MEETING PROGRAM & ABSTRACT BOOK

Connecting for a Resilient Future: Restoration of Midwestern Habitat Mosaics

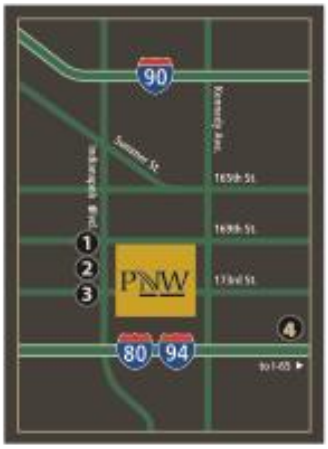
15th SER MIDWEST-GREAT LAKES CHAPTER MEETING
May 17 to 19, 2024
Purdue University Northwest, Hammond, Indiana

PNW

PURDUE UNIVERSITY NORTHWEST

HAMMOND CAMPUS MAP

(OFF CAMPUS SITES DENOTED BELOW)



1. **Center for Innovation & Design in Engineering Technology**
   7040 Indianapolis Blvd., Hammond
2. **Indianapolis Blvd. Counseling Center Couple and Family Therapy Center and Community Counseling Center**
   7030 Indianapolis Blvd., Hammond
3. **Commercialization and Manufacturing Excellence Center**
   7150 Indianapolis Blvd., Hammond
4. **Purdue Northwest Athletics Complex at Dowling Park**
   175th & Parrish Avenue, Hammond

ADDITIONAL PNW SITES:

Gabis Arboretum
450 West 100 North, Valparaiso, IN

Northwest Indiana Robotic Observatory (NIRO)
3606 Belshaw Road, Lowell, IN

Portage Meeting Facility
6100 Southport Road, Portage, IN

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WELCOME

The dunelands of Northwest Indiana is our gathering place for the Fifteenth Annual Meeting of the Society for Ecological Restoration's Midwest-Great Lakes Chapter. Welcome to an amazing ecological crossroads of North America that is bookended by Lake Michigan and the Kankakee River basin. Given the interplay between remarkable levels of regional biodiversity and extraordinary anthropogenic pressures there could scarcely be a more relevant venue than this one.

Our primary meeting goal is to highlight the linkages between restoration of Midwestern habitat mosaics and ecosystem resiliency and the importance of facilitating connections ecologically and socially. Our secondary meeting goal is to bring together all who are interested in ecological restoration and contribute to advancing the field of ecological restoration. Our chapter is also proud to note that this is the eighth year we can offer meeting attendees continuing education credits. Our Meeting Host (Purdue University Northwest) has organized a special Meeting Host Plenary Session and Tour. This plenary session and tour will provide an overview of the details of Gabis Arboretum's history, ecology, and its tallgrass prairie restoration efforts. Along with the plenary session, the scientific agenda for our three day in-person meeting will feature 41 contributed oral presentations, 21 contributed poster presentations, 4 symposia, 2 workshops, and 6 offsite field trips on a range of topics that reflect our meeting theme.

2024 ANNUAL MEETING COMMITTEE

The Chapter extends its sincere appreciation to the members of the Annual Meeting Committee for their time and effort in coordinating and developing the Fifteenth Annual Chapter Meeting: David Coulter*(Chairperson),* Mary Damm, Trevor Edmonson, Megan Hansen, Martha Holzheuer, Mark Krivchenia, Katie Kucera, Chris Lenhart, Alexis Lipstein, Nikki McDermond-Spies, Jessica Miller, and Peter C. Smiley Jr.

ACKNOWLEDGEMENTS

We are very grateful for the generous support provided by our meeting hosts and sponsors that enabled us to hold a sponsorship reception, support student participation, defray food costs, and make our Annual Meeting as environmentally friendly as possible. We greatly appreciate the contributions of the members of the Local Planning Committee (Young Choi (Chairperson), LaTonya Ovie, Curtis Creighton, Martin Denkhoff, Leslie Thompson, and Michelle Spaulding) who assisted with planning the meeting and provided onsite help. We thank Megan Taylor and Tony Ballard for their help with setting up the online registration page and help with maintaining the registration database. We thank Martha Holzheuer for her work in enabling us to offer continuing education credits through SER. We are thankful for the participation of the meeting presenters, moderators, tour leaders, field trip leaders, volunteers, and attendees at our Fifteenth Annual Meeting.

MEETING HOST

PURDUE UNIVERSITY NORTHWEST

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2024 MEETING SCHEDULE OVERVIEW

Date	Time	Location	Event
May 17	**9:00 AM – 4:30 pm**	SULB lobby (1st fl)	Registration
	10:00 – 12:00 pm	GYTE classrooms	Concurrent Workshops
	12:00 – 1:00 pm	SULB cafeteria	Lunch
	1:00 – 2:00 pm	GYTE 103	Keynote Presentation
	2:00 – 2:30 pm	GYTE 107	Break (refreshments served)
	2:30– 4:30 pm	GYTE classrooms	Concurrent Symposia
	4:30 – 4:45 pm	GYTE 107	Break
	4:45 – 5:30 pm	GYTE 103	Business Meeting and Recognition Awards
	5:30 – 7:30 pm	SULB 1st Floor Student lounge	Poster Session & Sponsorship Reception
May 18	**7:00 – 11:00 am**	SULB Lobby (1st fl)	Registration
	7:00 – 8:00	GYTE 107	Continental Breakfast
	8:00 – 10:00	GYTE Classrooms	Concurrent Oral Presentation Sessions
	10:00 – 10:20	GYTE 107	Break (refreshments served)
	10:20 – 11:20	GYTE Classrooms	Concurrent Oral Presentation sessions
	11:20 – 11:40		Break (refreshments served)
	11:40 – 12:40 pm	GYTE 103	Host Plenary Session
	12:40 – 1:00		Break; Pick-up box lunch at SULB; Walk to the bus in the NILS parking lot
	1:00 – 2:00		Bus ride to Gabis Arboretum
	2:00 – 3:00	Gabis Arboretum	Picnic Lunch
	3:00 – 4:00	Gabis Arboretum	Tour of Gabis Arboretum
	4:00 – 5:00		Return bus ride to PNW
	6:00 –	Dunes Pavilion in Indiana Dunes State Park*	Off-Site Field Trip, Social Dinner & Mixer*
May 19	**9:00 am**		Off-Site Field Trips**

*Meal and transportation to Indiana Dunes State Park are at your own expense. An entrance fee of $8 per vehicle, in addition to the meal expense, is collected at the park's gate. Indiana Dunes State Park is within approximately 45-minute drive from the PNW Hammond campus. Field trip includes the restoration of Dunes Creek and/or Noel's Oak-Savanna before and/or after dinner. Dunes Pavilion and the field trip sites are less than a mile from Indiana Dunes State Park.

**Participants must provide their own transportation to field trip sites.

FRIDAY MAY 17TH

CONCURRENT WORKSHOPS

10:00 am to 12:00 pm

All times Central Standard Time

Workshop #1 (GYTE 108)**:**

Characteristics of a well-planned ecological restoration project: with emphasis on the construction and implementation phases.

Instructors: Fevold, Brick, Tim Lewis, Craig Palmer, and Molly Middlebrook, General Dynamics Information Technology, Falls Church, Virginia; and Louis Blume, U.S. EPA-Great Lakes National Program Office, Chicago, Illinois. BF email: brick.fevold@gdit.com; TL email: timothy.lewis2@gdit.com; CP email: craig.j.palmer@gdit.com; MM email: molly.middlebrook@gdit.com; LB email: blume.louis@epa.gov

Whether you are new to ecological restoration project planning or consider yourself a seasoned professional, you will not want to miss this training opportunity. Trainers will provide guidance on key components of quality documentation fundamental to the effective planning of the construction (or installation) and implementation phases of an ecological restoration project. During this course, participants will receive focused instruction (plus a supplementary resources packet) on quality best practices compiled in a new EPA-Great Lakes National Program Office publication (in-review) titled: Guidance for Planning Quality Oversight During the Ecological Restoration Construction and Implementation Phases. This publication draws upon standards and guidelines recommended by the EPA, U.S. Army Corps of Engineers, U.S. Dept. of Agriculture, and the American National Standards Institute (ANSI) among other organizations promoting quality standards in science. Instruction will include collaborative learning through participatory activities relevant to project planning and quality oversight applicable to a variety of ecological restoration projects (e.g., freshwater streams, riparian areas, coastal and interior wetlands, forests, and prairies). The primary audience for this course includes individuals responsible for (or that provide support to) the planning and preparation of quality documents supporting the construction and implementation of ecological restoration projects funded by the Great Lakes Restoration Initiative (GLRI). The instructors of this course are co-authors of the new guidance and are co-authors of the publication “Application of Quality Assurance and Quality Control Principles to Ecological Restoration Project Monitoring,” EPA-905-K-19-001 (https://www.glri.us/node/250) published by the USEPA Great Lakes National Program Office and the Interagency Ecological Restoration Quality Committee. This workshop is funded under EPA contract in support of the Great Lakes Restoration Initiative.

Workshop #2 (GYTE 116)**:**
Pathways into the Profession and Practice of Ecological Restoration.

Instructors: Young, Christian C.[1,2], Martina Patterson[2,3], Nancy Aten[2], and Dan Collins[2]. [1] University of Wisconsin-Milwaukee, Milwaukee, Wisconsin. [2]Land Restoration School, Milwaukee,Wisconsin. [3]MarsEcoArts, Milwaukee, Wisconsin. CCY email: young3@uwm.edu; MP email: marsecoarts@gmail.com; NA email: nancyaten@landscapesofplace.com

This workshop is the product and work-in-progress status update of our collaborative efforts over the past three years to engage the next generation of ecological restoration professionals. We are deeply familiar with the challenges and possibilities for new professionals in ecological restoration. We offer more than mere observations here. Engaged as we are in advising and advocating for the field on multiple levels, we intend to lead conversation and offer examples from our work. These include ways of connecting people, plants, and place, as well as pedagogically sophisticated course projects that partner learners with one another and with mentors from varied organizations. We examine these connections but challenge one another to think more and differently about how our work now can create new opportunities for the future. What we all know is that we need more pathways into ER work and that the traditional pipeline to an ER profession is problematic. Current pedagogical realities need significant revamping. We lean into the metaphor of a “braided stream,” with many ways in and many ways onward in our profession. With examples from recent cohorts of the Land Restoration School, students at UW-Milwaukee, and honorees from Milwaukee’s African American Environmental Pioneer Awards, we highlight the implications of innovation for changing the faces of ER to include people who come from a wider variety of hometowns and represent greater diversity of race, ethnicity, and identity. Students we have taught and mentored will be invited to attend the SER conference to add their voices and interact with the audience (some, likely, via online video conference). One likely outcome of this workshop will be to provide participants with enhanced agency for taking action as individuals and organizations seeking affirmative participation in justice, equity, diversity, and inclusion efforts.

KEYNOTE PRESENTATION (GYTE 103)

1:00 pm to 2:00 pm Central Standard Time

Restoring Resilience to Conservation Landscapes in the Face of Climate Disruption

John Shuey
Indiana Office of The Nature Conservancy, Indianapolis, Indiana.
Email: jshuey@tnc.org

The Society for Ecological Restoration defines restoration as an “attempt to return an ecosystem to its historic trajectory”. Climate disruption turns this on its head. If we expect our restorations to perform into the foreseeable future, we have to envision alternate trajectories. In states like Indiana, restoration plays a huge role within the conservation community. Thanks to land-use decisions over the last century, we have broken, or at least significantly damaged, virtually all of our ecosystems across the state. But rather than lament our past ecological blunders, we should embrace a restoration-centric future that allows us to anticipate impending change. We can use our restorations as at least partial solutions to increase ecological resilience and better enable ecosystems to respond to change. Using examples from across Indiana, I’ll show how The Nature Conservancy has “placed our bets” in light of future climates and how we are using restoration to specifically address some of the ecological stressors that are likely to drive ecological change over the next several decades.

Biography: John guides the Indiana Office of The Nature Conservancy’s efforts connected with scientific research, conservation site planning, large-scale restoration planning, and climate change adaptation strategies, i.e., designing sites and strategies to weather impending change. John joined The Nature Conservancy in 1993 as a conservation biologist. Previously, he was a scientist at Battelle Memorial Institute, focusing on aquatic resource issues throughout the eastern U.S. John has and continues to serve on the boards of several regional and international conservation and scientific societies and is a Research Associate at the Smithsonian and Carnegie Museums of Natural History.

CONCURRENT SYMPOSIA

2:30 pm to 4:30 pm Central Standard Time

Symposium #1 (GYTE 108): *Ecological Restoration to Connect Habitats in the Chicago Crescent: Establishing Habitat Mosaics at the Southern Tip of Lake Michigan*

Organized by: Young D. Choi Purdue University Northwest, Hammond, Indiana. Email: ydchoi@pnw.edu
Presented by: Noel Pavlovic, US Geological Survey Lake Michigan Ecological Research Station. Ralph Grundel, US Geological Survey Lake Michigan Ecological Research Station. Rebecca Collings, Forest Preserves of Cook County in Illinois. Paul Labus, The Nature Conservancy.

The Chicago crescent refers to the land along the southern shore of Lake Michigan including southeastern corner of Wisconsin, northeastern Illinois with Chicago area, northwestern Indiana and southwestern tip of Michigan. This land has been a vast expense of tallgrass prairies, oak savannas, woodlands, marshes, pockets of forest and floodplains along with two major river systems – Des Plaines Rivers in Illinois and Calumet River in Indiana. Vast majority of natural habitats in the area have been destroyed or heavily degraded for agricultural, urban and industrial development. Less than 1% of the original habitats remain as “remnant" natural areas. Even the remaining remnants are significantly reduced in their sizes and highly fragmented. For this reason, connection of such remnants. In this respect, ecological restoration appears as a tool for connection and expansion of habitats leading to enhancement of biodiversity, ecosystem functions and structure. As an attempt to address the connectivity and restoration of natural habitats in the Chicago crescent region, this symposium focuses on landscape connectivity in the Indiana Dunes area, woody vegetation manipulation and management along the grassland-forest continuum, restoration of dune and swale habitats in the lake plain area near Grand Calumet River in Indiana, and restoration within the Forest Preserves of Cook County in Indiana.

Time	Presenters	Title
2:30 – 3:00 pm	**Pavlovic, Noel**	Dunes ecosystems in space and time: a restoration challenge
3:00 – 3:30 pm	**Grundel, Ralph**	Biodiversity changes with savanna restoration
3:30 – 4:00 pm	**Collings, Rebecca**	Accelerating ecological restoration in the forest preserves of Cook County (2014 – 2024)
4:00 – 4:30 pm	**Labus, Paul**	Restoring dune and swale habitats in the Gran Calumet River Area of Concern

Symposia #2 (GYTE 116): *Role of soil mutualists in Midwestern restorations*

Organizers: Emily M. Galloway, Katie N. Stahlhut, and Isabelle A. Turner. Miami University, Oxford, Ohio. EMG Email: gallowe@miamioh.edu; KNS Email: stahlhkn@miamioh.edu, IAT Email: turneri2@miamioh.edu
Presenters: Andrea M. Fogarty, Ohio State University. Meghan G. Midgley, Morton Arboretum.

Mutualistic interactions are important drivers in ecological processes and have the potential to shape community dynamics. However, anthropogenic change has disrupted many of these essential interactions by extirpating habitat, resulting in a displacement of soil microbial communities and specialized host plant species. These displaced plant species are often absent from restored ecosystems, despite practitioners' best efforts to reintroduce them partly due to the absence of essential mutualistic partners. The most notable of these plant partners are mycorrhizal fungi and rhizobia bacteria, which are responsible for providing many of these species with phosphorus and nitrogen, giving the plant partners a foothold in competitive or stressful environments, thus shaping community and ecosystem dynamics. Researchers are becoming increasingly more aware of the importance of reintroducing high-quality mutualists alongside hard-to-establish plant species, but the interactions between these plants and their mutualists are often poorly understood. Understanding the effects mutualisms have on communities can provide restoration practitioners with important insights into how restoring soil communities might help them meet their restoration goals. In this symposium, we present ecologists who study mutualisms across a variety of Midwest systems from tallgrass prairie to forest. These scientists will address how these core soil mutualists affect plant populations, communities, and ecosystems. During this symposium, we seek to connect researchers and practitioners in order to discuss the importance of restoring the soil and related best practices.

Time	Presenters	Title
2:30 – 2:35 pm	**Galloway, Emily M.**	Introduction
2:35 – 2:55 pm	**Stahlhut, Katie N.**	Variation in mycorrhizal responses and communities across and within tallgrass prairie plant species
2:55 - 3:15 pm	**Galloway, Emily M.**	The effects of rhizobia inoculation on rare leguminous plant species in restored prairies across the Midwest
3:15 – 3:35 pm	**Turner, Isabelle A.**	Tripartite mutualism as a diversity influencer in tallgrass prairie communities
3:35 – 3:55 pm	**Fogarty, Andrea M**.	The effect of arbuscular mycorrhizal fungi from former mining sites on attractive plant traits, pollinator visitation, and plant fitness
3:55 – 4:15 pm	**Midgley, Meghan G.**	Effects of common restoration techniques on mycorrhizae in tallgrass prairies and oak ecosystems
4:15 – 4:30 pm		Panel Discussion

Symposium #3 (GYTE 002): *Finding the middle ground: Exploring lawn alternatives in public spaces as a conservation tool from practice and research perspectives*

Organizers: Rebecca S. Barak. Chicago Botanic Garden, Glencoe, Illinois, Liz Anna Kozik, Chicago Botanic Garden, Glencoe, Illinois,. Rebecca K. Tonietto, University of Michigan-Flint, Flint, Michigan. RSB Email: rbarak@chicagobotanic.org; LAK Email: lkozik@chicagobotanic.orgemail; RKT Email: tonietto@umich.edu

Presenters: Lauren Umek Chicago Park District. Tony Troche, Stantec. Mandy Leifheit, Pizzo Native Plant Nursery. Emily Woodworth, Chicago Botanic Garden. Alison Branz, Chicago Botanic Garden

Lawns are everywhere. Turfgrass lawns are the number one irrigated crop in North America, with over fifty-million acres. Furthermore, not all lawns are residential, many of them occur within or alongside urban greenspaces or natural areas. In many of these spaces, recreational use or foot traffic needs do not require turf plantings. Turning these lawn spaces into full restorations targeting reference conditions is often not feasible, but there are options for a "middle ground" – a planting that is short, like lawn, but that delivers ecosystem services over and above those provided by turfgrass. We are a group of restoration practitioners and researchers who will discuss our experiences designing, installing, maintaining and studying multiple types of lawn alternative plantings at several locations in the SER MWGL region, including Chicago Park District, Chicago Botanic Garden, and University of Michigan-Flint. The alternative plant communities we study range from "lawn-like" nonnative turfgrass replacements (like fine fescues) and white clover lawns, to native grasses and sedges, and short-statured native prairie plantings that include both grasses and forbs. In this session, you will hear from practitioners discussing the elements of deciding which lawn alternative planting to use where, designing these plantings, and establishing and maintaining them. You will also hear from members of our research team studying the impacts of different lawn alternative plants and communities on pollinator visitation, plant cover, and more. We will share knowledge gained and lessons learned from installing plantings at large scales in city parks, from in-ground plot experiments, and lab and greenhouse studies. We will also talk about our experiences communicating about lawn alternatives. The overall goal of the symposium is to encourage and support the use of lawn alternative plantings in lieu of non-native turf in areas not feasible for full-scale restoration within natural areas and urban greenspaces.

