Wetland Science Conference

2023 Wisconsin Wetlands ASSOCIATION

Abstracts & Presenter Biographies

Wetlands: Central to Wisconsin

28th Annual Wetland Science Conference

February 21-23, 2023

Stevens Point, WI

WEDNESDAY, February 22, 9:00 am - 9:30 pm

9:00 - 10:20 **Plenary Session (Northwoods Expo)** *Sponsored by Fund for Lake Michigan*

9:00 **Welcome & Opening comments**

9:20 **Conference Keynote: Beavers: Heroes or villains of climate change?**
Carol Johnston, Professor Emerita, South Dakota State University

10:20 - 10:40 **Break (Northwoods Expo & Commons)** *Sponsored by Westwood Professional Services*

10:40 - 12:00 **Concurrent Sessions, Working Group, & Roundtable Conversation**

	Spruce Ballroom Working Group	Evergreen Ballroom Hydrologic Assessment in Flood-Prone Landscapes Moderator: Kyle Magyera	Stonefield Ballroom Science-informed Wetland Regulation Moderator: Josh Brown	Woodland Ballroom Roundtable Conversation
10:40	**Tribal Wetland Programs** Facilitator: Randy Poelma (by invitation only)	Connecting flood-related fluvial erosion with vulnerable downstream road-stream crossings **Fitzpatrick, Faith**	Wisconsin Wetland Conservation Trust: Moving towards mitigating for wetland functional values | **Pearce, Tom**	**Wisconsin's Women and Wetlands** Facilitators: Sally Gallagher Jarosz and Nicole Staskowski
11:00		Using updated hydrologic and hydraulic models to develop the Marengo River Watershed Management Plan | **Rappolee, Eleanor**	Connecting wetland and stream mitigation activities | **Marcangeli, April**	
11:20		Developing a new hydrologic conditions assessment framework in the Marengo River watershed | **Rockwood, Stephanie**	WDNR Technical Standard 1072 Horizontal Directional Drilling: An overview | **Nye, Ann**	
11:40		Q & A Discussion		

12:00 - 1:30 **Lunch (provided - Northwoods Expo)** *Sponsored by We Energies Foundation*

1:30 - 2:50 **Concurrent Sessions, Workshops & Working Groups**

	Spruce Ballroom Working Group	Evergreen Ballroom Wetlands and People Moderator: Chris Young	Stonefield Ballroom Effective Restoration & Management Techniques Moderator: Sally Jarosz	Woodland Ballroom Workshop
1:30	**WWA Wetland Policy Roundup** Facilitatators: Frin O'Brien and Jennifer Western Hauser	The Land Restoration School: Preparing the next wave of ecological restoration practitioners **Aten, Nancy**	Monitoring hydrology of Minnesota's reference condition wetlands **Skancke, Jennie**	**Wetland Natural Communities of Wisconsin** Instructors: Ryan O'Connor and Pat Trochlell **Pre-registration required**
1:50		Tangible steps forward: Diversity, equity, inclusion and justice lessons learned by a watershed group | **Wallrath, Matthew**	Mitigating a mitigation: Addressing failure in wetland design and maintenance **Downey, Will**	
2:10		New videos promote tribal wetland conservation leadership in Wisconsin | **Beilfuss, Katie**	Undoing the "drainage dream": Restoring a river in the heart of the sand counties **Strobel, Brad**	
2:30			Outlet management on wild rice lakes in Minnesota | **Geisen, Ann**	

2:50-3:20 **Break (Northwoods Expo)** *Sponsored by Sterling Site Access Solutions, LLC*

3:20-4:40 **Concurrent Sessions, Workshops & Roundtable Conversation**

	Spruce Ballroom Roundtable Conversation	Evergreen Ballroom Floodplain Restoration in FEMA-regulated Mapped Floodplains Moderator: Erin O'Brien	Stonefield Ballroom Wetland Plants & Plant Communities Moderator: Aaron Feggestad	Woodland Ballroom Workshop
3:20	**The Mary Linton Wetland Poetry Session** Facilitatators: Lisa Hartman, Mike Mossman, and Alice Thompson	Restoring floodplains in rural communities: Opportunities and challenges | **Magyera, Kyle**	Vegetation change over five years in ephemeral ponds | **Little, Mandy**	**Wetland Natural Communities of Wisconsin** (continued)
3:40		Wetland and floodplain restoration at Fancy Creek, Richland County, WI | **Hayden, Nick**	Evolutionary responses of bacteria to antibiotics affect their ability to inhibit a fungal pathogen | **Tuthill, Isabella***	
4:00		Accelerating investments in floodplain restoration: Facilitated discussion and listening session | **O'Brien, Erin**	Testing the waters: Wisconsin's Aquatic Invasive Species Monitoring Program **Kalscheur, Maureen**	
4:20				

4:40 - 6:30 **Poster Session and Social (Northwoods Expo & Commons)** *Sponsored by Merjent*

6:30 - 9:00 **Banquet and Presentation (Ticketed Event - Northwoods Expo)** *Sponsored by Stantec*

7:30 **Banquet presentation: If the waters could speak: Hoocąk voices and values**
Janice Rice, senior academic librarian and lecturer emerita, UW-Madison, and member, Ho-Chunk Nation

Green Shading = Pre-registration required

* denotes presenter is participating in the student presentation competition

THURSDAY, February 23, 8:30 am - 4:30 pm

8:30 - 9:30 **Plenary Session (Northwoods Expo)** *Sponsored by Wisconsin Department of Natural Resources*

8:30 **Welcome**

8:40 **Plenary Address: Central Wisconsin's treasured wetlands: From storied past to dynamic future**
Katie Hein and Ryan O'Connor, Wisconsin Department of Natural Resources

9:30 - 10:30 **Concurrent Sessions, Workshop, & Roundtable Conversations**

	Spruce Ballroom Roundtable Conversation	Evergreen Ballroom Research and Monitoring in the Little Plover River Watershed Part I Moderator: Sue Schumacher	Stonefield Ballroom Effective Wetland Conservation Partnerships Moderator: Jason Granberg	Woodland Ballroom Workshop
9:30	**Working with Tribes to build wetland program capacity and a nationwide framework for advancement** Facilitators: Andy Robertson and Marla Stelk	The Little Plover River Watershed Enhancement Project: Background and accomplishments | **Hames, Tracy**	Rural landowners: Key partners in successful invasive species management in wetland restorations **O'Connor, Kaitlyn**	**Identification of Wisconsin's Aquatic Plants** Instructor: Paul Skawinski **Pre-registration required**
9:50		Restoring channel morphology on the Little Plover River and reconnecting its floodplain | **Herrman, Kyle**	Restoring a section of Sugar River Wetlands through volunteer workdays **Urban, Jared**	
10:10		Brook trout in the Little Plover River: A system with restoration efforts to improve flow and habitat **Raabe, Joshua**	Goat Guardians: How Vernon County volunteers use goats to remove invasives in wetlands **Wallrath, Matthew**	

10:30 - 11:00 **Break (Northwoods Expo)** *Sponsored by BioApp, LLC*

11:00 - 12:00 **Concurrent Sessions and Workshops**

	Spruce Ballroom Workshop	Evergreen Ballroom Research and Monitoring in the Little Plover River Watershed Part II Moderator: Sue Schumacher	Stonefield Ballroom Wetlands in a Changing Climate Moderator: Travis Olson	Woodland Ballroom Workshop
11:00	**Identity, Civic Imagination, and Wetland Communities** Facilitator: Kyra Lyons	Restoration and habitat work in the upland/wetland matrix of the Little Plover River watershed **Demchik, Michael**	Dibaginjigaadeg Anishinaabe Ezhitwaad: A tribal climate adaptation menu for indigenous-led adaptation planning | **Panek, Bazile**	**Identification of Wisconsin's Aquatic Plants** (continued)
11:20	**Pre-registration required**	Connecting stream, wetland, and watershed restorations within the Central Sands | **Gumtow, Jon**	Odanata survey of five protected wetlands in southcentral Columbia County, Wisconsin, 2020-2022 **Steinhauer, Graham**	
11:40		Q & A Discussion	Michigan dam disaster: Evaluating wetland extent on the bottomlands of a drained lake system | **Roos, Robb**	

12:00 - 1:30 **Lunch (provided - Northwoods Expo)** *Sponsored by Wisconsin Public Service Foundation*

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

Evergreen Ballroom
Working group

Practioners' Working Group

Facilitatator: Kaley DuCoeur

Stonefield Ballroom
Working group

Wisconsin Partners in Amphibian and Reptile Conservation

Facilitatators: Joey Cannizzaro and Gary S. Casper

Woodland Ballroom
Workshop

Introduction to Common Wisconsin Sedges
Instructors: Steve Eggers and Patricia Trochlell

Pre-registration required

Field Trip: Benefits and Challenges of Wetland Restoration in the Central Sands Region

**Pre-registration required
**Meet at the Conference Center Entrance at 12:50 pm depart by bus.

1:00 pm–4:30 pm

Leaders: Jason Behrends, Josh Brown, Scott Fuchs, Jon Gumtow, and Tracy Hames

Field Trips

**Pre-registration required
**Meet at the Conference Center Entrance at 1:20 pm to depart by bus.

Freckmann Herbarium at UWSP

1:30 pm–4:30 pm

Leader: Robert Freckmann

Moses Creek: Resurrection of an Urban Stream and Riparian Community

1:30 pm–4:30 pm

Leaders: Jennifer Gibson, James Havel, and Bree Richardson

Green Shading = Pre-registration required

ORAL PRESENTATIONS

Aten, Nancy

Dan Collins, Land Restoration School; Chris Young, Land Restoration School

The Land Restoration School: Preparing the next wave of ecological restoration practitioners

We face the challenge of needing many more ecological restorationists in a community of practitioners working to address ecosystem and wetland health. To help address this challenge, the Land Restoration School (LRS) formed in 2021 and launched an inaugural course in summer 2022 in northeastern Wisconsin. The LRS provides paid stipends and residency in support of a just and equitable program for up to twelve adult participants from diverse hometowns and experiences. We offered an immersive course on the principles, practice, and planning of ecological restoration for degraded lands and wetlands, awarding a badge upon completion. Every weekday for eight weeks together allowed us to connect natural sciences and theory with field methods and observation. The curriculum is designed to complement or, for some, modestly replace a degree program. The LRS featured expertise from guest faculty drawn from academic institutions and private practice who share a commitment to the school's mission and are invested in its outcomes. With integrated topics in soils, hydrology, botany, community ecology, and human engagement, participants' work culminated in developing ecological restoration plans for actual sites. In this talk, we review the structural framework—an investment in 'big seeds'—including paid stipend, residency, learning landscapes, facilities, funding methods, affiliations, and followup community-building in 2022, and changes that we plan for 2023. This talk is the what-why-and-where of the LRS. (See our complementary poster for the who-and-how, which assesses the transformation of participants in the eight-week process.)

