**2024 Wetland Science Conference Abstracts and Bios**

**Aleladia**, Blessing

 Brian Ohsowski, Loyola University Chicago; Shane Lishawa, Loyola University Chicago; Thomas Marrero, Wakefield Biochar

**Investigating the effect of invasive plants derived biochar on heavy metal adsorption**

Urban wetlands face heavy metal accumulation from road runoff, posing risks to larger water bodies. Invasive plants like hybrid cattail, often employed as hyperaccumulators in urban wetlands, produce excess biomass, leading to contaminant re-deposition upon decay. Biochar efficiently absorbs heavy metals, but there is limited exploration of using invasive plant-derived biochar to address heavy metal accumulation in wetlands. This study focuses on assessing the heavy metal adsorption efficiency of three distinct biochar feedstocks. The primary aim is to determine the optimal biochar feedstock type and application rate to diminish heavy metal accumulation in wetland ecosystems, thereby mitigating downstream pollution. The study replicates wetland conditions in a greenhouse at Loyola University Chicago, employing biochar sourced from *Typha × glauca* (hybrid cattail), *Phragmites australis* (common reed), and *Rhamnus cathartica* (European buckthorn), each pyrolyzed at 500°C and applied in seven replicates at rates of 0, 10, and 25 t/ha. Midway through the study, live cattails rhizomes were introduced to assess their hyperaccumulation potential in the biochar environment. Data collection in this ongoing study involves periodic analyses of soil, biochar, and plant, utilizing methods such as inductively coupled plasma mass spectrometry (ICP-MS) and Fourier transform infrared spectroscopy (FTIR) to comprehensively assess heavy metal content and distinct biochar quality. The study's hypothesis suggests that *T. × glauca* biochar will demonstrate superior heavy metal adsorption due to distinctions in chemical composition, functional groups concentrations, and structural variations that significantly impact adsorption efficiency.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 21, 5:00 pm-6:30 pm*

Blessing Aleladia is an experienced environmental scientist with more than four years of specialization in soil and bioremediation projects. Her recent focus has shifted towards wetland invasive plant management, where she excels in crafting and implementing effective strategies, contributing significantly to the sustainability and resilience of wetland ecosystems.

**Beardmore**, Ben

 Francesca Sanchez, WDNR; Tom Nedland, WDNR

**Assessing factors determining perception of natural beauty of Wisconsin wetlands**

Natural scenic beauty is identified as a wetland water quality standard in Wisconsin AdministrativeCode (s. NR 103.02) as one of several wetland functional values to be considered in permitting decisions. However, the Wisconsin Department of Natural resources (WDNR) lacks a calibrated tool to integrate natural scenic beauty into its regulatory process. We developed a decision-support tool to address this gap by quantifying the effects of wetland landscape features on public perceptions of scenic beauty. We compiled a catalogue of 100 photographs encompassing a range of wetland types, and the biophysical attributes captured in the images were coded. An online survey, which was pretested by 32 WDNR staff, was administered to a panel of 900 Wisconsin residents. Survey participants rated the scenic beauty of 21 photographs randomly selected from the full catalogue, as well as a common set of four photographs seen by all participants. We standardized these ratings using the Scenic Beauty Estimation method and applied multivariate linear regression to estimate the effects of coded features. For WDNR staff, the most important drivers included active farming, hills, immature forest, anthropogenic structures, plant diversity, and invasive vegetation. For the online panel, important drivers included hills, dead vegetation, mature forest, sedge meadow, and invasive vegetation. While WDNR staff were largely homogenous in their perceptions, latent class analysis revealed six groups within the online panel defined by which landscape features drove their aesthetic preferences. These results provide information to allow managers to anticipate potentially conflicting views on decision outcomes.

*Lightning Round Presentation, Bear Clan/Turtle Clan Ballroom*

*Thursday, February 22, 9:30 am-10:15 am*

Ben Beardmore has been a social scientist with the Wisconsin Department of Natural Resources (WDNR) since 2014. Dr. Beardmore holds a bachelor’s degree in biology from the McGill University, a master’s degree and PhD from the interdisciplinary School of Resource and Environmental Management at Simon Fraser University in British Columbia, Canada, and a post-doc with UW-Madison’s Center for Limnology.

**Bednard**, Eva

**Assessing biochar’s influence on soil nutrients and native plants in Great Lakes coastal wetlands**

Native species in Great Lakes Coastal Wetlands (GLCWs) are threatened by rampant invasion of aggressive species such as *Typha angustifolia*. Anthropogenic activity alters GLCW ecosystems through nutrient runoff that results in eutrophication, creating favorable conditions for aggressive plant invaders. An emerging mitigation strategy to address invasion via pollutant and macronutrient capture is the application of the soil amendment product, biochar. Research suggests that biochar has the potential to remove nutrients and pollutants from soils and thus mitigate invasive growth. However, little research has been done on GLCW native response to the addition of biochar. This project addresses how 2 common GLCW native species, Schoenoplectus acutus and Juncus nodosus, respond under the stress of biochar compared to the invasive cattail, *Typha angustifolia*. Experimental conditions replicate GLCW ecosystems in which biochar is utilized to inhibit the spread of invasive Great Lakes species in order to assess whether or not native growth and survival is impacted. A wetland soil mixture was used as a mesocosm substrate in two gallon buckets. Following soil addition, commercially available wood-derived biochar was mixed in respective pots (0 T/ha, 50T/ha), and two plugs of each wetland plant species were grown in each pot. Flooded conditions were maintained in the buckets to mimic wetland saturation conditions. After 12 weeks, plant survival, total biomass, soil, and plant nutrient content will be assessed. Data had not yet been analyzed at the time of this writing. Project results can subsequently be used to inform land managers about the survivorship of native wetland plants, allowing them to mitigate invasion without harming native species.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 22, 5:00 pm-6:30 pm*

Eva Bednard has participated in research of Great Lakes Coastal Wetlands during her time as an undergrad at Loyola. In early 2023, Eva earned the Mulcahy Fellowhip offered through the College of Arts and Sciences. The fellowship funded her research project, which focused on the impacts of biochar on native species in Great Lakes Wetland ecosystems.

**Bernthal**, Thomas

 Joanne Kline, Conservation Strategies Group, Wisconsin's Green Fire; Nick Miller, The Nature Conservancy, Wisconsin's Green Fire

**Mapping the impacts of the Sackett decision in Wisconsin : A risk assessment**

The US Supreme Court's "Sackett decision" in Sackett vs US EPA has dramatically undercut federal regulation of the nation's wetlands under the Clean Water Act. Fortunately, Wisconsin does have state-level protection of “non-federal wetlands.” We present here an estimate of the impact of the Sackett decision for federal regulatory protection of Wisconsin wetlands carried out by a Green Fire workgroup in collaboration with The Nature Conservancy. We estimate that 88% of Wisconsin's wetlands will no longer be federally regulated under the Clean Water Act. The estimate makes use of a wetland mapping database and functional assessment produced by WDNR and The Nature Conservancy called Wetlands by Design. Because that project included a statewide assessment of wetland function, we have also been able to conduct a risk assessment of the potential loss of public benefits these wetlands currently provide. We will share examples of how this risk analysis can provide a powerful tool to inform a wetland conservation response to the Sackett decision in Wisconsin. Discussion around the shape of that response will be the focus of a related working group session on Thursday at 10:40 am. This talk serves as one starting point for that discussion.

*Science Informed Wetland Policy & Regulations, Bear Clan Ballroom*

*Wednesday, February 21, 11:40 am-12:00 pm*

Tom Bernthal served as the Wetland Assessment and Monitoring Coordinator for the Wisconsin Department of Natural Resources and retired in 2019. He led projects that ranged from the field-intensive plant surveys to GIS-based mapping of potentially restorable wetlands and a statewide functional assessment called Wetlands by Design. In retirement, he has been involved in Wisconsin's Green Fire and Friends of Pheasant Branch Conservancy.

**Block**, Jason

 Emily Rumschlag Booms, Northeastern Illinois University

**Assessing how biotic and abiotic factors impact survival of *Batrachochytrium dendrobatidis* zoospores**

*Batrachochytrium dendrobatidis*, the amphibian chytrid fungus known as Bd, is one of the greatest threats facing amphibians. Bd has been the leading cause of frog deaths from Australia to local wetlands. Wisconsin and the Midwest have reported Bd cases but have been spared large mortality events so far. The disease associated with Bd, chytridiomycosis, is fatal in post-metamorphic frogs. Bd is an amphibian generalist, as it can also be linked to other amphibian deaths. In this study, I aim to understand how environmental factors associated with climate change may impact zoospore survival and Bd spread by first testing rising temperatures and CO2 impact. Zoospores were incubated from 17-35 degrees Celsius, and live zoospore counts were assessed at days 4, 8, and 12. Zoospores thrived in this range, with modest inhibition at 35 degrees Celsius, suggesting that as climate change warms environments, zoospores can survive and potentially infect a broader host range. I also tested the effects of a CO2-enriched environment and found that this environment does not inhibit zoospores but enhances survival. I also tested different soil Bacillus species that have some antifungal properties to determine if they could counter abiotic enhancement effects. *Bacillus thuringiensis* consistently decreased zoospore survival, suggesting that this bacteria may provide amphibians protection. These findings may be used by aquariums or zoos during amphibian assessments and could serve to treat infected amphibians or reduce infection risk by modifying environmental conditions. For at-risk wild amphibians, soil assessment could determine if the *Bacillus* sp. are present, and if not, soil could be treated as a prophylactic action.

*Wetland Wildlife, Turtle Clan Ballroom*

*Thursday, February 22, 11:00 am-11:20 am*

Jason Block is a first generation college student that received his bachelor's degree in biology from Northeastern Illinois University (NEIU). Jason had been a member of the biology department's laboratory prep staff for the duration of his undergraduate degree. Jason has also been awarded several grants and scholarships through NEIU's biology department and graduate college.

**Carrozzino-Lyon**, Amy

 Fiona Crowley-Oswald, UW-Green Bay; Lynn Terrien, UW-Green Bay; Brian Glenzinski, Ducks Unlimited

**Restoring manoomin on the Green Bay west shore through conservation partnerships & community outreach**

Manoomin (wild rice) is an ecologically and culturally important native emergent wetland plant believed to be lost from Lower Green Bay and its tributaries during post-colonial intensive land use and environmental degradation. UW-Green Bay, Ducks Unlimited, Wisconsin Department of Natural Resources, US Fish & Wildlife Service, and other conservation partners are working to restore wild rice and enhance fish and wildlife habitat in Green Bay west shore coastal wetlands. Since 2017, sites have been hand seeded in late fall to allow overwintering in the sediment and stimulate germination in the spring. Monitoring efforts led by UW-Green Bay during the growing season have helped partners to understand factors impacting establishment and have informed adaptive management. Mid-bay sites responded immediately after the first seeding, while Lower Bay sites experienced initial challenges but have since improved with recent declining lake levels. Preliminary observations suggest that exposure to high energy wave action, carp disturbance, and persistent water clarity and turbidity issues are likely factors influencing establishment. The team established a "Wild Rice in the Classroom" outreach program in 2020 to engage regional K-12 educators and students in restoration through growing wild rice in their classrooms or greenhouses as a placed-based learning experience. In 2023, 17 educators and more than 450 students participated in their classrooms with more than 250 attending spring field trips to transplant their plantings in local wetlands. A collaborative approach to management and monitoring among conservation partners, along with effective community engagement and outreach focused on youth, serves to enhance the restoration effort and broaden its impacts.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 23, 5:00 pm-6:30 pm*

Amy Carrozzino-Lyon (she/her/hers) is a restoration scientist and Green Bay restoration project coordinator at UW-Green Bay. In this role she coordinates with conservation partners, community groups, and local schools on projects working toward ecological restoration of coastal wetland communities.

**Carrozzino-Lyon**, Amy

 Lynn Terrien, UW-Green Bay

**Enhancing wetland vegetation on the Green Bay west shore through restoration, monitoring, and outreach**

For nearly a decade, UW-Green Bay and conservation partners have collaborated to enhance aquatic vegetation along the Green Bay west shore, one of the last strongholds of Wisconsin’s coastal wetland habitat within the Lake Michigan basin. Management activities include reintroducing manoomin (wild rice) to suitable wetland habitats, enhancing impounded wetlands to promote fish and wildlife habitat, and managing non-local (invasive) wetland plants such as *Phragmites* and European frog-bit to support native wetland plants. Focusing on long-term, coordinated management at priority coastal wetlands concentrates the team’s efforts and allows for site-specific adaptive management. Ongoing monitoring contributes to understanding of important environmental or ecological factors at play and documents changes over time. This approach assists with response to challenges such as fluctuating water levels and localized invasive plant impacts on priority wetlands. Local site information in combination with a geographically broader context of adjacent sites influences decision making as part of an adaptive management feedback loop. Building partnerships beyond traditional conservation groups enhances restoration goals and works toward rebuilding community connections with the bay of Green Bay. For example, more than 1,200 local students grew wild rice in their school classrooms or greenhouse since 2020 as a learning opportunity to connect with a culturally-important wetland plant and participate in restoration. A combination of effective long-term conservation partnerships, adaptive management flexibility in response to environmental conditions, and continued monitoring and outreach are key components to successful community conservation.

*Symposium: Restoring Green Bay, Bear Clan Ballroom*

*Wednesday, February 21, 4:00 pm-4:20 pm*

Amy Carrozzino-Lyon (she/her/hers) is a restoration scientist and Green Bay restoration project coordinator at UW-Green Bay. In this role she coordinates with conservation partners, community groups, and local schools on projects working toward ecological restoration of coastal wetland communities.

