flows to and from the bog. The data we collected will be used to provide estimates of the water budget for the bog. We can delineate those parts of the bog that are most dependent on groundwater flows from outside the bog's borders and be able to understand how land use changes might impact those flows. This information can then inform protection strategies such as education, transportation and land use planning, zoning, conservation easements, and land acquisition.

Symposium: Healthy Wetlands & Groundwater: The Other Watershed
Thursday, February 14, 2013, 11:40 am
Salon E

Hlina, Paul, Lake Superior Research Institute
Reed Schwarting, UW-Superior
Tom Bernthal, WDNR

Setting floristic quality assessment benchmarks for non-forested wetlands of the Lake Superior basin

This project will establish non-forested wetland condition benchmarks in the Lake Superior basin using floristic quality metrics (FQA) by linking plant community composition to measures of anthropogenic stress. During the 2012 field season, 111 Assessment Areas of four types (alder thickets, shrub carrs, open bogs and northern sedge meadows) were surveyed by a timed-meander sampling method and correlated with independent landscape and site level measures of stress. GIS measures of land disturbance within a 300m buffer around each Assessment Area were used to sort candidate sites into "least disturbed" (or reference condition) sites and "most-disturbed" sites. Both weighted (by % cover) and non-weighted Mean C and FQI values (which includes a species richness component) will be tested as preliminary benchmarks in determining low, medium, or high wetland plant community condition. The Coefficient of Conservatism (C) value is simply a numerical rating of an individual species' conservatism and habitat fidelity in relation to disturbance. C-values range from 0-10 and have been assigned to each native species in the Wisconsin flora by an expert panel of Wisconsin botanists. Non-native species are not assigned C-values as they were not present during the evolution of native species and local plant communities, but are included in index calculations with a value of 0. On a subset of sites, timed meander surveys are being compared with traditional quadrat sampling to evaluate the efficiency of field effort, precision, accuracy, and completeness of each method.

Assessment & Planning for Wetland Conservation
Thursday, February 14, 2013, 10:40 am
Salon F

Hoy, Erin, USGS
Larry Robinson, USGS

Wetland vegetation mapping in the 21st century: Advances in technology and why maps matter

Vegetation mapping has advanced considerably within the last 10-15 years due to the widespread adoption of digital aerial photography and advancements in Geographic Information Systems (GIS) software and hardware. Vegetation maps can be produced more quickly and efficiently and, due to the ubiquity of GIS, can be utilized by an increasing number of individuals, both in wildlife management and among the general public. This poster will cover the process used by the Resource Mapping and Spatial Analysis Team (RMSAT) at the Upper Midwest Environmental Sciences Center- United States Geological Survey (UMESC-USGS) in La Crosse, WI for creating a digital vegetation map: from the aerial imagery collection to final products (completed digital vegetation map with associated metadata, etc.). It will also examine how our partner organizations utilize these maps, especially wetland maps produced for the Long Term Resources Monitoring Program (LTRMP), a component of the Upper Mississippi River Restoration-Environmental Management Program and for various USFWS refuges. Vegetation mapping may be used to study the effects of water-level drawdowns, distribution of tagged animals in a wetland habitat, detecting long-term land-use/land-cover changes, etc.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Jensen, Jens, Cardno JFNew
Gary Birch, WisDOT

WisDOT invasive control program: Large scale invasive plant control across transportation corridors and mitigation sites

It is well known that transportation corridors provide a convenient route for invasive species dispersal. Exposed soils in new road construction and disturbance in created mitigation sites allow ample opportunity for invasive species establishment. WisDOT actively pursues control of major invasive plants on newly constructed roadways and wetland mitigation sites. Cardno JFNew conducts much of the invasive control on nearly 1,800 acres across more than 25 wetland mitigation sites as contracted by WisDOT. The management and control of species targeted requires much planning to reduce variables in execution of invasive treatment across the State. Weather, phenology, funding, and personnel scheduling are the major factors addressed while determining the logistics of invasive treatment on multiple sites. Because of funding limitations, priorities must be set and more broad scale techniques are often used. Certain sites have not been maintained in years and therefore have high densities of invasive species on site. Significant reduction of invasive plants on sites treated has been observed. The next step is to encourage native vegetation growth in the areas of invasive eradication. Continued diligence in invasive species control will ensure more diverse native wetland ecosystems with increased resilience in resisting invasion from noxious species.

Wetland Invasive Species I
Wednesday, February 13, 2013, 2:20 pm
Salon F

Jessop, Jordan, University of Illinois
Jeff Matthews, University of Illinois
George Geatz, Illinois Natural History Survey

Tradeoffs among ecosystem functions in compensatory mitigation wetlands

Compensatory wetland mitigation is required when a wetland is impacted by development. A wetland of equal or greater size must legally be created to replace the lost site. Built in to this legal framework is the assumption that wetlands of equivalent quality can be created to replace those lost, but recent research is beginning to demonstrate this may not be the case. Additionally, the quality and type of mitigation sites created falls across a broad spectrum of high to low quality wetlands. In this large collaborative project, we seek to quantify various indicators of wetland structure and function in restored and natural reference wetland sites across the state of Illinois. The goal is to evaluate how restoration sites compare to natural reference wetlands, to determine whether functional tradeoffs exist among different types of wetland mitigation sites, and to evaluate the implications of this research to current wetland mitigation policy. Since restored and created wetlands are variable in landscape setting, site design, soil development, and plant community composition, it is likely that significant differences exist in the ecosystems functions being performed at mitigation sites. Some of the variables to be measured include: vegetation composition, aboveground biomass, soil bulk density, soil organic matter decomposition rates, basin water storage capacity, denitrification potential, avian and anuran biodiversity, as well as several others. This project is currently a work-in-progress, with data still being collected and analyzed.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Kearns, Kelly, WDNR
Thomas Boos, WDNR

Observations sought for plants being assessed for Wisconsin's invasive species rule

WDNR is in the process of assessing species to consider adding to NR 40, the state's comprehensive invasive species rule. When the rule was first drafted, the species listed as regulated were primarily those which were widespread and well documented, or those not yet established in the state. Left off the list for the first round were species for which there was not sufficient information about their spread and/or impacts. Also put on hold were those species that were commercially valuable in some way. Now that NR 40 has been law for a few years, WDNR staff and the WI Council on Invasive Species are gathering information about those species that are more problematic. For many of these plant species, we are in need of further information about the plant's distribution, rate of spread and impacts on native species. We also need information about which cultivars may be weedy and which ones are not. We need many eyes in the field this season, reporting on these plants. This poster will list the plants for which observations are needed and how observers should report those plants. Observations in adjacent states are also helpful, so please send them in.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Kearns, Kelly, Endangered Resources, WDNR

Japanese Hop: A rapidly spreading riparian invasive

A fast-growing annual vine, Japanese hop (*Humulus japonicus*), has recently been spreading along the banks and floodplains of streams and rivers in the Upper Mississippi River (UMR) watershed, literally blanketing other vegetation. Reported populations are currently limited to a few tributaries to the UMR with relatively new infestations, but most streams and their associated wetlands in the region are vulnerable to invasion by this vine. As an annual, hops can be controlled if action is taken to plan ahead, search for new populations, and initiate control immediately. Monitoring to find all populations and follow through each year are critical. This presentation will cover the biology of the plant, how it spreads, habitats and streams invaded, and what is known about its impacts and control efforts. Participants will be encouraged to share additional information that they know about the biology and spread of this plant

Wetland Invasive Species II
Wednesday, February 13, 2013, 3:10 pm
Salon F

Kuhns, Roger, SustainAudit LLC and UW-Milwaukee Cedarburg Bog Field Station

Natural history of the Cedarburg Bog, Saukville, Wisconsin: Insights into post-glacial wetland formation

The Cedarburg Bog is a post-glacial wetland complex west of Saukville Wisconsin. This presentation will discuss work done through four field seasons with the UW-Milwaukee Field Station Director Dr. Jim Reinartz. Research focused on the bog's post-glacial formation history. Cores were collected from string bog, shrub carr, conifer swamp, and marsh meadow habitats, the deepest to 60 feet. Cores revealed the bog's evolution. The lowest stratigraphic section consists of unconsolidated river and lake sand and pebble deposits (60-45 feet), with increasing clay contents upwards. The sediment's fine fraction consists of clay-sized rock/mineral particles (rockflour formed during glacial transport and released through meltwater flow). Between 45-35 feet consists of clay-sized mineral sediment interlayered with organic gyttja. From 35-7 feet is thin-to-thick white to gray/dark-gray banded or non-banded gyttja. Physical examination of the gyttja reveals soft gelatinous degraded plant cellulose material. Between 7-1 feet is a sapric-hemic-fibric peat sequence, topped with surficial root and litter zones of the bog. Depths and thicknesses of units vary from core to core. Data shows a downward decrease in diatom diversity and freshwater gastropod and mollusk species abundances. Downward changes in pH (5.2 to 6.5 to deeper 8.3 values) correlates with formation of gyttja and dissolution of gastropod and mollusk shells. The data indicates an early river complex through which rockflour bearing meltwater flowed. This environment gave way to lake and wetland fen-bog environments, which restricted the input of mineral sediment into the system as water supplies decreased and sediment deposition dammed river valleys and formed lakes, wetlands, and, ultimately, the bog.