Time	Presenters	Title
2:30 – 2:45 pm	**Umek, Lauren**	Introduction: When, where and why would you want a native lawn alternative in the city?
2:45 – 3:00 pm	**Troche, Tony**	Choosing, sourcing, and planting lawn alternative plantings in natural areas
3:00 - 3:15 pm	**Leifheit, Mandy**	Supplying the demand for native lawn alternative installations
3:15 - 3:30 pm	**Woodworth, Emily**	Introduction to the Rethinking Lawns research project
3:30 – 3:45 pm	**Barak, Becky**	Plant cover and diversity in lawn alternative research plots.
3:45 – 4:00 pm	**Branz, Alison**	How grass species and mowing treatments impact growth, biomass, and microbes, results from a greenhouse experiment
4:00 – 4:15 pm	**Tonietto, Rebecc**a	Native lawn alternatives provide support for pollinators
4:15 – 4:30 pm		Questions and discussion

Symposium #4 (GYTE 026): *Creating a regional native seed network for the Midwest – who are the players and what are the needs?*

Organizer: Kramer, Andrea. Chicago Botanic Garden, Glencoe, IL Email: akramer@chicagobotanic.org

Presenters: Kay Havens, Chicago Botanic Garden. Diana Digges, U.S. Fish and Wildlife Service. Meredith Holm, U.S. Fish and Wildlife Service. Stephanie Frischie, Xerces Society. Tyler Bassett, Tyler. Northern Pine Plains Partnership. Jared Foster, Native Connections. Elliot MedinaForest Preserves of Cook County.

A 2023 report from the National Academies of Sciences says an insufficient supply of seeds from native plants is a major barrier to ecological restoration and other revegetation projects across the United States. The report calls for concerted action to build a more robust native seed supply and industry. One of the recommendations focuses on the need for regional seed networks to address issues related to developing target species lists by ecoregion; standard protocols, practices, and data management; infrastructure for seed cleaning, seed banking and warehousing, and seed increase; research needs; and engagement efforts. Ideally these hubs incorporate members from federal, state, and local government, botanic gardens, seed banks, non-profits, and the seed/nursery industry. While the Midwest is behind many regions in the U.S. in developing an infrastructure for coordinated work on native seed production at the regional level, we are fortunate to have many agencies and organizations doing excellent work individually and at smaller scales to produce the native seeds needed to support restoration efforts. The first half of the symposium will be dedicated to hearing from county and federal agencies as well as non-profit organizations and the native seed industry to better understand current regional capacity for native seed production as well as gaps that a regional seed network could help fill. The second half of the symposium will focus on a discussion of current native seed production capacity and demand across the region, with the goal of identifying what is needed from a regional native seed network, and who is interested in being involved in its development. While we especially hope individuals currently producing or using native seeds for restoration will join in this conversation, anyone interested in learning more about native seed production and use for restoration is welcome.

Time	Presenters	Title
2:30 – 2:35 pm	**Kramer, Andrea**	Introduction
2:35 – 2:45 pm	**Havens, Kayri**	What the 2023 NAS survey means for development of a Midwestern native seed network
2:45 - 2:55 pm	**Holm, Meredith & Digges Diana**	How the U.S. Fish and Wildlife Service is working with partners to meet native seed needs in the Midwest
2:55 - 3:05 pm	**Frischie, Stephanie**	The Xerces Society and native plant materials development for pollinator conservation in the Midwest
3:05 - 3:15 pm	**Bassett, Tyler**	Developing a regional partnership to support native seed needs for restoration
3:15 - 3:25 pm	**Foster, Jared**	A native seed nursery perspective on the gaps a regional native seed network can fill
3:25 – 3:35 pm	**Medina, Elliot**	Building capacity to meet a growing demand for native seeds at the Forest Preserves of Cook County
3:35 - 4:30 pm		Group Discussion

BUSINESS MEETING AND RECOGNITION AWARDS
(GYTE 103) 4:45 to 5:30 pm Central Standard Time

The SER Midwest-Great Lakes Chapter recognizes the following two individuals for their contribution to ecological restoration in Northwest Indiana. We thank Paul Labus and Dr. Noel Pavlovic for their tireless commitment to the restoration of natural spaces in Northwest Indiana.

Paul Labus retired in May of 2021 after a 27-year career with the Indiana Chapter of The Nature Conservancy. As Northwest Indiana Director, his responsibilities included developing and implementing conservation plans and programs for sites across northwest Indiana, as well as managing local natural areas. He served on multiple advisory boards, working with government agencies, industry, and other NGOs to develop conservation visions and restoration plans for sites throughout northwest Indiana. During that time, he helped identify the best opportunities to protect, restore and manage fragments of the native landscape, set conservation goals for the restoration of highly degraded habitats, develop regional invasive species management plans, and plan for long term ecological management of restored habitats.

Dr. Noel Pavlovic is a research ecologist with the U.S. Geological Survey, stationed at the Lake Michigan Ecological Research Station in Porter, Indiana, where he has worked for 30 years. He addresses ecological and biological issues in plant and animal restoration and conservation from the populational, community, ecosystem, and landscape levels. He is currently interested in the roles of soil and endophytic microorganisms on the bittersweet invasion. He has served on the Great Lakes Restoration Initiative's Terrestrial Habitat and Connectivity Working Group leadership team and has been involved in research concerning coastal and regional corridor creation (habitat connectivity) in the Great Lakes region.

POSTER SESSION OVERVIEW

All times Central Standard Time

Calumet Falls Student Lounge-1st Floor SULB Bldg.: 5:30 – 7:30 pm		
Poster #	**Presenter**	**Title**
1	**Greymont**	Student led stewardship: A path to ecological restoration through volunteer workdays with the student chapter of the Society for Ecological Restoration at UWSP.
2	**Fevold**	The Interagency Ecological Restoration Quality Committee (IERQC) - advancing applications of quality assurance in ecological restoration across the Laurentian Great Lakes.
3	**Tonkovich**	Using ecological data to connect and guide restoration stewards.
4	**Menzies**	Finding the middle ground: designing low-growing, native lawn-alternative plant communities for stormwater infiltration.
5	**Schiafo**	Bringing restoration to Northwestern University: one year as an SER Student Association.
6	**Dacres**	Influence of environmental gradients and forest cover on soil carbon content in Ohio forests.
7	**Jones**	Use of soil ripping to jumpstart vegetative succession of mined forestland impacted by soil compaction.
8	**Adams**	The impact of invasive plants on the spatial ecology of white-tailed deer (*Odocoileus virginianus*) in southeastern Michigan.
9	**Duda**	Using reproductive biology to predict the potential impact of hybridization in rare species.
10	**Duffy**	Impacts of native prairie restoration on soil health indicators of reclaimed mineland.
11	**Simitz**	Taxonomic, phylogenetic, and functional changes in grasslands worldwide encroached by woody plants.
12	**Jackson**	Effect of fire frequency on growth and nitrogen fixation in *Desmodium canadense.*
13	**Talaba**	Investigating the effect of seed predation by a non-native weevil, Larinus planus on pollinator visitation and floral scent of *Cirsium pitcheri*.
14	**Zapata**	The effects of environmental conditions on the growth of manoomin (*Zizania aquatica*) at Corey Marsh Ecological Research Center.
15	**Rademacher**	Adaptive management of invasive hybrid cattails (Typha x glauca) at the Minnesota Landscape Arboretum.
16	**Gaffney**	Biogeochemical restoration potential? Dissolved organic matter and nitrogen in Lake Erie tributaries.
17	**Henzarek**	Examining potential zoochory of Flint River fishes across multiple feeding guilds.
18	**Smiley**	Piscivore-prey relationships in agricultural headwater streams.
19	**Mantis**	Reproductive success in the burying beetle *Nicrophorus orbicollis* under different temperature regimes.

20	**Norise-Muhammand**	Understanding the true diversity of Indiana morel species: a molecular study.
21	**Bauer**	Leveraging ChatGPT to infer guild information for fungi: assembling a validated AI pipeline for augmenting the FUNGuild database.
22	**Fischer**	The evolving role of the Plant Materials Program at the Tallgrass Prairie Center

POSTER PRESENTATION ABSTRACTS (ALPHABETICAL ORDER)

Adams, Trent*[1], Melissa Starking[2], Nicklas Smith[1], and Rebecca K. Tonietto [1]. The impact of invasive plants on the spatial ecology of white-tailed deer (*Odocoileus virginianus*) in southeastern Michigan. University of Michigan-Flint[1], Flint, Michigan., Michigan State University[2], Lansing, Michigan. Email: Trentad@umich.edu.

White-tailed deer (*Odocoileus virginianus*) overpopulation has been shown to reduce native plant diversity and facilitate the success of invasive plants. It is important to understand how deer interact with habitat once it has become dominated by invasive species, as deer activity may be driving differences in the plant community structure. For example, deer may be attracted to areas with invasive plants that can be used as a food or cover resource, such as Honeysuckle (*Lonicera* spp.) and Autumn Olive (*Elaeagnus umbellata*). This could put more browse pressure on native plants in the area and facilitate a continued invasion. We observed 16 1-hectare sites within Michigan Nature Association sanctuaries across Genesee and Oakland Counties. We deployed camera traps in each hectare from October to November and completed vegetation sampling in each hectare by using five 10 m^2 plots nested with nine one m^2 quadrats. We recorded all herbaceous plants to species and summarized invasive plant cover over the 10 m^2 plots using the Braun-Blanquet cover class system. Overall mean invasive cover ranged from < 1 %-63% in each hectare. We utilized Reconn-AI to process 8,854 photos and found that 3,521 (40%) photos contained deer. Additionally, we found that all of our sites had deer activity. Preliminary results from Pearson Correlation Coefficient tests show that deer detection does not significantly correlate with invasive plant cover (p=0.56, df=14) or herbaceous species richness (p=0.10, df=14) in the fall. We will continue to monitor our sites throughout all seasons to compare deer interactions within our spectrum of invaded habitat.

Bauer, Jared J.*, Temilade R. Adeyeye, Sebastian Galvan, George Stefanek, and Scott T. Bates. Leveraging ChatGPT to infer guild information for fungi: assembling a validated AI pipeline for augmenting the FUNGuild database. Purdue University Northwest, Hammond, Indiana. Email: bauer110@pnw.edu

FUNGuild (http://www.funguild.org) is a bioinformatic tool for parsing fungal operational taxonomic units (OTUs) by ecological guild, groups of species that exploit the same resources or that exploit different resources in related ways. This tool works independent of the sequencing platform or analysis pipeline, and the associated FUNGuild database that contains information on over 11,000 fungal taxa. The FUNGuild platform has been widely used in studies

of fungal ecology, with nearly 3000 publications citing Nguyen and colleagues (2016) to date. Although FUNGuild covers a broad range of important fungal groups, such as human and plant pathogens, with the roughly 150,000 fungal names in current use today, the FUNGuild database presently lacks ecological information on a significant number of fungal taxa. As FUNGuild is 'hand' curated resource, filling in these information gaps would likely require numerous human hours, perhaps years given the current rates of data acquisition for FUNGuild. We are using the ChatGPT application programming interface (API) to build an automated pipeline to gather ecological information on genera of fungi for extending the FUNGuild database. The information gathered is further filtered using ‘keyword’ searches to help us refine this information into the guild ‘vocabulary’ developed by the FUNGuild team. Using guild information already known for fungal genera in the FUNGuild database, we are also incorporating standard approaches of train-test splits used in machine learning to validate our ChatGPT pipeline for assigning ‘guilds’ to fungal taxa.

Dacres, Adriana P.*, G. Matt Davies, and Nicholas T. Basta. Influence of environmental gradients and forest cover on soil carbon content in Ohio forests. The Ohio State University, Columbus, Ohio. Email: dacres.3@osu.edu

Forest soil carbon levels may differ depending on management history and practices, geomorphological features, disturbances, forest composition, and other environmental parameters. Forest soils act as a major repository for sequestered atmospheric carbon. Increased soil carbon storage may aid in the improvement of soil quality, ecosystem resilience, and overall reduction of atmospheric C. However, there is limited research available on the long-term stability/permanence of soil C, particularly in mid-western forest ecosystems. This study aimed to quantify below-ground soil carbon stocks and permanence for forests across Ohio. Specifically, we addressed the influence of environmental gradients and forest composition on soil carbon content. We collected intact soil cores from representative conifer (pine and fir), deciduous plantations, semi-natural woodlands, and open grasslands. Samples were collected in 10cm increments to a depth of 30cm and returned to the SWEL at OSU where they analyzed for a range of parameters including texture, bulk density, pH, soil organic matter content (SOM), active carbon, and total carbon and nitrogen content (C:N). Preliminary data indicate that forest cover types consistently had higher SOM contents than grasslands in their upper horizons. Additionally, C:N ratios and SOM contents all decreased with increasing soil depth. Research is ongoing to further quantify the drivers of variation in soil organic carbon pools, stocks, and permanence across biophysical gradients in forests across Ohio. These results will facilitate the production of a complete carbon account for forests across Ohio which will be used in offsetting emissions and producing marketable carbon credits.

Duda, Melissa A.*, Andrea Kramer, and Jeremie B. Fant. Using reproductive biology to predict the potential impact of hybridization in rare species. Northwestern University, Evanston, Illinois. Chicago Botanic Garden, Glencoe, Illinois. Email: melissaduda2024@u.northwestern.edu

Natural hybridization involves successful mating between species that are not reproductively isolated. Ongoing hybridization may lead to the extinction of one taxon, but conversely, it may promote the acquisition of adaptive traits. This paradox is an especially relevant problem for rare species where hybridization can either accelerate extinction or increase persistence. To

investigate this, I used *Gentiana puberulenta* (Gentianaceae), a dry prairie species considered rare in portions of its range, and *Gentiana andrewsii*, a common congener, to identify the reproductive mechanisms and ecological conditions responsible for promoting hybridization. Populations of *G. puberulenta* and *G. andrewsii* occur sympatrically, but their hybrid (*G.* x *billingtonii*) is not present in all sympatric populations. I ask: What mechanisms are limiting hybridization in some populations and not others? And are hybrids a threat to the rare *Gentiana puberulenta*? To answer these questions, I used sites with hybrids present and sites with hybrids absent to 1) collect flowering phenology data, 2) measure calyx-lobe and corolla-lobe length to evaluate potential introgression, 3) perform controlled crosses to determine the fertility of hybrids, 4) conduct pollinator observations to analyze the role of pollinators in promoting hybridization. During the month of September, flowering times overlapped between parental species at sites with absent hybrids. Similarly, flowering times overlapped between parental species and the hybrid at sites with hybrids present. The overlap in flowering times contributes to the chances of hybridization and backcrossing. For the rare parent, *G. puberulenta*, calyx lobe lengths and corolla lobes lengths were significantly longer at sites with hybrids present than at sites with hybrids absent, hinting at potential introgression occurring between *G. puberulenta* and the hybrid, *G.* x *billingtonii*. This study will contribute to the growing knowledge of hybridization in rare species to better understand the challenges and opportunities hybridization presents for the persistence of rare species.

Duffy, Josephine D.* and G. Matt Davies. Impacts of native prairie restoration on soil health indicators of reclaimed mineland. Ohio State University, Columbus, Ohio. Email: duffy.412@osu.edu

Strip-mining has extensive impacts on vegetation and soil. Reclaimed mineland soils are often highly compacted and depleted of plant-available nutrients and organic matter. Such sites are often revegetated with low-diversity mixtures of non-native grasses and forbs. The combined effects of competitive non-native species and poor quality soils often create challenges for restoration. Nevertheless, there is significant interest in enhancing the ecosystem function of former minelands to enhance biodiversity and carbon sequestration. We studied a reclaimed coal mine in eastern Ohio to determine whether prairie restoration in such settings would affect the recovery of key soil health indicators. Four prairies and adjacent unrestored pastures were sampled along 100m transects that intersected perpendicular to the prairie patch boundary. We surveyed vegetation cover and aboveground biomass within eight $1m^2$ quadrats spaced along each transect. Soil cores were collected at each quadrat along with penetrometer readings to measure soil carbon content, bulk density, and compaction. We intend to characterize the changes in soil health across the boundary of the restored prairie, along with identifying potential relationships between soil health indicators and plant species composition. Contrary to our expectations, preliminary results suggest that soil organic matter content is greater in the upper horizons of pastures compared to restored prairies. Further analysis will seek to link soil health characteristics to plant functional traits, such as growth form, root system, and Raunkiær life form. We anticipate results that will aid in the revegetation of reclaimed minelands to accelerate soil health recovery while restoring a valuable native ecosystem.

Fevold, Brick[1]*, Tim Lewis[1], Craig Palmer[1], Molly Middlebrook[1], Doran Stegura[1], and Louis Blume[2]. The Interagency Ecological Restoration Quality Committee (IERQC) - advancing applications of quality assurance in ecological restoration across the Laurentian Great Lakes. [1]General Dynamics Information Technology. Falls Church, Virginia. [2]U.S. EPA-Great Lakes National Program Office, Chicago, IllinoisEmail: brick.fevold@gdit.com

The Interagency Ecological Restoration Quality Committee (IERQC) was formed in 2012 to support the U.S. Great Lakes Restoration Initiative (GLRI). The central role of the committee is to serve as a 'think-tank' focused on advancing applications of quality assurance (QA) and quality control (QC) in ecological restoration. The IERQC is chaired by the U.S. Environmental Protection Agency's Great Lakes National Program Office and is composed of representatives from federal, tribal, state, and non-governmental organizations. The committee provides a collaborative environment for the development and advancement of quality best practices and includes the development of guidance publications and factsheets, virtual- and in-class workshops, a monthly webinar series, and contributions of symposia and presentations at scientific meetings. Published in 2019, "Application of Quality Assurance and Quality Control Principles to Ecological Restoration Project Monitoring," EPA-905-K-19-001 (https://www.glri.us/node/250) represents the committee's flagship publication. This publication is a comprehensive treatise on QA/QC best practices fundamental to planning, implementation, and assessment of ecological restoration projects. Other resources developed by the committee include an annotated bibliography on quality concepts applied to adaptive management (AM), an online Zotero Group® reference database on AM, and a synopsis publication describing a variety of online tools and resources on AM. In addition, recent efforts by the committee include the development of guidance on quality oversight specific to ecological restoration projects that involve a construction phase (e.g., installation of engineered solutions, grade and elevational contouring, capping, wetland reconstruction, among others). This poster summarizes the IERQC resources available to the ecological restoration community of practice.

Fischer Walter, Laura. The evolving role of the Plant Materials Program at the Tallgrass Prairie Center. Tallgrass Prairie Center, University of Northern Iowa, Cedar Falls, Iowa. Email: laura.walter@uni.edu

High quality prairie restoration requires genetically diverse, regionally adapted seed. Commercial production of native seed enables restoration at scales beyond the size of an individual project and promotes restoration at the institutional level. To make more species of regionally adapted native prairie seed available and affordable for seedings along Iowa's federal, state, and county highways, a plant materials program was initiated in 1990 at the University of Northern Iowa, in partnership with several agencies. The program has released 89 species of Iowa source stock seed, developed from remnant prairie collections, to growers for commercial production of certified Source Identified seed. Several functional groups are represented: warm season and cool season grasses, sedges, legumes, forbs, and prairie shrubs. As the program and native seed market have matured, the Plant Materials Program has taken on a coordinating role among native seed stakeholders. Communication can partially offset the challenges of a volatile and unpredictable seed market. We discuss the evolving role of the Plant Materials Program in supporting a healthy market for diverse, regionally appropriate native seed. The history and continuing work of this program may provide useful examples for considering how a broader, regional seed network could function.

Gaffney, Katie* and Rachel S. Gabor. Biogeochemical restoration potential? Dissolved organic matter and nitrogen in Lake Erie tributaries. Ohio State University, Columbus, Ohio. Email: gaffney.75@osu.edu.

Biogeochemical cycles are critical, interconnected components of ecosystem functioning, yet they are often overlooked in ecosystem restoration. Global carbon and nitrogen cycles have been heavily perturbed by human activity, resulting in ecological disturbances. Dissolved organic matter (DOM), a class of carbon-based molecules, acts as a nutrient source for biota, and regulates aquatic nitrate concentrations through the denitrification reaction. Denitrification and other biogeochemical reactions vary depending on DOM chemistry, making DOM chemistry an important variable to track throughout restoration of aquatic systems. We aimed to better understand how the concentration and chemistry of DOM and nitrogen are affected by season and land use. We sampled 80 tributaries along the US coast of Lake Erie in fall, early spring, late spring, and summer. DOM concentrations were generally higher with greater seasonal variation in watersheds dominated by intensive agricultural use (1.4 – 13.0 mg C/L, mean = 6.3 mg C/L), compared to more forested watersheds (1.8 – 9.1 mg C/L, mean = 3.7 mg C/L). DOM chemistry in agricultural streams was composed of more aliphatic material sourced from in-stream production, which has previously been shown to be preferentially used for denitrification. Samples from agriculturally-dominated watersheds also exhibited the highest total dissolved nitrogen (TDN) concentrations (0.5 – 13.7 mg N/L, mean = 3.8 mg N/L), with the highest values in spring, driven by increases in nitrate. Watersheds not dominated by agricultural land use consistently showed low TDN concentrations (urban: 0.7 – 2.4 mg N/L, mean = 1.4 mg N/L; forested: 0.4 – 1.4 mg N/L, mean = 0.8 mg N/L). These results indicate that land use controls the export of both carbon and nitrogen from watersheds in the Lake Erie basin. Further understanding of interactions between DOM and nitrate in streams may produce restoration and management recommendations based on DOM chemistry in agricultural streams with high nitrate concentrations.