**Casper**, Gary

 Clay Frazer, Native Range Ecological, LLC; Andrea Weissgerber, Eco-Resource Consulting, Inc.; Jennifer Rutten, Glacial Lakes Conservancy

**Restoring wetland biodiversity at the Willow Creek Preserve**

The Willow Creek Preserve is an approximately 143-acre nature preserve in the City of Sheboygan owned and managed by the Glacial Lakes Conservancy. The Preserve contains a diverse assemblage of kettle-moraine floral and faunal community types with more than 60 acres of wetlands, including Willow Creek and an ancient oxbow of the Sheboygan River. Like many urban preserves, it suffers from invasive species, prior land use issues, and impaired biodiversity. We performed extensive field and office studies following methodology developed for the Milwaukee Estuary Area of Concern to assess biodiversity losses and restoration potential. This identified 57 impaired fish and wildlife species, 48 of which had recovery potential. Most of these impaired species, including state- and federally-listed species, had been overlooked in prior property assessments and were revealed only by performing a biodiversity assessment. We completed Checklists of Species of Local Conservation Concern for birds, mammals, fishes, herptiles, and crayfishes and mapped plant communities to support the greatest biodiversity. We then completed a restoration and land management plan focusing on restoring recoverable fish and wildlife species and appropriate native plant communities. This plan differs from typical land management plans in having a more holistic approach to addressing biodiversity and recognizing a right to life for all beings on the landscape. In comparing our processes to more “typical” assessments, we will address cost/time estimates for process components and the need for improving standards and BMPs for biodiversity assessments.

*Wetland Wildlife, Turtle Clan Ballroom*

*Thursday, February 22, 11:40 am-12:00 pm*

Gary Casper conducts research throughout the western Great Lakes Region with a recent focus on bioacoustics. He is currently director of biodiversity programs at the Mequon Nature Preserve, owner of Great Lakes Ecological Services, and an associate scientist with the UW-Milwaukee Field Station. His latest publication is a Field Guide to Amphibian Eggs and Larvae of the Western Great Lakes.

**Cerroni**, Kyle

 Sean Babasin, UW-Green Bay; Michael Holly, UW-Green Bay

**Modified *Phragmites* biochar for phosphorus and nitrogen removal in agricultural runoff treatment systems**

In many wetland areas surrounded by residential or agricultural zones, the impact of nutrient-rich and polluted runoff is apparent. This study determined the effectiveness of biochar made from an invasive species (*Phragmites australis*, common reed grass) as a sustainable solution for removing dissolved phosphorus (P) and nitrogen (N) from runoff. Plants were sourced from an invasive lineage collected in residential wetland areas using a cut-stem approach with comprehensive seed capture to minimize the additional spread of the invasive species. The collected *Phragmites* material underwent initial processing using a hammer mill, followed by nitrogen gas purging and heating to produce biochar. Subsequent enhancements to the biochar included activation through potassium hydroxide and the introduction of specific metals. The modified biochar, serving as the carbon source in this activated carbon filtration system, was then tested to ascertain its performance as a filtration medium for agricultural runoff. *Phragmites australis* biochar shows potential in removing dissolved phosphorus and nitrogen from runoff. Utilization of this organic material in future filtration products could complement current management practices of the invasive species, potentially providing additional economic incentives.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 24, 5:00 pm-6:30 pm*

**Cole**, Stephanie

 Katie Unke Ehrenberg, GEI Consultants, Inc.

**Development of wildlife habitat restoration design plans for the Tank Farm Marsh in an urban setting**

GEI Consultants Inc. (GEI) partnered with the City of Green Bay and the Wisconsin Department of Natural Resources for planning and design services for fish and wildlife habitat restoration within the Tank Farm Marsh. The site is surrounded by highly industrialized lands and has many urban challenges. This area is a remnant of the former 600+ acre Atkinson Marsh and is located along the southwest shoreline of the bay of Green Bay. The marsh is still an important refuge for migratory and resident wildlife species but is degraded. The purpose of the project is to improve fish and wildlife habitat to address fish and wildlife-related beneficial use impairments (BUIs) and support long-term Lower Green Bay and Fox River Area of Concern (AOC) delisting efforts. The project was constrained by several factors that are associated with an urban setting: management of sediment, contaminants, access, utilities, and more. These conditions jeopardized the project but did not stop the team from developing concepts and solutions. GEI conducted field surveys and desktop reviews for the documentation of wetlands/waterways, invasive species, wildlife species and habitats, bathymetric data, contamination, and more. Engineering staff utilized these data and conducted hydrologic and hydraulic modeling of the site to support the accuracy of design and feasibility of the project. The collected data were used to develop three concepts that determined how to best improve conditions for AOC priority fish and wildlife populations and habitats while balancing existing site conditions and constraints: with one concept moving forward to final design. The final design will establish multiple wetland types based on fluctuating water levels, making the site more resilient and self-sustaining.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 25, 5:00 pm-6:30 pm*

Stephanie Cole is an environmental scientist at GEI Consultants, Inc. She recently earned her master’s degree in environmental science and policy from UW-Green Bay and her bachelor’s degree in biology from UW-La Crosse. Her career has been focused on implementing and planning wetland restoration projects, particularly within the Green Bay area.

**Crum**, Ryan

 Ryan Crum, Stantec; Melissa Curran, Stantec; Josh Sulman, Stantec

**Reconnecting a Lake Michigan coastal landscape: Wetland, stream, and watershed restoration in Manitowoc Co.**

Woodland Dunes Nature Center and Preserve (Woodland Dunes) owns and manages 1,500 acres in Two Rivers, Wisconsin. Woodland Dunes protects ecologically significant coastal resources, Great Lakes ridge and swale wetlands, and intact natural communities. Woodland Dunes, Wisconsin Department of Natural Resources (WDNR), Stantec, and other partner organizations are working to address the challenges created by habitat degradation, fragmentation, and climate change with the ultimate goal of re-connecting these habitats and restoring hydrologic connections and functions at a watershed scale. A multi-phase project is underway to restore drained farmland to wetland; restore stream function and reduce barriers to fish passage in Forget Me Not Creek, a ditched waterway connecting the Preserve to Lake Michigan; enhance degraded coastal ridge and swale habitats; and restore dune and beach habitat along Lake Michigan. The successes of the project will be measured by Stantec and partner organizations through monitoring of floristic quality, birds, fish, wildlife, and water quality in Forget Me Not Creek. Working at a watershed scale, this project demonstrates that, through innovative partnerships, sustainable benefits to water quality, bird and wildlife habitat, and local communities can be achieved in an urban and agricultural landscape, ultimately restoring the function of a highly degraded watershed.

*Effective Wetland Conservation Partnerships, Turtle Clan Ballroom*

*Wednesday, February 21, 3:20 pm-3:40 pm*

Ryan Crum is a restoration ecologist with Stantec. Ryan started with Stantec as an ecosystem restoration tech six years ago. Over the years, Ryan has developed through the Ecosystem Restoration Implementation Team through extensive field work and now assists with business and project development, as well as project management with a focus on ecosystem restoration projects.

**Dean**, Cortney

 Julie Beston, UW-Stout

**Beaver dam impacts on water quality, trout populations, and biodiversity: Challenges and early evidence**

As ecosystem engineers, North American beavers (*Castor canadensis*) have the capacity to affect both abiotic and biotic characteristics of stream and riparian habitats. In western Wisconsin, beavers are often assumed to be pests that negatively affect trout populations. However, there is little direct evidence supporting this position, and blanket beaver removal policies ignore the potential benefits of beavers, both for trout and for the riparian systems in which they live. We are investigating beaver impacts on Class II and III trout streams in western Wisconsin to better elucidate the actual costs and benefits of beaver activity. Preliminary data indicate that water downstream of beaver complexes had lower total inorganic nitrogen and lower chloride than control sites, but the total phosphorus and total suspended sediment were higher. The average water temperature at beaver-impounded sites was also higher than at control sites. Avian species richness observed during brief recording windows was 160% higher at beaver impounded sites on average. Our pilot work also illustrated the technical and logistical limitations to traditional in-stream trout sampling techniques in beaver-impounded locations. We have identified several goals for the next field season: use noninvasive DNA sampling for trout; expand biodiversity sampling using remote recording units calibrated for avian, amphibian, and bat vocalizations and additional in-person surveys; conduct formal wetland plant surveys; and monitor riparian habitat use by mammals. In the second year, we will expand our study to additional beaver-impounded trout streams on private land identified through community outreach.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 26, 5:00 pm-6:30 pm*

Cortney Dean is a conservation biology graduate student. She obtained her bachelor’s degree in ecology, evolution, and behavioral biology from Beloit College in 2001. Her prior career was clinical cancer diagnostics, but her current focus is process-based wetland-floodplain restoration and how beavers impact biodiversity and ecosystem services. She is also a gardener, winemaker, and avid maker.

**Delaney**, John

 Molly Van Appledorn, USGS; Nathan De Jager, USGS; Kristen Bouska, USGS; Jason Rohweder, USGS

**Reed canarygrass habitat suitability in floodplain forest understories of the Upper Mississippi River**

Reed canarygrass (*Phalaris arundinacea L*.) is one of the most common invaders of floodplains in North America. In the Upper Mississippi River floodplain, invasion by reed canarygrass in forest understories can inhibit forest regeneration when gaps in the overstory form. Knowledge of where reed canarygrass is likely to occur in the forest understories could help inform management actions to limit its spread or identify areas where reed canarygrass may inhibit forest regeneration following forest loss. We combined reed canarygrass presence and absence observations with 10 hypothesized environmental predictors of reed canarygrass invasion to create models to predict the presence of reed canarygrass in forest understories using three machine learning algorithms (Bayesian additive regression trees, boosted trees, and random forest). We used the outputs from the habitat suitability models to map and summarize reed canarygrass habitat suitability in floodplain forests across Navigation Pools 3-13 of the Upper Mississippi River (~41,000 ha). We found variation in reed canarygrass presence in forest understories across the study region that appears to be influenced by several factors, including inundation regime, propagule pressure, and light availability. Additionally, we performed a more detailed analysis of plot-level observations and recent inundation metrics to characterize the niche of reed canarygrass in forest understories that may be useful in understanding drivers and thresholds of reed canarygrass invasion. The results from these analyses may be used to develop more complex models that incorporate inundation patterns and forest successional processes and for refining management and restoration strategies in the future.

*Wetland Invasive Species, Turtle Clan Ballroom*

*Wednesday, February 21, 11:00 am-11:20 am*

John Delaney is a biologist at the US Geological Survey in La Crosse, WI, studying reed canarygrass invasion, climate change impacts and adaptation strategies, ecological vulnerability, and developing tools to assist managers in decision making.

**Dzyacky**, Spencer

**Looking into the effects of freighter wakes on wetland distribution within the St. Marys River**

The St. Marys River is the connecting channel between Lake Superior and Lake Huron; it is the only passage large shipping vessels (freighters) can use for travel. The freighters create large amounts of wave energy that results in shoreline erosion. The US Army Corps of Engineers (Corps) approved construction of a third lock for the St. Marys river that may result in increased frequency of freighter traffic. Wave action creates erosion, potentially resulting in wetland loss along the river's shores. In this project, I plan to model the effects of freighters on the presence of *Schoenoplectus acutus* and *Typha* spp. I’m using these plants as a proxy for wetlands because their wave tolerance is the maximum wave energy a coastal wetland can receive. In the summer of 2023, I collected water depth, location, and density data of both emergent plants across a transect divided into equally spaced subplots. Sampling occurred in 5 areas with paired sites that are exposed and unexposed to the freighter channel. Using spatial analysis software (ArcGIS pro), I applied a fetch (distance across a body of water) value as well as distance from the channel to each plot surveyed as well as created a weighted distance from channel based on land cover classes created by Michigan Tech Research Institute. I found that the weighted distance (cost distance) from the channel to the shore was the greatest predictor of emergent plant presence. Based on my data, the slope of the wetland is also most affected by the exposure to the channel, which contradicts the traditional belief that fetch has the greatest affect on wetland slope/distribution. In the future, I plan to create a model that measures the effects of increasing freighter traffic. I also hope to use high-frequency water depth monitors to measure the amount of wave energy generated by the freighters.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 27, 5:00 pm-6:30 pm*

Spencer Dzyacky is an undergraduate researcher at Loyola University Chicago. He is a carbon undergraduate research fellow and this is the second time he has been to this conference.

**Finzel**, Matthew

 Jason Bried, Illinois Natural History Survey; Suneeti Jog, Illinois Natural History Survey, David Zaya, Illinois Natural History Survey

**Indicator species of floristic quality in Illinois wetlands: Success story or a textbook preconception?**

Wetland assessment has become increasingly imperative considering widespread wetland degradation coupled with the implications of the recent Sackett vs. US Environmental Protection Agency decision issued by the US Supreme Court. While traditional wetland assessment in Illinois relies on expertise-intensive, taxonomically-demanding methods like Floristic Quality Assessment, recent endeavors elsewhere have cautiously recommended using indicator plant species to identify high floristic quality wetlands and prioritize their conservation value. As a result, we chose to test candidate plant indicators for high as well as low floristic quality wetlands with larger datasets, more specific habitat categories, and geographic stratification. We considered candidate indicators as singleton species as well as pairs and triplets. Candidate plant indicators were generated using Indicator Value analysis with a subset of training data; subsequently, we tested the candidates’ relative abundance, relative frequency, and false positive error using the remaining data. Indicators of low floristic quality sites were generated but did not perform reliably enough to be ecologically meaningful. Some candidate plant indicators of high floristic quality sites met our testing requirements, and the suite of candidates plant indicators varied within geographic habitat strata and between datasets. Some candidate indicators performed well in certain tests and failed in others. Overall, results are varied when using indicator species as a surrogate for FQA and caution should be exercised when attempting to approximate a multi-species index with a single indicator. If indicator species exist for high floristic quality wetlands, land managers and consultants should use them only conservatively and incorporate other assessment criteria.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 28, 5:00 pm-6:30 pm*

Matthew Finzel (they/he) is a senior scientific specialist in wetland plant ecology at the Illinois Natural History Survey and a 2nd Year master’s degree student in the University of Illinois’s Natural Resources and Environmental Sciences program. Matthew’s research interests include wetland bioassessment, ecological restoration, rare plant conservation ecology, citizen science, and field botany collections.