Historical Perspectives on Wetland Conservation
Wednesday, February 13, 2013, 11:20 am
Salon F

Loheide, Steve, UW-Madison
Jeffrey F. Miller, UW-Madison
James M. Doherty, UW-Madison
Stephanie G. Prellwitz, UW-Madison
Anita M. Thompson, UW-Madison
Joy B. Zedler, UW-Madison

Groundwater influences on wetland health and ecosystem services provided by stormwater treatment wetlands

Stormwater treatment wetlands are designed to provide an array of services that typically include flow attenuation and water quality improvement, but may also attempt to provide habitat and increase biodiversity. A Stormwater Management Research Facility (SMRF) was constructed at the UW Arboretum to evaluate the effectiveness of wetland swales to provide this array of desirable ecosystem services. While the construction of replicate swales was identical, the hydrologic function of the three study swales was substantially different in terms of water level recession rates, flow attenuation, and stormwater recession. The cause of these hydrologic differences is related to subsurface hydrologic variation that is difficult to detect a priori. The effect of the hydrologic differences manifests itself both in alteration of 1) vegetation composition, diversity, and productivity, and 2) water quality through nutrient removal and erosion resistance. Our observations indicate that stormwater retention, flow attenuation, nutrient removal, erosion resistance, and diversity support were all positively correlated, suggesting a strong synergy amongst this bundle of ecosystem services. On the contrary, plant productivity was negatively correlated with all of the other services considered. Recognition of this unexpected trade-off is critical since many stormwater managers would assume that healthy and robust looking vegetation would be an indicator of a well-functioning stormwater treatment wetland.

Symposium: Healthy Wetlands & Groundwater: The Other Watershed
Thursday, February 14, 2013, 10:00 am
Salon E

Macleod, Robb, Ducks Unlimited, Inc.
Aaron Smith, Equinox Analytics, Inc.

Semi-automated wetland mapping techniques: A pilot project in Wisconsin

Consistent, accurate, and timely wetland maps are an important part of any conservation planning effort. However, wetlands are often difficult to map because they are diverse in size (from small ponds to large complexes), vary in type (aquatic to forested), and are constantly changing (from both natural and anthropogenic causes). Traditionally, wetland maps were created by manual interpretation of aerial photography. While the traditional photo interpretation methods produce consistent and accurate wetland maps, this process is slow, expensive, and labor intensive. With shrinking budgets for wetland mapping and the advent of newer technology and mapping techniques, the wetland mapping community would benefit from developing more efficient methods for wetland mapping. Ducks Unlimited has teamed up with Equinox Analytics to develop semi-automated techniques to improve the efficiency of mapping wetlands from digital imagery. Our goal is to produce wetland maps in a cost efficient and timely manner while still producing consistent and accurate results. The automated workflow includes image segmentation and Random Forest machine learning classification using four-band spring aerial imagery, SSURGO soils, and a Digital Elevation Model (DEM). The methods were piloted on USDA Forest Service lands in northern Wisconsin. Our goal was to automate up to 80% of the total repetitive labor related to the wetland delineation and classification process and then use trained photo-interpreters to identify and classify difficult and confusing wetland classes. Final results of the wetland maps will be shown; field verification is anticipated in the spring of 2013.

Assessment & Planning for Wetland Conservation
Thursday, February 14, 2013, 10:20 am
Salon F

Magyera, Kyle, Wisconsin Wetlands Association

Lessons from supporting local wetland protection

Now more than ever it is evident that local communities can play an important role in protecting their local wetlands. Various opportunities exist for local governments to do so. This presentation will discuss how WWA is encouraging and supporting communities to become more active players in wetland protection. We will share findings from research that evaluated how certain Wisconsin communities have (or have not) adopted and implemented local policies (e.g., zoning) to protect wetlands. We will discuss the more common types of local wetland policies that exist in Wisconsin, as well as the policy gaps that limit more effective protections. The presentation will also give an overview of the suite of wetland-friendly policy recommendations that are being shared with local governments throughout Wisconsin. The presentation will wrap up with a discussion of ways that wetland professionals can become more involved in encouraging and helping communities – across Wisconsin and the region – to adopt strong(er) local wetland protection programs.

Symposium: Wetlands and Watershed Planning & Protection
Wednesday, February 13, 2013, 11:20 am
Salon E

Malott, Melissa, Clean Wisconsin

Wisconsin's Watershed Adaptive Management Option and opportunities for wetland restoration

Under Wisconsin's new phosphorus rule, Clean Water Act permittees may choose a compliance strategy that involves restoring water quality through nonpoint source controls. Permittees who choose this option may avoid high-cost technology upgrades that would not significantly improve water quality. This compliance option, called the Watershed Adaptive Management Option, focuses on nonpoint source phosphorus load reduction, and if done strategically, can create benefits beyond phosphorus reductions, like wetland restoration, where wetland restoration would reduce phosphorus loading. This presentation will review this new rule, the watersheds in the state where the Watershed Adaptive Management Option may be successful, how and by whom it will be used and implemented, and how wetlands advocates can be involved in the process to leverage the restoration of wetlands.

Watershed Approaches to Wetland Conservation
Thursday, February 14, 2013, 11:40 am
Salon G

Martinka, Jeff, SE Wisconsin Watersheds Trust, Inc. (Sweet Water)

Healthy watersheds: Changing the rules and the roles to improve our chances

This presentation will provide a candid review of a major Great Lakes watershed collaboration, offering key lessons in watershed-wide environmental planning and implementation. From an analysis of Sweet Water's watershed work in the Milwaukee River region, session participants will learn of promising approaches and potential minefields in managing cross-sector water quality work. This session offers practical, how-to advice on creating and improving regional water quality and conservation collaborations based on Sweet Water's successes and challenges. The mix of partners has led to both short term successes and substantial growing pains. While youthful, Sweet Water successes include completion of watershed restoration plans for the Kinnickinnic and Menomonee Rivers, creation of an EPA-funded watershed-based stormwater permit for the Menomonee River (one of 3 national pilots for EPA), leading stakeholder outreach for four complex new third-party TMDLs, and creating and funding both a green infrastructure mini-grant program and a new regional storm water education program. Some Sweet Water projects have included strong wetland restoration components. Sweet Water was established in 2008 to achieve healthy and sustainable water resources throughout the five Greater Milwaukee watersheds, comprising 1,147 square miles. Sweet Water is based at UW-Milwaukee's Great Lakes Water Institute and its partners include local governments, special purpose districts, NGOs, residents, and representatives of business and academia. Its active project partners include local, regional, and national environmental NGOs as well as key governmental players in statewide and national water quality issues.

Watershed Approaches to Wetland Conservation
Thursday, February 14, 2013, 11:20 am
Salon G

McGinley, Paul, UW-Stevens Point

Modeling wetlands in the watershed: Some challenges to simulating wetland hydrology, hydraulics, and nutrient transport

Simulating the impact of wetlands on the movement of water and nutrients in watersheds is increasingly important. Models may help us understand how wetland water budgets, resistance to flow, and nutrient cycling influence flow and nutrient export from watersheds. At the same time, using watershed models to understand wetland impacts can sometimes seem complex, confusing, and even contradictory. One of the challenges to simulating wetlands in watersheds is the wide variety of models available. Another challenge relates to the models themselves. These models provide relatively simplified representations of complex phenomena and they may not have been designed specifically to examine wetland impacts. In these cases, the models may not include all of the important processes or they may incompletely or inappropriately characterize them. This presentation will attempt to improve our understanding of how watershed models simulate wetlands by presenting an overview of watershed models and then examining how several watershed models incorporate wetland impacts on hydrology, hydraulics, and nutrient movement.

Symposium: Wetlands and Watershed Planning & Protection
Wednesday, February 13, 2013, 1:40 pm
Salon E

Melchior, Marty, Inter-Fluve
Tom Sear, SEH, Inc.
Stacy Hron, WDNR
Scott Horzen, OTIE

Restoration of riverine wetland habitat as part of the Sheboygan Area of Concern Project

The Sheboygan River Area of Concern (AOC) is one of several sites in the US and Canada listed as impaired under the U.S.-Canada Great Lakes Water Quality Agreement. The EPA, State of Wisconsin, City of Sheboygan, and Sheboygan County have cooperated in developing, funding, and implementing a Remedial Action Plan for the Sheboygan AOC. As part of the process for removing Beneficial Use Impairments and ultimately delisting the project area, the cooperators have undertaken significant dredging operations to remove PCBs and other contaminants from river sediment. This talk focuses on the final phase of the project: the improvement of riparian wetland habitat conditions within the AOC project limits. The Sheboygan AOC Habitat Restoration Project included the excavation of island and shoreline areas to remove *Phragmites* and reed canarygrass infestations. Wildwood Island, a large island in the lower Sheboygan River, was rebuilt using large wood and bioengineering techniques. Floodplain wood was used to encourage sediment deposition and small island formation. Boulder and large wood placement was used to improve fish habitat within the river, and depositional features were constructed to provide targeted access areas for anglers and boaters. In heavily used parks, riparian areas were converted from turfgrass to native vegetation. A large WisDOT mitigation pond was converted to a more complex series of stormwater detention basins and wetlands, and heavily used angling areas were modified with fishing piers and expanded or modified native riparian vegetation.