Greymont, Olivia J.* and Laura E. Traver. Student led stewardship: A path to ecological restoration through volunteer workdays with the student chapter of the Society for Ecological Restoration at UWSP. UWSP Society for Ecological Restoration, Stevens Point, Wisconsin. Email: ogrey417@uwsp.edu

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 them 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. 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.

Henzarek, Danielle A.[1*], Rebecca K. Tonietto[1], Heather A. Dawson[1], and Madeline Tomczak[2]
Examining potential zoochory of Flint River fishes across multiple feeding guilds.
[1]University of Michigan – Flint, Flint, Michigan. [2]Cooperative Institute for Great Lakes Research, Ann Arbor, Michigan. Email: dahenzar@umich.edu

Zoochory is the dispersal of seeds by animals that is prevalent all around the world. Seed dispersal by animals have the potential to increase plant species diversity and contribute to the conservation and restoration of native plant communities. Zoochory by fish is mainly studied in the Neotropics, this research has been used to showing how they benefit plant communities in the riparian zones. Unfortunately, zoochory by fish in temperate zones and urban systems have been severely understudied. To help further this gap in the literature, I will be studying fish of three feeding guilds with a heavy focus on fish with inferior mouths like *Cyprinus carpio* (common carp) and Siluriformes (catfish). I started by understanding and identifying the plant community in the riparian zone along the Flint River in Flint, MI by using meandering transects. My preliminary data shows the riparian zone is mainly covered in invasive plant species. I am hoping to show that if fish are consuming seeds, they are either helping with the dispersal of either the native or invasive plant species. Fish sampling will be conducted from March to around August of 2024 using cast nets, hook and line, and electrofishing. Biophysical data and diets utilizing a gastric lavage method will be recorded immediately after fish are caught. After the completion of the gastric lavage, the stomach contents containing potential seeds will be germinated to examine germination success and plant identification to further examine diet. Examining fish diets can further explain the importance of zoochory by fish and how it can affect surrounding riparian zones and their native plant communities.

Jackson, Benjamin E.*[1], Katherine T. Charton[2], Michelle A. Homann[2], and Ellen I. Damschen[2].
Effect of fire frequency on growth and nitrogen fixation in *Desmodium canadense*.
[1]Emory University, Atlanta, Georgia. [2]University of Wisconsin-Madison, Madison, Wisconsin. Email: Benjamin.Jackson@emory.edu

Fire is essential to the maintenance of tallgrass prairies, an ecosystem that is under immense threat worldwide due to conversion to agriculture, loss of historical disturbances, and global warming. Fire benefits nitrogen fixing plants, which are a key element in the tallgrass prairie biome, by providing a temporary competitive advantage over the dominant taller grasses because of a lack of soil nutrients after fire. Nitrogen fixers are able to utilize resources that are not available to non-fixing plants. One species of nitrogen fixing legume found in the tallgrass prairies of Wisconsin is Showy Tick Trefoil, *Desmodium canadense.* The specific response of *D. canadense* to burning has not been described in literature, however, previous studies have shown that a relative in the *Desmodium* genus showed a negative response to burning, which opposed that of other nitrogen fixing legumes in its respective prairie ecosystem. We conducted a field study in a restored tallgrass prairie in Madison, Wisconsin, with varying fire frequency in different management over the past 14 years. We measured the percent cover, height, aboveground and belowground biomass, leaf nitrogen content, and nodule count and biomass for up to five *D. canadense* individuals in each management unit to determine if an increased

number of burns translated to increased growth and/or increased nitrogen fixation. Higher nodule count/biomass and leaf nitrogen content represents a greater investment in nitrogen fixation for the plant. We found a significant positive relationship between fire frequency and nodule count. All other variables showed non-significant positive relationships. These results suggest that fire increases nitrogen fixation in *D. canadense*, however, more research is needed to determine whether increased fixation leads to increased growth. Fire benefits *D. canadense*, promoting biodiversity and important components of the prairie ecosystem, further justifying its importance in tallgrass prairie maintenance.

Jones, Rebekah A.[1*], Christie Bahlai[1], Tom A. Ruggles[2], Nova Montgomery[1], Katie Dray[1], Militca Denee[1], Chris Davis[3], and Christopher B. Blackwood[4]. Use of soil ripping to jumpstart vegetative succession of mined forestland impacted by soil compaction. [1]Kent State University, Kent, Ohio. [2]Oak Ridge National Lab, Oak Ridge, Tennessee, [3]Cuyahoga Valley National Park, National Park Service, Brecksville, Ohio, [4]Michigan State University. East Lansing, Michigan. Email: rjone123@kent.edu

In ecosystems undergoing reforestation, secondary succession often follows a standard trajectory, as woody species start to outcompete herbaceous species and ultimately shade them out. However, when disturbances dramatically alter the underlying substrate, reforestation often follows a slowed trajectory. In Ohio's Cuyahoga Valley National Park, in between Akron and Cleveland, five sites previously mined for gravel and topsoil are being actively managed for reforestation after passive management failed to result in colonization by trees. Several decades ago, the topsoil was graded and compacted to control erosion after mining, and various native and nonnative species were seeded. As succession beyond this initial seeding was not observed, in 2018-19 two of the sites were mechanically decompacted using 2m shanks to deeply till the soil. Vegetation was surveyed in 2018 from Sept-Oct prior to tillage and again in 2022 from June-Sept after tillage, using the same grid locations. Two of five surveyed sites were subject to the deep tilling treatment, leading to a before-after, control-impact study design. We compared vegetation across time and in response to the deep-tillage treatment. Our observations suggest that vegetation communities occurring in the non-ripped sites have not changed dramatically from the previous survey, while vegetation communities at the deep-tilled sites had started to change. Overall, vegetation communities were different between the ripped and non-ripped sites at the 2022 timepoint. Higher cover of invasive species was found in the non-ripped sites than the ripped sites. Vegetation communities at the non-ripped sites remain similar to the 2018 surveys while the ripped sites are slightly different. These results support the hypothesis that compaction of the soil has been a major obstacle in impeding forest succession and that ripping the soil as an active management strategy has begun the process of secondary succession.

Mantis, Theodore N.*, Scott T. Bates, and John C. Creighton. Reproductive success in the burying beetle *Nicrophorus orbicollis* under different temperature regimes. Purdue University Northwest, Hammond, Indiana. Email: tmantis@pnw.edu

Gut microbiota provides a plethora of benefits to several organisms including enhancement of the immune system from pathogens and facilitation of recovering nutrients essential for survival. In burying beetles especially, the benefits of a healthy gut microbiota allow for

increased fitness in offspring. When burying beetles breed on small vertebrate carcasses, they utilize anal and oral secretions to properly preserve carcasses along with regurgitation to hatched larvae that transfer beneficial microbes to offspring. Studies considering microbiota and reproductive success in the past have considered the impact on parental care but have not looked at the impact of environmental conditions such as temperature. To better understand the impact of temperature on both the reproductive success and gut microbiota on the burying beetle species *Nicrophorus orbicollis*, laboratory reared adults were put into mating broods at three separate temperatures that mimicked below optimum (18℃), above optimum (23℃) and optimum (20℃) breeding temperatures for burying beetles. At each temperature, Illumina high-throughput sequencing of the 16S rRNA gene will be utilized to understand the composition of the bacterial communities prepared carcasses along with the digestive tracts of the laboratory reared adults and offspring at each temperature. From this experiment, temperature will show an impact on the reproductive success of the broods should more failures occur at temperatures that deviate from the optimum 20℃. Due to the pivotal role gut microbiotas play in burying beetle reproduction, utilizing 16S high-throughput sequencing will allow for a comparison of bacterial communities to understand the differences in bacteria species that will overall affect the fitness of offspring due to their presence or absence from the communities seen at the optimum temperature.

Menzies, Rose[1]***,** Rebecca K. Tonietto[1], Lauren Umek[2], Teresa Yoder-Nowak[1], Rebecca S. Barak[3,4], and Liz Anna Kozik[5]. Finding the middle ground: designing low-growing, native lawn-alternative plant communities for stormwater infiltration. [1]University of Michigan-Flint, Flint, Michigan. [2]Chicago Park District, Chicago, Illinois, [3]Chicago Botanic Garden, Glencoe, Illinois, [4]Northwestern University, Chicago, Illinois, [5]University of Wisconsin-Madison, Madison, Wisconsin. Email: Romenzie@umich.edu

Non-native turfgrass lawns cover significant areas of the Midwest that could otherwise support native plant communities and provide ecosystem services. Not all current turfgrass lawns are feasible sites for full-scale habitat restoration. To this end, I am testing treatments of low growing, native lawn alternatives in the Midwest and their potential to provide ecosystem services while meeting aesthetic norms. Specifically, are low growing lawn-alternative plant communities better equipped for stormwater infiltration than non-native turf grass lawns? I am additionally investigating if plants can affect water infiltration rates because soil is often assumed to be the primary driver of infiltration rate. I measured water infiltration of 9 lawn alternative treatments at the Chicago Botanic Garden. I had a negative control (turf grass, non-native), a positive control (Dixon prairie, native), a microclover treatment (white dutch clover, non-native), a microclover and turfgrass combination treatment, a fescue treatment (5 species, non-native), a sedge sampler treatment (20 species, native), a mini meadow-low diversity (9 species, native), a mini meadow-high diversity (18 species, native), and lastly, a prairie treatment (native). I measured water infiltration of all treatments in June 2023 and September 2023 using an infiltrometer. My preliminary data have not revealed discernible patterns among the treatments, surprisingly, even within the same treatments across replicates. Thus far, the treatment with the highest infiltration rate is fescue (3 species, non-native), and the lowest infiltration rate is the high diversity mini-meadow treatment (18 species, native). I will be testing soil texture of each treatment and conduct a more controlled experiment with treatments planted at the same time in the same soil to elucidate these patterns.

Miller, Gabbie[1], Tyler C. Wood[2], and Peter C. Smiley Jr.[2]* Piscivore-prey relationships in agricultural headwater streams. [1]Ohio State University, Columbus, Ohio. [2]USDA Agricultural Research Service, Columbus, Ohio. Email: rocky.smiley@ars.usda.gov

Stream fish community structure is influenced by abiotic and biotic factors. Information on the influence of piscivory on fish communities in agricultural headwater streams is limited. Understanding the relationships between piscivorous fishes and their fish prey may provide insights to help develop piscivore-prey indicators that can be used to assess stream fish responses to restoration practices. Previous research has documented creek chub (*Semotilus atromaculatus*) consume other fishes in lentic and lotic ecosystems. Our research question was: what are the relationships between piscivorous creek chubs with their fish prey [creek chub, Johnny darter (*Etheostoma nigrum*), fathead minnow (*Pimephales promelas*), bluntnose minnow (*Pimephales notatus*), white sucker (*Catostomus commersoni*), blacknose dace (*Rhinichthys atratulus*)] in agricultural headwater streams? Fishes were sampled by backpack electrofishing in 10 sites in nine agricultural streams in central Ohio in the summer and fall 2023 to determine creek chub gape length-body length and fish prey body depth-body length relationships. Regression analyses yielded creek chub gape-length and fish prey body depth-length equations with good predictive abilities. We applied these equations to a 14-year dataset on the focal six species from 18 sites in nine agricultural headwater streams to determine the abundance of creek chub piscivores and their vulnerable fish prey from each stream and season. Summaries of this 14-year data set indicated 33,497 creek chubs and 26,405 of the five fish prey species were captured. Mean creek chub length was 6.5 cm (range 1.3-23.5 cm), and mean prey species length was 6.2 cm (range 1.3-37.0 cm). Generalized least squares regression analyses will be used to evaluate the relationships between piscivorous creek chub abundance and the abundance of vulnerable fish prey. Our analyses will provide insights into the types of piscivore-prey relationships within agricultural headwater streams and their implications for stream restoration.

Norise-Muhammad, Kayla*, Meghanne Burns and Scott T. Bates. Understanding the true diversity of Indiana morel species: a molecular study. Purdue University Northwest, Hammond, Indiana. Email: knorisem@pnw.edu

Morel mushrooms (*Morchella* spp.) are important edible fungi that are highly sought after by local foragers. Morels are frequently sold in Indiana and the state Department of Health regulates their sale and collection, specifying that wild species must be, “individually inspected and found to be safe by a mushroom identification expert”. Indiana residents have been known to be zealous collectors of morels and they tend to be familiar with habitats and conditions that are associated with their growth. The growing season of morels in Indiana typically extends from April to May and six species have been reported from the state: *M. angusticeps*, *M. conica*, *M. crassipes*, *M. deliciosa*, *M. esculenta*, and *M. hybrida*. Modern molecular studies, however, have suggested that older concepts of morel species in North America are often no longer valid and specimens identified using morphological means need to be re-evaluated using DNA-based methods. We have establishing protocols for sequencing and molecularly identifying morel mushrooms with modern DNA-based methods using molecular marker genes (e.g., ITS1 of the nrRNA gene) for morel mushrooms collected in Indiana. Our results are helping us better

understand the diversity of Indiana morels and we are now properly assigning taxonomic names for morels from the state according to modern molecular concepts recently proposed.

Rademacher, Sarah*[1] and Daniel Tix[2]. Adaptive management of invasive hybrid cattails (Typha x glauca) at the Minnesota Landscape Arboretum. [1]University of Minnesota Landscape Arboretum, Chaska, Minnesota. [2]MNL, Inc., Otsego, Minnesota. Email: radem153@umn.edu

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 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 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 have since completed spot-treatments using backpack sprayers. Following two years of herbicide treatments, we planted over 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, which 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.

Schiafo, Rory B*, Rafael Urbina Casanova, and Erin Snyder. Bringing restoration to Northwestern University: one year as an SER Student Association. Northwestern University, Evanston, Illinois and Chicago Botanic Garden, Glencoe, Illinois. Email: rschiafo@u.northwestern.edu

Globally, ecosystems health and biodiversity are declining. Restoration is an effective and necessary way to restore ecological integrity and combat biodiversity loss. To effectively restore ecosystems, there is a need for collaborations between academic institutions, tribal government, and community partners. There is also an explicit need to provide students and emerging professionals with hands-on experience and professional training in the field of ecological restoration science, practice, and policy. To this end, the Society for Ecological Restoration's (SER) Student Association Program provides an opportunity for students to engage in restoration activities in their local communities, build skills, and engage with the greater SER global network. To take advantage of these opportunities, we founded the Society for Ecological Restoration Student Association Chapter at Northwestern University (SER NU) at the beginning of 2023. Our purpose as a graduate student group is to create and participate in ecological restoration projects and to facilitate opportunities for our members to build essential skills in restoration. Since our inception, we have amassed over twenty-five active

members and have held multiple events within our academic institution and local communities. Events have included a native seed swap, visits to restoration sites, seed cleaning with the Forests Preserves of Cook County, and more. Here, we present the progress of SER NU. We share our experiences as a new SER Student Associatoin including sharing our highlights, challenges, and goals for the future. Through this presentation, we hope to inspire opportunities for collaboration within the Midwest-Great Lakes chapter of SER.

Simitz, Tija A.*, Katherine T. Charton, and Ellen I. Damschen. Taxonomic, phylogenetic, and functional changes in grasslands worldwide encroached by woody plants. University of Wisconsin-Madison, Madison, Wisconsin. Email: simitz@wisc.edu

Grassland ecosystems worldwide are experiencing significant transformations due to the encroachment of woody plants into these open-canopied, herbaceous ecosystems, impacting their taxonomic, phylogenetic, and functional diversity. Phylogenetic and functional diversity capture the selective pressures on the plant community better than taxonomic diversity alone as many plants are constrained to certain life histories and morphologies due to the abiotic and biotic components of the ecosystem. Taxonomic diversity illustrates the variety of species present in a community, while phylogenetic diversity highlights the variation in evolutionary histories and relatedness among a community. Functional diversity is the variety of morphologies and physiologies within a community that influence how plants respond to environmental conditions as well as their ecosystem function. We conducted a meta-analysis of 50 studies globally and extracted relevant data on the effects of woody encroachment on herbaceous grassland diversity. We hypothesized that encroachment would lead to a decrease in taxonomic, phylogenetic, and functional diversity, with increasingly greater changes at each level of diversity. In instances where only taxonomic diversity was reported, which was true for the majority of studies, we used existing regional phylogenies and publicly available plant trait data to calculate phylogenic and functional diversity. Our results will contribute to a more nuanced understanding of the ecological consequences of grassland transformation, allowing us to predict which species are at greatest risk of loss due to encroachment.

Talaba, Rina.*, Kayri Havens, and Paul Caradonna. Investigating the effect of seed predation by a non-native weevil, *Larinus planus* on pollinator visitation and floral scent of *Cirsium pitcheri.* Chicago Botanic Gardens-Northwestern University, Evanston, Illinois. Email: rinatalaba@u.northwestern.edu

Cirsium pitcheri, also known as Pitcher's Thistle–a rare dune plant species endemic to the Great Lakes–is under threat by the invasive seed weevil, *Larinus planus*. Though we know that *L. planus* infestation *C. pitcheri* causes a decline in seed production, little is understood about other how infestation affects other floral traits. Floral scent, in particular, is composed of volatile organic compounds (VOCs) which signal interactions with pollinators and predators. We collected *C.pitcheri* floral scent samples and insect interactions from Whitefish Dunes State Park (WFDSP) along high-quality dune habitats. Analysis of the floral scent samples uncovered VOCs which are correlated to the signaling plant-insect interactions. Pollinator visitation and richness were higher in infested *C. pitcheri* where there were higher levels of of VOCs associated with insect attraction. Terpenoids were found in *C. pitcheri* as a defensive

mechanism against predation. The dominating VOC benzaldehyde, however, is associated with the attraction of predators of the *Curclionidae* family. The increase of benzaldehyde may be a contributing factor to the further growth of *L.planus* despite the positive effect on pollinator interaction. Furthermore, the floral scent makeup of *C.pitcheri* can be used in the development of scent traps to manage against *L.planus* infestation.

Tonkovich, Gayle S.*[1], Wyatt C. Gaswick[2], and Peter G. Avis[3]. Using ecological data to connect and guide restoration stewards. [1]Indiana University Northwest, Gary, Indiana. [2]Field Museum of Natural History, Chicago, Illinois. [3]University of Maine, Orono, Maine. Email: gstonkov@iu.edu

The ability to track ecological restoration progress and adapt stewardship activities when trajectories waver from defined goals is critical and yet often done in somewhat haphazard ways due to lack of resources (time, personnel, funding, expertise, etc.). Most funding for habitat restoration is focused at “boots on the ground” activities rather than tracking the long-term ecological changes that occur at a restoration site. While most entities recognize and support the need for consistent and on-going monitoring of restoration sites to adequately plan for management activities, there is still a lack of appropriated resources and standardization of techniques employed for assessment. In 2010, the Northwest Indiana Restoration Monitoring Inventory (NIRMI) was created to help fill that gap. With financial support from many partners over the past 14 years, NIRMI has helped TonNIRMI has established 160 plots at 53 sites throughout northwest Indiana and select locations in neighboring northeast Illinois and southwest Michigan, to evaluate and guide restoration activities. The datasets are available open-access on the internet (nirmi.org) and detailed reports have been produced for specific sites and stewards. While data collection has stalled in the last 5 years, NIRMI is ready to consult with partners on analyzing data, setting up new monitoring plots, collecting new data, and sharing datasets with the wider ecological restoration community. NIRMI is still poised to play an important role in the Restoration Revolution.

