2024 Jim and Katie Krause CNR Student Research Symposium

This booklet and event have been made possible by support from the
James and Kathleen Krause Student Research Endowment

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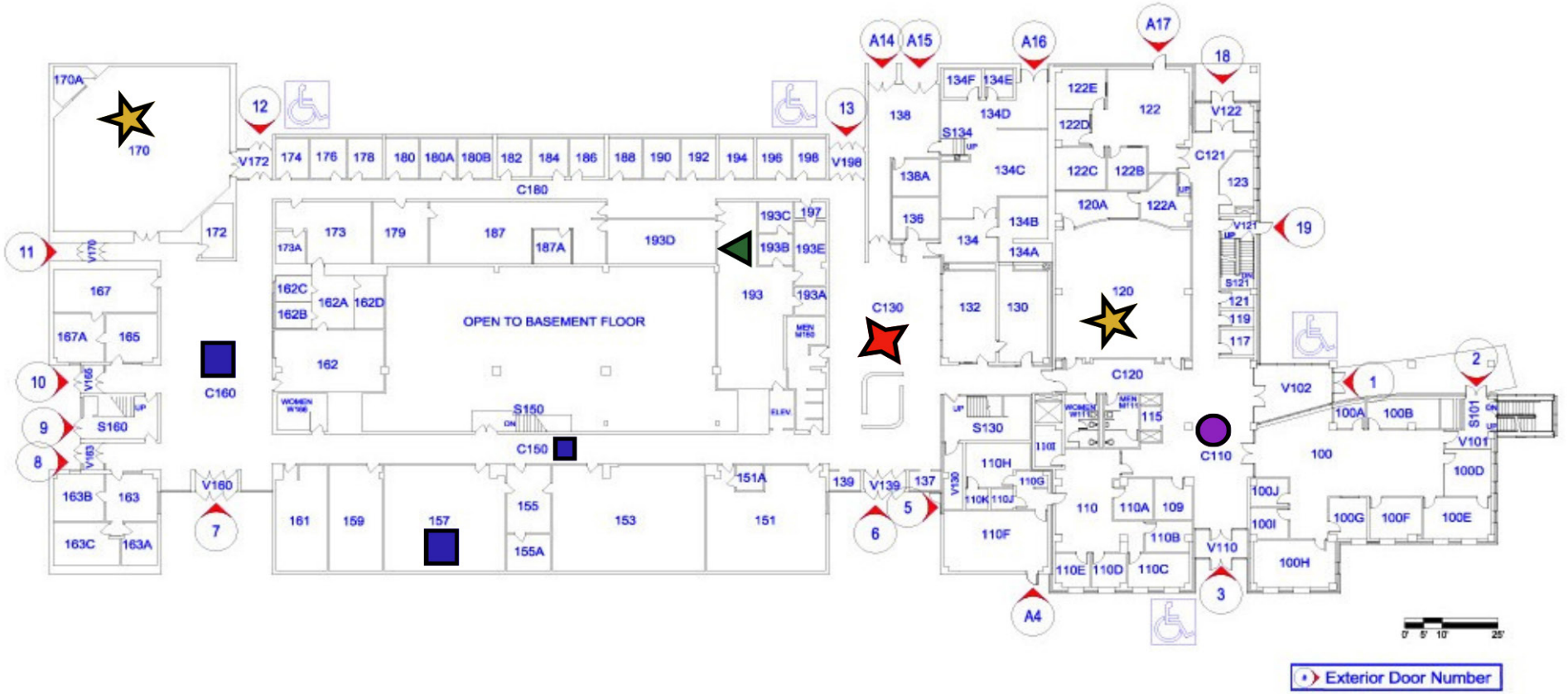

Drawn: Angie Novak Date: 01/18/2019 UWSP Facilities Planning	Trainer Natural Resources Building First Floor Plan	Bldg No: 0012

Key

- **Oral Presentations - TNR 170 & 120**
- **Poster Presentations - TNR 157, West Lobby, South Hallway**
- **Lunch & Information - Central Lobby**
- **Coat service - TNR 193**
- **Additional Seating - East Lobby**

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Acknowledgments

Special thanks to all those who helped make this year's event possible:

CNR Dean Brian Sloss
UW-Stevens Point Chancellor Thomas Gibson
Mark Zabrowski - Plotter Assistance
John Oestreich and Tim Sattler - Building Logistics
Stacey Allen-Bannach - Support and Publicity
Sharon Reichert - Room Logistics and her Kindness
CNR and Biology Faculty/Staff - Mentoring and Support
Tom Charlesworth - Photography
Volunteer Evaluators and Moderators

Events Schedule

April 19th, 2024

Oral Presentations
9AM - 10AM
TNR Room 120 and 170

Poster Presentations
10AM - 11AM
TNR West Lobby, South Hallway, TNR 157

Keynote Speaker
William Risse, M.A.
11AM - 11:30AM
TNR Room 170

Lunch Break
11:30AM - 1PM
TNR Central Lobby

Poster Presentations
12PM - 1PM
TNR West Lobby, South Hallway, TNR 157

Oral Presentations
1PM - 3PM
TNR Room 120 and 170

Poster Presentations
3PM - 4PM
TNR West Lobby, South Hallway, TNR 157

Clive and Beverly David Memorial Research Scholarship Award

This scholarship honors the lives and careers of Clive and Beverly David, Ph.D., who both served on the faculty at UW-Stevens Point. Clive, who passed away in 2004, was Professor of Forestry in the College of Natural Resources from 1989 to 2003. A true champion of undergraduate research and cutting edge technology, he was an early advocate for incorporating Geographic Information Systems (GIS) technology in the classroom, and was a driving force in launching the College's CNR Student Research Symposium back in 2000. Beverly taught in UWSP's Department of World Languages and Literatures since 1991 before retiring in 2015 as Assistant Professor of French and Spanish. Among her many accolades, she earned the University Service Award in 2013 and the UWSP Excellence in Teaching Award in 2000.

This award is funded by the Clive and Beverly David Research Scholarship Endowment, made possible through generous gifts in Clive's Memory from the David family, alumni, and friends.

The 2024 recipient of the Clive and Beverly David Memorial Research Scholarship is:

Kayla Reed

Hometown: Pulaski, Wisconsin
Major: Fisheries and Aquatic Sciences, Water Resources

Engagement:
American Water Resources Association (Secretary/Public Relations, President)
UWSP Fisheries Society (President)
Izaak Walton League
Women in Natural Resources
Jim & Katie Krause Student Research Symposium
Journal of Great Lakes Research
Midwest Fish & Wildlife
Research on the Rotunda

"Over 15 years, I have advised dozens of students participating in undergraduate research, many of whom were exceptional. However, Kayla represents the very best of these..."

Daniel Isermann, P.h.D. USGS-Wisconsin Cooperative Fishery Research Unit, UWSP/CNR

"Kayla's dedication to her career and that of her peers has been astounding…Kayla has assumed leadership roles: crew leader, Vice President and President of the American Fisheries Society and President and Secretary/Publish Relations Officer for the American Water Resource Association…Kayla has created an inviting environment that fosters membership growth and provides strong leadership by mixing professional development opportunities with fun social events. Under her leadership our Fisheries Society has been award the Most Active Chapter from the North Central Division of the American Fisheries Society."

Justin VanDeHey, P.h.D. Fisheries & Water Resources

From the Student Research Symposium Committee...

From the Student Research Symposium Committee...

Welcome to the 25th annual University of Wisconsin-Stevens Point Jim and Katie Krause CNR Student Research Symposium. This year's program features students who have invested considerable time conducting research in areas such as fisheries and water resources, forestry, environment and society, paper science and engineering, soil and waste management, and wildlife ecology and management. The symposium allows students to present data they have collected, explored, and analyzed during the course of their research. Faculty mentors played an essential role in guiding students through the process in a spirited and educational fashion which expands beyond the traditional bricks and mortar of the classroom.

As we proceed with this year's poster and oral presentations, we honor the memory of Clive and Beverly David, true friends to students and faculty. The Davids were extremely significant in building and strengthening the undergraduate research program. Although Clive passed in November 2004, his influence remains to this day. The positive atmosphere he fostered created a venue for students to learn to conduct and present their research. The hundreds of students who have benefited from the symposium over the past 24 years can credit Dr. David for his pioneering efforts.