**Fritz**, Jason

**Wetland seed mix design 101**

Reestablishing wetland plant communities from seed can be challenging. Seeding failures can often result from poor site preparation, changed hydrologic conditions, seasonal extremes in weather, invasive species competition, or other factors. In addition to the selection of diverse plant species suitable to site conditions, one must consider the effect of water, on-site species selection, and application rates. Examples include, but are not limited to, presence and depth of standing water, pH and source of water, and potential fluctuating future water levels. Other key considerations are soil types, the introduction of invasive species from adjacent areas, and the potential for the dormant seed bank to contribute to the future plant matrix. To address these and other considerations—besides species selection—I will discuss seed mix formulation, sourcing, and installation strategies that can address common issues or uncertainties. I will also offer recommendations on best practices for specifications when using third parties, such as partner organizations or contractors, to install seed mixes.

*Wetland Flora and Plant Communities, Turtle Clan Ballroom*

*Wednesday, February 21, 1:50 pm-2:10 pm*

Jason Fritz is the business development manager at Stantec Native Plant Nursery. He has more than 20 years of experience with native plants, seed mixes, and habitat restoration projects. Jason assists clients and Stantec restoration staff with custom seed mixes for varied habitats across the Midwest.

**Giese**, Erin

 Tony Kuchma, Oneida Nation; Randy Cornelius, Oneida Nation; Tom Prestby, Audubon Great Lakes; Joe Torres, Oneida Nation; Patti Schevers, NEW Audubon

**Oneida bird monitoring program: Connecting community science and Oneida culture, history, and language**

Since 2021, UW-Green Bay’s Cofrin Center for Biodiversity, Northeastern Wisconsin (NEW) Audubon, and Audubon Great Lakes formed a deep, collaborative partnership with the Oneida Nation through the successful implementation of a volunteer bird monitoring program at multiple restoration sites on the Oneida Nation Reservation located near Green Bay, Wisconsin. During the past three years, with the help of more than 100 volunteers, we conducted breeding grassland, marsh, and forest bird surveys and spring and fall migratory shorebird and waterfowl surveys at locations spread across five restoration sites, totaling nearly 200 bird species and >75,000 bird observations. Program goals include 1) collecting an inventory of bird use on Oneida’s restoration lands, 2) providing bird-informed land management guidance to the Oneida Nation at their key restoration sites, 3) building a community of birdwatchers, 4) integrating Oneida’s beautiful culture, history, and language throughout the project with the leadership of an Oneida Tribal Elder, and 5) building bridges between the Oneida and non-tribal communities. Our collaborative project has witnessed incredible successes in terms of bird data collected; the integration of Oneida culture, history, and language into the project; a summer nature camp for Oneida youth; number of people engaged; volunteer events within the Oneida community; and land management decisions made. I will provide a brief overview of the bird monitoring program, describe how our partnership has been effective for wetland and prairie conservation, and share a few “lessons learned.”

*Caring for Green Bay-area Wetlands, Bear Clan Ballroom*

*Wednesday, February 21, 2:10 pm-2:30 pm*

Erin Giese (she/her) is a senior scientist at UW-Green Bay’s Cofrin Center for Biodiversity. She is a principal investigator for the Great Lakes Coastal Wetland Monitoring Program and project manager for the Oneida Bird Monitoring Program. She currently serves on the board of directors for Audubon Great Lakes and Northeastern Wisconsin Audubon.

**Glenzinski**, Brian

**Leveraging local programs for landscape scale impacts**

Ducks Unlimited (DU) is working with partners to maximize the impact of conservation dollars spent in Green Bay. These are unprecedented times for funding opportunities to make significant strides towards restoration of degraded ecosystems at a landscape scale. The Lower Green Bay and Fox River Area of Concern and The Fox River Natural Resource Trustee Council are two great examples but barely scratch the surface of funding opportunities. Great Lakes Fish and Wildlife Restoration Act (GLFWRA), National Fish and Wildlife Foundation – Sustain Our Great Lakes (NFWF-SOGL), US Fish and Wildlife Service Coastal and Partners for Fish and Wildlife Programs, and North American Wetland Conservation Act (NAWCA) grants have been and continue to be useful tools for leveraging funding as shown in the recent Green Bay to Marquette Phase III NAWCA application. However, increases to Great Lakes Restoration Initiative funding coupled with the influx of America Rescue Plan Act and Inflation Reduction Act funds have brought multiple large relevant funding programs that now dwarf typical funding sources. Partnerships will need to navigate these new opportunities to effectively continue the conservation delivery at an increased scale and scope not seen in Green Bay.

*Symposium: Restoring Green Bay, Bear Clan Ballroom*

*Wednesday, February 21, 4:40 pm-5:00 pm*

Brian Glenzinski received a bachelor’s degree in wildlife and biology from UW-Stevens Point and worked for the Wisconsin Department of Natural Resources for 15 years prior to joining Ducks Unlimited (DU). Brian oversees DU’s conservation program in the Great Lakes Initiative, delivering a diverse range of services from technical review/consultation to wetland restoration implementation along with regional conservation planning for wetlands and waterfowl.

**Greymont**, Olivia

 Isaiah Guida, UW-Stevens Point; Anna Matthews, UW-Stevens Point

**Student led stewardship: A path to restoring wetlands through volunteer workdays**

The 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. In 2019 the officers of the club developed a weekend stewardship training class and a textbook based on the official Society for Ecological Restoration standards. This training allows students 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, which focuses on a specific work site and allows new stewards to practice their leadership skills. UWSP 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. This presentation will focus on the training of volunteer stewards and the work that follows at their chosen sites.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 29, 5:00 pm-6:30 pm*

Olivia Greymont is a senior at UW-Stevens Point (UWSP). She is majoring in ecological restoration and is actively involved on campus through student organizations including UWSP Fire Crew and UWSP Society of Ecological Restoration (SER). She has served as the vice president of student chapter of UWSP SER for three years. Olivia is also involved in SER’s student stewardship program and has been a site steward for four years.

**Grubisha**, Lisa

 Jennifer Boush, UW-Green Bay; Amy Carrozzino-Lyon, UW-Green Bay

**Wild rice conservation genetics in the bay of Green Bay**

Wild rice is native to North America and has been a seasonal staple food for Native Americans for centuries as well as an important species for Wisconsin wildlife. Wild rice consists of four species of grasses that, together, form the genus *Zizania*. Of the three species of wild rice native to North America, two species can be found in Wisconsin: Northern wild rice (*Zizania palustris*) and one of two varieties of Southern wild rice (*Zizania aquatica* var. *aquatica*). Wild rice restoration in northeast Wisconsin is gaining importance in public, private, and governmental sectors. Samples from native wild rice populations on the western shore of lower Green Bay were collected between 2017-2023. Previous student research at UW-Green Bay identified four populations of *Z. palustris* and one population of *Z. aquatica*. In this current study, we are using simple sequence repeat (SSR) loci to evaluate genetic diversity within populations and gene flow among populations. Population genetic analyses of the 105 plants from four populations and SSR loci identified from the genome sequence of *Z. palustris* are underway. Results from conservation genetics studies such as this one can be used to provide essential information for land managers to use for developing and refining wild rice restoration plans, including seed sourcing for restoration projects. The development of molecular markers that capture population-level variation are crucial for tracking gene flow among populations. Estimates of genomic variation can provide information on the potential of native wild rice populations to respond to environmental change.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 30, 5:00 pm-6:30 pm*

Lisa Grubisha is an associate professor of biology at UW-Green Bay. She conducts molecular ecology research on aquatic and terrestrial plants, fungi, and microbial communities.

**Heindel**, Gabe

 Rachel Cramer, GEI Consultants; Eric Englund, GEI Consultants; Sam Prentice, GEI Consultants; Rebecca Eiden, GEI Consultants

**Form meets function: A practical approach to replicating streambank inventories to reach a wider audience**

The Lake Winnebago watershed has been a source of nutrient loading for decades. Wisconsin Department of Natural Resources (WDNR) has developed a Total Minimum Daily Load (TMDL) targeting nutrients within the watershed. TMDL targets are limits set by WDNR that assess a range of water quality parameters. Loading is the amount of sediment moving across the watershed. The United States Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) has developed soil type and phosphorous ratios to determine a stream loading within a watershed. GEI developed new methods to assess streambank erosion and calculate loading intended for replication by stakeholders. The loading results provide an opportunity for comparing existing TMDL standards along with identifying future restoration locations to reduce nutrient loading. The new methods were developed in collaboration with WDNR and combine principles from NRCS and Rosgen Stream Classification systems. The goal was to create a series of standard operating procedures that could be repeated in any HUC12 watershed by stakeholder groups such as conservation clubs, non-profits, or local governments. Current models require intensive field surveys by highly trained people and limit stakeholders. A series of weighted overlay models were created to classify erosion potential. Model results were used in site selection of 12% of the total watershed stream miles to be surveyed. Field efforts mapped streambank erosion, assessed habitat quality, and identified quality of wetlands. Data collected from these stream reaches were then extrapolated across the watershed to determine nutrient loading for each watershed. Initial results indicate the methodology developed yielded meaningful results for nutrient loading and identified areas for stream and wetland restoration as compared to prior data in the reporting phase.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 31, 5:00 pm-6:30 pm*

Gabe Heindel has ecological consulting experience related to wetland and waterway delineations, threatened and endangered species surveys, habitat assessments, streambank inventories, invasive species management, project management, environmental monitoring, environmental reports, offsite wetland assessments, permitting, and spatial analysis.

**Huang**, Annie

 Jeffrey Matthews, University of Illinois Urbana-Champaign

**Assessing the competitive abilities of invasive wetland plants under variable light and water availabilities**

Invasive plant species pose substantial risks to wetland ecosystems, resulting in a loss of biodiversity and changes to plant community composition. With an increase in biological invasions, ecosystems are more likely to be simultaneously invaded by multiple nonnative species. In field settings, we observed the invasive Japanese hop (*Humulus japonicus*) growing over reed canarygrass (*Phalaris arundinacea*), potentially impacting ecosystems prone to erosion. Additionally, a native analogue to *H. japonicus* and co-occurring species, burr cucumber (*Sicyos angulatus*) grew most abundantly in shaded areas. Determining how interactions between species change under different environmental conditions will aid invasive species management. Through a greenhouse experiment, we studied the interactions between the three species under variable environmental conditions. We grew species in monoculture and competition (*H. japonicus*×*P. arundinacea* and *S. angulatus*×*P. arundinacea*) under two light levels, unshaded or 60% shade, and two water depth levels, with pots submerged in 1 cm or 7 cm of water. All monocultures grew best in low water and unshaded conditions, with significant effects of light and water on total biomass. High water strongly reduced *H. japonicus* growth, while low light strongly reduced *P. arundinacea* growth. In competition against *P. arundinacea*, *H. japonicus* was a better competitor than *S. angulatus*, especially in unshaded and low water conditions. However, under both shaded and sun/low water conditions, *S. angulatus* outcompeted *H. japonicus*. *P. arundinacea* was outcompeted by *S. angulatus* and *H. japonicus* in shaded conditions. We recommend establishing shade through tree planting to limit *P. arundinacea* and *H. japonicus* growth.

*Wetland Invasive Species, Turtle Clan Ballroom*

*Wednesday, February 21, 11:20 am-11:40 am*

Annie Huang is a student pursuing a master’s degree in natural resources and environmental sciences at the University of Illinois Urbana-Champaign, where she is part of the Matthews Lab studying wetland ecology and restoration. Her research examines interactions between invasive wetland plants under variable environmental conditions. She is interested in invasion ecology and the management of invasive species.

**Jablonski**, Marissa

**A collaborative approach to wetlands research**

The Freshwater Collaborative is a Universities of Wisconsin initiative built to bring together water education and research at all 13 UW universities. Members of the Freshwater Collaborative create an extensive network of professionals working in the water industry. Each University of Wisconsin institution offers opportunities to work with industry partners, high school educators and career counselors, community members, and governmental and nonprofit organizations. I will share how the Freshwater Collaborative is leveraging state funding to tackle grand water challenges and how you can get involved.

*Lightning Round Presentation, Bear Clan/Turtle Clan Ballroom*

*Thursday, February 22, 9:30 am-10:15 am*

Marissa Jablonski is an accomplished water engineer, environmental advisor, and plastics-reduction expert who has worked in more than 45 countries. She serves as Executive Director of the Freshwater Collaborative. Her innovative outlook on research, business, and life has won her awards from groups that include the National Science Foundation.