Watershed Approaches to Wetland Conservation
Thursday, February 14, 2013, 10:40 am
Salon G

Miller, Kay, Door County Planning Department

The challenges and opportunities of local wetland conservation: Door County's experience

Door County is actively involved in protecting local wetlands through county planning and local zoning and land division ordinances. This presentation will address the rationale and context for adoption and implementation of Door County's ordinances, and will explain how county wetland conservation programs have been integrated with and even exceed state and federal laws. I will also discuss the barriers to implementing local wetland protection and the opportunities for county and other local governments to advance wetland protection. Finally, I will provide a perspective on the planning and assessment assistance, technical support, and funding that local governments need to develop and implement stronger wetland protection policies.

Symposium: Wetlands and Watershed Planning & Protection
Wednesday, February 13, 2013, 11:40 am
Salon E

Miller, Thomas, Emmons & Olivier Resources, Inc.

Modeling the Pelican Lake restoration project

Pelican Lake is a 4,000-acre Minnesota DNR-designated shallow lake located in Wright County, Minnesota. Since the early 1970s, Pelican Lake levels have generally been rising, with record lake levels persisting from 2001 to the present. High lake levels have resulted in poor water quality, loss of important wildlife habitat, and localized flooding. The Pelican Lake Outlet project was initiated by Ducks Unlimited, Inc. and the Minnesota DNR Division of Fish and Wildlife. The study objectives were to determine the role of groundwater-surface water interaction as related to high water levels on Pelican Lake, evaluate lake outlet alternatives, evaluate potential environmental impacts of the lake outlet, and develop a conceptual design and cost estimate for a preferred outlet alternative. To determine the effects on the many wetlands in the project area, a groundwater study, XP-SWMM hydrologic and hydraulic model, and water budget approach were used together for design and analysis. This symposium presentation will cover the different methods of wetland modeling used as well as discussion of the project in general.

Symposium: Wetlands and Watershed Planning & Protection
Wednesday, February 13, 2013, 1:00 pm
Salon E

Minahan, Kristi, WDNR

Wisconsin's Healthy Watersheds Initiative

Wisconsin is conducting a Healthy Watersheds Initiative (HWI) in conjunction with USEPA's national effort. The goal of the HWI is to assess a range of statewide, watershed-level datasets to rank each watershed in the state on scales of "health" and "vulnerability". These rankings can then be used to prioritize and target appropriate funding and management practices to specific watersheds. While other EPA programs focus on restoring impaired waters, the Healthy Watersheds Initiative uses the watershed approach for proactive protection and restoration to avoid additional water quality impairments in the future. Wisconsin is one of the early states to adopt such a framework. This talk will describe the intent of the project, the data sets used for ranking, and potential uses of the watershed rankings by state agencies, watershed organizations, and other partners.

Symposium: Wetlands and Watershed Planning & Protection
Wednesday, February 13, 2013, 3:10 pm
Salon E

Motquin, Jon, Shawano Co. Land Conservation Div.
Zachary Hylinski, WDNR
Tom Eggert, Town of Richmond
Douglas Cox, Menominee Nation Trust Resources Department

Rapid response and control of policeman's helmet (*Impatiens glandulifera*)

The first known Wisconsin occurrence of policeman's helmet has been reported in the Town of Richmond, Shawano County. Policeman's helmet is a Wisconsin early detection wetland invasive species. Since its discovery, it has proven to be an incredibly invasive species. Originally planted by a landowner as an ornamental from seeds procured in the United Kingdom, it quickly escaped cultivation on the parent parcel. Strong evidence of deer herbivory and transport has been documented. An early detection and eradication program was undertaken by a diverse collaboration of public and private entities because of the close proximity of Wisconsin State Natural Areas and tribal forests. Response protocols were uniformly implemented within three miles of the infestation site. A direct mailing with species identification materials was sent to all landowners, roadside plant surveys were performed, and walk-through property inspections were performed where permission could be obtained. All observed plants were hand pulled and composted in August 2012. Additional surveys will be performed in 2013 to evaluate the effectiveness of the treatment.

Wetland Invasive Species II
Wednesday, February 13, 2013, 3:30 pm
Salon F

Muldoon, Maureen, UW-Oshkosh
Kylie Larson-Robl, UW-Oshkosh
Kyle Heimstead, UW-Oshkosh
Kenneth Bradbury, WGNHS
Dave Hart, WGNHS

Hydrogeology of the Mink River Estuary, Door County, WI: Geologic controls on spring locations

Located near the tip of the Door Peninsula, the Mink River Estuary (MRE) is one of the most pristine freshwater estuaries in the United States and it provides habitat to many endangered and threatened species, including the Hine's emerald dragonfly. The MRE is dominated by groundwater discharge through springs and seeps, thus making groundwater quality and quantity critical to the long-term health of the estuary. The importance of springs to the MRE has long been recognized, however, there as has been little detailed characterization of the springs themselves or the underlying flow system. We hypothesize that spring locations are controlled by two factors: depth to bedrock and the location of high-permeability bedding plane fractures in the underlying carbonate bedrock aquifer. Spring locations were identified in the winter of 2012 when much of the estuary was iced over. Detailed spring inventory data were collected during the summer of 2012. Depth to bedrock was determined using a combination of surface geophysical methods and hand coring using a Russian peat corer. While some springs are located in areas of shallow bedrock, other springs are located where there is >25 ft of low-permeability marl sediments. Geophysical data collected from four bedrock wells that surround the estuary were used to identify high-permeability bedding plane fractures within the carbonate bedrock aquifer. Well-to-well correlations based on these borehole geophysical data suggest that hydraulically-important bedding-plane fractures are important conduits for groundwater discharging at the springs, especially the springs located in areas with thick accumulations of marl.

Symposium: Healthy Wetlands & Groundwater: The Other Watershed
Thursday, February 14, 2013, 11:20 am
Salon E

Mushinski, Mike, Brown County Land & Water Conservation Department
Jim Jolly, Brown Co Land & Water Consv. Dept.

Neary, Steve, UW-Madison
Tom Beneke, UW-Madison

Northern pike habitat restoration project in Green Bay

The northern pike (*Esox lucius*) is Wisconsin's second largest native predator fish and is an important part of the Green Bay ecosystem. Over 70% of wetland habitat along the west shore of Green Bay has been lost. Many of these areas were once important spawning marshes for northern pike. In addition to the loss of suitable spawning habitat, fish encounter passage obstacles when leaving Green Bay to find spawning marshes or when migrating back. Since 2007, the Brown County Land and Water Conservation Department has been assessing tributaries within the watershed for restoration potential, evaluating properties suitable for restoration, and preparing site designs for wetland creation, enhancement, or protection. Incentive payments are made available to eligible landowners for the installation of vegetative riparian buffers, wetland restoration, and critical area stabilization. To date, nearly 17 miles of stream corridor have benefited from this project; 10 miles were made accessible for fish migration by replacing perched culverts. Over 30 acres of spawning marshes were created, 41 acres of buffers and 45 acres of critical area planting were installed, and 8 perched culverts were removed. Annually, spring spawning numbers are collected through both visual observation and fry trapping at the outlets of installed projects. Monitoring results indicate that pike migrate up to 17 miles inland to spawn, demonstrating that these constructed sites have been producing young of the year pike where previously no pike fry were present. These results further illustrate the need to provide spawning habitat throughout the west shore system.

Sedimentation in the Miljala Channel Watershed: Drained wetlands, agriculture, and restoration potential

Sedimentation, excessive phosphorus loading and bacterial contamination have created cause for concern in the Miljala Channel, a small inlet on the southwest corner of Rock Lake in Lake Mills, Wisconsin. The source of this problem is a drainage ditch created for agricultural purposes in the mid 1950's. This groundwater-fed ditch drains a significant portion of the subwatershed along its flow path through a former wetland and into the channel. The UW-Madison Water Resources Management (WRM) practicum worked in conjunction with the Jefferson County Land and Water Conservation Department (LWCD), Montgomery Associates: Resource Solutions, and the Rock Lake Improvement Association to survey the hydrology, hydrogeology, and ecology of the landscape in order to devise a comprehensive solution to three core issues plaguing the Miljala Channel. Final recommendations include buffer strip maintenance, nutrient management plan reevaluation, and a shallow marsh wetland restoration.