Wetlands and people, Evergreen,

Wednesday, February 22, 1:30 pm-1:50 pm

Nancy Aten (she/her) has Master's degrees in Engineering and Landscape Architecture and is a licensed landscape architect and a Certified Ecological Restoration Practitioner. She is principal of Landscapes of Place, offering landscape restoration planning and design, ecological restoration, and land stewardship services.

Beilfuss, Katie

Strand Mashkiiziibitt, Natural Resources Department; Jessica Jacobson, Treaty Natural Resources Division, Red Cliff Band of Lake Superior Chippewa

New videos promote tribal wetland conservation leadership in Wisconsin

Wisconsin Wetlands Association (WWA) is collaborating with the Wisconsin Tribal Conservation Advisory Council and the USDA Natural Resources Conservation Service to produce videos documenting and promoting tribal engagement in wetland conservation in Wisconsin. The videos promote examples of good wetland conservation by Tribes in Wisconsin; help tribal decision-makers and land managers understand how wetlands function and how they can care for them; motivate and guide others toward wetland protection and care; and encourage broad-based understanding of wetlands and watersheds among the tribal and general public. In this presentation, I will preview new videos in this series, which will be publicly debuted in spring 2023, that highlight the Bad River and Red Cliff Bands of Lake Superior Chippewa. The videos share how approaching wetland restoration and management with a landscape and cultural perspective provides

multiple benefits and how cultural values are an important driver for wetland and landscape conservation. I will also discuss how the partners will use them to promote effective watershed-based wetland restoration to address community needs as part of WWA's broader Communities & Wetlands Project.

Wetlands and people, Evergreen,

Wednesday, February 22, 2:10 pm-2:30 pm

Katie Beilfuss is the Outreach Programs Director at Wisconsin Wetlands Association, where she coordinates outreach and communications. Katie has a Master's degree in Land Resources from UW-Madison and more than twenty years of nonprofit and environmental experience.

Demchik, Michael

Restoration and habitat work in the upland/wetland matrix of the Little Plover River watershed

Rivers are nested in watersheds. Restoring structure and function in the upland/wetland matrix is influential in the success of river restoration as well as for the wildlife use of these sites. I will discuss the restoration and habitat work within a range of site conditions in the uplands/wetlands surrounding the Little Plover River. We created/restored ecological conditions in oak savanna, oak woodland, barrens, aspen coppice, and riparian forests. I will discuss the mechanics surrounding this restoration as well as the challenges that exist for the long-term stability of the ecosystem. I will discuss mobilization of college students, community volunteers, contractors, and others to complete the work as well as needs for follow up management. Finally, I will present post-treatment breeding bird use data collected for the oak woodland restoration site.

Research and Monitoring in the Little Plover River Watershed: Part 2, Evergreen,

Thursday, February 23, 11:00 am-11:20 am

Mike Demchik is a professor of forestry at the UW-Stevens Point. He has worked in West Virginia, Pennsylvania, Maryland, Minnesota, and Wisconsin in a wide range of jobs in natural resources. Mike teaches courses in silviculture, forest management, and ecosystem restoration.

Downey, Will

Mitigating a mitigation: Addressing failure in wetland design and maintenance

Establishing wetland sites can require substantial time and money for design, construction, monitoring, and maintenance, which can be further exacerbated when a site declines into a state of failure. Wetland creation or restoration efforts will run into unforeseen problems that can become overwhelming to practitioners or enthusiasts. Sharing these experiences allows others to learn from past mistakes and understand the difficulties other practitioners often face when dealing with complicated problems. I will share my experiences with three sites, including challenges faced at each site and how these challenges were addressed. Site A is as permittee responsible wetland mitigation site with significant setbacks including

fatality of tree plantings, hydrology incompatible with the mitigation objectives, invasive species, and structural failures due to an extreme precipitation event. Site B is a stormwater wetland design which was constructed, planted, and then ignored during the remaining construction of the surrounding development. Site C is a wetland mitigation bank which is situated in the floodplain of the Iowa River.

Effective wetland restoration and management techniques, Stonefield,

Wednesday, February 22, 1:50 pm-2:10 pm

Will Downey is a certified Professional Wetland Scientist with more than 10 years of professional natural resource and environmental survey experience. He provides expertise in wetland and aquatic resource delineation, threatened or endangered species survey and habitat analysis, and natural resources permitting and regulatory coordination.

Fitzpatrick, Faith

Connecting flood-related fluvial erosion with vulnerable downstream road-stream crossings

Fluvial erosion is increasingly responsible for infrastructure and building damages associated with floods across the U.S.. Northern Wisconsin is no exception: extreme floods in 2016 and 2018 caused widespread culvert blockages and road failures, including extensive damage along steep tributaries and ravines in the Marengo River watershed. In 2019, a pilot study was begun with partners from the U.S. Geological Survey, Wisconsin Wetlands Association, Ashland County, and the Northwest WI Regional Planning Commission to characterize the connections among the loss of wetland storage, headwater drainage extension, and downstream fluvial erosion hazards (FEHs). This study used a GIS approach to classify channel segments into fluvial process zones (FPZs) based on Strahler stream order, specific stream power, channel slope, presence of adjacent steep valley sides and headwater flats, and adjacent soils and surficial geology. The resulting vulnerability maps provide a screening framework to identify FPZs that are most sensitive to incision, gullying, and mass wasting along steep headwater channels, as well as potential lateral migration, mass wasting, and coarse sediment deposition along the valley bottoms of perennial streams. Additionally, each FPZ was characterized in terms of potential hydrologic alteration associated with ditching. The vulnerability mapping products and rankings of sensitivity of FPZs to large floods will ultimately be used by Ashland County and their collaborators to prioritize natural flood management projects that mitigate FEHs, restore hydrology, and reconnect streams, floodplains, and wetlands.

Hydrologic assessment in flood-prone landscapes, Evergreen,

Wednesday, February 22, 10:40 am-11:00 am

Dr. Faith Fitzpatrick is a research hydrologist at the U.S. Geological Survey in Madison, Wisconsin. Over her 30+ year career, she has worked on fluvial geomorphology-related studies of river channel change and floods, river corridor sources and sinks of sediment and phosphorus, habitat in urban streams, oil spills, river restoration, and hydrodynamics of Great Lakes estuaries.

Geisen, Ann

Outlet management on wild rice lakes in Minnesota

Wild rice (*Zizania palustris*) provides important habitat for waterfowl and other wildlife, and the grain is harvested by people for food and recreation. The Minnesota DNR's Section of Wildlife manages rice for both habitat and humans. Wild rice plants are very sensitive to water depth and water level fluctuations. To maintain rice beds, management often involves maintaining or restoring natural hydrology. Addressing hydrology issues often involves managing the lake outlets. Outlet management takes different forms, including removing beaver dams, replacing culverts and water control structures, and increasing the capacity of the outlet channels. The management method depends on the issue with the outlet. Using these methods on different lakes resulted in lower water levels and/or reduced water level bounce after storm events and increased wild rice coverage. I will present specific lake examples for each method.

Effective wetland restoration and management techniques, Stonefield,

Wednesday, February 22, 2:30 pm-2:50 pm

Ann Geisen earned a Bachelor's degree in Wildlife Management from UW-Stevens Point. After working for the Wisconsin DNR for 3 years, she joined the Minnesota DNR, where she has worked as a Wildlife Lake Specialist for more than 20 years. In her position, Ann helps manage and monitor shallow and wild rice lakes. She also serves as the point person for wild rice management and harvesting for Minnesota DNR's Section of Wildlife.

Gumtow, Jon

Chris Engle, P.E., Santec Consulting

Connecting stream, wetland, and watershed restorations within the Central Sands

The Little Plover River Stream and Riparian Wetland Restoration Project is an excellent example of the ecological and social benefits that can be achieved through collaboration and applied science. This headwater system is being restored following years of study and collaboration between agricultural users, conservation groups, and community leaders. This presentation will focus on the process to create a multifunctional restoration project. This 70-acre headwater restoration project is a continuation of previous stream and wetland restoration work completed along the Little Plover River corridor. The project connects numerous stream and wetland functions by restoring 17 acres of sedge meadow, 10 acres of scrub-shrub, 6 acres of riparian forested wetlands; 30 acres of prairie; and 2,700 linear feet of naturalized stream channel. The use of Natural Channel Design techniques, integrated floodplain design, and microtopographic features will reconnect stream and riparian wetland functions to improve groundwater hydrology; enhance aquatic, terrestrial and avian habitat; and improve water quality. Success of this project requires an integrated team and understanding of baseline hydrologic conditions including the interaction between surface water flows and groundwater discharge within this headwater reach. A multi-year study was completed to collect, analyze, and incorporate surface and groundwater baseline data into a resilient, groundwater driven, naturalized stream channel and riparian wetland design.

Research and Monitoring in the Little Plover River Watershed: Part 2, Evergreen,

Thursday, February 23, 11:20 am-11:40 am

Jon Gumtow is a Senior Wetland Scientist with Stantec Consulting in Green Bay. Jon was raised near Sheboygan and graduated from UW-Stevens Point focused on soil science and natural resources management. Jon is a State-licensed Soil Scientist and a certified Professional Wetland Scientist. Over the last 35 years he has designed nearly 50 habitat restoration throughout the Midwest.

Hames, Tracy

The Little Plover River Watershed Enhancement Project: Background and accomplishments

The Little Plover River watershed has been the subject of research and study for decades. Many of the studies helping describe groundwater/surface water interactions in the Central Sands region of Wisconsin were conducted in this watershed. Decades of concern and controversy regarding the impact of groundwater withdrawal on the aquatic resources of the Little Plover River helped bring together partners in search of solutions. This presentation will describe the resource characteristics of the LPR watershed, discuss the development of the Little Plover River Watershed Enhancement Project (LPRWEP), and report on the approach and progress of the LPRWEP in addressing the water related issues in this heavily agricultural landscape.

Research and Monitoring in the Little Plover River Watershed: Part 1, Evergreen,

Thursday, February 23, 9:30 am-9:50 am

Tracy Hames has been Executive Director of Wisconsin Wetlands Association for more than 11 years. In this position, he works with decision makers, agencies, conservation organizations, Tribes, landowners, and communities across Wisconsin. He has been involved in the Little Plover River Watershed Enhancement Project partnership for the past 5 years.

Hayden, Nick

Wetland and floodplain restoration at Fancy Creek, Richland Co, WI

The Fancy Creek restoration project proposes to reestablish more than 6,000 feet of meandering stream channel in the Pine River watershed, Richland County, WI. The abandoned meander channel will be reactivated by diverting water from the incised agricultural ditch, which was dug in the 1940s. The project is expected to improve wetland and aquatic health at the site and provide regional hydrology benefits by reconnecting floodplains and increasing flood attenuation and retention. In this presentation I will describe the proposed project and the anticipated regulatory requirements for modifying the existing ditch, including the floodplain modeling and permitting process, and I will discuss regulatory challenges for hydrologic restoration in mapped floodplains here and elsewhere.