**Jarosz**, Sally

 Melissa Gibson, WDNR; Allison Willman, WDNR

**New rapid floristic quality assessment tool**

The Wisconsin Department of Natural Resources (WDNR) has recently completed development of a Level 2 Rapid Floristic Quality Assessment (RFQA) tool. The intent of this new tool is to collect wetland vegetation condition information quickly and consistently throughout the state for various purposes ranging from regulatory permit reviews to conservation planning. This tool was designed to assess the condition of dominant wetland flora for Wisconsin’s commonly-occurring wetland communities. The RFQA should be used by wetland professionals (or those familiar with dominant plants) but does not require the user to be an expert botanist. The audience will hear about the development of the RFQA, the basic methodology of this assessment tool, and an introduction to the field forms. The tool is based off the Level 3 Timed Meander Survey protocol but is simplified in a manner that doesn’t require the user to be an expert botanist.

*Symposium: Wisconsin and Minnesota Wetland Monitoring and Assessment, Bear Clan Ballroom*

*Thursday, February 22, 11:20 am-11:40 am*

Sally Jarosz has worked for the Wisconsin Department of Natural Resources (WDNR) for 13 years as a wetland ecologist in various roles. Currently, she serves as the WDNR wetland monitoring and assessment coordinator in the Water Quality program.

**Jordahl**, Harald (Jordy)

**Stream mitigation & wetland restorations: Better together!**

New regulations for stream mitigation in Wisconsin create opportunities to increase functional uplift through the restoration of stream/wetland complexes. KCI Technologies capitalized and incorporated the restoration of a functional stream/wetland corridor into Wisconsin’s first stream mitigation bank approved by the US Army Corps of Engineers (Corps). The Dead Sheep Mitigation Bank at Jackson Marsh (Washington County – Milwaukee River Watershed) is currently restoring a 96-acre mosaic of habitats and vegetative communities, including 80+ acres of wetland and more than 4000 linear feet of Cedarburg Creek. KCI has been working on the Dead Sheep project since 2021. I will share our experience planning and developing the complex project. Discussion will include how integrating the stream component with the wetland restoration helped develop a more comprehensive restoration, enhancing the wetland area and delivering greater measurable conservation benefits to the site and adjacent WDNR conservation area. In the 1950s, Cedarburg Creek was ditched and completely isolated from the floodplain, and the historic, natural channel was transformed into an incised, 2800’ ditch. On the floodplain, more than 7 miles of drainage tiles were installed for agriculture. By planning and including the stream restoration, KCI developed a more comprehensive riverine plan for a hydrologic corridor with dynamic habitats and interplay of water on the surface and subsurface, producing a higher level of restoration. This approach required additional time and planning effort working with regulators as they developed new procedures, but it will result in a greater potential for meaningful ecological uplift.

*Effective Wetland Conservation Partnerships, Turtle Clan Ballroom*

*Wednesday, February 21, 4:40 pm-5:00 pm*

Harald (Jordy) Jordahl has worked on conservation initiatives for many years in many roles. For the last 3 years, he has worked on stream and wetland restorations for KCI Technologies. Previously, Jordy worked on state and national natural resource policies with The Nature Conservancy and as staff in the Legislature, Policy Advisor to the Governor, and at the Department of Administration.

**Joshi**, Suprima

**Conceptual design for urban ecology restoration, community engagement, and education at Ken Euers Nature Area**

Ken Euers Nature Area, located near the heart of Green Bay, stands as a vital sanctuary not just for a diverse array of migratory birds, anurans, and other Great Lakes wetland species, but also for the local community. The dike impoundments at Ken Euers offer a unique opportunity for the public to experience the bay’s coastal wetland habitats. These diked wetlands provide refugia for native species like the yellow-headed blackbird and pied-billed grebe during low water periods. Recent restoration in and along lower Green Bay have enhanced bird sightings and increased the value of Ken Euers as an accessible recreational spot for birdwatchers, anglers, kids, and nature enthusiasts. Thus, as part of my research assistantship with the Wisconsin Sea Grant and UW-Green Bay Office of Sustainability, I developed a conceptual design to convert the valuable coastal edge of Ken Euers Nature Area from a concrete parking lot to an immersive green space. The multifunctional design incorporates prairie areas and native trees for pollinators. It also includes green infrastructure, such as permeable paving and wet meadow buffers, to provide stormwater treatment solutions. Public amenities such as a bird observatory, outdoor classroom, fishing access, and canoe launches were added to enhance public engagement with the surrounding wetlands. This conceptual design thus aims to demonstrate the transformation of a concrete coast edge into a thriving habitat. This revitalized space not only encourages community engagement but also provides educational opportunities about wetland ecosystems. By doing so, it plays a crucial role in urban ecological restoration.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 32, 5:00 pm-6:30 pm*

Suprima Joshi is a graduate student in environmental science and policy at UW-Green Bay. As a research assistant at Wisconsin Sea Grant and UW-Green Bay Office of Sustainability, she developed a conceptual design for Ken Euers Nature Area. She is a waterfront enthusiast with an earlier master’s degree in urban design. She has interned at Riverlife, Pittsburgh and worked on Bagmati Riverfront, Nepal.

**Kenton**, Michelle

 Dr. Rachel Toczydlowski, USDA Forest Service, Northern Research Station

**Identifying native jewelweeds using leaf traits: An effort fueled by citizen science and morphometrics**

Wetland species identification is often challenging given the prevalence of similar-looking species and the limited timeframe during which some traits are present. The two most prevalent species of native jewelweed in the northeastern United States are difficult to distinguish when they are not in flower. Introducing a different method of differentiating between them would allow for a greater timeframe of identification. Morphometric analysis, the mathematical quantification of shape, has been demonstrated to be a successful method for distinguishing species that lack obvious, distinct morphological differences. We quantified leaf shape, as well as size and color, of *Impatiens capensis* and *Impatiens pallida* and used statistical models to test whether leaf traits could be used to differentiate these species. In total, we analyzed 243 leaves that were collected from across North America by citizen scientists through iNaturalist for this project. We quantified 3 shape metrics, 4 size metrics, and 3 color metrics on each of these leaves. Leaf size, shape, and color all varied significantly by species. *Impatiens pallida* leaves were, on average longer, wider, rounder, less intensely red, and less intensely green than *I. capensis* leaves (P < 0.001 for these traits). Linear discriminant analysis assigned up to 100% of leaves to the correct species for *I. capensis* and up to 88% of the leaves to the correct species for *I. pallida*, depending on the combination of leaf traits used. Our approach demonstrates how morphometrics can be used with citizen science to discover and quantify new traits for identifying species. These traits can broaden the group of people that can identify species and extend the season over which species can be identified.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 33, 5:00 pm-6:30 pm*

Michelle Kenton is a undergraduate student at UW-Madison studying conservation biology and data science. She is also an intern for the US Department of State Virtual Student Federal Service program; she has been leading an independent research project on native wetland plants that leverages citizen science and morphometrics in partnership with US Forest Service.

**Klimesh**, Derrick

 Nathan Dhuey, WDNR

**Wisconsin USDA agricultural mitigation banking**

The Wisconsin Department of Natural Resources (WDNR) and the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) are developing Wisconsin’s first agricultural wetland mitigation bank. Wetland banking is the restoration, creation, or enhancement of wetlands for the purpose of compensating for unavoidable impacts to wetlands within a similar geographic area. This program provides a mechanism by which a landowner/producer may purchase offsetting wetland “credits” from other landowners or organizations that have previously restored a wetland. The credits represent acres of wetlands that have been previously approved for wetland replacement, subsequently restored, and deposited in the bank. The mitigation banking process allows farmers to meet their wetland compliance responsibilities and maintain eligibility for USDA programs. We will discuss the program and the current status of mitigation site locations and provide other updates.

*Science Informed Wetland Policy & Regulations, Bear Clan Ballroom*

*Wednesday, February 21, 11:20 am-11:40 am*

Derrick Klimesh is the Assistant State Conservationist for Compliance for the United States Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) in Wisconsin. Derrick has a bachelor’s degree in conservation management from Upper Iowa University and a master’s degree in watershed ecology from Louisiana State University. Derrick manages the wetland conservation and highly erodible land determinations NRCS makes for agricultural participants in USDA programs.

**Kuchma**, Anthony

**Using citizen-based volunteer bird monitoring to gauge the success of Oneida habitat restoration efforts**

The Oneida Nation has been restoring habitat on our lands for more than 20 years. We are approaching some major milestones, with nearly 1,000 acres each of restored wetland, native grassland, and forest. Partnerships have been the key to implementing this work. But how well are these restored habitats functioning on the landscape? Partnerships are also helping to answer that question. Through collaborations with UW-Green Bay, Northeast Wisconsin Audubon, and Audubon Great Lakes, we have formed a group of volunteer bird monitors who are providing data to measure the success of the restored habitats for bird populations. This presentation will focus on the habitat restoration work and how the analyzed data are helping make informed management decisions.

*Caring for Green Bay-area Wetlands, Bear Clan Ballroom*

*Wednesday, February 21, 1:50 pm-2:10 pm*

Tony Kuchma has worked as a Project Manager for the Oneida Nation’s Environmental Quality Department since 2001. He is a UW Stevens Point alumnus and specializes in habitat restoration. Outside of the office, he runs a small farm in Oneida and is an advocate for local food sovereignty initiatives.

**Kupsky**, Brie

**Restoration efforts in the lower Green Bay & Fox River Area of Concern**

The Lower Green Bay & Fox River Area of Concern (AOC) was designated in 1987 and encompasses the last 7 miles of the Lower Fox River and 21 mi2 of lower Green Bay. For more than thirty years, a strong coalition of stakeholders coordinated by the Wisconsin Department of Natural Resources (WDNR) has worked to identify and understand the source of several impairments related to contaminated sediment, habitat loss, and water quality degradation, and to develop targets and plans to address those impairments. Following completion of the Lower Fox River PCB Cleanup Project, one of the largest PCB contaminated sediment remediation projects carried out globally, the primary focus is on addressing degraded water quality and habitat loss in the AOC. I will describe plans to implement 12 large-scale habitat restoration projects in the AOC by 2030 anticipated to result in the re-establishment of 300-400 acres of coastal wetland, 40 acres of riparian marsh, 100 acres of wet meadow, and 20 new high-quality fish and native mussel habitat areas, among other improvements. Key messages include reflecting on how local, state, federal, and non-governmental AOC partners are overcoming challenges in implementing large-scale projects on a short timeline, how this effort fits into and complements work beyond the AOC boundaries in Green Bay, and how similar conservation initiatives can benefit by creating additional opportunities for stakeholder engagement.

*Symposium: Restoring Green Bay, Bear Clan Ballroom*

*Wednesday, February 21, 3:40 pm-3:40 pm*

Brie Kupsky is the Green Bay Program Coordinator at WDNR and coordinates efforts to restore and delist the Lower Green Bay & Fox River Area of Concern (AOC) and Lower Menominee River AOC and leads efforts by the Wisconsin Department of Natural Resources to develop a comprehensive natural resource plan to protect, conserve, and restore the Bay of Green Bay.

**Little**, Amanda

**Vegetation and hydrology of two black ash (Fraxinus nigra) swamps in western Wisconsin**

Black ash (*Fraxinus nigra*) is an important overstory dominant in northern hardwood swamps, but it is declining due to the invasive emerald ash-borer (*Agrilus planipennis*). We investigated plant community and hydroperiod characteristics in two black ash-dominated wetlands in Western WI in preparation for long-term study. The swamp in Muddy Creek Wildlife Area (MC) had a muck substrate, while the swamp in Gilbert Creek Fishery Area (GC) was located on a silt loam soil. We anticipated that the plant communities would be different and may respond differently to ash loss. Tree, shrub, and herbaceous vegetation data were collected in 8-10 permanent plots in each wetland. A set of nested piezometers was installed in each wetland with dataloggers. Fifty-one percent of trees at MC were showing signs of damage, while only 10% at GC were. Canopy cover was significantly higher at GC (94%) than at MC (86%), although ash made up a larger proportion of the canopy at GC. Co-dominants at MC included red maple, yellow birch, and American elm. The black ash at MC had a larger stem diameter but lower density than those at GC. There was little overlap between the herbaceous plant communities. MC was dominated by cinnamon fern, while GC was dominated by *Carex bromoides*. There was more evidence of ash reproduction with significantly more ash seedlings, saplings, and small-diameter trees at GC. GC also had larger groundwater-level fluctuations than MC. Future research will investigate how these two wetlands respond differently to ash decline using vegetation, soil, and hydrology surveys. This research may help us understand how contextual factors such as overstory diversity and soil type may contribute to swamp plant community resistance and resilience.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 34, 5:00 pm-6:30 pm*

Mandy Little is a professor and program director of environmental science at UW-Stout in Menomonie, WI. She studies wetland plant ecology, with current research projects in black ash swamps, trout stream restorations, and wetland restoration sites.

**Loutzenhiser**, Samantha

 Hart Davis, KCI Technologies, Inc.

**Life and death from above: Utilization of drones for wetland conservation**

Wetland conservation efforts are challenging, often because of the difficulty or cost of having staff and equipment onsite without damaging fragile ecosystems. The use of drone technology, when applied by wetland restoration ecologists, can unlock new opportunities on difficult-to-access sites and bring new efficiencies to long-standing conservation challenges. Drones equipped with high-resolution cameras have provided aerial assessments for many years, but technological strides have allowed drones to become active tools for herbicide applications and seed distribution, revolutionizing wetland and other conservation restoration practices. KCI has found that large drones capable of applying herbicide and spreading native seeds can be deployed in difficult-to-access locations, enabling the treatment of invasive species with a high degree of safety and minimal site disturbance. Drones can also collect vital information on hydrology, elevation, species composition, and encroachment for conservation and restoration efforts. However, drones are limited in their use by state and federal regulations and physical obstructions. Most notably, drones must be operated with appropriate certifications and within visual line of sight of the pilot. Mechanical limitations of drones vary depending on the type of drone and use case, but include flighttime, ability to navigate obstacles, and max flight distance. Even with limitations, the utilization of drones facilitates access to challenging terrains, increases efficiency, minimizes disruption, and introduces restoration tools previously unavailable.