Wetlands as Wildlife & Fish Habitat
Wednesday, February 13, 2013, 1:00 pm
Salon G

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

O'Leary, Mark, SmithGroupJJR, Inc.
Paul Evanoff, SmithGroupJJR, Inc.
Neal Billetdeaux, SmithGroupJJR, Inc.

Eight keys to successful urban wetland design

The reintegration of natural systems into urban settings is an essential component of urban design. Landscapes once designed for people are being diversified to maximize habitat. The result is a new kind of urban ecosystem that embraces human activity while maximizing environmental awareness and ecological benefits. We use several case studies from around the Great Lakes to demonstrate how eight key approaches lead to better wetland restoration solutions in urban settings. 1) While urban natural systems can perform multiple ecological and social functions, they cannot perform all functions all the time. Clear goals maximize ecological and social benefits. 2) Integrated, multidisciplinary teams solve technical problems efficiently and result in functional designs useful to people and wildlife. 3) Get the hydrology right. This is particularly important in urban settings with flashy hydrology. 4) Go native. Use indigenous ecological communities for inspiration, and as your restoration template and palate. 5) Intentionally integrate your design within the larger network of open spaces and greenways to provide more connections for wildlife, waterways, and stormwater management. 6) Education and interpretive facilities are an essential part of urban ecological design. Creative exhibits and strong storytelling help demonstrate the value of urban ecological restoration and enhancement, fostering understanding and support for future initiatives. 7) Keep your boots on the ground during construction to make sure it is built as designed, and to learn from contractors when they can offer better approaches. 8) Design for posterity. Anticipate maintenance and management needs and monitor the results.

Wetland Mitigation & Design
Wednesday, February 13, 2013, 11:20 am
Salon G

O'Reilly, Neal, Ecological Research Partners, LLC. and Marquette University
Tim Ehlinger, UW-Milwaukee

Use of enhanced ditch plugs and riparian wetlands to reduce nitrogen and phosphorus export from small agricultural watersheds

Stream floodplains and riparian wetlands provide many environmental benefits including flood storage, habitat for fish and wildlife, and water quality treatment. The scientific literature contains many documented reports on the water quality benefits of floodplain buffers and their ability to trap sediment and nutrients. However, many streams have been channelized to facilitate agriculture or urbanization, reducing a stream's connection with it riparian floodplain and wetlands and reducing its abilities to provide the environmental benefits named above. To restore the water quality treatment capacity of the floodplain wetlands upstream of Fox Lake in Southern Wisconsin, the Fox Lake Inland Lake Protection and Rehabilitation District and WDNR financed the installation of several specially designed weir structures to improve the natural nutrient trapping capacity of the floodplains of three tributary streams that feed Fox Lake. Monitoring of inflows and outflows illustrated significant reductions in nitrogen and phosphorus loadings. The presentation will discuss design criteria, installation methods, and nutrient loading reductions.

Case Studies of Wetland Restoration
Wednesday, February 13, 2013, 3:30 pm
Salon G

Paloski, Rori, WDNR
Gregor Schuurman, WDNR

WDNR species guidance documents

The WDNR's Bureau of Endangered Resources recently released its first set of Species Guidance documents. These documents are peer-reviewed publications with comprehensive information for rare species tracked by the Natural Heritage Inventory or identified in the Wisconsin Wildlife Action Plan as a Species of Greatest Conservation Need (SGCN). They contain identification, life history, management guidelines, screening guidance, and avoidance measures, and are intended for a wide variety of users, including resource managers, private landowners, contractors, students and the general public. Species Guidance documents are available online and will be updated periodically, as needed, when significant information becomes available.

Wetlands as Wildlife & Fish Habitat
Wednesday, February 13, 2013, 1:40 pm
Salon G

Patti, Heather, PWS, R.A. Smith National, Inc.
Alice Thompson, Thompson & Associates Wetland Services

Effects of two popular herbicides on the control of the invasive *Glyceria maxima* (reed manna grass) in Southeast Wisconsin

Glyceria maxima is an invasive, rhizomatous grass that can form dense monocultures over large riparian wetlands and floodplains. Several populations have been documented in southeast Wisconsin, especially along riverine corridors including the Pike River in Mount Pleasant (Racine County). Manual control methods are difficult due to the dense, rhizotamous mats that *Glyceria* can make over large, expansive areas. The purpose of this project was to determine an effective chemical control regime for *Glyceria maxima*, in regard to herbicide type and timing of application. The Village of Mt. Pleasant secured funding from the WDNR's Aquatic Invasive Species Program to conduct a randomized block, split plot study using two herbicides (Aquaneat® and Habitat®) over three timing regimes. Treatments occurred over two years, 2011 and 2012. The results were similar for both herbicides and treatment times. In almost every plot, we started with 75-95% cover of *Glyceria* and ended up with 0-25% cover of *Glyceria* by the end of the study. However, the Habitat® herbicide had a harsher effect on the native species in the plot. "Dead zones" of sterile soil were also more prevalent in the Habitat® - treated plots. Overall, the Aquaneat® herbicide was as effective as the Habitat® herbicide and appeared to have a less harsh effect on the native species in the plots. Regardless of herbicide used and timing, careful follow up treatments of resprouts and plantings of native species are critical. Because *Glyceria maxima* is rhizotamous, post-treatment re-sprouting is common and follow-up treatments appear to be necessary beyond 2 years.

Wetland Invasive Species I
Wednesday, February 13, 2013, 1:00 pm
Salon F

Redlinski, Izabella, The Wetlands Initiative
Gary Sullivan, The Wetlands Initiative

Practical climate change adaptations: What does TWI do to restore with climate change in mind?

For over 2 decades, climate change has been a critical concern for those involved in conservation and environmental restoration. Most published literature has been urging practitioners to take climate change into consideration while planning restorations. Although it is widely accepted that climate change will negatively affect biological diversity on multiple levels, most of the peer-reviewed work provides few practical or applicable actions to take or strategies to follow. Based on regional climate models and relevant recommendations, The Wetlands Initiative incorporates climate change adaptation into each of its projects to improve basic restoration practices and outcomes. This presentation is a short review of actions that practitioners can take to help restoration projects and restored species adapt to the stresses of climate change.

Case Studies of Wetland Restoration
Wednesday, February 13, 2013, 4:30 pm
Salon G

Rios, Maria, Northeastern Illinois University
Dayvis Blasini, NEIU
Yaiyr Astudillo-Scalia, NEIU
Pamela Geddes, NEIU
Joel Olfelt, NEIU

Intra- and inter-population variability in microsatellite markers for cattail plant species

Cattail plants (*Typha spp.*) are commonly found in wetlands throughout North America. *T. latifolia* is considered native and *T. angustifolia* is considered exotic. Their hybrid, *T. x glauca*, is the most invasive of the cattail species. Both *T. angustifolia* and *T. x glauca* alter wetland ecosystem function and biodiversity. Due to their hybridization, identification based on morphological traits is no longer reliable since there is a high overlap of these physical traits among the three species. Molecular techniques are a more promising way of identifying the different species. We have successfully identified four diagnostic microsatellite primer pairs and tested their variability within populations of each species in the Chicago region. We assess inter-population variability of microsatellite markers by collecting samples from a variety of geographic locations (Illinois, Iowa, Minnesota, South Dakota, and Wisconsin). At each field site, we used morphological characters to identify the *Typha* species and collected leaf tissue from at least five individuals. DNA was extracted with a Qiagen DNeasy® Plant Mini Kit and the four diagnostic microsatellite primer pairs were amplified with Polymerase Chain Reaction. Results obtained were visualized in a Beckman Coulter gene sequencer and analyzed in order to determine inter-population variability. The microsatellite markers were able to discriminate among the three cattail species and successfully detected advanced-generation hybrids. The observed level of discrepancy with our morphological identification suggests that the molecular markers are a more robust identification method. These genetic markers are essential for prevention and control of invasive species of cattail.