We would like to thank our primary benefactors, Jim and Katie Krause, all of our volunteer evaluators, faculty and staff members in the College of Natural Resources and in the Department of Biology, CNR student organizations, Dean Brian Sloss, Chancellor Thomas Gibson, and the UW-Stevens Point administration.

Congratulations to all our student presenters. Your work is truly outstanding! Our hope is that today can be as enjoyable as it is educational for you, and that you inspire more students to step up to the challenge of undergraduate research.

Cheers,

CNR Student Research Symposium Committee

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Oral Presentations
TNR 120

Time	Presenters	Title
9 AM	Reece Lisowski	Relation between body temperature and response to surveyor disturbance in *Sistrurus c. catenatus*
9:20 AM	Shelby Sterken Katie Carlson	The influence of food availability on trap success of Southern Flying Squirrels (*Glaucomys volans*) and Eastern Gray Squirrels (*Sciurus carolinensis*) in Schmeeckle Reserve, WI
9:40 AM	Sophie Reid	Ex-situ Nesting Ecology of Olive Ridley Sea Turtles (*Lepidochelys olivacea*) in Mayto, Jalisco, Mexico.
1 PM	Alice Maas	A Practical Guide to Seam Defects in *Quercus rubra*
1:20 PM	Amelia Shingle	Carbon Storage in Restored Prairies: How carbon storage changes with sampling depth, sampling location, and age of restored prairie
1:40 PM	Andrew Rasch Amelia Shingle	Breaking Ground: Gathering baseline recreation ecology data along a section of the Ice Age Trail
2 PM	Eric Alfredson	A Practical Guide to Epicormic Sprouts in *Quercus rubra*
2:20 PM	Hannah Kovalaske	A practical analysis of tearout-related defect in *Quercus rubra*
2:40 PM	Abby Mueller	Bow-Riding Behavior of Indo-Pacific Bottlenose Dolphins (*Tursiops aduncus*): Insights to Dolphin Behavior in the Context of Anthropogenic Disturbance

Oral Presentations
TNR 170

Time	Presenters	Title
9 AM	Joseph Lemancik	Evaluation of Panfish demographics in 6 central Wisconsin River flowages
9:20 AM	Tyler Hoffman	Population dynamics of Brook and Brown Trout in the Tomorrow River across differing harvest regulation boundaries
9:40 AM	Parker Kreie	Examining the Apparent Survival and Detection Probabilities of Eastern Gray Squirrels (*Sciurus carolinensis*) in Schmeeckle Reserve, Stevens Point, WI
1 PM	Cecelia Giesen	Long-term examination of a northern Wisconsin black bear population
1:20 PM	Dana Lotz	Analysis of Neotropical Bat Species in Costa Rica from Autonomous Recording Units
1:40 PM	Parker Kreie Hunter Janitch Dakota Longsine	Comparing metrics derived from manual photo processing to artificial intelligence when identifying wildlife from a camera trap project
2 PM	Emily DeVetter Dalton Zingshiem William Watry Tia Stanton Cece Giesen Abby Mueller Alayna Reynolds	Analysis of Developed Areas' influence on Diurnal and Nocturnal Movement Patterns in Northern Wisconsin Rehabilitated Black Bears
2:20 PM	Jacob Tepsa	Foraging Interactions of Sympatric Waterfowl on the Yukon-Kuskokwim Delta in Alaska
2:40 PM	Nicole Luoma Sophie Hauser Dana Lotz	Differential Timing of Migration in Northern Saw-whet Owls (*Aegolius acadicus*) in Central Wisconsin Based on Age and Sex Categories