*Lightning Round Presentation, Bear Clan/Turtle Clan Ballroom*

*Thursday, February 22, 9:30 am-10:15 am*

Samantha Loutzenhiser has 11 years of experience in ecological restoration, wetlands, and invasive species. She is a Part 107 Remote Pilot and, for the last six years, has been using drones to benefit restoration sites. Samantha is also certified by the FAA as a Chief Supervisor in UAS agricultural systems operations, allowing her to apply herbicides with a drone under a Part 137 exemption.

**Majerus**, Sarah

 Paul Meuer, Tall Pines Conservancy

**Wetland restoration for water quality along Mason Creek**

Water quality is a driving factor for surface water restoration throughout Wisconsin and often requires a watershed-scale approach to identify the sources of impairment and prioritize methods for improvement in our downstream waterbodies. Tall Pines Conservancy and Stantec will share a restoration project along a channelized section of Mason Creek in Waukesha County, where landowners, non-profits, municipalities, consultants, and agency partners collaborated in support of water quality improvement. Mason Creek is impaired due to elevated water temperature, low dissolved oxygen, and high levels of suspended solids and phosphorus. This restoration project enhances the floodplain connectivity between Mason Creek and adjacent wetland areas to improve aquatic habitat and expand the horizontal reach of flood events to reduce sediment and phosphorus loading to downstream waterbodies. We will focus on watershed planning and project partnerships, provide an overview of wetland design elements for water quality improvement, share lessons learned from permitting and construction challenges, and discuss ongoing monitoring and adaptive management efforts.

*Effective Wetland Conservation Partnerships, Turtle Clan Ballroom*

*Wednesday, February 21, 4:20 pm-4:40 pm*

Sarah Majerus is a wetland ecologist and enjoys working with local non-profits, businesses, and municipalities to provide integrated solutions that protect and conserve water resources. Her project experience includes wetland delineation, permitting, habitat restoration planning and design, watershed planning, and project management. She is a PWS with SWS and a WDNR Assured Wetland Delineator.

**McCabe**, Nick

**Wetland restorations serving different purposes in different landscape settings**

In agricultural settings common across the Midwest, there are many different reasons why a wetland restoration project might be undertaken. ISG has completed numerous wetland restorations for the primary purpose of generating mitigation banking credits that help to offset impacts resulting from permitted drainage or filling of wetlands for various development projects or crop production. Secondary benefits of these projects include nutrient reduction, flood water storage, and reducing peak flow rates and volumes before the water exits a particular watershed. This poster will focus on one of the more unique mitigation banking projects undertaken by ISG in collaboration with a private landowner on a public drainage system to provide insight on lessons learned that could be directly applicable to other projects and what might be done differently on future wetland restorations.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 35, 5:00 pm-6:30 pm*

Nick McCabe has more than 15 years of experience managing projects of all sizes and scopes, though his specific expertise lies in wetland and water resource-related efforts at the local, state, and federal levels. Nick has completed many wetland banking and restoration projects and has direct experience with wetland delineations, assessments, permitting, and monitoring.

**Michaels**, MacKenzie

**Removing chloride ions and heavy metals from roadside bioswales on the Illinois Tollway with woody biochar**

Traffic, salt application, and pollution from construction along urban roadways contribute to elevated levels of chloride ions (Cl-) and heavy metals (cadmium, arsenic, chromium, & lead) in soils and waterways through runoff. Bioswales along the Illinois Tollway (IT) remove excess pollutants from stormflows and snowmelt, but they possess Cl- and heavy metal levels that surpass the Illinois Environmental Protection Agency's surface water quality standards. These systems are also invaded by *Phragmites australis* (common reed grass) and *Typha × glauca* (hybrid cattail). The removal of Cl- and heavy metals from these systems is imperative for the protection of downstream water quality, biodiversity, and ecosystem services. Harvesting invasive biomass reduces invasive regrowth, but it fails to address the nutrient inputs that drive invasion. Preliminary research suggests that applying biochar, a high-carbon soil amendment, post-harvest decreases plant-available nutrients by adsorbing nutrients and heavy metals to its surface. Four bioswales were selected for a fully factorial field experiment, each with 2 biochar treatment levels (no biochar, biochar present) and 2 harvest treatment levels (no harvest, harvest). We collected soil and plant tissue samples and surveyed vegetation metrics in fall and spring 2022 and 2023. Harvesting was completed in fall of both years with sickle bar harvesters and manual biomass removal. Ion chromatography and heavy metal analyses of the samples are being analyzed. This study predicts biochar addition will decrease Cl- and heavy metal levels in roadside bioswales with and without biomass harvest. This study may influence the use of biochar to mitigate pollution associated with highway systems.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 36, 5:00 pm-6:30 pm*

MacKenzie Michaels is a research assistant at Loyola University Chicago in Dr. Brian Ohsowski’s lab with a bachelor’s degree in environmental sciences from the University of Vermont. She studies restoration management practices in Great Lakes coastal wetlands. Her current research addresses the use of biochar as a restoration tool in sites degraded by hybrid cattail invasion and nutrient pollution.

**Nedland**, Tom

**New general permit to promote hydrologic restoration of streams, wetlands, and floodplains**

In May 2021, the Wisconsin legislature, working with Wisconsin Wetlands Association (WWA), other external stakeholders, and the Wisconsin Department of Natural Resources (WDNR), passed WI Act 77, which required WDNR to develop a Hydrologic Restoration General Permit (HRGP). WDNR worked cooperatively with WWA and other stakeholders to draft permit language that meets the intent of WI Act 77. The HRGP represents Wisconsin’s first attempt at issuance of a performance- or outcomes-based general permit that focuses on net improvements in hydrologic condition, connections, and function. The permit will utilize integrated and flexible review requirements for a variety of wetland- and stream-related regulations, so long as an applicant is able to demonstrate that the proposed activities will achieve improvements to wetland, streams, and watershed health. It is hoped that the flexibilities offered through the HRGP will accelerate the implementation of voluntary wetland, stream, and floodplain restoration and management projects. Potential audiences/applicants include agricultural landowners and engineers, local units of government, fish and wildlife managers, restoration practitioners, emergency managers, and non-profit conservation organizations. This presentation will provide an overview of the HRGP conditions and the intended uses for the permit.

*Science Informed Wetland Policy & Regulations, Bear Clan Ballroom*

*Wednesday, February 21, 10:40 am-11:00 am*

Tom Nedland is a Professional Wetland Scientist with more than 20 years of experience in the wetland science and regulatory realm. While at the Wisconsin Department of Natural Resources (WDNR), he has held positions in the Waterways Program conducting permitting and serving as WDNR’s wetland delineation and wetland mitigation expert. Tom is currently the section manager for the Waterways Program’s Policy and Professional Services Section.

**Nelson**, Hayden

**Dammed: The fur trade and its effects on forested wetlands**

Histories of the fur trade typically focus on the economic rise and fall of the European fur market, intercultural connections forged between Indigenous people and Euro-Americans, or the wars between Native Nations due to economic participation and alliances. This presentation examines how the overhunting of fur-bearing animals, particularly beavers, substantially altered the forested wetlands around Lake Superior. Incorporating historical evidence and environmental science, I attempt to answer the question: if, according to historical estimates, fur hunters exterminated 95-99 percent of the regional beaver population, exactly how would that decline over several centuries have transformed the region’s characteristic wetland environments, specifically water levels? I also examine the ways in which other animals would have responded to the decline of beaver and other fur-bearing animals, moving into their ecological niche and transforming the forest environment in new ways. A full accounting of the historical ecological fallout from the fur trade has yet to be written, but may help researchers better understand both the environmental effects of the fur trade and the sociocultural changes experienced by Native Nations during that time.

*Wetland Wildlife, Turtle Clan Ballroom*

*Thursday, February 22, 10:40 am-11:00 am*

Hayden L. Nelson is a Ph.D. Candidate in History at the University of Kansas, where he specializes in environmental and Indigenous history in the North American West. His dissertation, “The North Woods: An Environmental History from the Fur Trade to the Civil War,” investigates the ways in which both human and non-human actors transformed the forested region before the post-Civil War logging boom.

**Nieset**, Julie

 Elizabeth Miernicki, Illinois Natural History Survey; Eric Janssen, Illinois Natural History Survey; Scott Wiesbrook, Illinois Natural History Survey

**Spatial strategies for wetland mitigation success: Insights from Illinois landscape analyses**

Illinois does not have statewide ‘wetland restoration potential’ mapping to aid in discerning suitable sites for wetland restoration. Topographic Wetness Index (TWI) analyses paired with existing datasets from state and federal agencies provide the foundation for typical wetland restoration potential mapping efforts. This study additionally utilized field-verified wetland data. We studied three HUC 8 watersheds (Des Plaines (IL and WI), Upper Mississippi River - Cahokia-Joachim (IL and MO), and Embarras (IL)). In TWI spatial analyses, there are differing algorithms and assumptions for how water is modeled to flow and accumulate in a landscape. Three algorithms—D8, Multiple Flow Direction (MFD) and D-Infinity (DINF)—informing flow direction and flow accumulation were investigated in the context of TWI analyses. It was determined that the MFD algorithm was the best fit to field-verified wetland data (n=960). The “threshold” TWI value was found to vary between watersheds. The mean wetland TWI values ranged from 6.5 – 10.2. Since TWI threshold values are used to eliminate large areas of respective landscape from site suitability and are often set at a state or regional level, this result indicates that finer scale investigations such as at the watershed level may be important in not over- or underestimating this metric in determining areas of suitability. Other selection factors such as drainage class, depth to water table, and hydric classification percentage were found to have varying prominence between watersheds. The next steps in the development of this ‘wetland restoration potential’ mapping project will incorporate these variations in watershed characteristics, but the exact method is yet to be determined.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 37, 5:00 pm-6:30 pm*

Julie Nieset is an assistant research scientist in wetland plant ecology with the Illinois Natural History Survey, Prairie Research Institute, University of Illinois at Urbana-Champaign.

**O'Connor**, Ryan

 Melissa Gibson, WDNR

**Floristic quality benchmarks for rare and unique wetland plant communities**

From 2021 to 2023 the Wisconsin Department of Natural Resources (WDNR) conducted surveys of six rare and unique wetland plant communities. Our goals were three-fold: 1) to better characterize uncommon wetland communities and their plant species for the purposes of classification and restoration; 2) to develop floristic quality benchmarks to better evaluate ecological integrity of uncommon communities; and 3) to update the conservation status and state rarity rank (S-rank) of these communities, which are used in conservation planning. Community types surveyed were bog relict, forested seep, interdunal wetland, southern tamarack swamp, wet prairie, and white pine-red maple swamp. At each site, we determined the plant community type, conducted a timed meander survey, estimated percent aerial coverage of each plant species, and evaluated anthropogenic disturbance using a standardized field checklist. FQA benchmarks for five condition tiers ranging from least to most disturbed were developed for most communities. These will facilitate more objective site evaluations, permitting decisions, mitigation monitoring, and conservation of these uncommon plant communities. Community descriptions, distinguishing features, and the key to wetland communities were also updated, which will allow practitioners to more accurately determine when they encounter these community types. Preliminary analysis of S-ranks suggests that southern tamarack swamp and wet prairie are highly threatened by anthropogenic disturbance and are in severe decline. In concert with FQA benchmarks, revised S-ranks can help justify and prioritize protection and management of communities by highlighting the best remaining examples of the most imperiled communities.

*Symposium: Wisconsin and Minnesota Wetland Monitoring and Assessment, Bear Clan Ballroom*

*Thursday, February 22, 11:00 am-11:20 am*

Ryan O’Connor is an ecologist with the Natural Heritage Conservation program of the Wisconsin Department of Natural Resources (WDNR). He conducts biotic inventory and maintains the WDNR’s natural community classification. He received a master’s degree from the University of Michigan and has worked in the Great Lakes region for more than 20 years. He strives to keep his knee boots wet and his socks dry.

**Ohsowski**, Brian

 Shane Lishawa

**A biomass conundrum: Investigating biochar produced from harvested hybrid cattail to manage wetland diversity**

Great Lakes watershed wetlands are subject to socio-economic pressures, thus exacerbating the climate crisis and global biodiversity loss. Specifically, regional wetland systems are influenced by invasive species proliferation, often driven by development and nutrient pollution. To address invasion degradation, prior research has shown that invasive clonal plant biomass harvesting (e.g. hybrid cattail, common reed) effectively reduces ecological invasion pressures to improve biodiversity. This practice, however, accumulates metric tons of low-value biomass rich in viable propagules, leading to biomass movement impracticality. Biochar production from invasive biomass shows potential for storing long-term carbon and adsorbing available soil solution nutrients while concurrently reducing biomass volume. Biochar is produced when organic material is pyrolyzed [450oC-700oC] in a low-oxygen kiln to produce stable carbon with high cation-ion exchange capacity. We will explore current research successes and challenges in biochar production/wetland reapplication of invasive plant biomass. Furthermore, we will share research of a recently established (August 2023) large-scale (total = 56 plots; plot size = 1.01 acres), multi-year experiment at Shiawassee National Wildlife Refuge near Saginaw, MI. This research investigates peak biomass cattail harvesting (control, annual, triennial) and annual cattail biochar production/reapplication (0 metric tons (T) / hectare(ha), 20T/ha, 40T/ha) at a land management scale. This novel research is anticipated to serve as a launching point to scale-up ecological restoration while closing logistic loops in invaded wetlands.