Floodplain restoration in FEMA-regulated mapped floodplains, Evergreen,

Wednesday, February 22, 3:40 pm-4:00 pm

Nick Hayden has more than 19 years of experience as a water resources engineer specializing in stream monitoring and geomorphology and integrated GIS. Over his career, he has worked as a stream and watershed analyst, GIS lead for a public participatory ocean uses effort, and water resources engineer conducting groundwater and hydrologic/hydrolic analyses for a variety of resource assessment and restoration projects.

Herrman, Kyle

David Palme, United States Army Corps of Engineers

Restoring channel morphology on the Little Plover River and reconnecting its floodplain

To address poor channel form, faculty and students at UW-Stevens Point implemented various stream restoration techniques and reconnected a section of the floodplain along the Little Plover River. In 2019, three 600-ft stream reaches were restored along the stream using different techniques along each reach. The following three techniques were used: 1) upper canopy thinning (T); 2) upper canopy thinning plus channel lining with brush bundles(TB) placed along the stream edges to narrow and deepen the channel; and 3) upper canopy thinnging, channel lining with brush bundles, and sod mat placement (TBS) with *Carex stricta* plugs placed on top of the brush bundles to stabilize the structures. Immediately following restoration and 3 years later, we assessed canopy cover, channel morphology, water velocity, water temperature, and sediments and compared results to reference sections (i.e., sections that still maintain ideal channel form). I will present results comparing these restoration techniques to each other and comparisons between the reference reach. In addition, with the help of Wisconsin Department of Natural Resources we restored a wetland within the floodplain of the Little Plover River to better connect the stream to its floodplain. This 1-acre wetland was created by lowering the land elevation in a prime location along the stream and seeding the area with *Carex stricta*. One major objective of this reconnection was to enhance water storage during storm events. I will present a preliminary hydrologic budget examining water pools and fluxes within the restored floodplain wetland during the 2022 growing season.

Research and Monitoring in the Little Plover River Watershed: Part 1, Evergreen,

Thursday, February 23, 9:50 am-10:10 am

Kyle Herrman is a Professor of Water Resources in the College of Natural Resources at UW-Stevens Point. His educational background has focused on stream and wetland ecology, and his current research focuses on restoration and water quality in agricultural watersheds. He teaches courses on wetlands ecology and management, water chemistry, and soil and water resources.

Kalscheur, Maureen

Testing the Waters: Wisconsin's Aquatic Invasive Species Monitoring Program

Wisconsin's Aquatic Invasive Species Monitoring Program engages citizens, partners, and scientists to document new invasive species and record populations over time. Our efforts are founded on Wisconsin Administrative Code Chapter NR 40, which identifies a list of species that we monitor and regulate. We work closely with UW-Extension, regional groups, and Wisconsin Department of Natural Resources (WDNR) staff to implement monitoring for the NR40 listed species. These efforts are reported to the WDNR database and records are available on the Program's website. I will

review NR40 and the various monitoring programs, explain how to check for species occurrence data, report major discoveries in recent years, and discuss how you can get involved.

Wetland plants and plant communities, Stonefield,

Wednesday, February 22, 4:00 pm-4:20 pm

Maureen Kalscheur is the Wisconsin DNR Aquatic Invasive Species Monitoring Lead and worked for the Department since 2010. Previously she worked for Florence County, United Stated Forest Service and as a private botanist. She has a Master's degree from the Wisconsin Cooperative Fishery Research Unit at UW-Stevens Point.

Little, Mandy

Vegetation change over five years in ephemeral ponds

Ephemeral ponds are small wetlands that dry during some years. We assessed vegetation change in 37 ephemeral ponds in the Chippewa Moraine over a series of five years (2013-2017). 3 permanent plots were placed in different zones (bottom, edge, and intermediate transition regions) of each pond. There was high interannual variability in precipitation, with notable flooding in 2014. Over 30% of bottom plots had no vegetation present in 2014-2015, up from 8% in 2013. Both species richness and cover declined across all plot types in 2014. Although species richness recovered by 2017, cover did not. Aquatic and annual plant species exhibited slight increases in richness over the five years. Herbaceous perennials recovered quickly, but woody plants exhibited a lag in recovering species richness. Similar patterns were seen in cover, although all guilds had abundance declines in 2014. Plant communities in the bottom plots changed significantly from 2013 to 2014 but had resumed 2013 composition by 2017. No differences were seen in the transition and edge plots. In summary, plant communities of ephemeral ponds appear to have mechanisms to accommodate strongly fluctuating water levels, except for woody plants. This ability to rebound indicates possible resilience to future changes in precipitation patterns due to climate change.

Wetland plants and plant communities, Stonefield,

Wednesday, February 22, 3:20 pm-3:40 pm

Mandy Little is a Professor at UW-Stout in Menomonie, Wisconsin. She researches ephemeral ponds, wetland restorations, peatlands, trout stream restorations, and invasive plant species. She is working to build the UW-Stout Herbarium and teaches wetland, plant, and ecology courses.

Magyera, Kyle

Mary Jo Gingras, Ashland County; Stacy Dehne, WI Department of Agriculture, Trade, and Consumer Protection; Troy Maggied, SW WI Regional Planning Commission

Restoring floodplains in rural communities: Opportunities and challenges

Healthy floodplains store and slow the flow of floodwaters, but their restoration can be complex, time-consuming, and cost-prohibitive. This talk will provide basic information about floodplain functions and will highlight insights and lessons learned from the design phase of a natural flood management demonstration in Ashland County, WI. Using a proposed floodplain reconnection project within a mapped FEMA floodplain of a tributary to the Marengo River Watershed as an example, I will cover: 1) characteristics of highly connected floodplains and the importance of revitalizing floodplain functions on large landscape scales; 2) how floodplain restoration can recover self-sustaining hydrologic conditions, connections, and functions; 3) why rural and tribal communities are critical for finding and accelerating upstream solutions to flood risks and vulnerable infrastructure; and, 4) the difficulties and disadvantages these communities face when trying to plan, secure, and/or implement funding for floodplain reconnection work. The presentation will help set the stage for an interactive discussion on opportunities to increase investments in floodplain restoration as a risk reduction and infrastructure management strategy for county, municipal, and tribal governments.

Floodplain restoration in FEMA-regulated mapped floodplains, Evergreen,

Wednesday, February 22, 3:20 pm-3:40 pm

Kyle Magyera leads the Natural Flood Management Initiatives in Wisconsin's Lake Superior basin for Wisconsin Wetlands Association (WWA). He has Master's degrees in Urban and Regional Planning and Water Resources Management from UW-Madison and more than ten years of experience working on wetland conservation and water policy issues with WWA and the Wisconsin DNR.

Marcangeli, April

Connecting wetland and stream mitigation activities

The U.S. Army Corps of Engineers St Paul District (Corps) continues to develop and refine tools and procedures that support effective wetland restoration in combination with stream restoration where possible and environmentally preferable. This session will provide an overview of the Corps' procedures related to planning, constructing, monitoring and maintaining mitigation banks with both wetland and stream credits. Mitigation banks provide compensation to offset unavoidable impacts to aquatic resources. An Interagency Review Team, made up of members from both state and federal agencies, provides review, approval, and oversight of the banks. This session will describe criteria to consider when evaluating sites for potential stream and wetland functional lift, what qualitative information to collect from the field to inform initial assessments on stream condition, and how to use the Wisconsin Stream Quantification Tool to predict gain of stream function at mitigation sites.

Science-informed wetland regulation, Stonefield,

Wednesday, February 22, 11:00 am-11:20 am

April Marcangeli has worked with the St. Paul District Corps of Engineers for 6 years and currently serves as a Regulatory Ecologist. In this role, she develops & implements tools and procedures that promote consistent, transparent, and science-based decisions on stream impact assessments and compensatory mitigation projects. She holds a Master's degree in Biology and has worked in water resources for 16 years.

Nye, Ann

Dana Halverson, Alliant Energy

WDNR Technical Standard 1072 Horizontal Directional Drilling: An overview

Horizontal Directional Drilling (HDD) is a common, trenchless utility installation method often used to avoid or minimize impacts to wetlands, waterways, roads, and other surface features. The WDNR recently approved Technical Standard 1072 Horizontal Directional Drilling to specify the minimum requirements needed to plan, design, and implement best practices aimed at preserving the land and water resources of Wisconsin during HDD installations. The technical standard was created using the Standards Oversight Council Full Process and includes input from a technical work team and public review. Best practices included in the standard are based on current research, field experience, and best available technology. The standard focuses on protecting water quality by reducing sediment discharge from work areas, reducing the potential for runoff to carry construction materials into state waters, and clarifying expectations for spill prevention and response procedures relevant to HDD construction methods. This includes reducing the risk of runoff-carrying drilling fluid from inadvertent releases, also known as a frac-out or inadvertent return, to water resources through prevention and response planning. Wetland and waterway resource identification is an important component of the standard as these resources present unique challenges for HDD installation. In this presentation, I will provide an overview of the new technical standard with a specific focus on wetlands and the best practices aimed at protecting water resources of the state during HDD installations.

Science-informed wetland regulation, Stonefield,

Wednesday, February 22, 11:20 am-11:40 am

Ann Nye has more than 18 years of experience in environmental review and permitting with a specific focus on energy projects. She currently provides environmental compliance oversight for electric and gas projects in the Midwest and was a member of the Wisconsin Standards Oversight Council Team that developed Wisconsin DNR Technical Standard 1072.

O'Brien, Erin

Jennifer Western Hauser, Wisconsin Wetlands Association

Accelerating investments in floodplain restoration: Facilitated discussion and listening session

Floodplain restoration can reduce flood risks and damages, improve water quality, and reestablish healthy conditions for fish and wildlife. Opportunities to reconnect floodplains are also abundant across the state. Given the many benefits that can be achieved, why do we see so little floodplain restoration work in Wisconsin? In this session, we'll host a community conversation about the need for and opportunities and challenges associated with floodplain restoration in Wisconsin. The

discussion will be structured to draw from conference participants' experiences in Wisconsin and other states to identify actionable opportunities to help accelerate investments in floodplain restoration in Wisconsin's flood prone watersheds. We will cover perspectives on how to simplify or better support compliance with regulatory requirements such as hydrologic and hydraulics modeling and national flood insurance map updates. We will also explore what financial and technical supports may be available but underutilized through state agencies, regional planning commissions, and the private sector.

Floodplain restoration in FEMA-regulated mapped floodplains, Evergreen,

Wednesday, February 22, 4:00 pm-4:40 pm

Erin O'Brien joined the staff of Wisconsin Wetlands Association in 2004. Her work focuses on strengthening state laws and regulations governing wetland management, building capacity to help integrate wetland conservation into state-sponsored programs, and providing support to communities interested in restoring wetlands to solve problems. Erin has a Master's degree in Land Resources from UW-Madison.