Talaba, Rina.*, Kayri Havens, and Paul Cardonna. Investigating the effect of seed predation by a non-native weevil, *Larinus planus* on pollinator visitation and floral scent of *Cirsium pitcheri.* Chicago Botanic Gardens-Northwestern University, Evanston, Illinois. Email: rinatalaba@u.northwestern.edu

Cirsium pitcheri, also known as Pitcher’s Thistle–a rare dune plant species endemic to the Great Lakes–is under threat by the invasive seed weevil, *Larinus planus*. Though we know that *L. planus* infestation *C. pitcheri* causes a decline in seed production, little is understood about other how infestation affects other floral traits. Floral scent is composed of volatile organic compounds (VOCs) which signal interactions with pollinators and predators. We collected *C.pitcheri* floral scent samples and insect interactions from Whitefish Dunes State Park (WFDSP) along high-quality dune habitats. Analysis of the floral scent samples uncovered VOCs which are correlated to the signalling plant-insect interactions. Pollinator visitation and richness were higher in infested *C. pitcheri* where there were higher levels of of VOCs associated with insect attraction. Terpenoids were found in *C. pitcheri* as a defensive mechanism against predation. The dominating VOC benzaldehyde, however, is associated

with the attraction of predators of the *Curclionidae* family. The increase of benzaldehyde may be a contributing factor to the further growth of *L.planus* despite the positive effect on pollinator interaction. Furthermore, the floral scent makeup of *C.pitcheri* can be used in the development of scent traps to manage against *L.planus* infestation.

SATURDAY MAY 18TH

CONCURRENT ORAL PRESENTATION SESSIONS

All times are Central Standard Time

SESSION 1: 8:00 – 10:00 AM (GYTE 108). Moderator Barbara Mania-Farnell FOREST & WETLANDS		
8:00 – 8:20	**Hunt, Lindsay, E.F.,** Pavlovic, N.B. & Grundel, R.	Using umbrella species to understand connectivity: A case study in Northern Michigan and Wisconsin
8:20 – 8:40	**Fuka, Mark E.** & Orrock, J. L.	Invasive shrubs affect the efficacy of capsaicin-coated tree seeds at reducing small mammal granivory
8:40 – 9:00	**Swab, Beck,** Knisely, C., Watson, M. & Burke, D.	Managing forests is about more than the trees: Rapid Upland Forest Assessments (RUFA), a tool for holistic forest health prescriptions benefiting wildlife and ecosystem function
9:00 – 9:20	**Naylor, Shawn &** Gahala, A.M.	Hydrology and water quality of a restored dune-and-swale wetland adjacent to the Grand Calumet River, Indiana, 2019-22
9:20 – 9:40	**Del Valle, Antonio,** Franke, G., Kelleher, E., Leavens, E. & Midgley, M.	Recovery of plant communities and soil biogeochemistry following brush pile burning
9:40 – 10:00	**Kanine, Jennifer**	The Pokagon Band's Dowagiac River Restoration: A Tribal Wetland Project with a Decade of Progress

SESSION 2: 8:00 – 10:00 AM (GYTE 116). Moderator Michelle Spaulding GRASSLANDS		
8:00 – 8:20	**Homann, Michell A.** & Damschen, E.I.	Prescribed fire timing drives differing emergence phenology in tallgrass prairies plants
8:20 – 8:40	**Leavens, Emma,** Thomas, K., Glasenhardt, M., Ernst, A., Hipp, A., Midgley, M.	Plant community diversity as predictors of tall goldenrod (*Solidago altissima*) invasion and persistence
8:40 – 9:00	**Parr, Mary*** & Aschenbach, T.	The influence of fire seasonality on plant composition of restored tallgrass prairies in the Great Lakes Basin
9:00 – 9:20	**Snyder*, Erin F.,** Barak, R., Kramer, A., Ksiazek-Mikenas, K. & Umek, L.	A post-industrial prairie? Calumet Region slag could provide vital habitat for dolomite prairie plants
9:20 – 9:40	**Cook, Jaron*,** Blanke C., & Larkin, D.	Influence of management practices on plant diversity in Conservation Reserve Program grasslands

SESSION 3: 8:00 – 10:00 AM (GYTE 002). Moderator Leslie Thompson URBAN & COMMUNITY-BASED RESTORATION		
8:00 – 8:20	**McConnell, Coilin P.**	Urban stream restoration-an ecological contractor's perspective
8:20 – 8:40	**Molinaro, Nicole M.** & Kruszynski, L.	Restoration of residential lands for sustainable ecology
8:40 – 9:00	**O'Reilly, Catherine**	Fostering collaboration for sustainable landscapes: gROWing Chicago Habitat
9:00 – 9:20	**Patterson, Mars**	Respite and restoration for Walnut Hill and beyond
9:20 – 9:40	**Unke Ehrenberg, Katie** & Cole, S.	Development of a restoration project in an urban/industrial setting - Tank Farm Marsh
9:40 – 10:00	**Zimmerman, Steve R.**	Village of Riverwoods, Illinois-Woodland Protection Ordinance

SESSION 4: 8:00 – 10:00 AM (GYTE 026). Moderator Curtis Creighton WETLAND RESTORATION DESIGN & MONITORING		
8:00 - 8:20	**Lewis, Timothy,** Palmer, C., Middlebrook, M., Fevold, B. & Blume, Louis	Constructing restoration projects with precision and accuracy: ensuring quality control throughout construction
8:20 – 8:40	**Majka, Brian**	Development of natural and nature-based features decision support tools for Great Lakes shorelines in Michigan and New York
8:40 – 9:00	**Appelgren E.**	Design theory of ecological interventions in riverine restoration
9:00 – 9:20	**Overbeck, Will W.,** Kraft, D. & Mosca, V.	Hydrologic restoration as a key to unlocking the potential in degraded wetlands and streams, leading to ecosystem stability through adaptive management
9:20 – 9:40	**Hammer-Lester, Rebecca,** Lampe, D.C., Couchman, A., Moore, M., Byappanalhalli, M., Shively, D. & Auninis, A.	Monitoring in the Grand Calumet River Area of Concern after restoration in relation to an imposed eutrophication impairment
9:40 – 10:00	**Lenhart, Christian,** Cazier, A., Reins, J. & Herrington, S.	Assessment of USFWS wetland restoration to inform strategy in Minnesota

SESSION 5: 8:00 – 10:00 AM (GYTE 035). Moderator Scott Bates SOIL, FUNGI, AND MISCELLANEOUS RESTORATION TOPICS		
8:00 – 8:20	**Veerabahu*, Aishwarya,** Banik, M.T., Lindner, D.L., Pringle, A. & Jusino, M.A.	The Midas mushroom: ecological impacts of the invasive Golden Oyster mushroom
8:20 – 8:40	**Powell*, Rosalie H.,** Charton, K.T. & Damschen, E.I.	Effects of climate change and management on soil health in tallgrass prairies
8:40 – 9:00	**Bauer, Jonathan T.**	Restoring below-ground interactions: what do we know, and how do we move forward?
9:00 – 9:20	**Cowdin, Kristi A.,** Moran, E., Nelson, S., Gordon, B., Ritchie, A.	Vegetative composition on permanent conservation easements in an agricultural landscape in southern Minnesota
9:20 – 9:40	**Roehrie, Kylie** & Barker, S.	Overview of NiSource Monarch CCAA and Biodiversity Program
9:40 – 10:00	**Showerman, Troy, Silic, Steve & Suarez, Daniel**	Beyond the surface: unveiling Powderhorn Lake's Restoration story. [1]Forest Preserves of Cook County, River Forest, Illinois

SESSION 6: 10:20 – 11:20 AM (GYTE 108). Moderator Chris Westering CLIMATE AND TECHNOLOGY		
10:20 – 10:40	**Norris, Jessica Hardesty**	Counting carbon with an abacus: lessons from the literature and field
10:40 – 11:00	**Mosca, Vincent** & Byers, S.	The value of regional scale land protection and restoration for climate change resiliency
11:00 – 11:20	**Costilow, Luke** & Soldierson, K.	Using agricultural drones in ecological restoration

SESSION 7: 10:20 – 11:20 AM (GYTE 116). Moderator Kay Rowberg HABITAT MANAGEMENT		
10:20 – 10:40	**Catchpole, Floyd B.**	Lessons from restoring sand savanna in the Grand Prairie of Illinois
10:40 – 11:00	**Easter, Bob**	Prioritizing stewardship practices to improve efficiency and maximize ecological potential
11:00 – 11:20	**Duke, Shawn T.,** McAlister, T.J., Bergeson, E.	Large scale estuary and upland habitat restoration at Spirit Lake in the St. Louis River Great Lakes Area of Concern

SESSION 8: 10:20 – 11:20 AM (GYTE 002). Moderator Leslie Thompson STREAM RESTORATION AND RESEARCH		
10:20 – 10:40	**Little*, Matthew R.** & Sander, H.A.	Restoration site-selection in a heavily anthropogenic watershed using multi-criteria decision analysis
10:40 – 11:00	**Ptacek, Kevin**	Funding mechanisms to restore an impacted watershed: Paddy's Run
11:00 – 11:20	**Smiley Jr., Peter C.**	Instream habitat and fish responses to planting grass filter strips adjacent to agricultural headwater streams

SESSION 9: 10:20 – 11:20 AM (GYTE 026). Moderator Vanessa Quinn TOOLS FOR RESTORATION PROFESSIONALS		
10:20 – 10:40	**Tekverk, Karen A.**	Is practitioner certification right for you?
10:40 – 11:00	**Young, Chris**	Innovations in pathways into ecological restoration with collaborative models for students, educators, and professionals
11:00 – 11:20	**Schneider, Rebecca L.,** Trlica, A., Morreale, S., Van Es, H. & VerCauteren, T.	Growing an Old Growth Grasslands Network as the foundation for restoration and improved management of North American grasslands

ORAL PRESENTATION ABSTRACTS (ALPHABETICAL ORDER)

Appelgren, Ethan R.* Design theory of ecological interventions in riverine restoration. Hey and Associates, Inc., Chicago, Illinois. Email: eappelgren@heyassoc.com

The design of ecological interventions, systems structured to improve habitat conditions in their immediate surroundings, is a delicate art, especially in dynamic environments like river corridors. An intrusion to the ecosystem can be disruptive to existing conditions, but the rewards for successful integrations of restoration techniques are well worth the risk. Hey and Associates, Inc., has prescribed the installation of several typologies of riverine ecological interventions, such as stream barbs, engineered log jams, root wads, brush boxes and lunker structures across a variety of projects, ranging from minor creeks to major river bodies. The habitat and ecological benefits of these interventions are immense and have the potential to assist in the restoration of degraded waterways across the Midwest. Through my article, I will aim to explain and demonstrate how the design of these practices can lead to successful river system restorations in Midwest River systems, and how their installation can benefit representative members of the local ecosystem.

Bauer, Jonathan T.[1]*, Emily Galloway[1], Grace L. Brock[1], Katherine N. Stahlhut[1], Isabelle Turner[1], Paul A. Price[2], and Emily Grman[2]. Restoring below-ground interactions: what do we know, and how do we move forward? [1]Miami University, Oxford, Ohio. [2]Eastern Michigan University, Ypsilanti, Michigan. Email: bauerjt@miamioh.edu

Anthropogenic disturbance can cause long-lasting changes to soil microbiomes, including mycorrhizal fungi and rhizobia. Restoring soil microorganisms has the potential to improve restoration outcomes, such as increasing plant diversity and improving re-establishment of rare species. However, translating basic science into tractable approaches for ecological restoration remains a challenge. One major challenge for incorporating mycorrhizal fungi (AMF) into restoration practice is developing more effective methods for isolating and culturing these fungi. AMF must be cultured with a plant host, and only a small subset of these fungi responds well to growing under controlled lab or greenhouse conditions. This challenge also limits our basic knowledge of AMF; with limited fungal cultures to study, it is difficult to know how AMF communities recover with restoration or to know when active restoration is needed. Our work so far indicates that inoculation with beneficial AMF strains can improve rare plant establishment. However, we've also found highly beneficial strains in surprising locations, suggesting potential for passive recovery of AMF communities, even in highly degraded landscapes. In contrast to AMF, rhizobia are easily cultured with standard microbiology techniques, but their relationships with plant hosts are specialized, so strains must be isolated for each plant species that relies on mutualisms with rhizobia. Our work shows that the presence of high-quality rhizobia is highly variable among sites, but rhizobia presence is not clearly predicted by site history. So, it can be difficult to know where inoculations are needed. However, as with AMF, inoculation with rhizobia can improve growth and survival of rare legume species. Overall, the goal of our talk is to discuss the challenges of working with soil microbiomes, review recent advances in our understanding of restoring plant-microbe mutualisms, and start a discussion about how academic research can better translate the science of plant-microbial interactions into restoration practice.

Catchpole, Floyd B.* Lessons from restoring sand savanna in the Grand Prairie of Illinois. Forest Preserve District of Will County, Joliet, Illinois. Kankakee Torrent Chapter of the Illinois Native Plant Society, Chicago, Illinois. Email: fcatchpole@comcast.net

Illinois sand savanna mosaics have become destabilized due to loss of species, introduction of nonnative species and disruption of abiotic conditions such as hydrology and fire. This has led to a management crisis requiring aggressive management to restore natural communities to a typical condition. Intensive management of the Braidwood Sand Area (1,700 managed acres) began in 2012, when it became apparent that prescribed fire and partial hydrologic restoration was not stopping the transition of savanna, prairie, and wetland natural communities to forest, shrubland and swamp conditions. Going far beyond controlling invasive species, we are aggressively controlling native trees, shrubs and grasses as needed to rebalance the system. The management process is discussed with a focus on logical activity sequences that are effective and minimize expenses, as well as possible solutions that have not been implemented.

Cook, Jaron, Chelsey Blanke**,** and Daniel Larkin. Influence of management practices on plant diversity in Conservation Reserve Program grasslands. [1]University of Minnesota-Twin Cities, St. Paul, Minnesota. Email: cook0602@umn.edu

The Conservation Reserve Program (CRP) is the largest land restoration program in the United States, with over 23 million acres enrolled across the contiguous 48 states as of 2022. However, ecological studies of CRP lands have shown that the program does not provision biodiversity, acre-to-acre, as well as other restored grasslands and remnant prairies. This study aims to identify the effects of restoration practices and site characteristics on biodiversity-related outcomes. The ultimate goal is to identify practicable opportunities for the Farm Service Agency and participating landowners to improve biodiversity outcomes on CRP-enrolled lands. We sampled plant species composition and richness on 10 CRP-enrolled sites and 5 reference sites across western Minnesota and eastern North Dakota to characterize plant communities established by high- vs. low-diversity CRP practices (seed mixes) and compare these outcomes to nearby reference prairies. We worked with county Farm Service Agency offices to compile seed mixes and management history for each participating site and conducted surveys with landowners to tabulate year-to-year land management activities that were not officially reported. We applied statistical models to explain trends in biodiversity outcomes based on seed-mix diversity and management practices, while accounting for topographic heterogeneity and hydric soils as key underlying environmental factors. We found that frequency of active management (including mowing, grazing, and fire) was positively correlated with multiple metrics of biodiversity, highlighting the importance of regular disturbance for maintaining plant diversity in grasslands. We also found that sites seeded with higher forb:grass mixes tended to have higher native forb: grass composition in the established vegetation. However, sites seeded with higher forb:grass mixes also tended to have higher relative abundance of non-native grasses, suggesting a tradeoff between establishment of native forbs vs. suppression of non-native grasses.

Costilow, Luke* and Kristen Soldierson. Using agricultural drones in ecological restoration. Davey Resource Group, Inc., Kent, Ohio. Email: luke.costilow@davey.com

This presentation will delve into the benefits of utilizing drones for wetland and ecological restoration. Two case studies will be featured: one showcasing the use of an agricultural spray drone in a wetland setting targeting invasive species, and the other highlighting an agricultural drone seeder's effectiveness in seeding newly constructed restoration areas. These examples will demonstrate the advantages of utilizing drones as compared to traditional seeding and spraying methods, including reducing the time, cost, and effort needed to complete a project. These case studies review how utilizing this technology reduces potential negative impacts to site integrity, such as disturbing sensitive habitats and introducing invasive species via traditional equipment, while also having the added benefit of reducing the health and safety risks to applicators and operators.

Cowdin, Kristy A.*, Evelyn Moran1, Sara Nelson, Brad Gordon, Alan Ritchie. Vegetative composition on permanent conservation easements in an agricultural landscape in southern Minnesota. Great River Greening, St. Paul, Minnesota. Email: Kristy Cowdin, kcowdin@greatrivergreening.org

Permanent conservation easements are the prime land protection tools on private lands in Minnesota. Over $200 million state dollars have protected over 6,000 easements statewide. Since 1986, Redwood County, in Southwest Minnesota, has acquired approximately 600 easements covering more than 19,000 acres. Protection and restoration occur through a variety of funding sources, primarily the Minnesota-funded Reinvest in Minnesota program, and the state and federal partnership – the Conservation Reserve Enhancement Program. Vast amounts of money have been expended to acquire and restore easements, though funding has not been available to monitor vegetative condition. Great River Greening has been working on a project to evaluate the current vegetative diversity, floral cover, and tree encroachment on these easements. This presentation will review the results of a three-year monitoring study on 21 easements within Redwood County, Minnesota. The floristic quality assessment (FQA) was run on all transects. Additionally, bloom times and floral coverage were analyzed to represent plant species of high pollinator benefit and those specifically used by specialist bees. All conservation easements within the county were evaluated for tree encroachment. Vegetation monitoring data for these landowner-managed easements was compared to “high quality” Prairie Bank easements managed Minnesota Department of Natural Resources staff. Vegetative diversity and floral coverage ranged from low with primarily invasive species to moderately high on others. There is some evidence suggesting easement age, easement type, and varied management activities affect vegetative diversity, though that information needs to be better evaluated. Tree encroachment is notable across the board. This data is being used to generate resources for landowners and conservation professionals alike. We anticipate this information will be very useful when looking at ways to improve vegetative cover on existing easements, plan for new easement reconstruction and restoration, and provide useful land management recommendations across the entire region.

Del Vallé, Antonio[1]*, Greta, Franke[1,2], Eleanore Kelleher[1,3], Emma Leavens[1], and Meghan Midgley[1]. Recovery of plant communities and soil biogeochemistry following brush pile burning. [1]The Morton Arboretum, Lisle, Illinois. [2]Emory University, Atlanta, Georgia. [3]Arizona State University, Tempe, Arizona. Email: antoniodelvalle@mortonarb.org

To restore oak woodlands in the Midwestern US, ecosystem volunteers and managers cut invasive shrubs and thin trees. The resulting woody debris is usually piled and burned in place, a process known as brush pile burning. Though individual brush piles are generally small (2-5 m in diameter), burning them can produce zones of extreme soil temperatures that adversely affect soil properties and plant regeneration. Because brush piles are often produced at high density in small management units undergoing ecological restoration in the Chicago region, they may have consequences for ecosystem functioning and regional biodiversity conservation. However, the ecological effects of these brush pile burns, which may include long-term changes in plant communities and soil biogeochemistry, are largely unexamined in this region. In this study, we used a chronosequence of burn scars created between 2015 and 2023 at The Morton Arboretum (Lisle, IL, USA) to evaluate the effects of brush pile burning on

plant communities and soil biogeochemistry across eight years of successional recovery. We found that brush pile burning had dramatic effects on plant communities and soil biogeochemistry, much of which persisted for at least eight years following burning. It took seven years for burn scar vegetation cover to approximate that found in unburned areas ($P<0.001$). Soil nitrate and phosphate concentrations increased for one and four years respectively following burning, before returning to control levels ($P<0.001$). Brush pile burning increased pH from an average of 6.1 to an average of 7.9 and brush pile burning dramatically decreased microbial biomass ($P<0.001$). These effects persisted throughout the eight-year chronosequence. Our results suggest that while soil nutrient dynamics may recover unaided, soil pH, microbial populations, and vegetation communities may require active restoration following brush pile burning.