*Wetland Invasive Species, Turtle Clan Ballroom*

*Wednesday, February 21, 10:40 am-11:00 am*

Brian Ohsowski conducts research on restoration of aquatic and terrestrial ecosystems in the Great Lakes. His research focuses on closing the restoration loop when harvesting wetland clonal invaders (hybrid cattail [*Typha* sp.], common reed [*P. australis*]). His research team investigates converting harvested invasive plants to biochar to unpack soil / biotic responses to wetland reapplication.

**Palmquist**, Madeline

**Impact of hybrid cattail (*Typha × glauca*) on waterbird diversity at Shiawassee National Wildlife Refuge**

Intact Great Lakes wetlands host diverse populations of waterbirds, provide food resources, and support breeding and migration. In the Shiawassee National Wildlife Refuge (SNWR) [Saginaw County, MI], invasive hybrid cattail (*Typha × glauca*) has homogenized wetlands by suppressing diverse native plant communities. Responding positively to eutrophication and altered hydrology, *Typha* dominates throughout the region, limiting waterbird food resources. My research mentors have effectively managed *Typha* in a 3.28 ha plot via aboveground harvesting in North Marsh, SNWR, from 2016-2018. However, we need to understand the long-term response of waterbird usage after this *Typha* management. I will test the efficacy of this management to increase waterbird utilization four years after *Typha* harvesting. At three different sites (managed for *Typha*, *Typha* invaded, and a high-quality site), I remotely collected bird habitat occupancy using autonomous recording units (ARUs) and surveyed vegetation diversity surrounding each ARU. Each site contained 3 randomly distributed ARUs. I will assess waterbird diversity from the audio recordings with BirdNET technology and analyze species diversity in relation to vegetation; I will have preliminary results prepared by the conference. I expect that plant diversity—and likewise waterbird food resources—will be higher in the site managed for *Typha* compared to the invaded site. I hypothesize that the expected higher vegetation diversity in the managed site will correlate to a higher species diversity compared to the invaded site. The conclusions of this study will outline novel methods for bird surveys and evaluate the impact of restoration techniques for invasive *Typha* removal on native wildlife.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 38, 5:00 pm-6:30 pm*

Madeline Palmquist is an undergraduate student at Loyola’s School of Environmental Sustainability. She has worked with Loyola University of Chicago's Team *Typha* as an undergraduate researcher investigating invasive species management and biochar application in Great Lakes coastal wetlands. Her current research fellowship focuses on assessing the impact of invasive cattail on waterbird diversity.

**Pearce**, Tom

 Ken Powell, Minnesota Board of Water & Soil Resources

**Draft Wetland Functional Assessment Tool for WI and MN**

The Wisconsin and Minnesota Wetland Rapid Assessment Methods (RAM) are currently used to evaluate wetland function and inform some regulatory and mitigation decisions. Supported by US Environmental Protectin Agency wetland development grant funding, state agencies in Minnesota and Wisconsin are working jointly to update their RAM with a quantitative tool that evaluates several wetland functions, including water quality, hydrology, ecology, and human use values. Presenters will discuss the strategy for developing the new tool and show current tool functions, data sources, and plans for field testing and public input.

*Symposium: Wisconsin and Minnesota Wetland Monitoring and Assessment, Bear Clan Ballroom*

*Thursday, February 22, 11:40 am-12:00 am*

Tom Pearce received a master’s degree in urban and regional planning and a master’s degree in water resources management from UW-Madison. Tom has worked for the Wisconsin Department of Natural Resources (WDNR) for the past five years coordinating policy and administration of the state wetland regulatory program. Prior to working for WDNR, Tom spent five years working in environmental education and conservation leadership.

**Pfost**, Mark

 Anna Rzchowski, Wisconsin Waterfowl Association; Peter Ziegler, Wisconsin Waterfowl Association

**A new partnership to benefit Wisconsin’s public land wetlands**

In early 2023, the Wisconsin Waterfowl Association (WWaA) contracted with the Wisconsin Department of Natural Resources (WDNR) to restore and enhance wetland habitats on WDNR’s 1.4 million acres. The WDNR lacks workforce experience and capacity for this state-wide effort. The agreement comprised two parts: 1) WWaA searches out wetland restoration opportunities on lands owned or managed by the WDNR. WWaA’s wetland ecologists review soil maps, historic maps, and various aerial imagery to identify possible restoration opportunities. Next, WWaA ecologists visit sites and survey to verify restoration potential. WWaA ecologists use an iterative and collaborative approach to design the restoration. Throughout this process, the ecologists communicate with WDNR property managers and wetland habitat specialists to ensure that site-specific habitat management goals and infrastructure maintenance needs are considered in the prospective restoration plan. Once the plan is finalized, WWaA submits the wetland restoration permit application and will eventually oversee construction. To date, WWaA has conducted desk reviews of 144 properties. Of those, 15 have progressed beyond desk review, one wetland permit application has been submitted, and a second application is nearing completion. 2) WWaA will partner with WDNR and others to expand the extent of wild rice across Wisconsin’s Ceded Territory. In 2023, WWaA collected 250 pounds of wild rice from a Vilas County lake and gave it to WDNR, who planted it on another site the next day. WWaA also purchased 1,400 pounds of wild rice planted on priority sites determined by WDNR and partners. Both wetland restoration and wild rice collection are part of this three-year pilot program that is potentially renewable.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 39, 5:00 pm-6:30 pm*

Mark Pfost joined the Wisconsin Waterfowl Association following a brief retirement hiatus. Pre-retirement, he worked for the US Fish & Wildlife Service for twenty-two years—the last twelve as a private-lands biologist with the Partners for Fish & Wildlife program. He designed and implemented habitat restoration projects, primarily wetlands and prairies, to help landowners enhance their properties to benefit wildlife.

**Powell**, Ken

 Dennis Rodacker, Minnesota Board of Water & Soil Resources

**Condition of wetland banks following initial establishment & active management**

Wetland condition is the relative ability of a wetland to support and maintain functions comparable to a reference wetland in a particular region. The ability of compensatory wetland mitigation banks to maintain and support wetland functions is related to their condition. Wetland banks are required to meet performance standards that are associated with corresponding credit releases. It is assumed that these wetland banks are in good condition as credits are released and used. However, the condition of wetland banks after credits are released and used is typically not quantitatively assessed. In 2020-21, we evaluated the condition of 105 wetlands within 68 wetland banks using Minnesota's Rapid Floristic Quality Assessment methodology. All banks were 6-15 years old, had been determined to meet performance standards, all credits had been released, and required annual monitoring had ended. The condition of wetlands in these banks was compared to wetlands statewide and within each of Minnesota's four ecoregions. Additionally, wetland condition was compared to environmental stressors and other management strategies used in bank development and establishment. The condition of wetland banks was similar to other wetlands in the state except for the Mixed Wood Shield ecoregion in the northeast. Environmental stressors associated with human disturbance in the surrounding landscape appeared to negatively influence condition ratings. Management frequency and seed mix diversity had little influence on condition ratings, while control of hybrid cattail appeared to have a positive influence on condition. Although sample sizes among the variables considered in this study were too small for statistical analysis, the data indicate potental trends that could be further explored through additional sampling.

*Symposium: Wisconsin and Minnesota Wetland Monitoring and Assessment, Bear Clan Ballroom*

*Thursday, February 22, 10:40 am-11:00 am*

Ken Powell received a bachelor’s degree in wildlife from UW-Stevens Point and master’s degree in biology from Kansas State University. Ken has worked for the Minnesota Board of Water and Soil Resources for the past 15 years managing the state's wetland regulatory program, the Minnesota Wetland Conservation Act. He is a Professional Wetland Scientist and Certified Wildlife Biologist.

**Prestby**, Tom

**Immediate avian response to restoration in lower Green Bay**

Lower Green Bay was once recognized as one of the most productive locations for birds and other wildlife in the Great Lakes, including scores of migrating shorebirds and waterfowl and an abundant population of breeding marshbirds. During decades of industrialization, invasive species colonization, and other severe impacts, use of the area by migrating and breeding birds plummeted. However, restoration projects in the past decade including the Cat Island Restoration Project and Ken Euers Nature Area Restoration within the Lower Green Bay & Fox River Area of Concern (AOC) have already showcased extremely positive responses from migrating and nesting birds, including Federal and State listed species, demonstrating that “if you build it, they will come”. Other AOC restoration projects that are currently in planning or design phases offer additional potential to help bring lower Green Bay back to its premiere historical track record as a migratory stopover and nursery for key bird species. This presentation will detail immediate avian response to restoration at Cat Island and Ken Euers, as well as Sensiba State Wildlife Area (SWA) and Oconto Marsh SWA just north of the AOC, and will describe long-term management challenges to ensure restored habitat remains ideal for bird use in an age of invasive species and climate change impacts.

*Symposium: Restoring Green Bay, Bear Clan Ballroom*

*Wednesday, February 21, 4:20 pm-4:40 pm*

Tom Prestby is the Wisconsin conservation manager at Audubon Great Lakes. He manages habitat restoration projects and bird research, monitoring, and stewardship projects in Wisconsin, particularly in Audubon's strategic priority areas of Green Bay and the St. Louis River Estuary and in the Important Bird Area Program. Tom is based in Green Bay, WI.

**Rademacher**, Sarah

 Daniel Tix, MNL

**Adaptive management of invasive hybrid cattails (*Typha x glauca*) at the Minnesota Landscape Arboretum**

Native vegetation is often displaced by dense stands of invasive hybrid cattail (*Typha x glauca*) in Midwestern wetlands. Hybrid cattails have invaded multiple wetlands at the University of Minnesota Landscape Arboretum, including the area around Green Heron Pond. The shallow open-water pond is part of a wetland complex that includes the surrounding cattail marsh, shrub swamp, and sedge meadow communities. Surveys prior to treatment indicated approximately 90% of the marsh was covered in hybrid cattail from shrub line to the water’s edge. In 2020, we began treatment with a broadcast herbicide application using aquatic glyphosate from a Marsh Master (a tracked amphibious vehicle). In 2021, we completed a follow-up treatment with an agricultural drone sprayer, and we have since completed spot treatments using backpack sprayers. Following two years of herbicide treatments, we planted more than 750 plugs of emergent marsh species in the cattail thatch. A meander survey in the fall of 2022 showed a reduction to approximately 25% cover of hybrid cattail and an increase in native plant diversity and cover. With the use of different herbicide application techniques, we have found advantages and disadvantages to each that will inform future management strategies at this site and other wetlands. We also experienced several challenges that have impacted management or project results, including ongoing drought, altered hydrology, site access, and budget. Despite these obstacles, our project is showing promising results from intensive herbicide applications with continued follow-up treatments as the cattail thatch slowly degrades and allows for more native plant recolonization.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 40, 5:00 pm-6:30 pm*

Sarah Rademacher is the wetlands horticulturist at the University of Minnesota Landscape Arboretum, where she manages the habitat restoration projects in several of the wetlands at the Arboretum. She received her bachelor’s degree in forest restoration and management at UW-Stevens Point and her master’s degree in forestry at Purdue University.

**Risdal**, Alex

**Evaluating the impacts of invasive cattail and European frog-bit on northern wild rice growth and germination**

*Zizania palustris*, northern wild rice, is an important plant for the ecology of Great Lakes coastal wetlands (GLCWs) and the culture of Native American tribes in the northern United States. Human development has severely limited its native range, and the ongoing invasion of *Typha × glauca* (hybrid cattail) and *Hydrocharis morsus-ranae* (European frog-bit) into lakes with native *Z. palustris* may further threaten surviving populations. There is little understanding of the effects of these invasives on *Z. palustris*, but the litter accumulation of *Typha* and the shading effect of floating *Hydrocharis* mats are suggested mechanisms impacting their populations. This two-week study, conducted at the University of Michigan Biological Station, addresses these impacts through a mesocosm experiment mimicking the effects of litter and shade on the germination and development of *Z. palustris* seedlings. *Hydrocharis* mats were simulated at three lighting cover levels (0%, 40%, and 80%), using floating circles cut to a uniform size, and *Typha* litter collected from nearby lakes was added in uniform amounts to a separate factor level. After the experiment, plant size, water chemistry, and dried seedling chemistry were evaluated to determine possible explanations for differences in plant development and nutrient distribution. This study determines the impact of light cover and plant litter accumulation on *Z. palustris* germination and growth. It also offers a better understanding of how the effects of two highly invasive plants can impact native plant survival and development. This knowledge can inform land management strategies for protecting and growing native *Z. palustris* populations throughout the Great Lakes basin.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 41, 5:00 pm-6:30 pm*

Alex Risdal is a current undergraduate sophomore at Loyola University Chicago. She works with Loyola's Team *Typha* as an undergraduate researcher. Alex's current work is determining the impacts of invasive European Frogbit (*Hydrocharis morsus-ranae*) and invasive cattail (*Typha*) on the growth and development of Wild Rice (*Zizania palustris*).

**Rockwood**, Stephanie

**Mapping natural flood management opportunities in the Marengo River Watershed**

The Marengo River watershed (MRW) in the Lake Superior basin has experienced multiple devastating flood disasters in recent years, placing a significant burden on under-resourced rural communities in the region. The Wisconsin Wetlands Association collaborated with the Association of State Floodplain Managers to help local decision-makers in the MRW to identify where there are high-impact opportunities to restore degraded wetland and floodplain hydrology and mitigate risks to vulnerable local infrastructure. I will cover: 1) the development, outputs, and end uses of a hydrologic conditions screening framework, which maps which catchments in the watershed have a higher opportunity to increase wetland and floodplain storage and connectivity upstream of vulnerable structures, with an emphasis on headwater-dominant landscapes; 2) the importance of inclusive community engagement in conservation work and how we incorporated community values, needs, and barriers into this work; 3) lessons learned and recommendations regarding replicating this work in other watersheds. The ultimate goal of this work is to provide the data and technical support needed for rural communities to utilize natural flood management to make their watersheds more climate resilient.