O'Connor, Kaitlyn

Kaitlyn O'Connor, ISG Plant Ecologist

Rural Landowners: Key partners in successful invasive species management in wetland restorations

The wetland bank program is a system where public and private entities can restore wetlands to create credits that are used to offset authorized wetland impacts elsewhere within the watershed. The number of credits, and ultimately dollars, a landowner can earn from a privately owned wetland bank relies, in part, on the quality of vegetation within the wetland restoration. At the end of a 5-year monitoring period, the relative percent cover of nonnative or invasive species must typically be below 10% for credit release. In this way, the wetland bank program incentivizes landowners to be active managers to control and prevent invasive species establishment. Although rural landowners in agricultural watersheds may not have experience managing diverse wetland plant communities before starting a wetland bank project, they often have the skills and equipment necessary to be able to effectively manage invasives themselves with a little bit of technical expertise from consultants. In this talk, we will highlight successes and lessons learned from teaching landowners how to manage invasive species before, during, and after wetland restoration construction.

Effective wetland conservation partnerships, Stonefield,

Thursday, February 23, 9:30 am-9:50 am

Kaitlyn O'Connor is a Certified Ecological Restoration Practitioner based out of La Crosse, Wisconsin. As a plant ecologist at ISG, she collaborates with an interdisciplinary team of engineers, landscape architects, and environmental scientists to restore habitat and integrate native biodiversity into the built environment.

Panek, Bazile

Dibaginjigaadeg Anishinaabe Ezhitwaad: A tribal climate adaptation menu for indigenous-led adaptation planning

The Tribal Climate Adaptation Menu (TAM), which was developed by a diverse group of collaborators representing tribal, academic, intertribal, and government entities in Minnesota, Wisconsin, and Michigan, provides a framework to integrate Indigenous knowledge, culture, language, and history into the climate adaptation and wetland management planning process. Manoomin (wild rice) projects that have employed the strategies included in the TAM will be used as example cases. If you are working on wetlands within or near tribal lands, this presentation will help you to learn how the TAM may be used as a tool to help you overcome communication barriers with tribal partners, emphasize tribal priorities in wetland management, and support overall tribal engagement in the environment.

Wetlands and management in a changing climate, Stonefield,

Thursday, February 23, 11:00 am-11:20 am

Bazile Panek recently graduated from Northern Michigan University with a Bachelor's degree in Native American Studies. He works at the Great Lakes Indian Fish & Wildlife Commission as the Tribal Climate Adaptation Menu Coordinator. In this position, he collaborates with Tribal communities and non-tribal agencies to integrate Indigenous knowledge into climate change adaptation.

Pearce, Tom

Wisconsin Wetland Conservation Trust: Moving towards mitigating for wetland functional values

Since November 2014, the Wisconsin Wetland Conservation Trust, which manages the In-Lieu Fee mitigation program, has sold more than 400 wetland mitigation credits and constructed 15 mitigation projects. This talk compares the wetland type and acreage impacted through permit authorizations that were mitigated through the purchase of ILF credits to the wetland type and acreage of ILF wetland mitigation sites, both in Wisconsin and in the Upper Illinois Service Area. This analysis reveals the limitations of assessing wetland functional values under the current mitigation crediting model and the potential benefits of developing a wetland quantification tool to better offset wetland functional losses.

Science-informed wetland regulation, Stonefield,

Wednesday, February 22, 10:40 am-11:00 am

Tom Pearce has managed wetland mitigation projects, finance, and policy with the Wisconsin DNR's Wetland Conservation Trust since 2018. Tom holds Master's degrees in Urban and Regional Planning and Water Resources Management from the UW-Madison. His favorite wetland so far is Starlight Wetlands State Natural Area in Jackson County.

Raabe, Joshua

Benjamin Schleppenbach, University of Wisconsin-Stevens Point; Zachary Mohr, University of Wisconsin - Stevens Point; Natalie Coash, University of Wisconsin-Stevens Point; Hal Edwards, University of Wisconsin-Stevens Point

Brook trout in the Little Plover River: A system with restoration efforts to improve flow and habitat

Brook trout (*Salvelinus fontinalis*) are popular sportfish, important apex predators, and indicators of cold, high water quality systems. The Little Plover River in Portage County, WI, contains a self-sustaining brook trout population that experienced declines due to extreme low flow periods (2005-2009), including entirely dry river sections. Various groups have conducted restoration efforts in the watershed (e.g., wetlands, well and drainage ditch changes) and channel (e.g., brush bundles) to improve flow and habitat. Our objectives were to determine if brook trout demographics have changed since restoration efforts occurred and if brook trout are using restored habitat including for spawning. Extensive brook trout monitoring commenced in Fall 2015, including sampling with electrofishing to evaluate relative abundance and size structure and to implant passive integrated transponders (PIT) to monitor growth, survival, and movements. In 2020, radio telemetry evaluated brook trout fine-scale movements and use of restored habitat. Weekly redd (spawning ground or "nest") surveys occurred from 2017 – 2021 to locate spawning locations and were compared to estimates of groundwater input. Preliminary results indicate brook trout abundance and size structure have been stable or increased in restored reaches; a subset of individuals move into upstream restored reaches for spawning; and upstream reaches including restored areas contain higher levels of redds than other reaches. Watershed and in-stream restoration efforts appear to benefit brook trout, however conditions that caused extreme low flows have not occurred since extensive monitoring efforts of this population commenced on the Little Plover River.

Research and Monitoring in the Little Plover River Watershed: Part 1, Evergreen,

Thursday, February 23, 10:10 am-10:30 am

Joshua Raabe is an associate professor of fisheries and water resources at the UW-Stevens Point, where he teaches multiple fisheries courses and introductory labs. He received his PhD from North Carolina State University, a Master's degree from UW-Stevens Point, and a Bachelor's degree from Augustana College. His research interests include fish population dynamics, habitat, and movement and migrations.

Rappolee, Eleanor

Kyle Magyera, WWA; Jeff Stone, ASFPM, Stephanie Rockwood, WWA

Using updated hydrologic and hydraulic models to develop the Marengo River Watershed Management Plan

Degraded hydrology and erosion hazards have contributed to a number of flood disasters that have damaged local infrastructure such as roads, bridges, and culverts and impacted the livelihoods of communities within the Marengo River watershed in Northern Wisconsin. To better understand and mitigate the flood and erosion related risks in this watershed, we need better hydrologic and hydraulic (H&H) models. Updated H&H models would provide more in depth information about watershed functions and have a wide range of applications, such as delineating where wetlands and floodplains are disconnected from streams and assessing the vulnerability of critical infrastructure to being impacted by flooding. In this presentation, I will cover the process of updating H&H models for the Marengo River watershed using high resolution Lidar/elevation data, land cover, and culvert inventory data; and I will discuss how these H&H models will help inform the development of a watershed-wide management plan.

Hydrologic assessment in flood-prone landscapes, Evergreen,

Wednesday, February 22, 11:00 am-11:20 am

Eleanor Rappolee works at the ASFPM'S Flood Science Center as a GIS Research Analyst. Eleanor has a background in geological sciences, spatial and GIS methods, and social science methods. Her work in the Flood Science Center is focused on providing technical assistance and guidance to flood-prone communities across the country.

Rockwood, Stephanie

Developing a new hydrologic conditions assessment framework in the Marengo River watershed

Streams, wetlands, and floodplains have diverse but interrelated water management roles. When one or more of these is not functioning properly, the effects are often seen both at the natural site of interest as well as in aggregate downstream. Building on existing natural flood management work in the Marengo River Watershed, Wisconsin Wetlands Association and the Association of State Floodplain Managers are collaborating on the development of new methods to identify where a loss of wetland and floodplain storage and connectivity has occurred, to quantify those losses, and to evaluate how the loss or restoration of storage and connectivity affect streamflow and downstream flood risks. The objective is to create a holistic hydrologic conditions assessment and screening framework that links storage and connectivity functions to built infrastructure, particularly vulnerable roads and culverts. Catchment scale flood scenario modeling and vulnerability assessments are enabling cross-catchment comparisons of the current and potential capacity of natural infrastructure (i.e., stream, wetland, and floodplain system) to store and slow the flow of flood waters. The goals of this approach are to help prioritize natural flood management actions that restore healthy wetland and floodplain hydrology and to help road managers and community leaders make informed and fiscally responsible investments in hydrology-focused flood risk reduction strategies.

Hydrologic assessment in flood-prone landscapes, Evergreen,

Wednesday, February 22, 11:20 am-11:40 am

Stephanie Rockwood is the geospatial analyst for Wisconsin Wetlands Association, working to link geospatial information and local knowledge to help communities make informed decisions for natural flood management. Stephanie has more than 12 years of experience in plant conservation and GIS across many landscapes and agencies, most of which were with the National Park Service in the northern great plains and desert southwest.

Roos, Robb

Jaameson Loesch, Merjent

Michigan dam disaster: Evaluating wetland extent on the bottomlands of a drained lake system

In May 2020, an unprecedented rainfall event and associated heavy flooding resulted in the complete failure of the Edenville and Sanford Dams in Midland and Gladwin Counties, Michigan. As a result of this natural disaster, a series of four impounded lakes totaling thousands of acres were drained. This has led to the continued draining and degradation of adjacent wetlands due to changed hydrology and the formation of new wetlands on the disturbed lake bottomlands. The amount of wetland present on the current lake bottomlands requires evaluation in order to satisfy regulatory requirements to rebuild the dams and restore the lake system, as required under the current legal lake level order. Merjent, in coordination with state regulators, developed an approach that combined geospatial analysis and field verification techniques to determine an estimate of quantity, quality, and type of wetlands that are currently forming on the bottomlands. This review represents a number of challenges as all three parameters of typical wetland delineation methodology are considered both naturally problematic and significantly disturbed. Merjent reviewed a series of post-flood, drone-captured imagery spanning several months. Using geospatial tools, we classified signature types based on imagery differences. Next, Merjent's field biologists spot-checked these signatures by collecting soil, vegetation, and hydrology data at a series of monitoring points across the bottomlands. Using data, we revised the classified signatures and developed a detailed wetland and vegetation community type map. This information has since been provided to the regulators for further discussion related to project permitting.

Wetlands and management in a changing climate, Stonefield,

Thursday, February 23, 11:40 am-12:00 pm

Robb Roos is a project manager for an environmental consulting firm. He has worked in the fields of wetland and restoration ecology for more than ten years. Robb leads wetland delineation survey field teams on projects throughout the Midwest and co-instructs wetland delineation trainings. He is currently certified as a Wetland Professional by the Society of Wetland Scientists.