Easter, Bob*. Prioritizing stewardship practices to improve efficiency and maximize ecological potential. NICHES Land Trust, Lafayette, Indiana. Email: rleaster@nicheslandtrust.org

Natural areas in the Midwest face a set of challenges that are difficult to overcome but with dedicated and coordinated effort it is possible to complete meaningful restoration and revitalization of our natural ecosystems. Much of our landscape has been converted to agriculture and other human uses leaving our remaining natural areas vastly reduced in acreage and heavily fragmented. Prairies, barrens, savannas, and other grassland habitats that once stitched together our wooded stream valleys and forests into a mosaic landscape are nearly all destroyed. Human and wildlife interactions and activities that once shaped the composition of our natural areas for thousands of years in real-time are now virtually non-existent. Several main factors need to be addressed to achieve meaningful progress including - connecting natural areas at the landscape level through ownership and/or working across boundaries with neighbors, meaningful reduction of white-tailed deer populations, returning prescribed fire as an active process, restoring hydrology when possible, controlling invasive species and overabundant native species, and increasing light to the herbaceous layer. Many of our problems are symptoms of loss of balance and natural processes resulting from rapid changes in human populations and their relation to the world around them culturally and physically. NICHES Land Trust uses historical, financial, and human resources, partner organizations, and common-sense prioritization and integration of stewardship practices to revitalize and in some cases restore natural areas, repairing the landscape and educating the public to build a local culture of caring for natural areas.

Fuka, Mark E.*, and John L. Orrock. Invasive shrubs affect the efficacy of capsaicin-coated tree seeds at reducing small mammal granivory. University of Wisconsin-Madison, Madison, Wisconsin. Email: fuka@wisc.edu

Promoting regeneration of native trees is important given the ecological and economic importance of forested ecosystems. Although adding seeds of native trees may promote tree regeneration, the utility of seed addition can be greatly limited by animals that consume seeds. Moreover, given that regeneration often occurs in forests where invasive shrubs are abundant, and evidence suggests that invasive shrubs can increase granivory, it is important to explore whether methods for reducing granivory on tree seeds work equally well in invaded and

uninvaded habitats. Treating seeds with capsaicin may help increase regeneration by deterring granivory, but it is unclear whether the effectiveness of capsaicin differs in habitats with or without invasive shrubs. We used multi-site field experiments to measure the removal and dispersal of *Quercus rubra* acorns that were coated with capsaicin-extract in ethanol, along with ethanol-only and water-only controls. Both seed removal and dispersal occurred in sites with and without invasive shrubs (primarily *Rhamnus cathartica*). Seed removal was quantified daily until all *Q. rubra* acorns were removed. Seed dispersal was quantified by setting out nail-tagged acorns for 8 weeks which were located to record seed fate and dispersal distance. Our results reveal that both the presence of invasive shrubs and capsaicin-extract effected *Q. rubra* acorn removal. Extract-coated acorns lasted 37.8% longer in uninvaded compared to invaded plots. Additionally, our results show that following dispersal, 83% of all found acorns were destroyed, with all intact acorns being found within uninvaded plots. Among intact acorns, 68.4% were originally treated with capsaicin-extract. Our findings suggest that using capsaicin-coated seeds may be a viable restoration technique to reduce granivory, but the efficacy of capsaicin may be altered by invasive shrubs, rendering the use of capsaicin less effective. Therefore, removal of invasive shrubs should be a top priority for managers prior to seed addition.

Hammer-Lester, Rebecca*[1], David C. Lampe[1], Aleia Couchman[1], Myles Moore[1], Murulee Byappanalhalli[2], Dawn Shively[2], and Aaron Aunins[2]. Monitoring in the Grand Calumet River Area of Concern after restoration in relation to an imposed eutrophication impairment. [1]U.S. Geological Survey Ohio Kentucky Indiana Water Science Center, Indianapolis, Indiana. [2]U.S. Geological Survey Great Lakes Science Center, Chesterton, Indiana. Email: rhammer-lester@usgs.gov

Fourteen impairments to the Grand Calumet River (GCR) and Indiana Harbor and Ship Canal (IHC) in Northwest Indiana including eutrophication were identified by the Great Lakes Water Quality Agreement in 1987, which led to the designation by the USEPA of the Grand Calumet River Area of Concern. The GCR and IHC are highly altered waterways with a legacy of heavy industrial use, resulting in contamination of the sediment with industrial chemicals and byproducts. Since the designation, much work has been completed to remediate the water bodies, including dredging, dredging, and capping, and restoration of a dune, swale, and shelf wetland. Beginning in 2021, two years of growing season monitoring were performed, focused on continuous dissolved oxygen (DO) levels in relation to potential removal of the eutrophication beneficial use impairment. Monitoring sites were chosen to reflect current conditions in remediated and unremediated reaches of the GCR. Monitoring included continuous water-quality parameters related to eutrophication, eDNA sampling for cyanobacteria and eukaryotic algae community identification, and discrete nutrient-related water-quality sampling. In both 2021 and 2022, DO fell below target thresholds for maintenance of aquatic life at both remediated and unremediated sites. Due to the diversity of site conditions, remediation effects were not always clear. However, at the downstream end of remediated reaches both mean and minimum DO concentrations were often higher than at their unremediated upstream counterparts suggesting a relation between remediation status and DO concentration. Additionally, isotope sampling showed the role of releases from combined sewer overflows (CSOs) on algal communities and water quality. Nitrification was identified to be more efficient at sites where nutrient loading from CSO releases initiate conversions from

ammonia and nitrite to nitrate. Findings of this study display the role of CSO releases and remediation of legacy contaminants on algal communities and water quality.

Homann, Michelle A.* and Ellen I. Damschen. Prescribed fire timing drives differing emergence phenology in tallgrass prairies plants. University of Wisconsin – Madison, Madison, Wisconsin. Email: mhomann@wisc.edu

Disturbance by fire plays an important role in temperate grassland restoration by removing buildup of senesced plant material, stimulating grass and forb productivity, and promoting native species diversity. During tallgrass prairie restoration and maintenance, fire is typically prescribed on the shoulders of the growing season in either early spring or late fall. Yet, the timing of fire, even when prescribed during the “dormant” season, can alter prairie plant community composition. Spring emergence timing is an understudied aspect of plant community responses to fire and one potential driver behind long-term change in plant community composition depending on the timing of prescribed burns. To better understand how fire seasonality effects change in grassland plant community composition, we examined emergence timing, growth rate, and flowering effort for ten common tallgrass prairie plant species throughout the 2023 growing season. We hypothesized that spring prescribed burns would damage emerging plants, leading to delays in growth when compared to fall-burned conspecifics. To test our hypothesis, we collected weekly data on emergence timing and growth rate for species in plots that have been burned annually in April or November since 2016. Additionally, we determined how many individuals flowered during the growing season. We found that plants in fall prescribed burn plots emerged up to two weeks early when compared to spring-burned or unburned conspecifics. Some species emerged prior to, and were damaged by, the spring prescribed burn. Percent cover of plants in the spring prescribed burn treatment was significantly lower than in fall burn plots for five weeks following the spring burn. Growth rate and flowering effort responded to fire timing in different ways depending on the species. Our findings suggest that plant emergence timing may be a mechanism that drives plant community responses to prescribed burn timing and can inform management decisions surrounding prescribed fire.

Hunt, Lindsay E.F.*, Noel B. Pavlovic, and Ralph Grundel. Using umbrella species to understand connectivity: A case study in Northern Michigan and Wisconsin. USGS Great Lakes Science Center, Chesterton, Indiana. Email: lhunt@usgs.gov

Many driving factors in land cover change are increasing, making it imperative to maintain and improve connectivity. Human population growth, infrastructure expansion, and conversion to agriculture all encourage changing land cover and increase habitat fragmentation. Intensified fragmentation results in connectivity loss, forcing movement across inhospitable land cover and increasing mortality risk. Connectivity loss can result in habitat patches which support fewer individuals or species, causing higher extinction rates and lessening chances of recolonization. Umbrella species are often used in conservation decision making to indirectly conserve or protect a greater number of species. We have taken this concept and applied it to connectivity in a pilot area along the Lake Superior coastline of Michigan and Wisconsin. We

selected a suite of species each representing a vegetation class found in our study area and which were also of particular conservation interest to local stakeholders. While land cover is an important factor for species movement, we included other variables affecting species movement such as road density, canopy cover, and distance to water. Using principles of circuit theory, we incorporated all landscape movement variables for each species and, using both Circuitscape and Omniscape, produced connectivity maps showing all potential corridors of movement. Our maps show connectivity for each umbrella species as well as other species of that habitat. We combined these maps to understand connectivity for all vegetation classes, compared where connectivity loss was most likely for each species, and identified where connectivity overlapped between species. This can inform conservation decisions for land managers.

Kanine, Jennifer*. The Pokagon Band's Dowagiac River Restoration: a tribal wetland project with a decade of progress. Pokagon Band of Potawatomi, Dowagiac, Michigan. Email: Jennifer.Kanine@pokagonband-nsn.gov

The Pokagon Band of Potawatomi Indians sought to restore historic meanders to the Dowagiac River in Southwestern Michigan. The Dowagiac River, a subwatershed of the St. Joseph River watershed, was dredged, straightened, and disconnected from its floodplains in the early 1900's. The Dowagiac River is important in Southwestern Michigan because it is a coldwater fishery system fed by the Kalamazoo glacial moraine. Recently an additional St. Joseph River watershed project resulted in a dam removal downstream of tribal properties that allowed for migratory fish passage into 159 miles of the Dowagiac River and its tributaries for the first time in over 100 years. Over the past decade the Pokagon Band has made efforts towards securing funding and restoring a section of the Dowagiac River surrounded by tribal properties. The project cost was over five million dollars, so the project was split into two phases. The second, and final phase, was completed during November 2023. The completion of the project has increased the resiliency within the riverine system, restored hydrology to approximately 53.2 acres of wetlands on tribal properties, doubled the length of the river within the stretch that was restored from 0.66 miles to 1.29 miles (or 2.58 miles of engineered riverbank restoration), and created improved habitat niches for multiple aquatic, semi-aquatic, and terrestrial species.

Leavens, Emma[1]*, Kath Thomas[1], Mary-Claire Glasenhardt[1,2], Adrienne Ernst[2], Andrew Hipp[1], and Meghan Midgley[1]. Plant community diversity as predictors of tall goldenrod (*Solidago altissima*) invasion and persistence. [1]The Morton Arboretum, Lisle, Illinois. [2]Berry College, Mount Berry, Georgia. Email: eleavens@mortonarb.org

Tall goldenrod (*Solidago altissima*) is a common plant in many prairie, savanna, and woodland restorations in the Midwest. Although it is native, it frequently colonizes areas recently cleared of brush and pole trees, suppressing establishment of diverse plant communities. Furthermore, tall goldenrod does not carry fire well, inhibiting an essential cultural practice that supports biodiversity in these communities. Efforts to mechanically manage tall goldenrod include scything, mowing, and pulling while attempts to control it through biotic means have included introduction of parasitic and hemi-parasitic plant species. In this study, we sought to understand what aspects of diversity within seeded plant communities are most successful at resisting

invasion of tall goldenrod and/or outcompeting it over time. To assess this, we monitored tall goldenrod cover over six years in experimental plots seeded with different combinations of prairie plant species. In 2016, 72 2m^2 plots were seeded with 15 prairie species selected from a pool of 127 prairie species. A total of 36 different species combinations were seeded, each into 2 plots. Species mixes varied in both phylogenetic and functional diversity as well as in relative abundance of graminoids, legumes, and forbs. Tall goldenrod spontaneously established in the plots within the first 2 years of the experiment. Cover data of all 15 species was collected in early and late summer each year starting in 2017 and cover of tall goldenrod was surveyed in September of 2018, 2021, and 2023. This study provides insight as to which characteristics of plant communities may best resist initial establishment of tall goldenrod and which may outcompete tall goldenrod over time. This will be valuable for stewards and managers looking to establish diverse plant communities.

Lenhart, Christian[1,2]*, Amy Cazier[2]. John Reins[3], and Steve Herrington[2]. Assessment of USFWS wetland restoration to inform strategy in Minnesota. [1]University of Minnesota, St. Paul, Minnesota. [2]The Nature Conservancy Minnesota, North Dakota and South Dakota Chapter, Minneapolis, Minnesota. [3]The US Fish and Wildlife Service, Waite Park, Minnesota. Email: lenh0010@umn.edu

The United States Fish & Wildlife Service (USFWS), Partners for Fish & Wildlife program and The Nature Conservancy (TNC) are partnering to restore wetlands on private lands for wildlife habitat, water quality improvement, and enhancement of ecological services. The USFWS has restored hundreds of wetlands in the region, mostly for waterfowl and wildlife habitat. However, wetlands are increasingly being restored for water quality benefits and climate change mitigation potential. At the University of Minnesota, restored wetlands are being assessed for their effectiveness in achieving program goals. The Wetland Restoration Effectiveness Tool (WRET) is being used to predict nutrient removal and carbon storage benefits at a coarse scale with minimal inputs required. Selected sites are being monitored in more detail for hydrologic and vegetative response to re-wetting. The WRET analysis for USFWS-restored wetlands, which are predominantly 5-15 acres in size and treat less than 100 acres of drainage area, suggests that nitrogen removal averages>80%, whereas phosphorus (P) removal averages <60%. Of note, many wetlands are potential sources of dissolved phosphorus as indicated by a qualitative index of “P-leakage.” Carbon storage, measured in tons/ha, is greatest in peatlands and other histosols soils, which are common in central and northern Minnesota. Our analysis suggests the need to maximize wetlands’ water quality treatment by selecting sites with greater drainage area. Carbon storage potential is greatest in peatlands and re-wetting reduces CO_2 emissions from historically drained peatlands. The partnership is helping to scale-up wetland restoration on private lands and better target areas with the most benefit for water quality and climate change while still supporting traditional USFWS wildlife conservation goals.

Lewis, Timothy**[1*]**, Craig Palmer[1], Molly Middlebrook[1], Brick Fevold[1], and Louis Blume[2]. Constructing restoration projects with precision and accuracy: ensuring quality control throughout construction. [1]General Dynamics Information Technology, Falls Church, Virginia, [2]U.S. Environmental Protection Agency, Chicago, Illinois. Email: Timothy.Lewis2@gdit.com

To assess the effectiveness of ecological restoration treatments, adherence to engineering design specifications is essential. Quality assurance (QA) and quality control (QC) throughout project implementation are pivotal in the determination of adherence to design specifications. The U.S. Environmental Protection Agency Great Lakes National Program Office (GLNPO) led an initiative to craft a guidance document concentrating on key aspects of quality documentation crucial for effective oversight during ecological restoration projects' construction phases. These projects encompass various activities, such as stabilizing riparian corridors or adjusting habitat features like pool/riffle/run ratios. Quality control involves tasks like equipment calibration, confirming material quality and quantity, and ensuring appropriate seed/plant species selection. The guidance underscores the importance of documenting ongoing assessments to ensure workmanship quality and resource efficiency. It offers a comprehensive approach to QA/QC oversight by integrating insights from reputable sources. This presentation outlines the guidance document's core components and was funded by an EPA contract in support of the Great Lakes Restoration Initiative.

Little, Matthew R.*[1] and Heather A. Sander[2]. Restoration site-selection in a heavily anthropogenic watershed using multi-criteria decision analysis. The University of Iowa, Iowa City, Iowa. Email: matthew-little-1@uiowa.edu

Today’s landscapes are increasingly anthropogenic. Activities such as agricultural expansion drive the creation of these landscapes and contribute to biodiversity loss in regions where little unaltered land cover remains. Therefore, landscape-scale ecological restoration is required to conserve species and improve ecosystem functioning. However, designing landscape-level restoration efforts is challenging given the need to consider a range of ecological and social factors. We demonstrate the use of multi-criteria decision analysis (MCDA) in integrating multiple variables in landscape-level restoration site selection to address this challenge. We focus on the heavily agricultural Iowa-Cedar watershed of Iowa and Minnesota, USA as a case study. We identify restoration sites first using land-cover and social factors to identify location suitability for conservation-oriented protection under current land-cover conditions. Secondly, we add indicators of suitability for ecological restoration to these factors to assess suitability based on both conservation and restoration potential. We aim to identify the most suitable 30% of the landscape to restore or conserve in the respective approaches. Our conservation-focused approach identifies patches that are larger than patches identified by our restoration-focused approach on average with a higher degree of landscape connectivity. Our second approach clearly identifies sites with high restoration potential that include existing protected areas, vegetated land-covers, and watercourses. The larger contiguous patches of suitable land identified in the conservation-focused approach may be more challenging to conserve however, particularly in a landscape so dominated by anthropogenic land uses. Contrastingly, the finer-scale detail provided by smaller average patch sizes in the restoration approach may offer more flexibility in patch choice in a realized restoration scenario, despite the lower level of connectivity. These findings illustrate the utility of MCDA in landscape-scale restoration planning in regions with few remaining habitat patches but suggest a need for careful consideration of factors used in site selection.

Majka, Brian*. Development of natural and nature-based features decision support tools for Great Lakes shorelines in Michigan and New York. GEI Consultants, Inc. Allendale, Michigan. Email: bmajka@geiconsultants.com

The use of natural and nature-based features (NNBF) for erosion control and flood management along coastal shorelines is growing nationwide. However, as an emerging practice, there are limited tools available to guide landowners and practitioners in the selection of NNBF techniques. The States of Michigan and New York, in parallel efforts, are currently developing decision support tools (DST's) to better inform the selection of NNBF practices with the intent to increase resiliency in coastal communities. The DST's are semi-quantitative, combining engineering practices with ecological considerations in tools that will be functional and easy to use for both non-professional landowners and professional designers and practitioners. This presentation will review NNBF practices on Great Lakes Shorelines and will review the tools which are currently under development.

McAlister, Tim J., Emma Bergeson, and Shawn T. Duke*. Large scale estuary and upland habitat restoration at Spirit Lake in the St. Louis River Great Lakes Area of Concern. Stantec Consulting Services Inc., Brighton, Michigan. Email: shawn.duke@stantec.com

Stantec is helping restore one of the ecological treasures of western Lake Superior—the St. Louis River. Stantec is performing habitat restoration in upland and in-water portions of the site. In total, 138 acres of aquatic, emergent, and shoreline habitat and over 75 acres of upland habitat will be restored. Stantec's team has exhibited adaptive management by working with the stakeholders to adjust planting schemes due to the dynamic water elevations of the St. Louis River. In total, Stantec will install over 350,000 plants in the constructed/re-established Shallow Sheltered Bay, 99% of which were installed between May and September of 2023. Stantec utilized an on-site nursery, specially constructed for this project, to properly stage all upland, emergent, and submerged aquatic plants prior to installation. Additionally, over 1,800 shrubs were installed to enhance pedestrian access which will be granted at a time to be determined in 2024. Stantec also used an experienced team of five superintendents to lead planting, seeding, and nursery operations during the 2023 season, and at the most critical stages of installation retained over 30 skilled laborers to meet optimal planting windows for in, near, and out of water plantings. Construction will be finalized in 2024.

McConnell, Coilin P.* Urban stream restoration-an ecological contractor's perspective. Baxter & Woodman Natural Resources, LLC., Marengo, Illinois. Email: cconnell@baxterwoodman.com

Urban stream restoration projects are among the most difficult ecological projects to both design and construct. Stream restoration design usually includes a team consisting of a Restoration Ecologist, Landscape Architect, and Environmental Engineer. Ecological Contractors, however, are rarely included in the design phase and often have a different perspective. A contractor first looks for potential design and site condition issues that could

create lack of efficiency ultimately leading to financial loss before deciding to bid on and construct the project. The contractor's responsibility is ultimately to understand the proposed project and what needs to be built but also the intent and vision of the design team and how a contractor's "Means & Methods" often differ from the project specifications. This presentation will go through the entire contractor process of bidding on, meeting with design team, constructing, and final walk through related to Dixie Creek in Algonquin, Illinois. Also learn about items such as quantities of product, mobilization, equipment, unforeseen issues while on site, design changes, dewatering issues, and staying on schedule and budget to produce the final product.