*Effective Wetland Conservation Partnerships, Turtle Clan Ballroom*

*Wednesday, February 21, 4:00 pm-4:20 pm*

Stephanie Rockwood is a geospatial analyst at Wisconsin Wetlands Association, joining the staff in 2022. Her work focuses on linking geospatial information and local knowledge to help communities make informed decisions for natural flood management. She has a bachelor’s degree in ecology from Northern Michigan University and a master’s degree in environmental conservation from UW-Madison.

**Seilheimer**, Titus

 Amy Carrozzino-Lyon, UW-Green Bay; Isabelle Haverkampf, Northland College; Gwenith Malokofsky, UW-Green Bay; Fiona Crowley-Oswald, UW-Green Bay

**Wild rice with fish: A winning recipe for restoration**

Green Bay, Lake Michigan, was once home to seemingly endless beds of manoomin (wild rice, *Zizania palustris*). This “good berry” provided sustenance for thousands of years along with habitat for fish and wildlife. However, colonial settlement, followed by industrialization and development in the last 150 years, resulted in the decline of wild rice in Green Bay’s coastal wetlands. Since 2016, conservation partners have worked to restore wild rice on the Green Bay west shore. Wetland monitoring indicates success varies, generally following an environmental gradient from the mouth of the Fox River in the south to the Menominee River on the border with Michigan. Established rice beds represent a valuable aquatic habitat for grazing waterfowl as well as spawning and nursery habitat for fish. We surveyed fish assemblages using both active and passive gears in two restoration sites that did not have wild rice present and two sites with wild rice growing in the summer of 2023. A total of 36 fish species were observed, with yellow perch and banded killifish as the most abundant. Coastal wetlands were particularly important as nursery habitat for yellow perch, which is an important sport and commercial fish species. Results indicate that Green Bay wetlands serve as important fish habitat, but simple presence of wild rice is not a primary factor. However, successful wild rice restoration may be an indicator of diverse, healthy wetland ecosystems that provide valuable benefits to fish, wildlife, and people.

*Caring for Green Bay-area Wetlands, Bear Clan Ballroom*

*Wednesday, February 21, 1:30 pm-1:50 pm*

Titus Seilheimer is the fisheries specialist for Wisconsin Sea Grant and has studied all five Great Lakes coastal wetlands for more than two decades in the US and Canada.

**Smale**, Mike

 Sophie LaFond-Hudson, Wisconsin Sea Grant; Madeline Magee, WDNR; Cherie Hagen, WDNR

**Assessing the climate sensitivity and resiliency of Great Lakes coastal wetlands**

Great Lakes coastal wetlands are diverse and dynamic ecosystems that have developed to function under disturbances at the interface of terrestrial and aquatic systems. Climate change is projected to alter these disturbances outside their historical ranges, subjecting wetlands to warmer temperatures, more extreme precipitation events, larger fluctuations in lake levels, and increased wind and wave action. These anticipated changes pose an uncertain risk to coastal wetland habitats and are therefore challenging for natural resource managers who have limited resources for wetland management, preservation, and adaptation efforts. Using wetlands in the Lake Superior basin as a pilot, we are developing a framework to quantify the relative sensitivity of Great Lakes coastal wetland habitats to the anticipated effects of climate change. Data from the Coastal Wetlands Monitoring Program (CWMP) and state databases (e.g. Wisconsin National Heritage Inventory, Wisconsin Wetland Inventory) are used in conjunction with the Wisconsin Initiative on Climate Change Impacts (WICCI) and expert opinion of regional and state-wide wetland professionals to assign sensitivity scores to each wetland. Here, we present this framework and initial wetland vegetation sensitivity rankings for 38 coastal wetlands in the Lake Superior basin of Wisconsin. By combining sensitivity and adaptive capacity scores, estimates of wetland resiliency may assist in prioritizing management efforts and distributing limited funds in the Lake Superior basin, and can then be replicated on other Great Lakes systems.

*Lightning Round Presentation, Bear Clan/Turtle Clan Ballroom*

*Thursday, February 22, 9:30 am-10:15 am*

Mike Smale is a Wisconsin Sea Grant Kelior Great Lakes Fellow stationed with the Wisconsin Department of Natural Resources. He completed his undergraduate degree in geography, GIS, and environmental studies at UW-Madison and recently received a master’s degree in water resources management from the Nelson Institute at UW-Madison.

**Soyk**, Trina

**Restoration efforts through the Natural Resource Damage Assessment and Restoration (NRDAR) Program**

Since the 1950s, the Lower Fox River system has been contaminated by the release of polychlorinated biphenyls (PCBs) from paper mills, paper recyclers, public treatment works, and other sources. Through the Natural Resource Damage Assessment and Restoration (NRDAR) program, certain trustees are authorized to act on behalf of the public to assess and recover natural resource damages, and to plan and implement actions to restore, replace, or acquire the equivalent of resources or resource services injured or lost as a result of a release of a hazardous substance. To address the injury from the release of PCBs into the Lower Fox River and Green Bay, the following natural resource trustees formed a Trustee Council: The US Fish and Wildlife Service, the Wisconsin Department of Natural Resources, Oneida Nation, and the Menominee Indian Tribe of Wisconsin (together, Trustees). Over the course of the NRDAR process, the Trustees have recovered $106 M in settlement dollars from responsible parties. The Trustees implement restoration projects that focus on preservation and restoration of natural resources in aquatic, nearshore, and riparian habitats, as well as upland habitat associated with wetlands and tributaries within and around the Fox River and Green Bay area. This presentation will provide an overview of the national NRDAR program and the cumulative impact the Fox River case has had on restoring the Green Bay since restoration began in 2002. It will also provide partners with information on how to implement restoration projects supported by NRDAR settlement dollars in the future. Conservation partners have been paramount to the success of this program and natural resource recovery in the Green Bay.

*Symposium: Restoring Green Bay, Bear Clan Ballroom*

*Wednesday, February 21, 3:40 pm-4:00 pm*

Trina Soyk serves as the Trustee Council Coordinator for the Fox River/Green Bay Natural Resource Damage Assessment and Restoration (NRDAR), working to maintain close working relationships with federal, state, and tribal co-trustees and a wide network of partners to implement restoration projects across the landscape.

**Thomforde**, Stephen

**Canvasback ducks, wild celery, and nutrient regulation in aquatic ecosystems: Restoring keystone processes**

This presentation highlights the importance of historic biological controls over water quality in wetland ecosystems. Historic wetlands are characterized as clear-water ecosystems that supported a diverse array of plankton, vegetation, invertebrates, and vertebrates. Many organisms synchronized via food webs to provide strong regulation over nutrient cycling. The terminal fate of many food webs actively exported nutrients out of the aquatic and into the terrestrial environment. Nutrient exporting food webs acted as critical keystone processes for maintaining the clear water state and diverse biological assemblages. This presentation seeks to emphasize the importance of biological controls over nutrient regulation, water quality, and biodiversity in wetlands. The presentation begins by modeling a significant nutrient export mechanism, a symbiosis between the canvasback duck and wild celery, that actively exported thousands of pounds of nitrogen and phosphorus annually from aquatic ecosystems. Functional extinction of the canvasback wild-celery nutrient export mechanism, one hundred years ago, facilitated the collapse of the clear-water state in many wetlands across Wisconsin. The presentation then identifies additional nutrient export mechanisms associated with wetland ecosystems, including eat-outs by herbivores, herp migrations, and insect hatches. The presentation concludes by suggesting restoration of nutrient export mechanisms is critical for long-term wetland health and models several management strategies for implementation.

*Lightning Round Presentation, Bear Clan/Turtle Clan Ballroom*

*Thursday, February 22, 9:30 am-10:15 am*

Stephen Thomforde has 30 years’ experience in restoration design, installation, and research in wetlands, shallow lakes, streams, and shorelands. His research involves modeling historic keystone processes that reinforced biologically diverse, highly functional, productive, and provisional aquatic ecosystems. His designs on 10,000 acres incorporate restoring processes that ultimately lead to highly successful projects.

**Thomforde**, Stephen

**Wetlands, nitrogen, and restoration**

I will highlight the impacts of nitrogen on wetland vegetation and associated food webs via trophic cascades that result in a catastrophic transition from highly diverse functional wetlands into aggressive monocultures and dysfunctional ecosystems. Nitrogen sources, pathways, and both early warning and terminal stage symptoms will be identified. By identifying novel management strategies, such as haying and grazing, to prevent or reverse eutrophication, and also identifying areas that due to severe nitrogen eutrophication, are not suitable for restoration, information will be synthesized.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 42, 5:00 pm-6:30 pm*

Stephen Thomforde has 30 years’ experience in restoration design, installation, and research in wetlands, shallow lakes, streams, and shorelands. His research involves modeling historic keystone processes that reinforced biologically diverse, highly functional, productive, and provisional aquatic ecosystems. His designs on 10,000 acres incorporate restoring processes that ultimately lead to highly successful projects.

**Toczydlowski**, Rachel

**Leveraging genetic tools and building partnerships to conserve Hine's emerald dragonfly**

The Hine’s emerald dragonfly (*Somatochlora hineana*, HED) is one of the most imperiled species of dragonflies in the Great Lakes region and is federally listed across its range. Understanding the species distribution, and, by extension, habitat requirements, is critical to designing effective monitoring and conservation strategies for this endangered species. Currently, there are ten known HED populations. Additional potentially suitable habitat exists but has proved difficult to survey. Adult HED are only present for 2-6 weeks, larvae are difficult to identify, and traditional survey methods require invasive, direct handling. Environmental DNA (eDNA) provides an alternative, non-invasive survey method by testing for the presence (or absence) of HED DNA in the water column. We are currently building a scientific network to conduct extensive eDNA sampling for HED across its range. Pilot sampling has occurred in the Hiawatha National Forest (MI) and Door County (WI). This range-wide eDNA survey effort will allow us to improve species distribution maps, develop a better understanding of the factors that shape HED habitat suitability, identify and prioritize critical habitat for conservation, and establish a baseline against which to compare future changes in the species’ distribution. We are currently building partnerships and soliciting input to identify areas to focus eDNA surveys. Please connect with us if you have input! Dragonflies provide critical ecosystem services that are disproportionate to the relatively few species of dragonfly present in the Great Lakes region. This limited functional redundancy makes HED a critical player in maintaining wetland ecosystem resilience and function.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 43, 5:00 pm-6:30 pm*

Rachel Toczydlowski is a Research Scientist for the US Department of Agriculture Forest Service (Northern Research Station, Rhinelander, WI). Dr. Toczydlowski's research focuses on understanding the relationships between ecological processes and evolutionary outcomes, especially the determinants and consequences of genetic diversity at the level of the individual, population, and species.

**Tucker-Silva**, Taaja

 Matthew Puz, WDNR

**Expansion of the European Frog-bit Collaborative: Applications in Wisconsin waterbodies**

European frog-bit (*Hydrocharis morsus- ranae L*.; EFB) is an invasive free-floating aquatic plant of concern to resource managers, waterfront property owners, and recreational users due to its potential negative effects on coastal wetlands and inland waters. The EFB Collaborative was established in 2018 to improve coordination and collaboration among stakeholders and build consensus on next steps for EFB management and research in Michigan. However, subsequent EFB detections in Wisconsin, Ohio, Pennsylvania, New York, and Ontario resulted in interest to grow the Collaborative. In October 2022, the Great Lakes Commission received funding through the Great Lakes Restoration Initiative to provide backbone support and expand the EFB Collaborative’s reach across the Great Lakes region. The EFB Collaborative created and maintains GIS-based tools for prioritizing locations for EFB monitoring and field data collection, which have been implemented in multiple states, including Wisconsin. In 2021, the first population of EFB in Wisconsin was documented in several nearshore coastal areas of Green Bay. In response to this discovery, a response team formed and is working to control existing populations, detect new populations early in the invasion, prevent the spread through outreach, and expand the knowledge base of this species by supporting research opportunities. These efforts have revealed a larger species distribution and density than originally known. The response team is now shifting its goals of regional control to regional containment and control at high-priority sites while continuing to strengthen regional partnerships and leverage the experiences of other jurisdictions through involvement with the EFB Collaborative.

*Wetland Invasive Species, Turtle Clan Ballroom*

*Wednesday, February 21, 11:40 am-12:00 pm*

Taaja Tucker-Silva is a senior data analyst supporting a variety of invasive species and water resources projects at the Great Lakes Commission in Ann Arbor, Michigan. She has a bachelor’s degree in fisheries and wildlife from Michigan State University (2008) and a master’s degree in conservation biology from Central Michigan University (2011).

**Tyner**, Emily

**Designation of a new National Estuarine Research Reserve for the bay of Green Bay**

The University of Wisconsin-Green Bay is leading the designation of a new National Estuarine Research Reserve (NERR) on the bay of Green Bay. The NERR system is a national network of 30 sites across the coastal US, including the Great Lakes, designed to protect and study estuaries and their coastal wetlands. At the local level, a Bay of Green Bay NERR will offer a coordinating force to manage, restore, and protect the Green Bay ecosystem, with a programmatic focus on four sectors: research, education, stewardship, and training. This presentation will review progress on the designation, including selection of the natural area sites and preparation of the first Management Plan. We will share the components of the management plan, which include the NERR’s programmatic foundations, visitor use plan, and resource protection plan. We will also discuss proposed priority coastal management issues and a timeline for community feedback. Find information about the Bay of Green Bay NERR designation at www.uwgb.edu/national-estuarine-research-reserves

*Caring for Green Bay-area Wetlands, Bear Clan Ballroom*

*Wednesday, February 21, 2:30 pm-2:50 pm*

Emily Tyner is the Director of Freshwater Strategy at UW-Green Bay and the state lead on the designation of a new National Estuarine Research Reserve for the bay of Green Bay. Previously, she spent five field seasons as a biological technician at Sleeping Bear Dunes National Lakeshore. Emily has experience in informal water education and developing and managing citizen science programs.