Skancke, Jennie

Amy Kendig, MN DNR

Monitoring hydrology of Minnesota's reference condition wetlands

Effective wetland management and restoration requires a fundamental understanding of the frequency, timing, duration, and depth of water level fluctuations in different types of wetlands: the hydrologic regime. This effort to monitor hydrology in Minnesota wetlands is driven by a legislative directive to establish impact thresholds for wetlands. Because wetlands are frequently connected to and dependent on groundwater, understanding wetland hydrology can better inform regulatory groundwater management. The hydrology of lakes and streams has been systematically monitored for decades, yet there have been few comprehensive programs to monitor wetland hydrology. To address this lack of foundational data, we are building a network of 60 sites across 7 different wetland types in Minnesota to monitor hydrology. Through 2022, we installed monitoring stations at 25 of the 60 sites have been installed. Sites are within reference (minimally disturbed) wetlands on public lands. At each wetland site, we have conducted a vegetation survey and begun collecting hydrological

data. During the initial years of the wetland hydrological monitoring network, we identified key lessons to help sustain long-term data collection, including monitoring equipment components and placement. For example, we have discovered that some data loggers are able to stay in the well year-round to capture spring thaw and early winter water levels. These lessons and initial results can help guide other efforts to monitor wetland hydrology as well as lay the groundwork for foundational data from Minnesota's reference wetlands.

Effective wetland restoration and management techniques, Stonefield,

Wednesday, February 22, 1:30 pm-1:50 pm

Jennie Skancke received a Bachelor's degree from the University of Minnesota and a Master's degree in Water Resources from the University of New Mexico. She spent 5 years working for the National Park Service Inventory and Monitoring Program in California prior to returning to Minnesota. She has been at the Minnesota DNR for 11 years and the Wetlands Program Coordinator for the last 3 years.

Steinhauer, Graham

Graham Steinhauer, Madison Audubon; Mark Martin, Madison Audubon; JD Arnston; Jim Otto; Richard Armstrong

Odonata survey of five protected wetlands in southcentral Columbia County, Wisconsin, 2020-2022

Dragonflies and damselflies are an important part of the biodiversity of Wisconsin wetlands, however few wetlands have Odonata species lists. Our project focused on surveying for Odonates in five protected wetlands dominated by shallow marshes in south-central Columbia County. The primary goals were to document the species composition at different wetlands and to collect baseline data that can be used to examine the impacts of climate change and other changes over time on odonata populations. By assisting with the ongoing Wisconsin Odonata Survey (a citizen science project sponsored by the Wisconsin Dragonfly Society and the Wisconsin Department of Natural Resources), we sought to educate Madison Audubon members and the public about Odonates while involving volunteers in a citizen science project. The 2019 Columbia County Odonata list contained 75 species including 11 species that had not been reported for 50 or more years. To update the 2019 species list, our team collected data from 2020 to 2022 and reported those data to the Wisconsin Odonata Survey. We observed fifty-six species (24 damselflies and 32 dragonflies) including eight species that had never been reported in Columbia County and eight species that had not been reported in Columbia County in more than 50 years. We learned about species composition across the five survey sites, but the project also highlighted strategies and challenges related to surveying this diverse, charismatic, and often elusive group of insects. The focus of this presentation is not dragonfly identification, but rather, undertaking a citizen science project on a challenging group of insects.

Wetlands and management in a changing climate, Stonefield,

Thursday, February 23, 11:20 am-11:40 am

Graham Steinhauer joined Madison Audubon as land steward at Goose Pond Sanctuary in 2018 after graduating from UW-Stevens Point with a Bachelor's degree in forest ecosystem restoration. His primary work includes prairie, savanna,

and wetland management, but citizen science projects, volunteer activities, and educational events, and community engagement are also important components of his job.

Strobel, Brad

Undoing the "drainage dream": Restoring a river in the heart of the sand counties

From 1910-1920 the Little Yellow Drainage District drained more than ten thousand acres of wetland and straightened more than 25 miles of the Little Yellow River in northern Juneau County. Aldo Leopold described it as "the decade of the drainage dream, when steam shovels sucked dry the marshes of central Wisconsin to make farms, but made ash-heaps instead." In 2016, U.S. Fish and Wildlife Service staff began planning to restore portions of the Little Yellow River on Necedah National Wildlife Refuge using beaver dam analogs, ditch plugging and filling, and a process-based restoration approach. Since then, nearly 3 miles of the Little Yellow River have been restored, and monitoring data show the positive effects of the restoration on both groundwater and surface water. In this presentation I will share the successes and lessons learned through an ongoing river restoration.

Effective wetland restoration and management techniques, Stonefield,

Wednesday, February 22, 2:10 pm-2:30 pm

Brad Strobel has been working on wetlands and wildlife for nearly 20 years. From waterfowl to whooping cranes, Brad has worked on a variety of species and their habitat. His recent work is focusing on restoring the form and function of the Little Yellow River on the Necedah National Wildlife Refuge.

Tuthill, Isabela

Eve Milusich, University of Wisconsin-Madison; Bryon Tuthill, University of Wisconsin-Madison; Mary Campbell, Binghamton University; Obed Hernandez-Gomez, Dominican University; Karin Sauer, Binghamton University; Jessica Hua, University of Wisconsin Madis

Evolutionary responses of bacteria to antibiotics affect their ability to inhibit a fungal pathogen

Emerging fungal diseases in wildlife are arising at unprecedented rates. Other microbes in the community (e.g., bacteria) can produce and release anti-fungal compounds influencing fungal disease outcomes. However, changing environmental conditions may alter the inhibitory effectiveness of these compounds. For example, antibiotic contamination of wetlands (i.e., via manure, wastewater treatment plants, human activity) can lead to the evolution of antibiotic-tolerant bacterial strains. Evolving tolerance to antibiotics may allow bacteria to persist when faced with antibiotics but may lead to costs that influence the anti-fungal compounds that are produced. We investigated whether the inhibitory compounds produced by antibiotic-tolerant vs. non-tolerant bacteria (*Pseudomonas aeruginosa*) differentially influence the growth of an amphibian fungal pathogen found in Wisconsin wetlands (*Batrachochytrium dendrobatidis*- Bd). We cultured four strains of P. aeruginosa: tolerant and non-tolerant, from both planktonic and biofilm forms. Then we exposed Bd to the bacterial secretions and measured Bd growth after 14 days. We found that secretions from P. aeruginosa strains that have not evolved tolerance to antibiotics inhibited Bd growth. In contrast, secretions from P. aeruginosa strains that have evolved tolerance to antibiotics enhanced Bd growth. Understanding how evolutionary changes in bacteria influence the suite of

compounds released into the environment may have important implications concerning the conservation of Wisconsin amphibian communities facing an increased risk from human activities and disease.

Wetland plants and plant communities, Stonefield,

Wednesday, February 22, 3:40 pm-4:00 pm

Isabela Tuthill is a graduate student at UW-Madison, where she is part of the Hua lab. Isabela received the Science and Medicine Graduate Research Scholars (SciMed GRS) Fellowship in her first semester at UW-Madison. Previously, she attended a semester as a graduate student SUNY Binghamton at Binghamton, NY, where she received the Clark Fellowship.

Urban, Jared

Restoring a section of Sugar River Wetlands through volunteer workdays

The Wisconsin Department of Natural Resources and the Upper Sugar Watershed Association formed a partnership in 2016 with the goal of restoring a degraded section of Sugar River Wetlands State Natural Area through volunteer workdays. The area had been thinned of large oak trees many years ago and still had a few oaks along with 30-40 year old black cherry, aspen, and thick brush with minimal understory plants. Our goal was to remove invasive plants and establish native wet prairie species. Over the course of the next six years, volunteers made solid gains through monthly workdays by removing brush and trees (black cherry, buckthorn, honeysuckle, aspen), and invasive plants, and by establishing natives through seed collecting and scattering. We have identified planted natives that successfully established early on, native and invasives that have required extra effort to keep in check, as well as the response of the seedbank. The area now has an understory with a majority of natives, though invasive plants are still present. I will discuss the difficulty of removing invasive plants and trees, seed bank response (native and invasive), planted native species response, and volunteer effectiveness.

Effective wetland conservation partnerships, Stonefield,

Thursday, February 23, 9:50 am-10:10 am

Jared Urban works for Wisconsin DNR as the State Natural Areas Volunteer Coordinator. In this position he works with some of the most passionate people of the state, taking care of State Natural Areas by removing invasives, collecting seed, and conducting prescribed fires. He formed the SNA volunteer program in 2014 and has worked on restoring Wisconsin plant communities since 2008.

Wallrath, Matthew

Ben Wojahn, Vernon Water County Land and Water Conservation

Goat guardians: How Vernon Co volunteers use goats to remove invasives in wetlands

The Friends of Vernon County Parks and Forest and partners have wrapped up another successful season of shepherding near Viroqua! This project is focused on using a sheep and goat herd to do brush control in wetlands. What started as a kid project for Ben Wojan of the Vernon Water County Land and Water Conservation District to control invasive species and maintain forests has turned into the Goat Guardians, a full community of volunteers and professionals dedicated to using this novel and pesticide free approach to land management. Work is achieved at a very low cost due to a synergistic public/private partnership. Volunteers tend the herd as they move from location to location to make sure they are contained and have enough forage to stay content. The diverse crew served conservation easements, public trails, and new campsites by munching problem plants like wild parsnip (*Pastinaca sativa*), non-native thistles, and other riparian and wetland invasive species that can crowd out native vegetation. Program manager Matt Wallrath will talk about the history, details, and impact of the projects.

Effective wetland conservation partnerships, Stonefield,

Thursday, February 23, 10:10 am-10:30 am

Matt Wallrath is a conservationist with the Upper Sugar River Watershed Association. A Milwaukee-born and Wisconsin-educated ecologist, he now specializes in invasive species management. Matt is proud to have helped found the Orcas Island Youth Conservation Corps. When he is not at work, you will find Matt teaching modern board games, playing ultimate frisbee, hiking, canoeing, and playing the tuba.

Wallrath, Matthew

Wade Moder, Upper Sugar River Watershed Association

Tangible steps forward: Diversity equity, inclusion and justice lessons learned by a watershed group

Upper Sugar River Watershed Association (USRWA) has been working on Diversity, Equity, Inclusion and Justice (DEIJ) issues for years, alongside an increased focus on environmental justice in conservation practice. Staff and board have taken on a number of initiatives to better ally the organization with people of color and those underrepresented in our programing. USRWA has made shifts to board documents, offered free admission to events, and engaged the PEOPLE program of UW-Madison, and we are in the process of completing a science observer backpack program to encourage youth to explore the outdoors. These are all ways to explore rivers and wetland areas with increased preparation to foster comfort in the outdoors and to introduce citizen science projects such as macroinvertebrate diversity and water clarity testing to foster future learning. USRWA is growing and in transition, and programs are part of a focused shift to allow staff to invest in DEIJ issues as a partner in sharing the watershed with all. Program manager Matt Wallrath and Board President Robert Bonahan will discuss the success and challenges of implementing these initiatives, with lessons learned from when the paddles hit the water.

Wetlands and people, Evergreen,

Wednesday, February 22, 1:50 pm-2:10 pm

Matt Wallrath is a conservationist with the Upper Sugar River Watershed Association. A Milwaukee-born and Wisconsin-educated ecologist, he now specializes in invasive species management. Matt is proud to have helped found the Orcas Island Youth Conservation Corps. When he is not at work, you will find Matt teaching modern board games, playing ultimate frisbee, hiking, canoeing, and playing the tuba.