Molinaro, Nicole M.[1*], and LeeAnn Kruszynski [2]. Restoration of residential lands for sustainable ecology. [1,2] Green Residents of Westchester (GROW) Ecological Commission, Westchester, Illinois. [1]Triton College, River Grove, Illinois. [1]Email: nmolinaro@westchester-il.gov

Located in central Cook County, the Village of Westchester is uniquely positioned with adjoining areas representing a variety of ecosystem types: Wolf Road Prairie to the west, Forest Preserves of Cook County to the south, and Addison Creek to the east. Because of the Village's geography, Westchester recognizes its pivotal role in helping to preserve and support the diverse natural areas that surround it. At the same time, turf grass lawns dominate the residential landscape and cannot be sustained without significant continued impact to local ecosystems. The 2020 Chicago Region Tree Initiative Urban Forestry Summary for Westchester justifies the need to increase canopy coverage through increased tree planting, but improvements in all layers of the landscape are necessary to return our surrounding ecosystems to pre-settlement levels of health and biodiversity. One challenge faced by the Green Residents of Westchester (GROW) Ecological Commission is to bring awareness to the many ecosystem services that are provided by the adjoining prairie, forest, and riparian areas, and to empower residents with the knowledge and tools needed to ensure that more private property in the Village functions to unite and support each of these distinctive environments. At the same time, GROW works to educate and advise elected officials and staff regarding policies and programs that "...improve the quality of air, water, and land; reduce greenhouse gases; minimize waste; and reduce energy consumption..." Through this top-down and bottom-up engagement, GROW has an opportunity to encourage favorable conditions for the development of optimized urban ecosystems that serve to sustain multiple facets of Illinois' natural heritage.

Mosca, Vincent*[1] and Steven Byers[2]. The value of regional scale land protection and restoration for climate change resiliency. Case Study: Hackmatack National Wildlife Refuge. [1]Hey and Associates, Inc., Volo, Illinois. [2]Friends of Hackmatack NWR Board, Richmond, Illinois. Email: vmosca@heyassoc.com

This presentation will provide a ten-year history of Hackmatack National Wildlife Refuge, the natural resources occurring within the refuge, how partners are working to help build the refuge, and how Friends of Hackmatack are supporting conservation goals of the refuge. The role of the refuge in promoting biodiversity on a regional scale in the Nippersink Creek watershed through natural resources protection and ecological restoration will be presented. Also, the

Hackmatack National Wildlife Refuge is valuable as an urban wildlife refuge, providing ecosystem services that strengthen resiliency to climate change in a fragmented landscape. The importance of Hackmatack NWR and accompanying ecosystem services in allowing regional biodiversity to adapt in the face of expected changes to weather patterns in the Upper Midwest will be discussed.

Naylor, Shawn*[1], and Amy M. Gahala[2]. Hydrology and water quality of a restored dune-and-swale wetland adjacent to the Grand Calumet River, Indiana, 2019-22. [1]U.S. Geological Survey Ohio-Kentucky-Indiana Water Science Center, Indianapolis, Indiana. [2]U.S. Geological Survey Central Midwest Water Science Center, DeKalb, Illinois. Email: snaylor@usgs.gov

Adverse ecological and water-quality effects associated with industrial land-use changes are common for littoral wetlands connected to river mouth ecosystems in the Grand Calumet River-Indiana Harbor Canal area of concern (AOC). Wetlands in the adjacent Clark and Pine Nature Preserve and Pine Station Nature Preserve are intended to mitigate wetland destruction in the AOC by restoring residual dune-and-swale wetlands and preserving habitat for endangered and threatened species. Physical hydrology and water-quality monitoring of restored wetland cells at the preserves were initiated during 2019 to evaluate changes after wetland restoration efforts in 2015 and near record-low water levels in early 2013. Lake Michigan water levels rose steadily between 2013 and 2018 to record-high water levels in 2019 and 2020. Precipitation, evapotranspiration, and groundwater and surface-water levels are analyzed to better understand wetland inundation controls and flow directions in restored northern dune-and-swale wetland settings relative to the Grand Calumet River. Continuous specific conductance data and discrete water-quality samples were collected and analyzed to provide a synoptic view of wetland water quality. High Lake Michigan water levels affected Grand Calumet River stage and shallow groundwater elevations in the study area after the onset of peak lake levels in June 2019. Grand Calumet River stage peaked soon after lake levels in July 2019, whereas groundwater elevations peaked in October 2019. Specific conductance values in closed-basin wetland cells in the western and central parts of the nature preserves indicated a dilution trend and contrasted those of interconnected wetland cells along an eastern corridor. Monitoring results indicate that varying seasonal wetland inundation trends with low stands in autumn have returned after high water table conditions owing to high water levels on Lake Michigan. Wetland water balance results during the study period indicated that the wetland ecosystem partially moderated flooding during high lake levels through summer evapotranspiration.

Norris, Jessica Hardesty.* Counting carbon with an abacus: lessons from the literature and field. Biohabitats, Columbia, Missouri. Email: jnorris@biohabitats.com

In recent years, and especially since the launch of the EPA's Climate Pollution Reduction Grant process, land managers are seeking ways to incorporate carbon sequestration and efflux considerations into land management decisions. In support of this, the field of ecological restoration has attempted to extrapolate and synthesize results of controlled experiments and restoration projects. While the potential benefits of such shared knowledge are great, translating results available in the scientific literature to local situations and decision-makers can be fraught. In the Midwest, where prairie restoration planning and research is state of the

art, literature synthesis has yielded powerful though sometimes conflicting insights into the costs and benefits of land management and restoration planning. Additionally, our understanding of carbon flux for wetlands and hydric soil systems is at an earlier stage of development than other elements of the midwestern habitat mosaic, so the gaps between peer-reviewed science and immediate local management needs can be pronounced. Restoration practitioners from Biohabitats will share insights on providing the best carbon flux information for local, small to mid-scale restoration planning and implementation projects in the Midwest and across the country, including stream, wetland, forest, grassland, and prairie systems. We will present and welcome input on making assumptions to parametrize carbon flux estimates across the midwestern habitat mosaic. We will also share the results of a survey of land managers on the importance and utility of carbon tracking and accounting in management decisions.

O'Reilly Catherine. Fostering collaboration for sustainable landscapes: gROWing Chicago Habitat. University of Illinois Chicago, Chicago, Illinois, Email: eobire2@uic.edu, cah272@uic.edu

This presentation will cover the innovative conservation strategies of gROWing Chicago Habitat, an initiative spearheaded by the University of Illinois Chicago engaging energy and transportation organizations in the creation of habitat. When managed to support habitat, energy and transportation corridors can serve as safe havens and linkages between ecosystems for all species, including migratory pollinators. Over the past two years, participants of gROWing Chicago Habitat created a tool to identify key areas for establishing thriving ecosystems along energy and transportation rights-of-way that can also benefit neighboring communities. This collaborative effort, involving conservation groups, energy and transportation organizations, and public-private partnerships across the Greater Chicago Wilderness region, emphasizes the use of geospatial software to focus habitat creation and conservation efforts on where they will have the most impact. Leveraging insights from gROWing Chicago Habitat participants, this tool aggregates data to identify biodiversity hotspots, areas for enhanced equity, and zones with high connectivity potential. This prioritization tool serves as a valuable guide for energy and transportation land managers for the pre-identification of strategic areas for expanding green infrastructure initiatives. By utilizing rights-of-way and geospatial analysis, we demonstrate how these initiatives can lead to the development of sustainable corridors, promote environmental well-being, and community resilience. The gROWing Chicago Habitat initiative and its activities stand as a model for cross-sector collaboration, inspiring participants to actionable outcomes for shaping sustainable landscapes across the Midwest.

Overbeck, Will W.*, Dave Kraft, and Vincent Mosca. Hydrologic restoration as a key to unlocking the potential in degraded wetlands and streams, leading to ecosystem stability through adaptive management. Hey and Associates, Inc., Volo, Illinois. Email: woverbeck@heyassoc.com

Hydrologic restorations are needed in many stream and wetland habitats to restore and enhance ecosystem function and stability, especially at rare high-quality fen sites in

northeastern Illinois. Many remaining examples of these unique groundwater fed wetlands have a lowered water table due to modified hydrology including accelerated channel incision and continued head cut erosion, leading to drying of wetland soils and the collapse of hydrologic and ecologic stability in the habitat. Engineering design and construction projects that allow restoration of ecological resiliency can be leveraged to benefit larger natural areas restoration. Case studies on hydrologic restoration designs at Gladstone Fen and Sterne's Fen in McHenry County, Illinois can serve as a model for future ecological restorations. By developing a detailed understanding of historic and current hydrology, topography, and function, solutions can be developed to restore surface and groundwater hydrology, allowing systems to once again flourish. Facilitating habitat recovery through adaptive management during and after ecological restoration, we can restore locally unique plant communities to protect and conserve a mosaic of regionally rare prairie, wetland, and woodland habitats.

Parr, Mary* and Todd Aschenbach. The influence of fire seasonality on plant composition of restored tallgrass prairies in the Great Lakes Basin. Grand Valley State University, Allendale, Michigan. Email: parrm@mail.gvsu.edu

Fire is a critical natural process in Great Lakes tallgrass prairie and can have varying effects on the plant community based on the season and plant phenology at the time of fire. Prescribed fire is a critical tool for managing these communities but is almost exclusively applied in the spring (dormant season). Anecdotal observations and research suggest that fire applied during the late summer (growing season) will influence differing responses in the plant community and ultimately increase diversity. However, there is a lack of research and peer-reviewed evidence for the effects of fire seasonality, especially for tallgrass prairie occurring in the Great Lakes Basin. Our long-term regional scale study aims to determine fire seasonality's impact on plant community composition in three tallgrass prairies of southern Michigan. This study will assess fire metrics and evaluate changes in plant composition, associated plant functional groups, and species diversity resulting from spring fire application (dormant season), late summer fire application (growing season), and no fire application (control). Our overarching goal is to provide greater insight into fire application and management of prairies in the Great Lakes Basin.

Patterson, Mars*. Respite and restoration for Walnut Hill and beyond. marsecoarts, Milwaukee, Wisconsin. Email: marsecoarts@gmail.com

Available healthy green spaces within Walnut Hill neighborhood on Milwaukee's Northwest side are sparse. The small sections of green that do exist in this area are underutilized. The approximate parameters of Walnut Hill are North Ave; Vliet St; 31st St; 35th St. Each block is lined with approximately 15-18 trees; predominantly Ash. The vision for this neighborhood is to activate underutilized city owned vacant green spaces that will connect people, place, and local plant beings *(native)* species through restoration via stewardship and co-ownership; creating safe, local access to nature for health, respite, beautification, and legacy. Currently, there are an average of 55 vacant plots of underutilized land. This plan encourages the collaborative efforts of hyperlocal community members and external stakeholders by engaging in a shared goal of education, connection to nature, and restoration of vacant city plots. This initiative is far

more intimate than building raised garden beds and providing packs of vegetable seeds. In that, the starting process is communication. First, we must build trusting relationships with the residents, then create opportunities for residents to connect with each other and the land; community members will steward the land that they have built a relationship with resulting in accountability, and a sense of ownership; growing into actual ownership in the future. I have lived in this neighborhood for over 20 years and have seen many initiatives from outside sources come and go, but very few internal ideas fully supported. I will use the adjacent land to my home that we have acquired from the city, to research, implement, and share results from this plan. These vacant plots paint a picture of the possibility of remnant restoration resulting in responsible, sustainable outcomes for future generations. Soil remembers.

Powell, Rosalie H.*, Katherine T. Charton, and Ellen I. Damschen. Effects of climate change and management on soil health in tallgrass prairies. University of Wisconsin-Madison, Madison, Wisconsin. Email: rhpowell@wisc.edu

Climate change is rapidly altering ecosystems, necessitating a nuanced understanding of management outcomes to guide adaptive practices. Prevailing research and management efforts in tallgrass prairie ecosystems predominantly focus on the implications for plant communities, while the implications for soil health remain underexplored. This research addresses the gap in understanding on the complex interplay between climate change and management practices and their effects on soil health. We sampled from two established multifactor field experiments in Wisconsin which manipulate precipitation regimes (increased summer drought and reduced winter snowpack) and management practices (woody management type and prescribed fire seasonality). We assessed treatment effects on soil health indicators, specifically soil respiration, decomposition rate, and nitrogen availability, to understand how management can mitigate or exacerbate climate change effects. We found a significant negative effect of increased drought on soil respiration. Additionally, we found moderate evidence that cut-stem herbicide treatments most closely resemble ambient unmanaged conditions with increased drought. Finally, we found that fall fire seasonality is best to use under reduced snow conditions to promote nitrogen availability. Overall, our findings suggest that soil health reactions to management are not linear and are highly dependent on climate conditions and other mechanisms that are not yet fully understood in the literature. More research is needed to further investigate the impacts of climate change, management practices, and their interaction on soil health in tallgrass prairie ecosystems.

Ptacek, Kevin*. Funding mechanisms to restore an impacted watershed: Paddy's Run. Davey Resource Group, Inc., Cincinnati, Ohio. Email: kevin.ptacek@davey.com

This presentation focuses on the funding mechanisms, planning, and implementation of projects to restore water quality and habitat, as part of a larger landscape-scale effort, within the Paddy's Run Watershed. The Paddy's Run Watershed sits atop the Great Miami Aquifer, the sole source of drinking water for the Greater Dayton region. The Paddy's Run Conservation Project (PRCP) provides funding to purchase development rights through agriculture and conservation easements from landowners in southwest Ohio. The easements help protect

water quality in the Paddy's Run watershed and the Great Miami Aquifer. The program helps to keep land in private hands while protecting working farms and the environment. The PRCP officially launched late in 2010 and the first easement was finalized in 2012. More than 4,800 acres have received a conservation easement using settlement funds from partial compensation to EPA for damages to the aquifer from the Department of Energy's Fernald Cold War production facility. Approximately thirty landowners have chosen to leave a legacy of clean water, natural habitat, and productive farmland for future generations by choosing a PRCP easement for their property to ensure the land remains permanently protected in accordance with landowner wishes defined in the conservation easements. One of these willing landowners and a PRCP easement provided an opportunity to design and construct a mosaic of pocketed pool wetlands to expand amphibian habitat. A previous herpetology survey on the property found a small and persistent wet corner of the site hosting seven different species of frogs, including the Blanchard's Cricket Frog (an Ohio Species of Concern). The project also improves water quality through infiltration of stormwater runoff, and removal of nutrient, sediment and bacterial pollutant loads prior to reaching the headwater of Paddy's Run.

Redick, Caleb H.*, and Douglass Jacobs. What factors determine the fate of hardwood trees planted on reclaimed coal mines? Purdue University, West Lafayette, Indiana. Email: credick@purdue.edu

Failure of reforestation efforts on reclaimed coal strip mines often occurs for reasons that are not clear. To better understand how variation in site factors and management affect success of the reforestation of coal mines, we conducted a survey of tree performance for mine sites across Indiana reclaimed between 2008 and 2018. We explored the impacts of climate, reclamation methodology, and soil conditions on the survival and growth of planted trees, as well as the cover of associated vegetation. This research, when combined with current knowledge on reclamation methods, aims to increase the efficacy of tree planting efforts. Organic matter had one of the most consistent and largest effects on most oak species, with highest performance between 3-5%. Soil phosphorus content was the most important factor that determined whether a planting totally failed and affected growth of white oak (*Quercus alba* L.) and swamp white oak (*Quercus bicolor* Willd.), though its effect on white oak was nonlinear. Rainfall in the year of planting had large positive effects on survival and growth of persimmon (*Diospyros virginiana* L.), and black walnut (*Juglans nigra* L.) and temperature in the year of planting had large positive effects on growth of bur oak (*Quercus macrocarpa* Michx.) and persimmon. A diverse mix of species continues to be the best option, both for approximating natural conditions, and for avoiding problems from failure of individual species. While conditions are variable, successful forest restoration on former coal mines can occur; this study reveals some of the most important factors affecting this success.

Roehrie, Kylie* and Steven Barker. Overview of NiSource Monarch CCAA and Biodiversity Program. NiSource, Valparaiso, Indiana. Email: kroehle@nisource.com

NiSource manages a vast electric and natural gas network across six states. NiSource operating companies include the Northern Indiana Public Service Company (NIPSCO), and the Columbia Gas companies in Kentucky, Maryland, Ohio, Pennsylvania, and Virginia. Our

geographic footprint of owned lands and managed easements covers over 150,000 acres of generation, transmission, and distribution facilities across a diverse landscape. Our company lands interface with a diversity of natural landscapes supporting habitats for at-risk, threatened, and endangered species. Our lands also support and connect a diversity of human landscapes across rural, suburban, and urban lands. As a result, NiSource has committed to two main corporate biodiversity goals which reflect the importance of biodiversity to both the natural and human communities we manage. These goals are: 1) create a net positive impact on biodiversity and 2) strengthen communities by our connections with nature. NiSource has focused on these goals by creating partnerships within our local communities and land management agencies, creating biodiversity management plans for several projects in our territory, reporting to the Down Jones Sustainability Index and Global Reporting Initiative, prioritizing landscape-scale connectivity where possible, participation in Rights-of Was as Habitat Working Groups, and much more. Additionally, NiSource is already contributing to the Nationwide Candidate Conservation Agreement with Assurances (CCAA) for Monarch Butterflies. This program is a national multi-sector collaborative effort to develop a voluntary conservation agreement to provide habitat for the monarch butterfly. Currently, NiSource has currently enrolled all of our managed lands in the CCAA program. Our presentation will give an overview of our biodiversity program and commitment to the Monarch CCAA while providing site specific examples of conservation and restoration projects.

Scheel, Max P.* and Tyler C. Coverdale. Shifts in plant community composition and structure over time in restored agricultural lands. University of Notre Dame, Notre Dame, Indiana. Email: mscheel2@nd.edu

Agricultural practices such as tilling, fertilization, and monoculture cropping have led to degradation, homogenization, and loss of habitat all across the prairie ecosystems of the Midwestern United States. The central goal of ecological restoration is to rebuild these degraded ecological communities by restoring ecosystem composition, structure, and function. My research investigates how these variables have changed over time—and in response to different management practices—at the restoration project at the Notre Dame Linked Experimental Ecosystem Facility (ND-LEEF). At ND-LEEF, former agricultural lands have been restored to a tallgrass prairie, and plots within the site have been seeded with native prairie species at different times over an 11-year period. By comparing plant community composition, structure, and function across this chronosequence of restoration plots, my work seeks to understand whether and how restored ecological communities change over time and to assess how successful current management practices are at maintaining restored communities. Preliminary evidence from data collection at ND-LEEF suggests that, in the absence of more intensive maintenance, the composition of the restored plant community quickly shifts to resemble unmanaged post-agricultural land. Additionally, biodiversity and species richness of the plant community was found to be similar between managed and unmanaged lands. These findings show that there is cause to further evaluate and experimentally test restoration methodologies, with the ultimate goal of discovering more effective land management practices for the Midwestern region.

Showerman, Troy*[1], Steve Silic*[1], and Daniel Suarez*[2]. Beyond the surface: unveiling Powderhorn Lake's Restoration story. [1]Forest Preserves of Cook County, River Forest, Illinois. [2]Audubon Great Lakes, Chicago, Illinois. Email: troy.showerman@cookcountyil.gov, steve.silic@cookcountyil.gov, Daniel.suarez@audubon.org

The Powderhorn Lake forest preserve, located on the far southeast side of Chicago, underwent a transformative three-year restoration project that spanned over 100 acres of wetlands. This initiative, a collaboration between the National Oceanic and Atmospheric Administration, Great Lakes Commission, Illinois Department of Natural Resources, Audubon Great Lakes, and Forest Preserves of Cook County (Forest Preserves), aimed to address the ecological degradation caused by a century of urban and industrial development. The preservation project focused on reconnecting the northern marsh of Powderhorn Lake, a once-shallow wetland, to Wolf Lake through a carefully engineered system of water control structures, wetlands, pipes, and open water streams. This allowed the Forest Preserves to regulate water levels, recreating historic conditions and preventing invasive plants from encroaching on native plants and animal habitats. Notably, the restoration efforts revitalized the northern shallows, serving as an effective fish nursery for species like northern pike, largemouth bass, lake chubsucker, and the state-threatened banded killifish. The connection between Powderhorn Lake and Wolf Lake not only benefited the aquatic ecosystem but also mitigated local flooding in adjacent neighborhoods. Additionally, it provided vital habitats for birds like least bittern, common gallinule, and pied-billed grebe. The completed project featured innovative elements such as a half-mile-long system of underground pipes and deepened water channels, reinstating crucial hydrological connections. Beyond its environmental impact, the restoration project exemplified collaborative environmental stewardship, bringing together multiple agencies to achieve a unique and ambitious goal. The initiative repurposed urban space, addressed flooding issues, and established a green corridor for wildlife movement. This holistic approach extended the benefits to the community, native plants, and animals, showcasing the profound and far-reaching positive impacts of cooperative environmental efforts. The successful completion of this endeavor marks a significant milestone in sustainable urban development and ecosystem restoration.