Poster Presentations
10 AM

Presenters	Title
Olivia Stellpflug, Michael Lilla, Christopher Tomaszewski	A Collaborative Research on Synthesis of Graphene Oxide (GO) from Sustainable Resources and Its Application for Removal of Per- and Polyfluoroalkyl Substances (PFAS) from Water
Brandon Frank, Zephyr Lopez	Impact of a Warm-Water Tributary on Intolerant Fish Species Distribution in a Northern Wisconsin Cold-Water Stream
Kayla Reed, Jamie Cahalan, Blake Raymer	Smallmouth Bass Diet Analysis in a Warmwater Central Wisconsin Stream Using the Aquatic Community Assemblage
Tyler Olson, William Weber	Evaluation of Natural and Artificial Habitat on Brook and Brown Trout in Central Wisconsin Streams
Josiah McLean	Effects of Various Methods of Deer Browse Deterrence and Exclusion on Survival of Planted Northern Red Oak Seedlings
Emily Lee	Effectiveness of a Roving Interpretation Program in Schmeeckle Reserve
Hannah Higgins	Climate Change Impacts on the Accessibility of Downhill Skiing in Wisconsin
Jordan Campbell	A GIS MCDM Approach to Identify Site Suitability for Utility Scale Solar Energy in Wisconsin, USA
Alaina Hart, Brenna Bogaczyk, Hannah Panitzke, Eric East, Maren Herndon	The effects of pH on the growth of *Helisoma* species
Katie Carlson, Justin Lechner, Alex Stone	Population Estimate and Influence of Environmental Variables on Capture Probabilities of Urban Eastern Gray Squirrels (*Sciurus carolinensis*) in Schmeeckle Reserve, Stevens Point, WI

Poster Presentations
10 AM

Presenters	Title
Logan Maier, Matthew Rutschow	Bison Selection in Regards to Prairie Dog Colonies
Maggie Handfelt	Impacts of Major Red Tide Events on Cownose Ray (*Rhinoptera bonasus*) Catch Rates
Parker Kreie, Logan Maier, Jillian Hesse, Jacob Bork, Zack Wilson, Ruby Valadez, Grace Burhop	Determining the Adult Sex Ratios of Observed Wild Turkey Populations in the George W. Mead Wildlife Area using Road Transects
Roxanne Gasperetti, Rianna Taylor	Parasites of the American Woodcock (*Scolopax minor*) from Wisconsin, USA
Sam Coleman, Maggie Handfelt, Gabby Shulfer, Elyse Gabriel, Elizabeth Grove	Collecting Bat Data from Private Organizations can Yield More Information on Bat Population Trends
Sam Korducki, Ella Davis, Parker Wisinski, Nick Helms	Effects of Precipitation on Duck Size in Central Wisconsin

Poster Presentations
12 PM

Presenters	Title
Ethan Davis, Morgan Smits, Sam Coleman	Comparison of Ectoparasite Communities in Great Horned Owls and Barred Owls
Elizabeth VanDomelen, Jordan Theys	The impacts of competition and fertilizer on the growth of *Cannabis sativa*
Ashley Authement, Anna Hahn, Grace Versnik, Jackson Mikel	PFAS Adsorption Utilizing Metal-Organic Frameworks
Kayla Reed	Gizzard Shad *Dorosoma cepedianum* movement and overwinter survival in a Missouri River reservoir
Lin-Li Szczesny	Multivariate Approaches to Assess Johnny Darter (*Etheostoma nigrum*) Body Condition within the Plover and Tomorrow Rivers, Wisconsin
Rose Wicherson	Chelex vs DNeasy in qPCR Genetic Sexing of Lake Sturgeon
Sawyer Schnettler, Alexis Sonnemann	Stream Flow Drought Index Model for Great Lake's Region
Maverick Lange	Evaluating Areas of Urban Tree Species Change from Emerald Ash Borer (*Agrilus Planipennis*) in Wausau, Wisconsin, using ArcGIS
Violet Schafer	An Assessment of Depreciative Behavior on the Green Circle Trail
Morgan Goff, Riley Hubanks	The Role of Conservation Easements for Protecting Land in Wisconsin
Ashley Hoth	Hatch and Release of Common Snapping Turtle Eggs at the Dane County Humane Society Wildlife Center, 2021-2023

Poster Presentations
12 PM

Presenters	Title
Ava Cross-Weisbeck	Analyzing Sound Variations of Drumming Male Ruffed Grouse
Cassie Loeffler, Kevin Heikkila, Jaime Tench	*S. nasicola* and Diet in Wisconsin Weasels
Dana Lotz	Behavioral Analysis of Novel Object Test on Group-Living Fish
Molly Moder, Nicole Luoma, Ella Follman	Analysis of Trapping Interference by Non-target Species on Eastern Gray Squirrels (*Sciurus carolinensis*) in Central Wisconsin