Wetland Invasive Species I
Wednesday, February 13, 2013, 1:20 am
Salon F

Rockman, Aubrey, Wisconsin Lutheran College
Andrew Armstrong, WLC
Angela Ebeling, WLC
Victoria Hartmann, WLC
Jarrod Erbe, WLC

Silver nanoparticle effects on zebrafish with potential remediation by wetland soil media

Nanoparticles (<100nm) are becoming more prevalent in antimicrobial cleaning materials, water filters, and detergents. They can enter the environment through waste water. Limited research has been conducted on the effects of nanoparticles in the environment, although lab studies have shown their ability to inhibit bacterial growth and reduce membrane integrity in fish. The specific aim of this study is to determine the impacts of silver nanoparticles (AgNP) in zebrafish and on bacteria, while concurrently investigating their potential remediation by a constructed wetland via soil and water treatment residual (WTR) adsorption. Researchers exposed adult zebrafish in a lab-scale constructed wetland to concentrations of AgNP and compared them to fish with no silver exposure. Additionally, the effects of AgNP on the survival of *Bacillus subtilis* and *Escherichia coli* was examined. Separately, sorption experiments were carried out examining a wetland soil, a silt loam soil, and a WTR in their ability to sorb silver nanoparticles out of water. The silt loam reached its maximum adsorption much sooner than the other two media. The WTRs demonstrated no difference in sorption based on particle size, but in the wetland soil and silt loam, approximately half of the nanoparticles sorbed to the sand-sized particles. The results of this study indicate that aggregated AgNP do not impact zebrafish and their effects on bacteria are unclear. The soil sorption data indicate that AgNP do sorb to soil and support the idea that wetlands (both natural and constructed) can remove AgNP from wastewater.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Salas, Dan, Cardno JFNew
Erika Biemann, American Transmission Company

Application of stream and floodplain restoration for protection of electric utility infrastructure

Natural channel design and wetland restoration are regularly used to restore river stability, riparian corridors, and aquatic habitats. Its application for infrastructure protection is less prevalent. In 2010 and 2011, Cardno JFNew was contracted to re-meander portions of Bass Creek in southern Wisconsin in order to protect electric transmission infrastructure exposed from ongoing channel erosion. The design approach utilized principles of natural channel design to develop a design that would protect the infrastructure while addressing and enhancing habitat for endangered species found within the stream. Stream stability was closely tied to restoration of floodplain wetlands found elsewhere along the creek. As such, the design needed to incorporate these features into the final project. This presentation will discuss the design process utilized on the project, data analysis and other factors considered in its development, and construction implementation. It will also discuss how restoration of the floodplain wetlands played an important role in the overall design of the project and stability of the site. Then we will review pre and post-project monitoring using cross section and the Bank Assessment for Non-point source Consequences of Sediment (BANCS) model analysis to evaluate results in the first year following construction.

Wetland Mitigation & Design
Wednesday, February 13, 2013, 11:00 am
Salon G

Salas, Dan, Cardno JFNew
Mark Pranckus, Cardno JFNew

Developing a tool for prioritizing resources of concern in habitat conservation

Identification of priorities is important for any resource manager. In this session, we will review the presenter's work in assisting the U.S. Fish and Wildlife Service identify priority resources of concern for several national wildlife refuges in the Midwest. Service guidance recommends the use of focal species as an indicator for the response of ecosystems and species guilds or groups to habitat conservation, restoration, and management. The selection of priority focal species and documenting these decisions are important to maintain long-term management goals, ensure consistency as management changes, and help identify assumptions that can be validated or corrected as more information becomes available. Based on our experience, the final selection of priority species for planning purposes can be difficult, subjective, and poorly documented. To address this concern, Cardno JFNew has developed a prioritization tool that provides structured analysis of important considerations for focal species selection and helps managers document their rationale for final priority determinations. We will review the tool, share examples of its application, and evaluate under what scenarios it is best utilized. This presentation builds on related topics presented at last year's wetlands conference. It will focus on the development of a decision framework for structuring the planning process and for providing decision documentation in order to facilitate management and communication of priorities.

Assessment & Planning for Wetland Conservation
Thursday, February 14, 2013, 11:20 am
Salon F

Scherer, Jeanne, The Rock River Coalition

The Rock River Coalition's successful citizen-based wetland monitoring at Zeloski Marsh

Many people understand there is some mysterious "value" to wetlands and want to know more, but they aren't quite sure where to start. The Rock River Coalition (RRC) provides both opportunities and tools to explore wetland ecology through citizen science. Citizen-based monitoring is a successful method used by the RRC to satisfy the need to learn while also providing valuable data to scientists, property managers, and the public. The data collected are vital to assessing successes as well as ongoing management needs. Thanks to repeated WDNR Citizen-based Monitoring Partnership Program grants (2005, 2006, 2012), the RRC has introduced people to the birds, frogs/toads, dragonflies/damselflies, plants and more at Zeloski Marsh, Lake Mills State Wildlife Area, west of Lake Mills, WI. In 2006, the 1,500 acre property was restored to wetland conditions after being drained for farming for approximately sixty years. Led by a wetland monitoring coordinator and experienced naturalists, the RRC volunteers conducted pre-restoration surveys on and around the degraded property. The WDNR grant program was utilized again in 2010-2011 to produce nine Wetland Monitoring Fact Sheets (http://wetlandmonitoring.uwex.edu/) which describe accepted protocols used for monitoring. The current grant has made it possible to continue monitoring training and guidance for approximately thirty volunteers who are conducting post-restoration surveys. Data are provided to WDNR and shared with the public on websites such as www.eBird.org and the Citizen-based Monitoring Network of Wisconsin (http://wiatri.net/cbm/).

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Schreck, Chrystal, WDNR
Kelly Wagner, WDNR
Mindy Wilkinson, WDNR
Jennifer Hauxwell, WDNR
Alison Mikulyuk, WDNR
Scott VanEgren, WDNR

Invasive species in trade: Coming to a wetland near you?

With funding from the Great Lakes Restoration Initiative, WDNR has been working with retailers in the aquatic plant trade to reduce the threat of aquatic invasive species (AIS) to water bodies in Wisconsin and Great Lakes Watersheds. From water gardeners and pond owners to aquarists and koi enthusiasts, many people turn to the aquatic plant industry for best practices, and, of course, to buy plants. In order to reduce the availability of aquatic and wetland invasive species to the Wisconsin public, we sought to assess current practices and educate retailers in the horticulture and aquarium industries on the ecological and economic impacts of invasive species and the current regulations in Wisconsin. This presentation will describe the scope of the study, explain the details of the educational components of the project, and share initial results from social and biological surveys. One goal of this project is to reduce the number of regulated wetland species available for sale, such as *Glyceria maxima*, *Butomus umbellatus* and *Typha angustifolia*, and to keep them from coming to a wetland near you.

Wetland Invasive Species I
Wednesday, February 13, 2013, 2:00 pm
Salon F

Smail, Robert, WDNR

Wisconsin's water withdrawal inventory and reporting program

In 2008, WDNR undertook an effort to inventory and register high capacity groundwater and surface water withdrawals. WDNR also expanded efforts to collect withdrawal reports from owners of these sources. A primary goal is to identify and quantify demands on water resources that could impact Wisconsin wetlands, surface waters, and aquifers. Over 11,000 withdrawal reports were collected for 2011. Results of these reports will be presented, demonstrating seasonal and spatial withdrawal trends as well as differences in withdrawals across water uses. In addition, this presentation will demonstrate publically available data and tools that organizations can use to evaluate the potential effects of withdrawals on specific wetlands, surface waters, and aquifers.

Assessment & Planning for Wetland Conservation
Thursday, February 14, 2013, 11:40 am
Salon F

Sullivan, Charlotte, Carthage College

Assessing the need of management techniques for aquatic invasive species in Kenosha, Wisconsin

Human movement across the globe has caused the dispersal of foreign species to new ecosystems. Some are able to establish in new environments and become invasive, crowding out native plants and reducing biodiversity. Billions of dollars are spent on management that also includes the loss of ecosystem services. Eurasian watermilfoil is an aquatic water weed that grows rapidly in warm spring and summers. This study surveyed Eurasian milfoil populations in lakes to determine when it is necessary to manage these aquatic invasives. The study took place at four different lakes within Kenosha County, Wisconsin. The rake throw method was used to collect macrophytes samples and species were separated and identified. These data were used to determine species richness and the percent Eurasian milfoil. This was then compared with previous data from the past four years at each of these sites to look for patterns of change in Eurasian milfoil abundance and the effects it has had on species richness. An assessment of the three main methods of Eurasian milfoil management (chemical, mechanical, and biological) was conducted through a literature review and through evaluating current management at the study sites. This study has concluded that the success of management of Eurasian milfoil is dependent upon the size of the lake and its use (as recreational, retention, or utilities).

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Trochlell, Patricia, WDNR
Tom Bernthal, WDNR

Wisconsin Rapid Assessment Methodology, v.2.0

This talk will outline the major features of the revised Wisconsin Rapid Assessment Methodology (WRAM), version 2.0 and the companion User's Guide. The major use of the WRAM is in the regulatory setting when evaluating the significance of a wetland's functional values and a proposed project's impacts to a wetland. The revised Rapid Assessment contains improved questions used to guide best professional judgment of functional values in qualitative categories of "low, medium, high, and exceptional" significance when applicable. A new section has been introduced to assess floristic integrity in qualitative categories, including an option for using Floristic Quality Assessment metrics if needed. Condition of wetland and buffer areas is assessed through use of a stressor checklist. The final section provides for an assessment of project impacts. A User's Guide provides guidance on using the methodology and explains the rationale behind it. Guidelines for establishing the Assessment Area, buffer concepts, and watershed-based wetland characteristics are described.