Schneider, Rebecca L.[1] *, Andrew Trlica[2], Stephen Morreale[1], Harold Van Es[1], and Tammy VerCauteren [3]. Growing an Old Growth Grasslands Network as the foundation for restoration and improved management of North American grasslands. [1]Cornell University, Ithaca, New York. [2] North Carolina State University, Raleigh, North Carolina. [3] Bird Conservancy of the Rockies, Fort Collins, Colorado. Email: RLS11@cornell.edu

Nearly two centuries of chronic tillage, erosion, and overgrazing have impacted grasslands throughout North America. With >90% of former grasslands converted to agriculture globally, few have remained untilled. Monitoring by WWF documents that the pressure is continuing with ~1.5 million new acres converted across the U.S. and Canadian Great Plains annually. Old-growth grasslands (OGGs) are unique in having never been plowed or overgrazed. They exist only in a few places – as small remnants in preserves, in cemeteries, or in a few well-managed rangelands. These remnants are an undervalued resource, giving us a unique window into the biophysical processes that made natural grasslands highly productive, biodiverse, and drought-resilient ecosystems. As such, they provide the ideal reference system for guiding restoration.

They also provide numerous ecosystem services including: flower resources for pollinators, plant and soil systems adapted for carbon sequestration, reservoirs of unique soil microbial communities, steppingstones for migrating wildlife, and refugia in an otherwise inhospitable landscape. Our team, working collaboratively with the Central Grasslands Roadmap, has created a new program, the Old-Growth Grasslands Network. We are compiling information on soils and plants in remnant North American grasslands for integration into an interactive website where landowners can access information about remnants near them. Our initial focus is on comprehensive soil health properties as diagnostic tools and natural benchmarks. Our database has a foundation of ~300 data points derived from the literature. We are currently developing Outreach Hubs where we can collaborate with stakeholders to sample additional remnant soils. Costs for soil sampling are provided by Cornell's Atkinson Center for Sustainability. We are looking for partners who are interested in: participating in the workshops, providing access to a remnant grassland, and/or helping to expand the OGG Network in fall 2024.

Smiley Jr., Peter C.* Instream habitat and fish responses to planting grass filter strips adjacent to agricultural headwater streams. USDA Agricultural Research Service, Columbus, Ohio. Email: rocky.smiley@ars.usda.gov

Grass filter strips (USDA Conservation Practice #21) are a widely used conservation practice in the United States to mitigate agricultural impacts on streams and rivers. Yet only a limited amount of information is available on the long-term effects of grass filter strips on instream habitat conditions and stream fishes at the watershed scale. My objective was to document the long-term effects of planting grass filter strips adjacent to channelized agricultural headwater streams on instream habitat and fish community structure. Riparian habitat, instream habitat, and fishes were sampled for 10 years from three channelized headwater streams without grass filter strips, three channelized headwater streams with grass filter strips, and two unchannelized streams having forested riparian habitats in central Ohio. Linear mixed effects model analysis was used to quantify the effects of riparian habitat type and time on the response variables. Mean riparian width, woody vegetation density, and percent canopy cover was greater ($P < 0.05$) in forested streams than unplanted and grass filter strip streams. Mean wetted width, mean dominant grain size, and percent instream wood did not differ ($P > 0.05$) among riparian habitat types. Annual trends in water depth, water velocity, and instream habitat diversity differed ($P < 0.05$) among riparian habitat types. Fish species richness, abundance, percent darters, sunfish species richness, minnow species richness, and percent headwater fishes did not differ ($P > 0.05$) among riparian habitat types. Annual trends in darter species richness differed ($P < 0.05$) among riparian habitat types. Our results suggest grass filter strips should not be implemented alone, but in conjunction with conservation practices that will improve physical habitat quality and subsequently benefit the fish communities.

Swab, Beck*, Chad Knisely, Mike Watson, and David Burke. Managing forests is about more than the trees: Rapid Upland Forest Assessments (RUFA), a tool for holistic forest health prescriptions benefiting wildlife and ecosystem function. Holden Forests & Gardens, Kirtland, Ohio. Email: rswab@holdenfg.org

Managing forests for wildlife requires first understanding what characteristics a forest is lacking, and then deciding what steps would improve forest processes to create needed features. The Rapid Upland Forest Assessment (RUFA) tool, developed by conservation staff at Holden Arboretum, is designed to quickly evaluate a variety of important forest characteristics including woody debris, canopy diversity, invasive species threats and understory composition. After evaluation, scores can be compared between sites or the same site can be compared over time, and management actions prescribed based on results. We used this tool at the Holden Arboretum to assess over 2,000 acres of forest. Scores and metrics showed unhealthy forests in need of management, and what characteristics were lacking. This information was used to make decisions about forest management, apply for grants, and implement hundreds of acres of management- primarily invasive removal and thinning. This is an important step in adaptive management to create more resilient forests supporting healthier wildlife populations.

Snyder, Erin F.[1*], Rebecca Barak[1], Andrea Kramer[1], Kelly Ksiazek-Mikenas[2], and Lauren Umek[3]. A post-industrial prairie? Calumet Region slag could provide vital habitat for dolomite prairie plants. [1]Chicago Botanic Garden and Northwestern University, Glencoe, Illinois and Evanston, Illinois. [2]Elmhurst University, Elmhurst, Illinois. [3]Chicago Park District, Chicago, Illinois. Email: efsnyder@u.northwestern.edu

Emerging research suggests that urban post-industrial sites could support biodiversity, but questions persist about the creation and maintenance of diverse, functional ecological communities in human-altered landscapes. In southeast Chicago, industrial steel waste (slag) shares abiotic characteristics with dolomite prairie soil (such as high pH). Slag sites could potentially support dolomite prairie plant species in Illinois, where only a small fraction of original habitat remains. However, since slag has not historically been considered for restoration of dolomite prairie species, it is unclear where seeds for these efforts should be sourced. This research explores whether seeds originating from dolomite prairies could be better equipped for slag than seeds grown for commercial sale. Greenhouse trials were used to test the emergence and performance of six dolomite prairie species from two different seed sources in slag vs standard topsoil. Plant traits, including frequently understudied but critically important belowground root traits, were used to evaluate seedling performance. In our study, significant differences in traits were more frequently driven by soil treatment than seed source. Our results show that seedlings originating from dolomite prairies were not consistently more competitive on slag, indicating that readily accessible, commercial sources could be used in seed-based restorations of slag sites. In addition to discussing key project findings, this presentation will share interesting results from a smaller, related experiment that tested commercially sourced *Dalea foliosa* (leafy prairie clover) and wild-sourced *Tetraneuris herbacea* (lakeside daisy) seeds in slag vs standard topsoil. Taken together, our results show that dolomite prairie species can emerge on slag. We suggest that slag could provide viable habitat that supports native biodiversity. Project findings are directly applicable for restoration practitioners at the Chicago Park District who manage slag sites and could improve restoration planning for other post-industrial landscapes.

Tekverk, Karen A.* Is practitioner certification right for you? Society for Ecological Restoration, Washington, DC. Email: karen.tekverk@ser.org

Are you looking to apply to become a Certified Ecological Restoration Practitioner (CERP) or CERP-in-Training? Have you investigated applying for CERP previously, but didn't finish the application process? Do you wish someone could help you figure out what you need to complete to become a CERP? If so, this session is for you! Join SER Certification Program Manager Karen Tekverk to learn about the requirements for becoming a CERP or CERPIT, see the application steps, and answer questions about your own application. Connect with SER staff available to support you, answer questions, provide guidance and feedback, or help you troubleshoot any technical challenges. Ecological restoration practitioners who are still deciding whether CERP makes sense for them, or those who have begun an application but have specific questions, are also encouraged to attend. SER's Certified Ecological Restoration Practitioner (CERP) program encourages a high professional standard for those who are designing, implementing, overseeing, and monitoring ecological restoration projects throughout the world. The program guarantees that practitioners meet a set of minimum requirements for restoration and ecological knowledge, on-the-ground practical experience, and an understanding of restoration principles and standards. The CERP program also offers a CERP-In-Training certification for those who don't quite meet all of the requirements of a full CERP certification, and it is ideal for new graduates of restoration programs and professionals who are newer to the field of ecological restoration.

Unke Ehrenberg, Katie*, and Steph Cole*. Development of a restoration project in an urban/industrial setting - Tank Farm Marsh. GEI Consultants, Inc. Green Bay, Wisconsin. email: kunke@geiconsultants.com; stephcole@geiconsultants.com

GEI Consultants partnered with the City of Green Bay and Wisconsin Department of Natural Resources 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 AOC (Area of Concern) delisting efforts. The project was constrained by several factors that are 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 stayed within budget. The final design was based on: avoidance of contamination issues, developing an option that was permittable by agencies, is resilient 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 later 2024.

Veerabahu, Aishwarya[*1,2], Mark T. Banik[2], Daniel L. Lindner[2], Anne Pringle[1], and Michelle A. Jusino[2]. The Midas mushroom: ecological impacts of the invasive Golden Oyster mushroom. [1]University of Wisconsin-Madison, Madison, Wisconsin. [2]USDA Forest Service, Madison, Wisconsin. Email: veerabahu@wisc.edu

The Golden Oyster Mushroom (GOM; *Pleurotus citrinopileatus*) is an invasive, edible wood decay fungus rapidly spreading throughout North America. This fungus is native to east Asia and was introduced multiple times in the midwestern and northeastern United States via commercial grow kits sold for home cultivation. GOM fruits prolifically from April to December on hardwoods like elm, ash, and cherry and is highly concentrated between the 40 - 45th parallels. Though there are few documented examples of invasive decay fungi, there are likely many undocumented invasions. Invasive wood decay fungi spreading in a new habitat may become competitively dominant, displacing native fungi and affecting decay processes and associated habitats. Our objective is to document how GOM affects the ecology in its invaded range informs the restoration needs of areas impacted by invasive wood decay fungi. To test whether GOM is associated with changes to fungal community composition, we collected drilled wood samples from pairs of GOM-colonized and uncolonized trees from Dane County, Wisconsin and sequenced ITS regions using high-throughput amplicon sequencing. We also compared samples taken from different heights within each tree to examine differences in colonization and communities throughout trees. GOM-colonized trees show significantly lower fungal species richness and significantly different community composition compared to uncolonized trees. Our results suggest that GOM is likely outcompeting the native community of wood decay fungi. Because wood decomposition is driven by the community of wood-decaying organisms in the wood, displacement of the community by an invasive will impact the native carbon cycling regime with significant implications for climate change and biodiversity loss.

Young, Chris*. Innovations in pathways into ecological restoration with collaborative models for students, educators, and professionals. University of Wisconsin-Milwaukee, Milwaukee, Wisconsin. Land Restoration School, Milwaukee, Wisconsin. Email: young3@uwm.edu

Through my work over the past three years as curriculum chair for the Land Restoration School (LRS), nearly three decades of academic teaching and advising students of biology at a small college, and recent experience as the director of a large conservation and environmental science program at UW-Milwaukee (with over 200 undergraduate students in the major), I am deeply familiar with the challenges and possibilities for new professionals to get launched into careers in ecological restoration. I will present more than mere observations. I am engaged in advising and advocating for the field on multiple levels. For the audience at SER, I offer knowledge that is already familiar to many, but I will package it as a challenge that we all need to think more about in our work together. What we all know is that we need to provide more pathways into ER work and that the traditional pipeline to an ER profession is problematic. I suggest pathways that include the metaphor of a braided stream and pedagogical realities that need significant revamping. With examples from recent cohorts of LRS and students at UW-Milwaukee, I also highlight the implications of innovation for changing the faces of ER to include people who come from a wider variety of hometowns and represent greater diversity of race, ethnicity, and identity. Students who I have taught and mentored will be invited to attend the SER conference to join me for Q&A with the audience. Major components of the next steps

involve ever more awareness of the power of collaboration and partnership, reaching into and beyond academia, and working through communities in and around cities.

Zimmerman, Steve R.* Village of Riverwoods, Illinois-Woodland Protection Ordinance. Baxter & Woodman Natural Resources, LLC., Marengo, Illinois. Email: szimmerman@baxterwoodman.com

The Village of Riverwoods was born in the mid-1950s out of an idea by Edward Ryerson to offer residents the experience of living in a unique oak woodland setting along the Des Plains River in Chicago's Northwest Suburbs. The health of the oak woodlands declined over the past 70+ years as a result of human activities. Natural fires were eliminated, surface water flows were altered, and deer populations increased. These changes are largely responsible for secondary stressors including invasion by non-native plant and insect species, changes in woodland species composition, and overabundant shading by canopy trees resulting in little to no oak regeneration. In the late 1990s, the Village began encouraging residents to be good stewards of their woodland properties through Ecological Cost-Share Programs aimed at preserving the woodlands, while assisting residents with woodland stewardship on their property. In 2015, the Village hired a Restoration Ecologist to assess and map the woodlands then develop a Woodland Protection Ordinance that outlines activities that can and cannot be performed as well as sets limits on the amount of woodland that can be removed on a property for human use. The Woodland Protection Ordinance is unlike any environmental projection ordinance in the region. Learn how the Village of Riverwoods created the ordinance based on completing a Village-wide woodland assessment then performed multi-spectral aerial imaging to delineate the protected woodlands on each property. Also learn how the Village enforces the Woodland Protection Ordinance and implements its Ecological Cost-Share Programs.

MEETING HOST PLENARY SESSION & FIELD TOUR

Gabis Arboretum and Tallgrass Prairie Restoration

Young D. Choi, Purdue University Northwest, Hammond, Indiana.
Email: ydchoi@pnw.edu

Gabis Arboretum at Purdue University Northwest (https://www.pnw.edu/gabis-arboretum/) is located approximately 35 km south of Lake Michigan in the northwestern Indiana. Saddled on the Valparaiso Moraine created by the glacial retreats 32,000 – 11,000 years ago, the arboretum covers approximately 150 hectares of woodlands, old fields (ie., abandoned farmland), restored tallgrass prairie, and wetlands. The arboretum's woodlands are a typical of secondary growth through spontaneous succession occurring after cessation of agriculture. More than 133 species of trees, shrubs, lianas, and herbaceous plants occur in the arboretum's woodlands. Bur oak (*Quercus macrocarpa*), shagbark hickory (*Carya ovata*), and northern red oak (*Quercus ellipsoidalis*) are among the common overstory trees. A few exotic species such as multiflora rose (*Rosa multiflora*) and garlic mustard (*Alliaria petiolata*) have invaded significantly into the understory of woodlands. During 1998 – 2000, the arboretum restored ~16 hectares of the old field to tallgrass prairie by sowing the seeds of > 40 species that are native to the tallgrass prairie of the Midwestern United States. The restored prairie vegetation is now sustained by prescribed burns. This restoration effort was designed to guide the succession trajectory from old field to tallgrass prairie instead of woodland vegetation. Post-restoration assessments indicate that the abundance and diversity of native species increased significantly while the opposite was true for exotic species. The elevated species diversity also promoted the diversity of arthropod functional groups, belowground primary production, and likely soil carbon sequestration. Details of the arboretum's history, ecology, and restoration will be presented during the plenary session and the subsequent field tour of Gabis Arboretum.

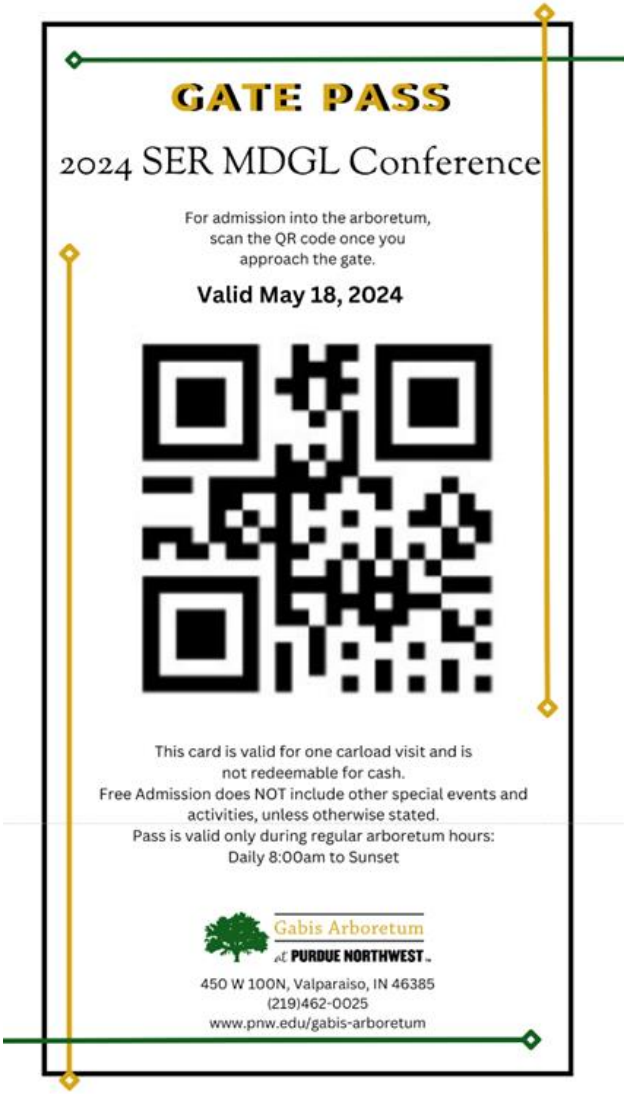
Biography: Dr. Young D. Choi is a Professor of Biology in the Department of Biological Sciences at Purdue University Northwest. Dr. Choi has been teaching and conducting research at Purdue University Northwest for more than 30 years. He has a PhD. from the State University of New York and his dissertation focused on vegetation development on iron mine tailings in New York. He has 17 publications in peer review journals and technical reports on various topics involving plant community ecology and restoration ecology. Additionally, Dr. Choi was one of organizing committee members of the SER Midwest-Great Lakes Chapter in 2008 and served as the Annual Meeting Chair from 2009 to 2012 and then as Vice-President from 2013 to 2014.

Driving directions from 173rd Street Parking Lot of Purdue University Northwest Hammond Campus to Gabis Arboretum

For those driving their own vehicles

Gabis Arboretum Address: 50 W 100 N, Valparaiso, Indiana 46385

1. Turn left at the stop light on 173rd Street and continue east.
2. Turn right at Kennedy Avenue and continue south.
3. Take Interstate 80/94 East and continue 1.4 mi.
4. Change to Interstate 65 South and continue 14.4 mi.
5. Take Exit 253 to US Highway 30 East (to Valparaiso) and continue 10.3 mi.
6. Turn right onto N 500W and continue 1.5 mi to south.
7. Turn left onto W 100 N and continue 0.5 mi to east.
8. Turn right onto the Gabis Arboretum gate.
9. Gate opens with scanning of QR code given below.



SUNDAY MAY 19TH

OFFSITE FIELD TRIPS

9:00 am to 12:00 pm CT**: Developing a 1,200 acre Project to Restore and Re-meander the Little Calumet River Channel and Floodplain Wetlands in Northwest Indiana *(walking tour & discussion)*.** Katie Kucera, Harry Kuttner, and Gary Sullivan, The Wetlands Initiative. Email: kkucera@wetlands-initiative.org; gsullivan@wetlands-initiative.org; hkuttner@wetlands-initiative.org

Field trip participants should meet at Central Avenue, an unmarked dirt road 0.28 miles southeast of E. 121st Street in the Marshalltown area of Gary, IN (41.57786, -87.29801) at 9:00 AM. Access to wetlands and viewing points will be by car on paved trails and dirt roads (car-pooling is encouraged if desired). This site is approximately 15 minutes from Purdue University Northwest in Hammond.