POSTER PRESENTATIONS

Cannizzaro, Joseph

Pop goes the muskrat: Evidence of muskrat (*Ondatra zibethicus*) in the diet of the Blanding's turtle (*Emydoidea blandingii*)

Identifying diet and other natural history requirements of an organism is essential to the proper management and conservation of that organism. The Blanding's turtle (Emydoidea blandingii) is an imperiled semi-aquatic emydid turtle with a distribution concentrated on wetland habitats within the Great lakes region of the United States and Southern Canada. Diet and food habits of the Blanding's turtle are characterized as omnivorous with a variety of plant and animal items reported. Crayfish and pulmonate snails comprise upwards of 90% of the diet in some populations. As part of a long term recovery program of Northern Illinois Blanding's turtles,we discovered unknown mammal-like hair in the feces of an adult female Blanding's turtle. Hair comparison analysis identified the hair to be that of the common Muskrat (Ondatra zibethicus). The consumption of mammals by Blanding's turtles has only been proposed in the literature and never documented. We report the first documented occurrence of the consumption of a muskrat—and the first mammal—by a Blanding's turtle.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Joseph Cannizzaro is a Master's degree student in the Biology department at UW-Milwaukee. He studies Anuran behavioral ecology primarily in the Eastern Gray Tree frog (*Hyla versicolor*). He also publishes on reptile and amphibian biology at large, with emphasis on ecology, evolution, and conservation biology.

Collins, Dan

Nancy Aten, Land Restoration School; Chris Young, Land Restoration School

Learning ecological restoration: Getting to proficiency in eight weeks

The pathways toward a career in the practice of ecological restoration are varied. Some of us get there from an academic background in ecology or conservation coupled with a passion for field work; some of us use continuing education practicums to develop know-how; some may move in their career as on-the-job experience shifts us towards the field and the practice. Given the critical need for many more practitioners doing effective, transformational work, the Land Restoration School (LRS) was formed in 2021 and launched an inaugural school in summer 2022. We tested the hypothesis of getting people from a range of initial conditions of background and experience to proficiency or beyond in

eight immersive weeks, five days each week. Proficiency means having critical knowledge to both practice ecological restoration and develop a plan for an actual site using the Society for Ecological Restoration framework, including assessment of ecological need, land use history, current conditions, reference models, trajectories, steps, methods, and evaluation. This poster addresses the who-and-how of the LRS. We discuss the range of participants the LRS engaged and served and their transformation, and we assess the eight-week program for developing the natural science knowledge, ecological restoration understanding, planning framework, field methods experience, the business essentials, and case study insights needed to effectively launch ecological restoration practitioner careers. That career might begin as an independent contractor or as a project architect ready to help heal the earth and its wetlands. (See our complementary oral presentation for the what-why-and-where of the LRS.)

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Dan Collins (he/him), P.E. (Engineering), is a restoration consultant and program manager at Landscapes of Place, where he applies scientific methods to ecological restoration, planning, implementation, and long-term management of landscapes as they are brought to higher levels of ecological function.

Dursky, Tyler

Best practices for avoiding and minimizing wetland impacts for trunk sewer projects

Every municipality manages its wastewater in a specific and unique way, dependent upon its population, rate of growth, and topography. Why should the everyday citizen care about this information? As the nationwide trend of people moving toward urban centers continues, larger municipal wastewater management systems will be needed to serve growing populations. Trunk sewers designed to transport wastewater are gravity driven infrastructure commonly constructed in low landscape areas, often coinciding with riparian corridors and floodplains. Designed to service specific developments while also maintaining a degree of cost efficiency, trunk sewer construction is often restricted to narrow corridors of land. As a result, avoiding and minimizing wetland impacts caused by trunk sewer projects can be challenging due to the restricted construction corridors. The majority of trunk sewer infrastructure is constructed underground using best practices and minimizing ground disturbance where reasonably possible. However, wetland hydrology may still be altered and restoring wetland conditions to pre-disturbance conditions is not always feasible when factoring for future sewer infrastructure maintenance needs and updates. Accounting for specific project needs, restrictions, and the type of potential wetland impacts posed by a trunk sewer project are important when determining how to move the project forward. In this presentation, I will draw from personal experience delineating and permitting wetlands impacts as part of trunk sewer projects within eastern and central Iowa and share best practices used to determine possible methods to avoid or minimize wetland impacts as part of the trunk sewer design process.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Tyler Dursky is a certified Minnesota Wetland Professional and environmental scientist with a focus on wetland delineation and mitigation projects, invasive species management, threatened and endangered species surveys, and habitat

restoration practices. He earned Bachelor's degrees in Environmental and Earth Science from the University of Northern Iowa.

Dzyacky, Spencer

Effect of trophic state and water depth on the growth of European frog-bit

Hydrocharis morsus-ranae (European frog-bit; EFB) is a free floating aquatic plant native to Europe and Asia. It was introduced to Ottawa, Canada in 1930 and has since spread throughout upper and eastern Michigan. It inhabits coastal wetlands where its invasion is often facilitated by invasive cattail. EFB spreads via the growth of stolons, horizontal asexual sprouts that form genetically identical clones of the original plant that can eventually form a dense mat. Mat expansion and subsequent decomposition reduces dissolved oxygen, which negatively impacts macroinvertebrate and fish communities. Determining the ideal habitat for EFB is key to preventing its spread, however there is a lack of data describing the influence of environmental factors on the growth of EFB. In this study, I conducted a fully factorial experiment to analyze the effects of nutrient concentration, and water depth on EFB growth. I collected EFB individuals from two Northern Michigan coastal wetlands, then randomly assigned the samples to 4 treatments of 10 replicates each crossing high and low nutrient concentration with high and low water depth. I also ran an environmental chamber study in which I studied the impact of the four different nutrient concentrations on EFB growth. Results showed that individuals placed in the low nutrient and low water depth treatments experienced the greatest growth. The results of the environmental chamber study were in line with those of the mesocosm experiment, showing increased growth at the lowest nutrient concentrations. I will use the data collected to inform a study further investigating EFB's invasive range.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Spencer Dzyacky is a second year student at Loyola University Chicago. He is studying conservation and restoration ecology and pairs his schoolwork with participation in a research group, "Team Typha", that conducts large scale habitat restoration on cattail invaded Great Lakes coastal wetlands.

Finnerty, Shannon

Marie Perkins, University of Wisconsin-Stevens Point; Ben Sedinger, University of Wisconsin-Stevens Point; Brad Strobel, U.S. Fish and Wildlife Service

Assessing wood duck (Aix sponsa) health parameters in central Wisconsin

Wood ducks (*Aix sponsa*) are popular game birds abundant throughout North America, making up roughly 10 percent of the annual duck harvest in the U.S.. Health factors such as immune system health and parasite load can contribute to breeding success and a better understanding of these factors is essential for making management decisions that will affect wood ducks and other species that inhabit wetlands. The objectives of this study were to determine the body condition, leukocyte counts, and parasite load of adult and juvenile wood ducks over the course of the 2022 breeding season in Wisconsin. We trapped 67 wood ducks using swim-in traps, walk-in traps, and rocket launchers, recorded their morphometric measurements, and collected blood samples to make blood smears. These smears were analyzed for heterophil-to-lymphocyte ratios in leukocyte counts to measure stress as well as parasite load within the genera

Haemoproteus, Plasmodium, and Leucocytozoon. We anticipate our results will better inform land managers of health factors of concern among wood ducks and other wetland species in central Wisconsin, particularly in areas inhabited by parasitic vectors. With this knowledge, managers can decide on necessary actions to manage vector populations and determine whether populations of wetland species in central Wisconsin are healthy compared to populations elsewhere.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Shannon Finnerty grew up in Gainesville, Florida. Inspired by the state's biodiversity and her love for nature, she decided to pursue a career in natural resources and earned her Bachelor's degree in Wildlife Ecology and Conservation from the University of Florida. Afterward, she worked seasonally with different conservation agencies before moving to Wisconsin for her Master's degree program at UW-Stevens Point.

Finnerty, Shannon

Marie Perkins, University of Wisconsin-Stevens Point; Ben Sedinger, University of Wisconsin-Stevens Point; Andrew Greeenawalt, University of Wisconsin-Stevens Point

Using geolocator data to evaluate wood duck (*Aix sponsa*) breeding propensity and nest success

Wood ducks (*Aix sponsa*) are popular game birds abundant throughout North America, making up roughly 10 percent of annual duck harvest in the U.S.. Monitoring overall breeding success is critical to making management decisions that will insure the continued abundance of the species. The objectives of this study were to determine the breeding propensity, clutch size, and nest success of wood duck hens over the course of the breeding season in Wisconsin. Wood ducks were previously trapped primarily in nest boxes and walk-in traps with geolocators attached with zip ties to plastic tarsal bands. Recovered geolocator light-level data was then analyzed using R to estimate breeding propensity, clutch size, and nest success of wood duck hens. Using geolocator data allows researchers to collect behavioral observations that would not otherwise be possible in an in-person survey. We anticipate our results will better inform land managers of breeding activity of the wood duck population in central Wisconsin, which can assist with recruitment estimations and other monitoring efforts. Monitoring wood duck recruitment efforts can assist managers in determining which wetlands provide the best habitat for chick rearing and identify which wetlands would benefit from additional management.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Shannon Finnerty grew up in Gainesville, Florida. Inspired by the state's biodiversity and her love for nature, she decided to pursue a career in natural resources and earned her Bachelor's degree in Wildlife Ecology and Conservation from the University of Florida. Afterward, she worked seasonally with different conservation agencies before moving to Wisconsin for her Master's degree program at UW-Stevens Point.

Gasperetti, Roxanne

Sydney Paoli, University of Wisconsin - Stevens Point; Shayla Wagner, University of Wisconsin - Stevens Point; Sarah A. Orlofske, University of Wisconsin - Stevens Point

Wetland management practices associated with parasite diversity

Wetlands support high species diversity including flatworm (trematode) parasites that rely on multiple hosts and feeding interactions in their life cycles. Therefore, wetland management could influence both host and parasite diversity. Wetlands at Mead Wildlife Area are managed through water level control management. Our research objective is to investigate how flatworm diversity responds to wetland drawdowns. We sampled 6 locations, three in large hydrologically stable wetlands that served as reference sites. Our three treatment locations included a recently created flooded depressional wetland, one wetland in full drawdown, and one wetland in partial drawdown. Up to fifty snails were collected from each site and screened for parasite infection. Based on morphological identification of the parasites, we found an average of more than five parasite taxa present in the reference wetlands. The newly-created wetland had only one taxon, and the two wetlands with water management applied had three taxa present. The wetland in partial drawdown had two species of snails present. Our results suggest that wetland management can alter parasite communities by changing snail host presence or absence. Snails represent important food resources and detritivores in these ecosystems. Our inferences are limited by low replication, but sampling during future seasons will allow us to track individual wetlands over time and parasite community responses to the hydrologic changes. Wetland managers could potentially utilize parasite diversity to assess the effectiveness of drawdowns in changing species diversity and feeding interactions.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Roxanne Gasperetti is an undergraduate majoring in Wildlife Ecology and Management at the UW-Stevens Point. She has been involved in research since spring of 2021. Her interests include wetland wildlife with a specific focus on birds. She enjoys learning about how management strategies influence species interactions.