**Unke Ehrenberg**, Katherine

 Kelli Mincheski, City of Green Bay

**Development of a restoration project in an urban/industrial setting: Tank Farm Marsh, LGBFR Area Of Concern**

GEI Consultants partnered with the City of Green Bay and the Wisconsin Department of Natural Resources (WDNR) for planning and design services for fish and wildlife habitat restoration within the Tank Farm Marsh, a degraded marsh within an industrial setting. The purpose of the project is to improve fish and wildlife habitat to address fish and wildlife-related beneficial use impairments (BUIs) and support long-term Lower Green Bay and Fox River Area of Concern (LGBFR AOC) delisting efforts. The project was constrained by several factors associated with an urban setting: management of sediment, contaminants, access, utilities, and more. Data collected by GEI was used to develop three concepts that determined how to best improve conditions for AOC priority fish and wildlife populations and habitats while balancing existing site conditions and constraints. One concept included a design with the greatest habitat improvements allowable based on budget with the easiest process for construction, a second concept included a minimalist restoration approach with no construction, and a third concept included significant habitat improvements but mitigated the permitting challenges while maintaining good working relationship and staying within budget. The final design was based on avoidance of contamination issues; developing an option that was permittable by agencies; resilience to climate changes including fluctuating water levels; ability to create and improve diversity of habitat; improvements to wildlife; and cost effectiveness. The final design will establish multiple wetland types based on fluctuating water levels, making the site more resilient and self-sustaining. Construction of the restoration project will begin in late 2024.

*Effective Wetland Conservation Partnerships, Turtle Clan Ballroom*

*Wednesday, February 21, 3:40 pm-4:00 pm*

Katie Unke Ehrenberg is the Wisconsin Ecological Practice Leader at GEI Consultants, Inc. Ms. Unke earned her master’s degree in Environmental Science and Policy from the University of Wisconsin-Green Bay and has been working on restoration projects for more than a decade. Her career is dedicated to planning and implementing restoration projects, community engagement, and connecting people.

**Vembar**, Rohini

 Suneeti Jog, University of Illinois Urbana-Champaign; Jason Bried, University of Illinois Urbana-Champaign

**Development of a rapid assessment method for Illinois wetlands**

Wetland assessment and estimating wetland condition in the state of Illinois is currently based on the intensive vegetation-based Floristic Quality Assessment (FQA). While reliable, this method's use is limited by cost, time, and expertise required and may not be needed in all scenarios. These limitations can be mitigated in a three-level approach towards wetland assessment; this approach uses Level 3 tools, including FQA, only if more broad Level 1 and 2 tools suggest further investigation is necessary. In Illinois, a Level 2 “rapid assessment method” (RAM) currently does not exist. We propose a RAM for Illinois (IL-RAM) that can be used statewide and for all wetland types and conditions. We selected fourteen metrics across four focus areas (landscape, substrate, hydrology, and biotic communities) for the tool, and we requested feedback from wetland experts throughout Illinois. We then validated the tool by testing it at 63 wetlands throughout the state that previously had been assessed using FQA for Illinois Department of Transportation projects. Linear correlations between FQA metrics and IL-RAM scores indicate the IL-RAM’s success in estimating wetland condition among various communities and levels of degradation.

*Wetland Flora and Plant Communities, Turtle Clan Ballroom*

*Wednesday, February 21, 2:10 pm-2:30 pm*

Rohini Vembar (she/her) is pursuing her master’s degree in natural resources & environmental sciences at the University of Illinois Urbana-Champaign. Previously, she received her bachelor’s degree from the Ohio State University and worked as an Environmental Scientist at Stantec.

**Volkening**, Aaron

**Floodplain-related regulatory challenges and opportunities for wetland and hydrologic restoration in Wisconsin**

Wetland restoration, stream restoration, and other hydrologic and watershed enhancement projects often involve work in a mapped floodplain. There are numerous federal, state, and local regulations that affect and may limit physical changes to and construction work in a mapped floodplain. In some cases, floodplain characteristics and floodplain rules may create major challenges to implementing a project, even if the proposed project has numerous ecological, environmental, and social benefits. In other cases, floodplain impacts would be negligible or limited and could be easily identified and addressed. I will provide an overview of Wisconsin and federal floodplain regulations that are most likely to affect wetland restoration, hydrologic restoration, and similar projects. I will explain floodplain map zones such as the floodway, flood fringe, flood storage areas, and Zone A approximate floodplains. I will summarize common regulatory submittals such as a floodplain hydrologic/hydraulic study, CLOMR, LOMR, and no-rise certifications. I'll discuss how floodplain-related regulations may affect restoration activities such as ditch plugs, ditch fills, berming, wetland scrapes, land reshaping, and culvert modifications. Examples will illustrate how to navigate these regulations to minimize impacts on project effectiveness, cost, and schedule.

*Science Informed Wetland Policy & Regulations, Bear Clan Ballroom*

*Wednesday, February 21, 11:00 am-11:20 pm*

Aaron Volkening is a water resources engineer with more than 20 years of experience in the use of hydrologic and hydraulic analysis to provide insight on environmental and ecological restoration and protection projects. Areas of practice include floodplain management, wetland restoration, watershed planning, and stormwater management. He is a registered professional engineer in the state of Wisconsin.

**Wasilewski**, Ellie

 Melissa Youngquist, Shedd Aquarium

**Drought effects on Chicagoland macroinvertebrates**

As extreme drought events increase in the Midwest with climate change, understanding how aquatic macroinvertebrates are responding is crucial to understanding the effects on the rest of the ecosystem. By shortening hydroperiods, drought may have prolonged effects on seasonal wetland ecosystems; an adequate hydroperiod is crucial for aquatic macroinvertebrates to complete their life cycles and achieve reproductive maturity. In 2021, moderate drought was seen in the Chicagoland area; this resulted in either unfilled or early dry-down of wetland habitats.We report the effects of this drought event on aquatic macroinvertebrate communities. From 2020-2023, six small seasonal forested wetland sites in the Chicagoland area were sampled every April and June for macroinvertebrate communities. Abundance and diversity of the aquatic macroinvertebrate communities declined in the year following drought and shows signs of recovery two years post-drought. This study suggests that macroinvertebrate communities are strongly affected by shortened hydroperiods, and recovery may take multiple years. Since very few long-term studies have been done on macroinvertibrate response to severe drought events, our results contribute important information for understanding seasonal wetland ecosystems in the Midwest within the context of climate change.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 44, 5:00 pm-6:30 pm*

Ellie Wasilewski graduated from the University of Dayton with a bachelor’s degree in environmental biology. She is an aspiring wetland scientist interested in wetland soils and plants.

**Wefferling**, Keir

**Bryophytes as indicator species in Wisconsin peat-accumulating wetlands**

Bryophytes are sensitive to microsite and substrate conditions, including pH, mineral and nutrient content, and position relative to the water table. I am coordinating with bryologists and ecologists from the Great Lakes region in order to integrate bryophytes into floristic quality assessments in peat-accumulating wetlands. The current project is evolving in coordination with ecologists and botanists with the Wisconsin Department of Natural Resources and is guided by input from botanists and bryologists from other regions that have implemented similar approaches (Minnesota, New Jersey, Ohio, Ontario). In this work, I hope to provide tools for land managers and ecologists to use bryophytes as indicators of particular conditions in our peat-accumulating wetland communities. This work will be especially important in wetlands where benchmarks or “tipping points” have not been identified using vascular plants alone. Specifically, I will address the question, “What can bryophytes tell us about ecosystem health and anthropogenic disturbance in Wisconsin peatlands?”

*Wetland Flora and Plant Communities, Turtle Clan Ballroom*

*Wednesday, February 21, 1:30 pm-1:50 pm*

Keir Wefferling is Assistant Professor of Biology and Curator of the Fewless Herbarium at UW–Green Bay. For his PhD 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.

**Williamson**, Caitlin

**NRF’s Diversity in Conservation Internship Program: Connecting students to careers in the environment**

The Diversity in Conservation Internship Program (DICI) of the Natural Resources Foundation of Wisconsin (NRF) provides meaningful experiences for undergraduates interested in careers in natural resource conservation, focusing on students with identities that are underrepresented in the environmental field. The goals of this cohort-based program are to introduce students to the field of conservation and its career pathways and to help strengthen the knowledge and skills of program participants to meet the need for diverse professionals in Wisconsin’s conservation sector. Learn about this impactful program, which is heading into its fourth year in 2024 and to date has worked with 20 students across three universities as well as dozens of partner organizations. I will share examples of wetland-related projects that DICI interns have been a part of through this program and will dive into lessons learned about how to create meaningful experiences for interns with identities that have historically been excluded from the conservation field. I will also offer actions that participants can take away to engage with this program or to support similar efforts within their own organizations.

*Lightning Round Presentation, Bear Clan/Turtle Clan Ballroom*

*Thursday, February 22, 9:30 am-10:15 am*

Cait Williamson is the director of conservation programs for the Natural Resources Foundation of Wisconsin, where she leads the organization’s initiatives for conservation and environmental education. She earned a master’s degree in environmental conservation from the University of Wisconsin-Madison and a bachelor’s in biology and environmental studies from Lawrence University.

**Winowiski**, Sophia

 Maja Petros, Carroll University; Todd Levine, Carroll University, Suzanne Joneson, UW-Milwaukee at Waukesha

**Impact of invasive buckthorn on the soil mycobiome surrounding wetlands**

Fungi are important components of ecosystems, e.g. forming symbiotic relationships with plants, regulating decomposition, and influencing carbon cycling. Fungi are an under-studied group, partially because they are difficult to see and identify. Invasive species may exert profound impacts on the structure and function of ecosystems. Putatively allelopathic chemicals produced by buckthorn (*Rhamnus spp*.) may have wide-ranging effects on many taxa. We used a metagenomics approach to obtain sequences representing the soil fungal community to test the hypothesis that the fungi are impacted by the presence or absence of buckthorn. Prairie Springs Environmental Education Center and Genesee Oak Openings in southeastern Wisconsin have buckthorn (*Rhamnus cathartica*) stands of varying ages and fens that have remained uninvaded. In summer 2023, we collected soil samples from the first 5 inches of soil at sites in these areas representing a range of restored habitats on a continuum from bare ground in newly cleared areas to areas where native plant communities have been re-established. We have sequenced the fungal metagenome and collected standard physical/chemical data for each site. As we continue analyzing the processed metagenomic data, we predict that the fungal community will differ between areas impacted and those not impacted by invasive buckthorn with lower fungal species diversity in areas impacted by buckthorn. We also expect altered fungal species composition. We present preliminary results from sequencing the mycometagenome. This information will allow conservation efforts to consider the fungal community in order to attain a more complete full-ecosystem restoration, e.g. determining whether soil transplants are needed.

*Poster Session, Wolf Clan Ballroom*

*Wednesday, February 45, 5:00 pm-6:30 pm*

Sophia Winowiski is a junior at Carroll University in Waukesha, WI, majoring in environmental science and minoring in public health and political science. She has engaged in numerous restoration efforts throughout Wisconsin, most recently focusing on the wetlands of her university’s field station. Upon graduating, Sophia plans to pursue a master's degree within the field of environmental science.

**Youngquist**, Melissa

**Weather weirding and urban amphibians: How two anurans respond to drought in Chicagoland**

Across the Midwest, efforts to restore and revitalize wetland habitats focus on vegetation and hydrological regimes because they determine community composition and ecosystem function. Restoring adequate hydroperiods is a challenge under normal circumstances and especially difficult within the context of climate change, which is predicted to affect the amount and timing of precipitation. Here I report on breeding responses of Boreal Chorus Frogs (*Pseudacris maculata*) and American Toads (*Anaxyrus americanus*) to periods of drought and consecutive years of early dry down, 2020-2023, within preserves that are undergoing restoration. One preserve has permanent and temporary wetlands; others have only temporary wetlands. Results show that in preserves with only temporary wetlands, *P. maculata* calling activity reduced each year following drought while *A. americanus* only showed minor reduction. However, in preserves with both temporary and permanent wetlands there was no change in calling activity. In 2021 and 2023, extreme precipitation in mid-summer refilled some wetlands; I documented delayed and repeated breeding by these species when wetlands refilled. Furthermore, 15 years of data from the Calling Frog and Toad survey suggest that late breeding by American Toads and Boreal Chorus Frog is rare but not unusual. Overall, this study highlights the importance of habitat heterogeneity to ensure landscapes and fauna are resilient to climate change. Landscape restoration efforts should ensure wetlands with temporary and permanent hydroperiods are accessible to wetland fauna, creating a metacommunity that can thrive in ‘wet years’ and persists in ‘dry years.’

*Wetland Wildlife, Turtle Clan Ballroom*

*Thursday, February 22, 11:20 am-11:40 am*

Melissa Youngquist is a research biologist at Shedd Aquarium. She studies the response of wetland communities, mainly amphibians and invertebrates, to habitat restoration in the Chicagoland region. She also teaches a college course on Freshwater Ecology and serves on the advisory board for Midwest Partners in Amphibian and Reptile Conservation.