Assessment & Planning for Wetland Conservation
Thursday, February 14, 2013, 11:00 am
Salon F

Van den Bosch, Kyle, University of Illinois
Jeffrey Matthews, University of Illinois

Taking a look back: Do wetland mitigation sites continue to satisfy original compliance standards?

The USACE facilitates a permitting process that requires wetland creation or restoration to compensate for wetland destruction. Compensatory wetlands must achieve standards that are established on a case-by-case basis and that are usually based on vegetation, soils, and hydrology. These sites are typically monitored for compliance with performance standards for up to 3-5 years. However, there is scant information regarding mitigation wetland performance beyond the brief, required monitoring period. With wetlands offering many ecosystem services, and because environmental conditions can change at a site on a yearly basis, it is important to know if the achieved short term goals yield similar long term results. To explore this question we, (1) re-visited 30 Illinois Department of Transportation mitigation wetlands ranging in age from 8-20 years; (2) surveyed adjacent reference wetlands when they were available; (3) are comparing our findings with each site's original compliance standard guidelines to gauge whether the re-surveyed sites meet their originally set goals; and (4) are using records describing the site's condition at the end of its monitoring period to gauge the subsequent changes in the wetland. We will evaluate the appropriateness of the original performance standards and assess whether short-term compliance is indicative of long-term sustainability.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Ward, Thomas, Manitowoc County Lakes Association

Response to an outbreak of giant hogweed (*Heracleum mantegazzianum*), a dangerous noxious weed

Giant Hogweed is a native of Asia introduced as a landscape plant because of its unique size. It grows to a height of 7 to 20 feet tall. Stalks can be 2 to 4 inches in diameter with leaves up to 5 feet wide and toped with a large flower up to 2 ½ feet wide that produces thousands of seeds. Sap from this plant is toxic to the skin. Large, painful burns and blisters will occur if sap contacts the skin in the presence of sunlight. Eye contact can cause permanent loss of vision. Skin can remain sensitive (phytophotodermatitis reaction) to light up to seven years after exposure. A property owner in Manitowoc County identified a plant that appeared to be Hogweed in the Town of Schleswig in Manitowoc County and reported it WDNR in 2009. Prior to this outbreak, the only known locations of this plant were in Iron County in Northern Wisconsin, whose source was Gogebic County in Upper Michigan. We addressed the problem by contacting and walking all neighboring properties in search of more plants. We have identified five properties with infestations. This case is a story about an immediate response to an outbreak and the development of a strategy to prevent the spread of the plant with the cooperation of local government and private property owners. After the 4th season of control, we are making substantial progress in eliminating this noxious plant.

Wetland Invasive Species II
Wednesday, February 13, 2013, 3:50 pm
Salon F

Wilkinson, Mindy, WDNR
Chrystal Schreck, WDNR

Wisconsin invasive species rule and planned revisions

In 2009, the Department developed Chapter NR 40, the Invasive Species Identification, Classification and Control Rule. This created a comprehensive, science-based system with criteria to classify invasive species into two categories: "Prohibited" and "Restricted". These rules are aimed at preventing new invasive species from establishing in Wisconsin and encouraging control of important but more widespread species. The rule includes legally-required preventive measures that are not species-specific but instead address common pathways that may allow invasives to spread. The approach to listing species under this rule varies by taxa group. The process of joint interagency enforcement and outreach on the role of the public, businesses, and partners is important to the success of this comprehensive approach. In 2011, the process to revise the rule was initiated and the regulated species list is being updated. The process will include extensive public input and is scheduled to conclude by the end of 2014.

Wetland Invasive Species I
Wednesday, February 13, 2013, 1:40 pm
Salon F

Wolf, Joy, UW-Parkside
Tim Flood, UW-Green Bay
Aaron Menke, UW-Parkside

A survey of riparian canopy for the Root River in downtown Racine, Wisconsin

The Root River, which flows through downtown Racine in southeastern Wisconsin, is now a focal point for redevelopment. The Root River Alliance of Wisconsin initiated a public outreach effort to revitalize the river in both community use and environmental integrity. The bank of a small section of the river on privately owned land in the downtown district is still vegetated. The objective of this study was to evaluate patterns of biodiversity to confirm appropriate community use of this stretch while protecting the river bank. Reaching the site by canoe, we ran transects on the slope from the river bank to where the vegetation ended to compare native versus non-native species and identify species shift by canopy, subcanopy, and understory. Canopy species include *Salix spp.*, *Carya spp.*, *Acer saccharum*, *A. negundo*, *Populus alba* and *P. deltoids*; subcanopy species are represented by *Lonicera spp.*, *Rhamnus cathartica*, and *Viburnum trilobum*. The understory contains over 70 native and non-native species. The understory species were either early successional species or disturbance-adapted riparian species in eroded areas. Factors such as erosion, flooding, human activity, and topography limit riparian vegetation but initiatives in Racine are in place to improve diversity, including rain gardens constructed near downtown street drains, a rain garden constructed at the bottom of the boat launch at the Racine Environmental Education Community Center (REC), the Racine community garden, and the native planting at the REC gravel hillside. These data will assist decision makers in their commitment to keep the City of Racine's downtown river corridor district functional and sustainable.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Wolf, Joy, UW-Parkside
Tim Flood, UW-Green Bay
Jeff Dalby, UW-Parkside
Ellen Clickner, UW-Parkside
Brad Winter, UW-Parkside

Assessment of restoration at Root River Environmental Education Community Center, Racine, WI

In 2008, a hillside of loose gravel located adjacent to the Root River was transformed to upland and aquatic species native to river systems and wetlands in Wisconsin thanks to the effort of faculty, students, and community members. The hillside was surveyed pre-restoration in 2008 and then monitored to assess the planting success in 2010 and 2012. The monitoring objectives were to identify established native species and to eradicate non-native invasive species. After many of the non-natives had been removed, all species were recorded in 5-meter plots. We created an interactive vegetation map of native species locations in ArcGIS 10. Diversity decreased but native biodiversity was still present in some areas; 48 native and 21 non-native species were recorded. Species that persisted in abundance include *Asclepias tuberosa*, *Asclepias syriaca*, *Mondara fistulosa*, *Penstemon digitalis*, *Silphium terebinthinaceum*, *Silphium integrifolium*, *Helianthus grosseserratus*, *Echinacaea purpurea*, and *Aster novae-angliae*. Pervasive exotics or invasives were *Polygonium cuspidatum*, *Ailanthus altissima*, *Vitus ripara*, and *Parthenocissus quinquefolia*. Emergent plants such as *Sagittaria latifolia*, *Scirpus validus*, and *Juncus effusus* are still present although a small patch of *Phragmites* and several *Lythrum salicaria* can be found. Native diversity was influenced by non-native competition and by the severe drought conditions earlier in the summer. Data collection ended before some species bloomed. This project contributes to education in river and wetland ecology, vegetation succession, and community stewardship at the Root River Environmental Education Community Center.

Poster Session
Wednesday, February 13, 2013, 4:50-6:30 pm
Lakeside Terrace

Key to Common Agency Abbreviations Used in Abstracts and Bios

USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UW	University of Wisconsin
WDNR	Wisconsin Department of Natural Resources
WGNHS	Wisconsin Geological and Natural History Survey
WisDOT	Wisconsin Department of Transportation

PRESENTER BIOGRAPHIES

Troy Anderson (troy@appliedeco.com) has worked in the ecological restoration field for nearly 20 years managing a multitude of large-scale ecological restoration projects throughout the United States. Mr. Anderson has directed restoration projects for private and corporate landowners, county forest preserve districts, and park districts as well as a multitude of municipal, state, and federal government agencies.

Andrew Badje (Andrew.Badje@Wisconsin.gov) is a Conservation Biologist with WDNR, Bureau of Endangered Resources. He received a Bachelors in Conservational Aspects of Biology and a Certificate in Geographical Information Systems from UW-Madison. Since 2009, he has worked on conserving bats, turtles, and frogs such as the Northern Cricket Frog (*Acris crepitans*).

Jean Bahr (jmbahr@geology.wisc.edu) has been a faculty member in the Department of Geoscience at UW-Madison since 1987. Her research explores the interactions between physical and biogeochemical processes in groundwater, nutrient cycling and contaminant transformations in aquifers, and groundwater as source of water to springs and wetlands. She is a past President of the Geological Society of America.

David Bart (dbart@wisc.edu) received a Ph.D. in Ecology, Evolution, and Natural Resources from Rutgers, The State University of New Jersey. He is currently an Assistant Professor in the Department of Landscape Architecture at UW-Madison. His research interests include the influence of land-use legacies on plant invasions and current community composition.

Mary Kay Baum (marykbaum@gmail.com) is a lifelong community activist twice elected to the Dane County Board of Supervisors and the Madison Metropolitan School board. At age 57, Baum had to leave her career of non-profit management due to early cognitive changes from Alzheimers. Baum improves her cognitive health through exploring and taking photos of the preserve upon which she is privileged to live.