Geisen, Ann

Minnesota's wild rice shoreland protection project

Historically, wild rice occurred throughout Minnesota and extended into northern Iowa. Wild rice has since been extirpated from most of its southern range. Recent well-documented human population and shoreline development trends pose a serious threat to wild rice habitat. This population and development boom has reduced the availability of developable shoreline on recreational lakes, resulting in shallow lakes, rivers, and shallow bays containing wild rice being increasingly targeted for shoreline development. Many of these wild rice shoreland complexes currently remain intact with good water quality, but they are subject to development pressure that if allowed, will degrade the resource. Voluntary, incentive-based conservation protection options for shoreland landowners are few, and many easement programs are targeted for restoration and not protection. Through grants from Minnesota's Outdoor Heritage Fund, the Minnesota Board of Water and Soil Resources, in partnership with 14 county Soil & Water Conservation Districts, and the Minnesota Department of Natural Resources permanent conservation easements and fee-title acquisition were used to permanently protect wild rice shoreland habitat. Sites are selected through an integrative ranking process that considers development risk, surrounding land use, habitat value, and numerous other criteria. The program is now in its 8th phase; the previous 7 phases of this project have protected 6,634 acres of wild rice shoreland habitat.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Ann Geisen earned a Bachleor's degree in Wildlife Management from UW-Stevens Point. After working for the Wisconsin DNR for 3 years, she joined the Minnesota DNR, where she has worked as a Wildlife Lake Specialist for more than 20 years. In her position, Ann helps manage and monitor shallow and wild rice lakes. She also serves as the point person for wild rice management and harvesting for DNR's Section of Wildlife.

Jaloszynski, Connor

Gregor Willms, UW- Stevens Point

Little Plover River headwaters wetland restoration remnant seedbank study, Plover, WI

Soil seedbanks are often diverse and spatially variable and contain a considerable number of seeds. However, the composition of a seedbank changes with time since last major disturbance and as a result of land management. The overarching purpose of this study is to determine if the composition and density of a wetland seedbank can contribute to the reestablishment of the desired native community. This research study takes place near the city of Plover on agricultural land within the headwaters of the Little Plover River. Portage County and Stantec are attempting to restore drained muck soils within these headwaters to wetland and stream habitats to improve water quality and groundwater recharge within the Little Plover River watershed. Three hypotheses were developed based on previous seedbank studies. Hypothesis 1: Soil pH and soil organic matter (SOM) will have no effect on the composition or density of the seed bank. Hypothesis 2: The length of the saturation period will have no effect on the number or composition of the seeds that germinate from the seedbank. Hypothesis 3: The seedbank density and composition will be no different among Meehan, Newson, and Friendship soil series. Samples were split between the 0-25cm and 25-45cm layers. This is an ongoing research study. This poster will present preliminary results.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Connor Jaloszynski leads a seed bank germination study on the Little Plover River Headwaters to collect research data for Stantec restoration efforts.

Kalscheur, Maureen

Sally Jarosz, DNR; Michelle Nault, DNR; Matthew Puz, DNR

Let's collaborate to detect new invasive species

Wisconsin Department of Natural Resources (WDNR) needs your help to report rare occurrences of invasive species. Wisconsin Administrative Code NR 40 Identification, Classification, and Control rule lists invasive species as either Prohibited (not established) or Restricted (established) and regulates invasive species possession, transfer (sale), and

introduction in Wisconsin. Whether a species is classified as Restricted or Prohibited will subject it to different legal requirements. While this rule has reduced invasive species introductions, rare introductions still occur. These introduced occurrences are challenging to detect. This poster provides an overview of identification and distribution of some rare facultative wetland invasive species detected in fewer than 10 locations in the state with links on how to report them and how WDNR cleans gear to prevent their spread. Whether you're completing a wetland restoration or are simply a wetland enthusiast, by identifying and reporting invasive species, you can help us protect Wisconsin's wetlands.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Maureen Kalscheur is the Wisconsin DNR Aquatic Invasive Species Monitoring Lead and worked for the Department since 2010. Previously she worked for Florence County, United Stated Forest Service and as a private botanist. She has a Master's degree from the Wisconsin Cooperative Fishery Research Unit at UW-Stevens Point.

Kirkpatrick, Bella

Olivia Greymont, SER Vice President; Erin McCune, SER Head Steward

UWSP Society for Ecological Restoration Student Chapter: Educating volunteers to promote wetland restoration and stewardship

The UW-Stevens Point student chapter of the Society for Ecological Restoration (SER) teaches members about stewardship and safety protocols to follow during volunteer workdays through a newly developed stewardship training program. In 2019, the officers of the club developed a weekend stewardship training class and a textbook based on the official SER standards. This training allows student members to safely lead workdays and put into practice many techniques used in the restoration field. This training is paired with a larger workday called the Restoration Celebration that focuses on a specific work site and allows new stewards to practice their leadership skills. UW-Stevens Point SER has workday sites within Schmeeckle Reserve and around the Portage County area. These sites are in a variety of habitats, including wetlands. On these workdays, volunteers perform activities such as collecting native seeds, planting native plants, removing invasive species, assisting with prescribed burns, and more. In this presentation, we will focus on the training of volunteer stewards and the work that follows at their chosen sites.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Bella Kirkpatrick is has been the President of the UW-Stevens Point chapter of the Society for Ecological Restoration for the past two years and has been a steward with the organization for the past three years. She is a senior at UW-Stevens Point studying Forestry with an emphasis on ecological restoration.

Kuchta, Matt

Amanda Little, UW-Stout;

Molluscan fauna of ephemeral and permanent wetlands in the Chippewa Moraine

Ephemeral ponds are well known for providing habitat for specialized aquatic invertebrates, including fingernail clams (*Sphaeriidae*). Less is known about the use of ephemeral ponds by other molluscan fauna, including snails. In addition, it is unclear whether adjacent permanent wetlands may contain similar fauna. We surveyed 40 permanent wetlands and ephemeral ponds in the Chippewa Moraine Scientific Natural Area over the course of two years in order to assess patterns in mollusk diversity and species composition. Mollusks were captured in surface activity traps, which were generally set on the bottom of wetlands for a 24-hour period three times per season. Ephemeral ponds contained significantly more mollusks than permanent wetlands, including significantly more snails. Air-breathing snails in the genus Stagnicola were significantly more abundant in ephemeral ponds, while those in the genus Planorbella (also air-breathing) were more abundant in permanent wetlands. Those of the genus Gyraulus were equally abundant in both wetland types. Other authors have found that Stagnicola elodes is common in ephemeral ponds and feeds on mosquito larvae. Interestingly, sphaeriids were not significantly more abundant in ephemeral ponds. The wetlands in the study were part of a vast mosaic, and it is likely that tiny molluscan larvae are well-distributed on waterfowl. In addition, many of the permanent wetlands contained habitat areas that had ephemeral water levels.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Matt Kuchta has been a Professor of Geology at UW-Stout for 14 years. He received his PhD from UW-Madison and Bachelor's degree from Lawrence University. His research focuses on terrestrial snails, microbial fuel cells, and the physical properties of soils.

Palmquist, Madeline

Brian Ohsowski

Utilizing biochar to restore damaged ecosystems

Due to agricultural and road salt runoff, wetlands can become sites of high nutrient loads and high salinity rates. Biochar, created by burning organic material, has the ability to bond to these ions and possibly help sequester harmful salts and nutrients. To better understand the complicated interactions between biochar and the ions present in these systems, we designed an experiment to test how biochar interacts with different rates of fertilizer and road salt over different time intervals. We added biochar, fertilizer, and salt to artificial streams to mimic the simplified hydrology of a wetland. We collected data at weekly intervals. The biochar will be analyzed for salt, nitrogen, and phosphorus to discern biochar's ability to bind to these ions. This poster will focus more on the experimental design, although we may have some preliminary results to share. The outcomes and effectiveness of this experiment can help the scientific community better understand biochar's chemical behavior and its application in wetland restoration practices.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Madeline Palmquist is an undergraduate student studying conservation and restoration ecology. Madeline has been working under Dr. Ohsowski at Loyola on invasive species and wetland ecology. More recently, Madeline has been working on a biochar experiment, hoping to better understand the impact of biochar on high salinity rates and high nutrient rates in wetland ecosystems.

Paulson, Hannah

Andrew Gronewold, University of Michigan; Yifan Luo, University of Michigan

Climate change and the Great Lakes Basin water management

The water balance equation describes how water storage changes in a delineated area based on changes in inputs (precipitation, runoff, inflow) and outputs (evaporation, outflow). The large lake statistical water balance model (L2SWBM) is a model that assimilates historical water balance data and executes millions of calculations to estimate what the "true" value of each water balance component must be that is both consistent with known data and with the water balance equation. To our knowledge, the L2SWBM is the most effective way to potentially reduce uncertainty across all components of the water balance. Currently, water balance estimates have up to 45% uncertainty in data points in the historical record. By reducing uncertainty, we gain more accurate predictions of future water balance values, including precipitation and evaporation, the two main processes that influence total water storage, measured as lake water levels. With better predictive certainty, we can prepare for the high and low water levels expected to reach extremes in the short-term. One key preparative action is to provide strong science for investments in coastal management to protect nearshore habitats and infrastructure. Particularly in the coastal Great Lakes, restoring riverine and coastal wetlands can insulate the nearshore areas from destructive storm waves and winds, and unusually high and low water levels. Restoration can also reduce combined-sewer overflows and stress on aging water infrastructure in addition to providing habitat for native birds, fish, mammals, and plants. This research was completed with funding from the Great Lakes and St. Lawrence Governors and Premiers as a supplement to a 5-year Cumulative Impact Assessment to be published in 2023.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Hannah Paulson is native of Manitowoc, Wisconsin, and has always had a passion for the Great Lakes. She went on to earn a Bachleor's degree in Conservation Biology from UW-Madison and a Master's degree in Environment and Sustainability from the University of Michigan. While pursuing her graduate studies, Hannah found an interest in water sciences and worked as a graduate teaching assistant in graduate-level hydrology.