The West Branch of the Little Calumet River was once a sluggish, braided channel flowing west through a rich mosaic of floodplain marshes, wet meadows, and wet prairies from northwest Indiana to Illinois and eventually out to Lake Michigan. The flow has long since been reversed to flow east from Highland to Burns Harbor, Indiana through a landscape that has been drained, channelized, filled, divided by roads and rail lines, and used as a dumping ground for industrial, agricultural, and construction waste. With local partners and participation from community members, The Wetlands Initiative is in the early phases of restoring long-neglected floodplain wetlands and "re-plumbing the river" to restore hydrologic function, fish passage, and natural habitat for wetland-dependent birds and other wildlife along a 10-mile reach of the West Branch of the Little Calumet River corridor. Old channels and oxbows will be reconnected, and meanders restored to lengthen channels, slow flows, and redevelop lost floodplain marshes. Water control structures will be utilized where appropriate to establish the conditions under which rare hemimarsh habitat may develop. This highly interdigitated mix of open water and emergent vegetation uniquely provides rare and protected nesting, feeding, and loafing habitat for a diversity of riparian and floodplain fauna. This work will also provide local communities in Gary and the surrounding area access to public recreational opportunities for fishing, birdwatching, hiking, and a now rare chance to interact with the natural world. Field trip attendees will accompany The Wetlands Initiative staff to two sites where our work is in the initial stages of development (the 400-acre

Marshalltown Marsh Complex and the 800-acre Chase St. Complex). You will be able to view much of the 'before' stage of a 4.9-mile river restoration and discuss the process of designing complex wetland systems with multiple project partners and stakeholders.

*Participants will not need to walk through wet areas (unless you absolutely can't help yourself!). Participants are encouraged to bring binoculars for viewing wildlife. Please wear clothes and shoes suitable for the weather and hiking in moderately rugged terrain. Ticks are generally abundant so prepare for that. Participants should also bring a reusable water bottle.

9:30 am to 12:00 pm CT**: Southern Lake Michigan Dune and Swale Restorations *(walking tour & discussion)*.** Joel Prez-Castaneda, John Shuey, The Nature Conservancy of Indiana. Email: joel.perez-castaneda@TNC.ORG; jshuey@tnc.org

Field trip participants should meet in Purdue University Northwest's Parking Lot at 9:30 am. A carpool will be organized for transportation to the site. The preserve is not open to the general public. This site is approximately 15 minutes from Purdue University Northwest in Hammond.

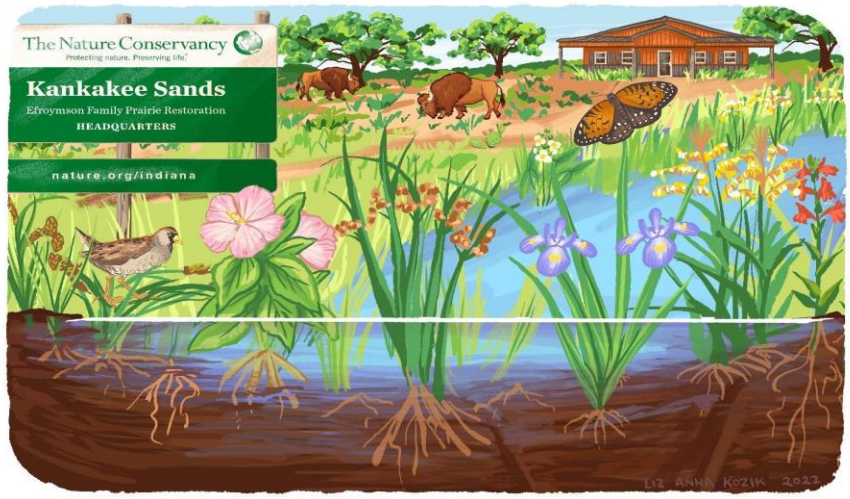
Nestled within one of the most heavily industrialized regions of the US and the Calumet River Area of Concern (AOC), are a series of dune and swale remnants that support and amazing diversity of plants and animals. The OAC was designated in part because of degradation to habitats adjacent to the river. While many habitats were impacted directly, other fragments were simply neglected, becoming overgrown due to fire suppression, or invaded by invasive species. Prior to restoration, wetlands supported monocultures of typha or phragmites, and dune ridges were densely shaded with little herbaceous cover. Although the region supported the highest density of imperiled species in Indiana at a few well managed sites, in most of the region these rare species were in serious decline. Approximately 25 years ago, a consortium of land management agencies and organizations began serious restoration of all the surviving ecosystem remnants in the dune and swale. Today, these areas support an amazing diversity of habitats including open dune ridges supporting oak barrens, mesic sand prairie that grade into herbaceous wetlands and open water in the swales. All the sites were structurally restored to reverse fire suppression and are managed with fire to maintain habitats. Herbaceous species responded and "restored themselves". The field trip will visit the DuPont Natural Area (approximately 140 acres) which sits between a contaminated brown field and the Calumet River, a perfect example of the juxtaposition of industrial landscape with natural wonder. The site includes some of the most expansive swaths of wet prairie and open water remaining in the dune and swale. Waterfowl should be abundant in the swales during this time of year, and spring prairie and barren plants should be in early season bloom.

*Participants are encouraged to bring binoculars for viewing wildlife. Please wear clothes and shoes suitable for the weather and hiking in moderately rugged terrain. Ticks are generally abundant so prepare for that. Participants should also bring a reusable water bottle.

9:30 am to 12:00 pm CT**: 25 Years and Beyond at Kankakee Sands *(walking tour & discussion)*.** Trevor Edmonson, The Nature Conservancy of Indiana. Email: trevor.edmonson@tnc.org

Field trip participants should meet at Kankakee Sands Office (3294 North U.S. 41, Morocco, Indiana) at 9:30 am CT. This site is approximately 60 minutes from Purdue University Northwest in Hammond.

In December 1996, The Nature Conservancy purchased an initial 7,200 acres of agricultural ground in Newton County and began the process of converting these acres back to high quality habitat. Today the Efroymson Restoration at Kankakee Sands is 8,400 acres of prairies and wetlands, owned and managed by the Indiana chapter of The Nature Conservancy, which serve as a critical connecting piece between Willow Slough Fish and Wildlife Area, Beaver Lake Nature Preserve, Conrad Savanna Nature Preserve and TNC's Conrad Station Savanna. Together these natural areas now total over 20,000 acres of dry, mesic and wet sand prairies, sand blows, sedge meadows, wetlands and black oak savannas in Northwest Indiana. These natural areas are home to more than 86 rare threatened and endangered species including over 600 native plant species and over 240 species. Kankakee Sands is also home to 70 species of butterflies, including the state-endangered regal fritillary butterfly, and more than 1300 species of moths! In October of 2016, we brought 23 bison to Kankakee Sands to help manage our prairies. Currently our Kankakee Sands bison herd is 90 around strong. The bison are grazing on 1,100 acres of prairie, located both north and south of our Kankakee Sands Office. For this field trip we will start at our main office to get an overview of the project area, equipment used, and meet TNC staff. From there we will learn about the bison program as we walk back to the bison corral. The group will then carpool over to our Kankakee Sands nursery and to our seed barn. Lastly the group will head up to Conrad Station Savanna to see some of our prairie restorations and hike through our black oak savanna restoration areas.



https://www.nature.org/en-us/get-involved/how-to-help/places-we-protect/kankakee-sands/

*Water and coffee will be provided for participants. Participants are encouraged to bring binoculars for viewing wildlife. Please wear clothes and shoes suitable for the weather and hiking in moderately rugged terrain. Ticks are generally abundant so prepare for that. Participants should also bring a reusable water bottle.

10:00 am to 12:00 pm CT**: Fisher Oak Savanna Nature Preserve – *Restoration and Revitalization of Rare Habitat Mosaic (walking tour & discussion)*.** Bob Easter, NICHES Land Trust. Email: rleaster@nicheslandtrust.org

Field trip participants should meet at Fisher Oak Savanna in Jasper County, Indiana (11560 S County Road 20 E Wolcott, IN) and park along the south boundary of the preserve on West County Road 1200 S (west of intersection with S County Road 20 E) at 10:00 am CT. This site is approximately 70 minutes from Purdue University Northwest in Hammond.

Fisher Oak Savanna is a 266-acre State Dedicated Nature Preserve in the Kankakee Sands Section of the Grand Prairie Natural Region of Indiana. The remnant core of the preserve consists of white and black oak savanna on sand ridges and pin oak flatwoods with significant native species diversity. The original 130 acres were protected in 2003 with additions of 67 acres of agricultural fields in 2005, which were subsequently restored to some of the highest quality prairie restoration in the state in coordination with Spence Nursery and Ecologic LLC. Another 20 acres of remnant flatwoods was added in 2007 and 49 additional agricultural acres acquired in 2016 and restored to diverse sand prairie in 2018. Significant stewardship effort has been applied to this preserve including prescribed fire (9 units since 2015 averaging 56 acres/burn), restoration of natural hydrology, invasive species removal, reduction of overabundant native tree species in understory, canopy reduction by timber harvest, and annual deer reduction. Discussion will focus on the stewardship activities listed above and open participation is encouraged.

*Participants are encouraged to bring binoculars for viewing wildlife. Please wear clothes and shoes suitable for the weather and hiking in moderately rugged terrain. Ticks are generally abundant so prepare for that. Participants should also bring a reusable water bottle.

10:00 am to 12:00 pm CT**: Restoration of Cowles Bog in Indiana Dunes National Park *(walking tour & discussion)*.** Daniel Mason, Indiana Dunes National Park. Email: Daniel_Mason@nps.gov

Field trip participants should meet at the visitor parking lot of the Indiana Dunes National Park Headquarters (1100 N Mineral Springs Rd, Chesterton, IN) at 10:00 AM CT. This site is approximately 25 minutes from Purdue University Northwest in Hammond.

This trip will feature Cowles Bog, a national natural landmark on 205 acres of wetland in Indiana Dunes National Park (INDU). It is an alkaline fen located at the western end of Great Marsh that was formed ~4,000 years ago. Great Marsh was once an open body of water drained to Lake Michigan. Over time the Great Marsh evolved to diverse types of wetlands including conifer swamp, wet prairie, fen, bog, sedge meadow and marsh. In the past century, urbanization and commercialization had a negative impact on Cowles Bog Wetland Complex and the Great Marsh. Along with fragmentation of Great Marsh, Cowles Bog was divided by the construction of a road for housing development and drained for a golf course. Native plants like white pine and sedges were harvested for human use. In the 1960's, industrial development in the adjacent dunes pushed Cowles Bog Wetland into a negative trajectory resulting in an alternate stable state, dominated by exotic invasive plants mostly hybrid cattails (Typha x glauca) and common reeds (Phragmites australis). For example, 135 acres of sedge meadow in 1961 decreased to 16 acres in 1979, while the exotic cattails increased from 9 acres to 99 acres during the same period. The invasion of these plants changed the wetland structure, greatly reducing habitats for waterfowl and other animals that depend on healthy wetlands to survive. INDU is currently in a process to restore the native vegetation such as sedge meadow and tamarack swamp to increase biodiversity, to create high-quality habitats for a rest stop for native plants and animals' habitat, to protect the beaches, and improve Lake Michigan's water quality by reducing and controlling runoff. The restoration activities may include but are not limited to eradication of invasive species, reduction of shrubs and trees, establishment of native vegetation and hydrology.

*Participants are encouraged to bring binoculars for viewing wildlife. Please wear clothes and shoes suitable for the weather and hiking in moderately rugged terrain. Ticks are generally abundant so prepare for that. Participants should also bring a reusable water bottle.

10:00 am to 12:00 pm CT**: Succession Trail in the Indiana Dunes National Park, West Beach *(hiking tour & discussion)*.** Young Choi, Purdue University Northwest. Email: ydchoi@pnw.edu

Field trip participants should meet at the visitor parking lot of the West Beach Unit within Indiana Dunes National Park (376 Countyline Road, Gary, IN) at 10:00 AM CT. This site is approximately 20 minutes from Purdue University Northwest in Hammond.

In this trip, we will hike over trails (Dunes Succession Trail and West Beach Trail) in the West Beach Unit of Indiana Dunes National Park. The trails are a part of the Algoma Dune system that was formed 1,000 – 3,500 years ago during the successive retreat of shorelines after the Wisconsin glaciation. Dune Succession Trail highlights the four stages of dune development- foredunes, embryonic dunes, pannes (also called intradunal ponds or dune slacks), and stabilizing dunes- within its one-mile length. The trail also features successional stages of plant community: Marram grass on foredunes, pioneer trees like cottonwood on embryonic dunes, jack pine disjunct on pannes, and mesophytic forest on stabilized dunes. The trail is scenic but strenuous and includes a climb up 270 stairs for a spectacular view of Lake Michigan and Chicago skyline. West Beach Trail starts from the northern end of Dune Succession Trail. It encircles a flattened area that was mined for sand. Sand mining that took place in the 1920s, prior to the land's protection. Nearly all vegetation was removed from the dunes prior to the mining. The mining reduced the dune's elevation by ~70 feet to a flattened sand plain. The area is being restored as oak savanna through spontaneous succession. However, with no or minimal intervention by humans, this passive restoration is extremely slow. Reintroduction of black oak seedlings has been proposed to boost the restoration process. Nonetheless, the area is a candidate habitat for the endangered species Karner blue butterfly to be restored as it supports healthy populations of wild lupine, the primary food plant for the butterfly larvae. The area also features an example of sand prairie along with a few rare plants like prickly pear cactus. The hike is easy on this ~1-mile-long flattened trail.

*Participants are encouraged to bring binoculars for viewing wildlife. Please wear clothes and shoes suitable for the weather and hiking in moderately rugged terrain. Ticks are generally abundant so prepare for that. Participants should also bring a reusable water bottle.

PNW

The Department of Biological Sciences

Master's Degree Highlights

The Masters of Science (MS) program offers a diverse range of coursework and research opportunities in areas such as ecology and conservation biology, evolution, cell and molecular biology, human biology and physiology, and microbiology. Students can pursue their MS degree following either a thesis or non-thesis option. For students interested in research or further graduate work, the thesis option is ideal. For those individuals interested in professional programs or job enhancement the non-thesis option may be preferable.

Application Deadlines

August 15th	Fall Admission
December 15th	Spring Admission
May 15th	Summer Admission

Contact

Please contact the Department of Biological Sciences at 219-989-2404 or email us at: biosciences@pnw.edu

Biology Master's Degree Page

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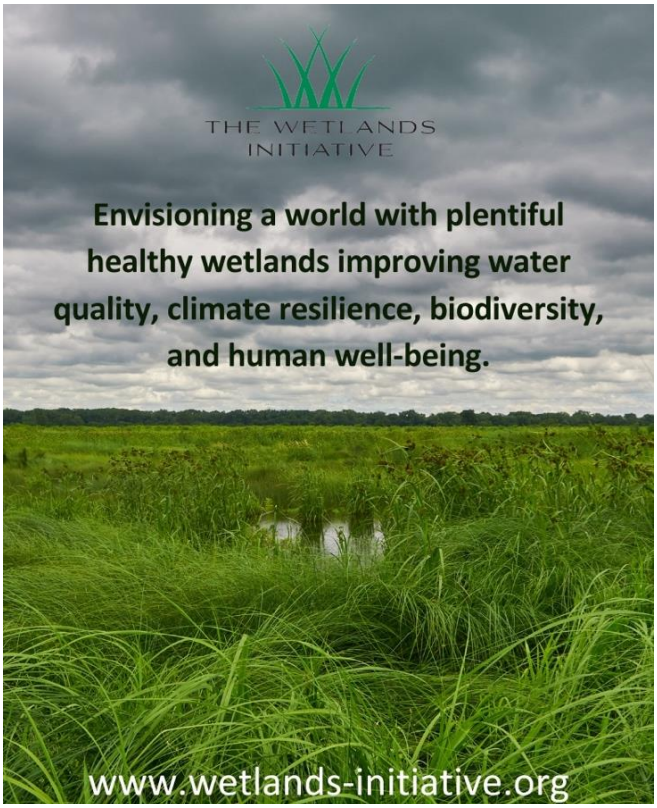
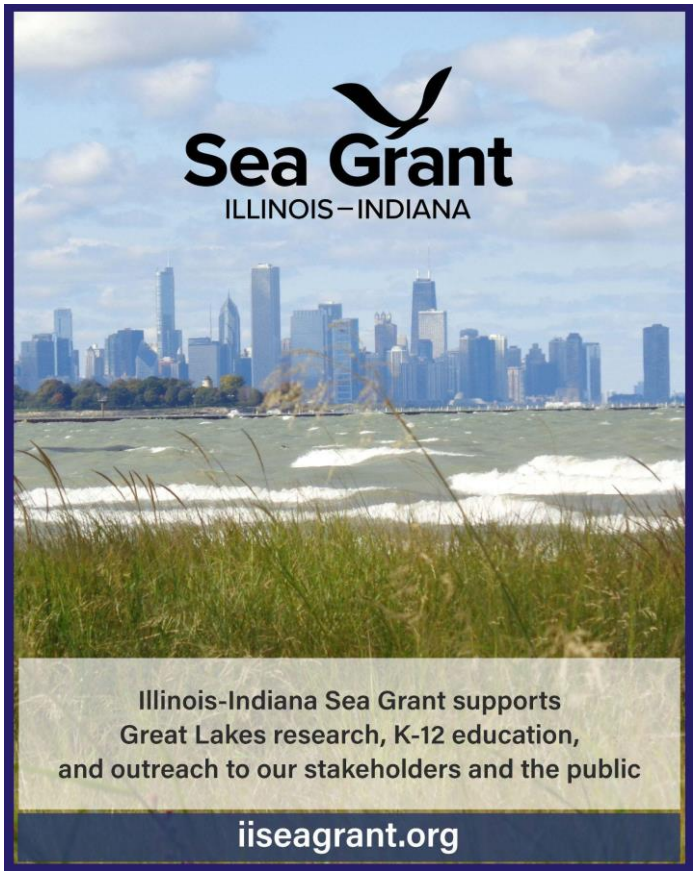
We seek environmental justice and embrace our responsibility for equity, inclusion and diversity.





ABOUT THE SER MIDWEST-GREAT LAKES CHAPTER

We are a non-profit organization that was recognized by SER as a regional chapter in March 2008. The Chapter serves a seven state region of Ohio, Indiana, Michigan, Illinois, Wisconsin, Minnesota, and Iowa.

Mission*:* To promote the science and practice of ecological restoration to assist with the recovery and management of degraded ecosystems within the Midwestern and Great Lakes regions.

Membership Benefits

Opportunity to network with colleagues and showcase your work at annual chapter meetings and state level events held throughout the year.

Reduced chapter meeting registration rates

Chapter communications consist of the Restoration News Midwest blog and other social media streams that highlight regional ecological restoration issues, news, projects, and practitioners.

Opportunities to promote ecological restoration-related events and discuss ecological restoration-related issues though the chapter social media.

Webinars on relevant restoration topics in the region

Student members eligible to apply for research and practice grants through our Student Grant Program

Membership within our international parent society

Interested in becoming a member? See *http://chapter.ser.org/midwestgreatlakes/*

WANTED! MEETING HOSTS FOR THE 2025 SER MIDWEST-GREAT LAKES CHAPTER MEETING

The Midwest-Great Lakes Chapter of the Society for Ecological Restoration is soliciting meeting host proposals for future Annual Chapter Meeting to be held in 2025.

Meeting hosts receive the following top tier Sponsorship benefits: 1) a minimum of eight free meeting registrations, 2) exhibit space, 3) advertising with their institutional logos placed on the cover of the meeting program and the cover of the abstract book, and 4) a full-page ad in the meeting program and the abstract book. Additionally, for those meeting hosts who are interested we will provide an opportunity to hold a plenary session and tour during the chapter meeting that will be devoted to highlighting their institution's ecological restoration work. **Those interested in submitting a meeting host proposal should contact Mark Krivchenia (email: mwgl.ser@gmail.com) with the subject line "Interest in submitting 2025 meeting host proposal".**