Callie Bernier (bernierc@my.uwstout.edu) is an undergraduate student majoring in Applied Science at UW-Stout. She has studied internationally and is interested in landscape architecture and ecosystem restoration. Callie plans to attend graduate school in the Fall of 2013.

Tom Bernthal (thomas.bernthal@wisconsin.gov) is the Wetland Assessment and Monitoring Coordinator for WDNR. He has a Masters in Water Resources Management from UW-Madison. He works on projects at a variety of scales with a variety of partners, from GIS and remote-sensing based studies covering major river basins to intensive assessments of small wetlands.

Thomas Boos (thomas.boos@wi.gov) is the Forestry Invasive Plant Coordinator for WDNR. His previous positions in water regulation for WDNR instilled a strong passion for protecting wetlands. He has a Bachelors in Landscape Architecture and has worked for WDNR for 13 years.

Kenneth Bradbury (krbradbu@wisc.edu) received his PhD in Hydrogeology from UW-Madison in 1982. Since that time, he has worked as a Research Hydrogeologist/Professor at the Wisconsin Geological and Natural History Survey, UWEX, where he is Program Leader for the Water and Environment Group.

Camilla Correll (ccorrell@eorinc.com) is a Water Resources Engineer with 15 years of experience specializing in stormwater infiltration, integrated watershed management, and sustainable engineering design. She received her Bachelors and Masters of Civil & Environmental Engineering from UW-Madison. Her extensive experience in watershed management and low impact development has facilitated her successful implementation of innovative stormwater and watershed management plans.

Juli Crane (jcrane@lakecountyil.gov) recently joined Lake County Stormwater Management Commission as a Principal Wetland Specialist. Before that, she was an environmental consultant for over 20 years. Juli holds a Bachelors in Wildlife and Range Resources from Brigham Young University and a Masters in Fisheries and Wildlife from Utah State University. She is a Professional Wetland Scientist and a LEED Accredited Professional.

Noel J. Cutright (noel.cutright@we-energies.com) has been involved in many bird-related activities and issues in Wisconsin for more than 35 years. Noel received his PhD from Cornell University and worked for We Energies in Milwaukee for 29 years. Along with his successful Quad 30 Campaign (quad30campaign.org), Noel's most exciting project has been working on the OWLT's Forest Beach Migratory Preserve.

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Tara Davenport (tedavenport@wisc.edu) received a Bachelors in Biology from Linfield College (OR) and Masters in Biology from California State Polytechnic University, Pomona. She is currently working on her PhD in Environmental Studies at UW-Madison. Tara is interested in wetland restoration and the relationship between human impacts and current wetland vegetation.

Peter David (pdavid@glifwc.org) is a wildlife biologist with Great Lakes Indian Fish & Wildlife Commission. He received his Bachelors and Masters in Wildlife Ecology from UW-Madison and from the tribal elders and members for whom he has worked for the last 25 years. At GLIFWC, he works on a variety of natural resources, with a special emphasis on wild rice and wolves.

James Doherty (jdohert1@gmail.com) received a Bachelors in biology from Binghamton University (2008) and a Masters in botany from UW-Madison working on California salt marshes with Joy Zedler (2010). He continues to work with Dr. Zedler as a PhD candidate investigating relationships between diversity and dominance in wetlands, trade-offs among functions and services associated with diversity or dominance, and restoration of plant diversity.

Sue Elston (Elston.Sue@EPA.GOV) has worked in the Clean Water Act Section 404 program for 30 years. She has been with EPA since 1989 working on wetland permitting issues. In addition, Sue works with the states and tribes in Region 5 to help them build or improve wetland protection programs and plays an active role in mitigation banking in the region.

Sara Erickson (erickson.sara@uwlax.edu) is a student at UW-La Crosse. She is majoring in Geography with a concentration in Environmental Science with minors in Biology and Environmental Studies. She will graduate in May 2013 with plans to attend graduate school with a focus on environmental conservation, remediation, and restoration.

Brick M. Fevold (brick.fevold@wisconsin.gov) is a Wildlife Ecologist and GIS Specialist serving WDNR as a Natural Resource Scientist leading the Ashland Chequamegon Bay Shoreland Restoration Project. Brick has an Masters in Wildlife Ecology (2003) and a Graduate Certificate in GIS from UW-Madison. Brick works on issues relating to wetland and vertebrate ecology and GIS analysis.

David Fowler (DFowler@mmsd.com) is a Senior Project Manager with the Metropolitan Sewerage District. He has a Master of Science degree in Stream Ecology and is a certified floodplain manger (CFM). Dave is a member of the Association of State Floodplain Managers and serves ASFPM as the Natural Floodplain Function Alliance Coordinator and Watershed POD Facilitator. Dave also assists the non-profit Earth Economics team as a flood management advisor.

Melissa Goldade (melgoldade@gmail.com) is a geography major at UW-La Crosse and is expected to graduate in May 2013. She has interests in physical geography, soils, and Geographic Information Systems. This research project was funded by a UW-La Crosse Undergraduate Research and Creativity Grant.

Madeline Gotkowitz (mbgotkow@wisc.edu) is a Hydrogeologist at the Wisconsin Geological and Natural History Survey. Her research interests include groundwater contamination in urban environments, management of municipal water supplies, and arsenic in Wisconsin's aquifers. Although she maintains water level monitoring systems at sites with historic high water table conditions, the public's interest in this topic is on hold during the current drought.

Jon Gumtow (jon.gumtow@stantec.com) has been working with wetlands since 1985 and has designed and installed nearly 1,000 acres of restored wetlands across Wisconsin. He is currently working on restoring a ridge and swale system at The Ridges Sanctuary that will be used for educational and interpretation of the complexity and beauty of Door County ridge and swale systems.

David Hart (djhart@wisc.edu) is a Professor in the Department of Environmental Sciences, UWEX, and a hydrogeologist and geophysicist for the Wisconsin Geological and Natural History Survey. His current research interests include the hydrogeology of the Cedarburg Bog in eastern Wisconsin and the connectedness of sandbodies within the lake clays of Glacial Lake Oshkosh.

Paul Hlina (phlina4@gmail.com) is a Research Botanist for the Lake Superior Research Institute and owner of Leaning Pine Natives. He has led and conducted vegetation surveys for several State Natural Areas in northwest Wisconsin. Recent work involves utilizing WDNR Level 3 Floristic Quality Assessment Methodology in setting wetland condition benchmarks for the Lake Superior Basin.

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Erin Hoy (ehoy@usgs.gov) is a biologist on the Remote Sensing and Spatial Analysis Team at the United States Geological Survey in La Crosse, Wisconsin. She has been involved in mapping the ecological communities of National Parks and the vegetation of the Upper Mississippi River, and in creating refuge-specific maps for several National Wildlife Refuges in the Midwest Region.

Jens Jensen (jens.jensen@cardno.com) manages complex, multi-year ecological restoration and native landscape projects and performs ecological consulting and design. With nearly 10 years of experience in natural resource management and landscaping, he supervises and implements techniques in restoration ecology, including invasive species control, bioengineering, prescribed burning, and native seed and plant installation

Jordan Jessop (jessop2@illinois.edu) graduated from the University of New Hampshire with a Bachelors in Environmental Conservation in 2009. He is currently a graduate student in the Department of Natural Resources and Environmental Sciences at the University of Illinois, where his advisor is Dr. Jeff Matthews.

Kelly Kearns (kelly.kearns@wi.gov) coordinates invasive plant work through WDNR's Endangered Resources program. She has a Bachelors from Purdue in Horticulture and a Masters from UW-Madison in Restoration Ecology.

Roger Kuhns (roger_kuhns_monologues@yahoo.com) is president of SustainAudit LLC, adjunct professor at City College New York, and a research scientist with the UW-Milwaukee Field Station. He holds a PhD in geology, and a LEED GA. He has worked in natural resources, hydrology, sustainable development, renewable energy, remediation and brownfield projects for firms in over 75 countries.

Steve Loheide (loheide@wisc.edu) is an Associate Professor in the Department of Civil and Environmental Engineering at UW-Madison. His research focuses on the interactions between ecological and hydrological processes in natural and built systems. His work is focused on improving the scientific basis for stream, floodplain, meadow, and wetland restoration efforts under current and future climatic conditions.

Robb Macleod (rmacleod@ducks.org) is the National GIS Coordinator for Ducks Unlimited. Robb has been mapping wetlands and performing GIS analysis for Ducks Unlimited for more than 18 years.

Kyle Magyera (kyle.magyera@wisconsinwetlands.org) is a Policy Specialist with Wisconsin Wetlands Association (WWA), where he coordinates the local government outreach program and supports individuals and organizations working to protect and restore local wetlands. He holds Masters degrees in both Urban and Regional Planning and Water Resources Management from UW-Madison.