Pociask, Geoff

Nicolette Sheffield, University of Illinois, Prairie Research Institute; Piotr Szocinski, University of Illinois, Prairie Research Institute

Hydrology, carbon storage, and water- and soil quality in wetlands along the Lake Michigan shore in Illinois

Great Lakes coastal wetlands are susceptible to inundation, desiccation, erosion, and pollution due to climate change and land- and water-use pressures. Attention to these challenges at the site scale requires evaluation of hydrologic changes and identification of pollution sources and delivery. Further, evaluating wetland function is critical for assessing shifts in ecosystem services due to environmental change and potential tradeoffs based on management scenarios. Analysis of water levels at Illinois Beach State Park provides the framework for assessing wetland function. Water levels at the study site show distinct differences in water sources. A distinct hydrologic gradient from the top of relict beach ridges to deep marshes shows the varying degrees of connectivity of these wetlands to the shallow aquifer and to Lake Michigan. The range of percent soil organic carbon indicates that not all wetlands provide the same capacity for carbon storage. Water-quality monitoring at a smaller sampling of monitoring locations generally suggests that lakeward areas within the park are less affected by pollutants from anthropogenic sources. Additionally, soil quality data show elevated levels of some pollutants associated with industrial sources and activities related to the history of the area. These findings are provided in support of the Illinois Department of Natural Resources Coastal Management Program, which assists coastal communities in managing wetland resources in the coastal zone.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Geoff Pociask, Nicolette Sheffield, and Piotr Szocinski are geologists in the Wetlands Geology section of the Illinois State Geological Survey, part of the Prairie Research Institute at the University of Illinois. They specialize in studying geology, hydrology, and water quality of wetlands and other aquatic habitats.

Roxo, Skylynn

How do different feedstock types influence biochars potential as a restoration tool in wetland ecosystems

Industrial agriculture practices over the past century have resulted in nutrient-loaded waterways and reduced biodiversity. Synthetic fertilizers are often overapplied and subsequently leached from soils, resulting in high levels of pollutants such as ammonium, nitrate, and phosphate within impacted watersheds. Nutrient run-off accelerates the growth of harmful algal blooms and monocultures of invasive species. Specifically, the invasive hybrid cattail Typha x glauca outcompetes native wetland vegetation and degrades crucial wildlife habitats. Biochar, a soil amendment made from pyrolyzed organic wastes, can adsorb plant-available nutrients, potentially reducing nutrients that facilitate the spread of T. x glauca. The type of organic waste, or feedstock, used to produce biochar influences its chemical and physical properties. My research investigates the biochar feedstock from various organic wastes (i.e. wood waste, T. x glauca) and the ability of these biochars to adsorb nutrients when incorporated into wetland soils. This research aims to compare the nutrient adsorption rates of store-bought wood waste biochar, T. x glauca biochar made in situ, and control mesocosms without biochar. I compared nutrient adsorption rates for each treatment through the application and analysis of plant root simulator probes and soil ion chromatography. My research results will provide essential feedback on how different biochar feedstocks and application rates affect eutrophicated wetland systems. The results will also provide further knowledge on how to apply biochar in disturbed wetland ecosystems for soil remediation and invasive species control for future restoration projects.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Skylynn Roxo received a Bachelor's degree from Loyola University Chicago, majoring in Environmental Science. As an undergraduate, she did independent research with Team Typha, a research group with a focus on wetland ecosystems. Her research project focused on the remediation of nutrients from eutrophication wetland soils using invasive cattail-based biochar.

Smith, Amanda

Matt Puz, WDNR

European frogbit (*Hydrocharis morsus-ranae*) in Wisconsin

European frogbit (*Hydrocharis morsus-ranae*; EFB) is an aquatic invasive species originally from Europe and northeastern Asia. EFB is a free-floating species with small heart-shaped leaves arranged in a floating rosette with white flowers that are short-lived. It was deemed invasive based on its ability to form large dense mats, especially in calm or slow-moving waterbodies, thereby negatively impacting recreation, the economy, and ecology. For this reason, it was legally classified as a Prohibited invasive species in Wisconsin per Wis. Admin. Code NR 40, which makes it illegal to possess, transport, transfer, or introduce certain invasive species in Wisconsin without a permit. In 2021, the first population of EFB was documented in several nearshore coastal areas of the Bay of Green Bay. In response to this infestation, a Response Team formed that has been working to control existing populations, detect new populations early in the invasion stage, prevent the spread through outreach, and expand knowledge of this species by supporting research opportunities. To date, the Team has carried out nearly 100 early detection surveys, conducted pre/post-treatment monitoring at 33 sites, manually removed over 5,000 lbs of EFB from 80 acres of previously infested sites! Wetlands provide exceptionally suitable habitat for EFB and managing potential invasion pathways including waterfowl hunters, boaters, and natural resource professionals play a critical role in preventing the spread. Visit our poster to learn more about how you can contribute to the response effort and how this species is impacting wetlands.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Amanda Smith is the Northeast Region Aquatic Invasive Species (AIS) Coordinator for the Wisconsin DNR based out of the Green Bay office. She is responsible for leading response efforts to NR 40 Prohibited & other locally significant AIS. Additionally, her role supports AIS prevention by overseeing the development and implementation of invasion pathway strategies and related Surface Water Grant Program grant projects.

Spang, Alana

Phragmites (*Phragmites australis* ssp. *australis*) removal and native plant recolonization in Schmeeckle Reserve, Portage County, WI

The Eurasian-native phragmites (*Phragmites australis* ssp. *australis*) was first recorded in Wisconsin in 1938. The invasion of this species results in an array of negative environmental impacts, including the displacement of native plant communities, reduced diversity, reduced property values, and loss of ecosystem services like wildlife habitat. This study took place in the southwest portion of Schmeeckle Reserve on the UW-Stevens Point campus, where there was once a phragmites monoculture. In the fall of 2014, stands of phragmites were treated with the non-selective herbicide Imazapyr. After treating the site, we conducted a seedbank study in 2015, which revealed many undesirable, facultative upland species. In the spring of 2016, a mix of 22.6% native sedges, 3.6% native grasses, and 73.8% native forbs was planted. Following the planting, re-sprouts of phragmites were controlled with spot treatments of Imazapyr and manual removal using spade shovels. We conducted plant inventories in 2017 and 2022 to help determine the effectiveness of the planting and native plant recolonization. The 2022 inventory results indicate 21% of the inventoried species were species planted in 2016. This represents 39% of the total number of species planted. While some natural regeneration and seed rain likely occurred, the results of the 2015 seed bank study offers some insight as to what species were previously onsite. While the planting is regarded as a success, narrow-leaved cattail (*Typha angustifolia*) and hybrid cattail (Typha x glauca) have invaded the site. We will continue to monitoring and control these invasive species to promote the expansion and recolonization of the native plant community.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Alana Spang is a junior at UW-Stevens Point, earning her Bachelor's degree in Forestry with a focus on ecosystem restoration and management. She is also earning minors in soil science and water resources along with a wetland science certificate. Alana currently works with UW-Extension Lakes as a program assistant. After graduation, Alana hopes to build a career in wetland restoration.

Tsakos, Kristina

Brian Ohsowski, Advisor; Sam Schurkamp, Advisor; Shane, Lishawa, Advisor

Remediating road salt pollution with biochar

Often considered a silent pollutant, salt pollution in the Laurentian Great Lakes region is steadily increasing with few strategies for containment and removal. Road salt application is effective in promoting regional road safety during winter conditions, however excessive sodium and chloride that flow into roadside ecosystems can reduce water and soil quality, potentially rendering habitats inhospitable for native plant and animal species. Biochar, a common agricultural soil amendment, is the product of heating organic waste in low oxygen environments to the point of incomplete combustion. Biochar's application has been observed to improve soil that has been degraded by salt. Biochar's qualities, such as high cation exchange capacity and surface porosity, are valuable tools in buffering pH, improving nutrient retention, and adsorbing Na+ and Cl- ions in soil. I assessed biochar's ability to adsorb Na+ and Cl- ions by filtering and sampling deionized water treated with road salt through buckets filled with sand and biochar, as well as only sand as a control. I expect to observe reduced Na+ and Cl- ions in the water that has been filtered through biochar treatments, indicating biochar's potential to remediate salt-polluted soil and reduce downstream salt pollution. The data I present in this poster

will contribute to a growing effort to understand the physical and chemical properties of biochar that lend it to be an effective restoration tool.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Kristina Tsakos is an undergraduate senior researcher for Loyola University Chicago's Team Typha. Kristina is investigating biochar's ability to remediate salt-polluted ecosystems in the Great Lakes region. She is a recipient of the Carbon Fellowship and the Society of Wetland Scientists Student Award.

Wefferling, Keir

Integration of bryophytes into floristic quality assessments for Wisconsin peatlands.

Wisconsin bryophytes currently lack coefficients of conservatism (CCs). I am coordinating with bryologists and ecologists from the Great Lakes region, through a working group to evaluate and refine existing bryophyte CCs for other regions (from New Jersey and Ohio) based on collective field experience of working group members. The current project is evolving in coordination with WDNR ecologists and botanists and is guided by input from botanists and bryologists from other regions that have implemented similar approaches (Minnesota, New Jersey, Ohio, Ontario). An important aspect of this work will be to modify and adapt existing WDNR protocols for wetland floristic quality assessments by providing an objective analysis of the bryophyte community. Specifically, I will address the question “What can bryophytes tell us about ecosystem health and anthropogenic disturbance in Wisconsin peatlands?”

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Keir Wefferling is Assistant Professor of Biology and Curator of the Fewless Herbarium at UW-Green Bay. For his Ph.D at UW-Milwaukee with Dr. Sara Hoot, Keir worked on the systematics and cytology of Caltha and completed a two-year postdoc with an NSF fellowship at University of California, Berkeley, studying polyploidy in ferns. He now studies peatlands and their mosses and teaches botany.

Wied, Joshua

Temporary wetland disturbance and vegetation recovery from the use of timber matting on utility projects

A commonly- used method to facilitate construction access and minimize wetland impacts on utility projects is the temporary use of timber matting. Matting is typically installed at the start of construction activities and removed immediately upon project completion. The time of year and the length of time the timber mats remain in place affect the vegetation recovery after mats have been removed. There are mMany factors driving drive the construction timeline on utility projects, resulting in timber mats having been placed and removed on projects throughout the year. Vegetation

recovery on recent utility projects could can be observed through photo documentation in areas following mat removal. These previously- matted wetlands were examined over time to compare what time of year the mats were removed and how long vegetation took to recover after removal. Looking into aAdditional project details in permit applications and matting restoration plans also helped determine, the length of time the mats were in place could also be observed. I analyzed and compared tThese factors for recent projects were analyzed and compared to observe trends in the vegetation recovery period following mat removal in recent projects. The results may influence future project planning with matting schedules to additionally further minimize the temporal impacts to wetlands and reduce the effort needed for follow up restoration activities.

Poster session, Northwoods Expo and Commons

Wednesday, February 22, 4:40 pm to 6:30 pm

Joshua Wied is a wetland scientist with more than seven years of experience in environmental regulatory support and compliance for energy, infrastructure, private development, and restoration projects. He completes wetland delineations, rare species surveys, stream surveys, and environmental permitting, and provides construction oversight and environmental monitoring for a variety of projects.