Melissa Malott (mmalott@cleanwisconsin.org) is the Water Program Director at Clean Wisconsin. As a member of the committee advising WDNR during the drafting of the phosphorus rule, she focused on the Watershed Adaptive Management Option and is now raising awareness about this important rule to stakeholders throughout Wisconsin.

Jeff Martinka (martinka@swwtwater.org) is the Executive Director of Sweet Water, a water quality collaborative in the five Milwaukee area watersheds. Martinka has also managed nonprofits in the Twin Cities and Milwaukee, worked at the Milwaukee County Parks, in Milwaukee Mayor John Norquist's Office, and in the Milwaukee Department of City Development. He earned Masters degrees in Urban and Regional Planning and Public Administration from UW-Madison.

Paul McGinley (pmcginle@uwsp.edu) is an Associate Professor of Water Resources in the College of Natural Resources and a University of Wisconsin-Extension water quality specialist in the Center for Watershed Science and Education at the University of Wisconsin-Stevens Point. His teaching and research interests include the impacts of land management on hydrology and water quality.

Marty Melchior (mmelchior@interfluve.com) is a Regional Director for Inter-Fluve. He is an aquatic ecologist and fluvial geomorphologist with 20 years of experience in river restoration projects throughout the US.

Kay Miller (kmiller@co.door.wi.us) is an Assistant Zoning Administrator with the Door County Planning Department.

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Thomas Miller (tmiller@eorinc.com) has 10 years of experience in hydrologic/hydraulic modeling for watershed analysis, site design, wetland restorations, and stormwater management planning. He has developed many watershed models for various TMDLs, natural resource management plans, and feasibility studies. An experienced technical writer, Tom has contributed toward, reviewed, and edited many hydrologic modeling and management documents.

Kristi Minahan (kristi.minahan@wisconsin.gov) is a Water Quality Standards Specialist with WDNR. Her work focuses on developing policies related to lake and stream classifications and assessments; previous areas include runoff management, water monitoring, and communications. She holds an Masters in Conservation Ecology and Sustainable Development from the University of Georgia at Athens, and a Bachelors in Biology from UW-Eau Claire.

Jon Motquin (jon.motquin@co.shawano.wi.us) is the Shawano County Aquatic Invasive Species Coordinator. He received a Masters in Environmental Science and Policy from UW-Green Bay. He has completed several invasive species control projects. As an urban planner and zoning administrator, he has incorporated several "green" components into subdivision and zoning ordinances that stress native landscaping, invasive species control, and natural ecosystem preservation.

Maureen Muldoon (muldoon@uwosh.edu) received her Masters from UW-Madison in 1987 and her PhD in 1999. She worked as a hydrogeologist with the Wisconsin Geological and Natural History Survey until 1998 and then moved to the Geology Department at UW-Oshkosh, where she teaches Environmental Geology, Hydrogeology, and various field courses.

Mike Mushinski (Mushinski_ml@co.brown.wi.us) received a Bachelors in water resources and soil science from UW-Stevens Point. Mike has been employed by the Brown County Land & Water Conservation Department for 13 years.

Steve Neary (sgneary@wisc.edu) is a Water Resources Management Masters candidate in the Nelson Institute for Environmental Studies at UW-Madison. Steve's emphasis of study is in Watershed Engineering, Planning, and Management.

Mark O'Leary (mark.oleary@smithgroupjjr.com) is a principal and senior ecologist at SmithGroupJJR. He received his Masters in Zoology with an emphasis in wetlands and wildlife ecology from Southern Illinois University at Carbondale. Mr. O'Leary has worked on wetland and other natural area restoration projects throughout most of the U.S. as well as Puerto Rico and Canada.

Neal O'Reilly (noreilly.erp@wi.rr.com) is an environmental engineer with over 30 years of experience in the field of water resource management. Dr. O'Reilly is a professor in the Civil and Environmental Engineering Department at Marquette University and Senior Partner at the environmental consulting firm Ecological Research Partners, LLC.

Rori Paloski (rori.paloski@wi.gov) is a conservation biologist with WDNR's Bureau of Endangered Resources. She is WDNR's incidental take coordinator and one of WDNR's herpetologists.

Heather Patti, PWS (heather.patti@rasmithnational.com) received a Masters in Botany from North Carolina State University and a Bachelors in Biology and Chemistry from UNC-Wilmington. She moved to Wisconsin in 2000 and began a career in wetland and environmental consulting. She now works at RA Smith National (a civil engineering firm based in Brookfield, Wisconsin) as an Ecologist and Wetland Scientist.

Izabella Redlinski (iredlinski@wetlands-initiative.org) works at the Midewin National Tallgrass Prairie overseeing landscape level wetland-prairie mosaic restoration. She is engaged in both planning and on-the-ground work to bring back natural hydrology, introduce native plant species, enhance remnant prairies and wetlands, and perform invasives management. Iza received a Masters in Environmental Science and a Master of Public Administration from Indiana University School of Public and Environmental Affairs.

Maria Rios (mjrios6@neiu.edu) is an undergraduate research student at Northeastern Illinois University where she is studying Biology with a focus in ecology and evolutionary biology and a minor in Chemistry. She is currently working under the mentorship of Dr. Pamela Geddes researching molecular markers for cattail species. Upon graduating she intends to work in wetland research and restoration.

Aubrey Rockman (Aubrey.Rockman@mail.wlc.edu) is a senior year undergraduate Chemistry and Spanish major at Wisconsin Lutheran College. She received the CRC Press Freshman Chemistry Achievement Award for excellence in Chemistry and is a recipient of the Presidential Scholarship throughout all four years of college.

PRESENTER BIOGRAPHIES

Dan Salas (dan.salas@cardno.com) has worked in the field of ecological restoration and natural resource management for nearly 15 years. His background includes invasive species control, endangered resource surveys, GIS analysis, stream and wetland restoration, and conservation planning. He is an Ecologist certified through the Ecological Society of America.

Jeanne Scherer (jsch802@yahoo.com) is the Wetland Monitoring Coordinator for the Rock River Coalition. She returned to school in 2009 and completed her Bachelors in Environmental/Physical Geography with a Biology minor focused on Ecology. Immediately after graduating in 2012, she wrote a successful application for a WDNR Citizen-based Monitoring Partnership Program grant for post-restoration monitoring at Zeloski Marsh.

Chrystal Schreck (Chrystal.Schreck@Wisconsin.gov) is the Invasive Species Education & Outreach Specialist for WDNR. She provides trainings and education on invasive species regulations to agencies, businesses, and citizens across the state and provides staff support to the Education Committee of the Wisconsin Invasive Species Council. Chrystal holds a Bachelors in Human Ecology and a Masters in Culture, Ecology, and Sustainable Community.

Robert Smail (Robert.Smail@wisconsin.gov) works as a Water Supply Specialist in the Water Use Section at WDNR. He has a Bachelors in History from Carroll College and a Masters in Natural Resource Policy and Planning from UW-Stevens Point. He lives in Watertown with his wife, daughters, and dog. He is an avid angler and homebrewer.

Charlotte Sullivan (CSullivan2@carthage.edu) is a Junior at Carthage College in Kenosha, Wisconsin. She is studying Environmental Science with a focus in conservation and ecology. Charlotte worked this past summer with an invasive species working group setting up a long-term monitoring project of invasives in Kenosha County, Wisconsin

Patricia Trochlell (patricia.trochlell@wisconsin.gov) is a wetland ecologist for WDNR. She has extensive experience in wetland regulation, restoration, and delineation, and provides training in these areas for WDNR and other agency staff, consultants, and the general public. She is a licensed professional soil scientist and professional hydrologist.

Kyle Van den Bosch (vndnbsc2@illinois.edu) is a junior at the University of Illinois majoring in Natural Resources and Environmental Sciences. In 2011, he was awarded both the Morris Udall and Coca-Cola Gold scholarships. In 2012, as an intern for Dr. Jeff Matthews, he became intimate with Illinois wetlands. In 2013, he will spend his senior year studying in the Netherlands.

Thomas Ward (tomward@tm.net) was the Department Director for the Manitowoc County Conservation Department for 32 years and retired in 2007. He also worked in the County's Zoning Department. Upon retirement, he began private consulting on aquatic invasive species management for the Manitowoc County Lakes Association. He has a Bachelors in Natural Resource Management from UW-Stevens Point.

Mindy Wilkinson (Melinda.Wilkinson@wisconsin.gov) is the Invasive Species Coordinator for WDNR. She works with the intradepartmental invasive species team and partner agencies to build consistent enforcement of the State's Invasive Species Rule. She is also the staff contact for the Wisconsin Invasive Species Council.

Joy Wolf (wolf@uwp.edu) is a biogeographer who conducts research in a variety of communities including ephemeral ponds, oak savanna, and maple-beech forests in Wisconsin, riparian corridors in central Arizona and Wisconsin, grasslands in Rocky Mountain National Park (Colorado), old-growth mixed-conifer forests on the North Rim of Grand Canyon National Park (Arizona), and future research in coastal forests in the Pacific Northwest.

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