Poster Presentations
3 PM

Presenters	Title
Andrew Rasch Amelia Shingle	Why Volunteer?: Motivations and Place Attachment Among Ice Age Trail builders
Elizabeth VanDomelen, Mary Joy Relagio, Tyler Jolin	Phytoremediation using *Cannabis sativa* - A comparative analysis of the effects of lead and arsenic on the fitness of six lineages of hemp
Ethan Davis	A Relative Comparison of Student-Performed Wetland Delineations
Lane Bowman	The Study of Hydrophobic Soils in Relation to Forest Fires
Maya Desai, Natalie Gruben, Alaina Hart, Addison Pfeil, Sydney Paoli, Gregor Wilms	A Compost Application Rate for Sustainable Hemp Agriculture in Wisconsin
Emily Michalzik	Tiger Beetles of the Navarino Wildlife Area and Beilfuss Unit Properties
Erik Holterman, Tyler Rasmussen, Kayla Allred, Rachel Boehlke, Rebecca Grichnik	Analysis of Trap Design Characteristics of Fisher Monitoring Stations
Josiah Gritter, Sophie Hauser Dana Lotz, Sophie Reid, Nicole Luoma	Preliminary Results for Quantifying Ectoparasite Abundance and Prevalence in Northern Saw-whet Owls (*Aegolius acadicus*) in Central Wisconsin
Kody Woodcock, Ryan Burmester	Southern Flying Squirrel Trap Success in Schmeckle Reserve 2020-2023 in Relation to Mast
Logan Maier, Parker Kreie, Jillian Hesse, Helena Stoflet, Pierce Davidson, Adrienne Cohoon, Alex Stone, Zephyr Lopez	Comparing Wolf and Coyote Call Response Success Rate with an Electronic Predator Call

Poster Presentations
3 PM

Presenters	Title
Alex Wolf	Updating the UWSP campus tree map to evaluate Periodic Annual Increment growth of trees in different locations
Elise Bass	Evaluating Relationships between Body Condition of Larval Sea Lamprey (*Petromyzon marinus*) and Environmental Conditions
Lee Hetzel	Effectiveness of a Lake Sturgeon qPCR Sexing Assay for Sex Determination in the American Paddlefish
Lin-Li Szczesny, Frankie Gonzalez, Henry Gray	Preliminary Steps in the Development of an Aquaponics System: A Comprehensive Overview
Tyler Hoffman	Effects of Lake Trout removals on a Bull Trout population in a northern Idaho lake

Comparison of Ectoparasite Communities in Great Horned Owls and Barred Owls

Ethan Davis
Water Resources

Morgan Smits
Clinical Lab Science

Sam Coleman
Wildlife Ecology and Management

Great horned owls (*Bubo virginianus*) and barred owls (*Strix varia*) are both geographically widespread, with ranges that overlap primarily in the Eastern United States. Great horned owls often prey upon the smaller barred owls, therefore occupying different trophic levels. Barred owls have recently expanded their range to the Pacific Northwest, which has resulted in hybridization and predation cases with the threatened northern spotted owl (*S. occidentalis*). This results in ectoparasite transmissions. Ectoparasites such as chewing lice (*Phthiraptera*), feather mites (*Acari*), and tick flies (*Hippoboscidae*) can cause sub-lethal damage to the host's feathers. Using digitized museum records from the Stephen J. Taft Animal Parasitology Collection and new specimens collected from owls collected from road mortality and rehabilitation centers, we had two research objectives. The first objective was a temporal comparison of ectoparasite communities of each species by comparing historical and current ectoparasite species richness. Second, we wanted to compare the ectoparasite communities between the two species of owls. Our museum records included 12 great horned owl specimens representing 4 ectoparasite species and 6 barred owl specimens representing 1 ectoparasite species. Our preliminary examination of 2 owls collected in 2022-2023 revealed 3 specimens in the family Menoponidae and 11 specimens in the family Philopteridae for great horned owls. One barred owl examined for ectoparasites was uninfected. Our results suggest that great horned owls have a more diverse ectoparasite community, but further data collection is needed to distinguish patterns. Our research highlights how museum collections can be used to address ecological questions.

Advisors: Sarah Orlofske, Ph.D
Presentation Style: Poster

The impacts of competition and fertilizer on the growth of *Cannabis sativa L.*

Elizabeth VanDomelen
Biology

Jordan Theys
(not pictured)
Biology

Cannabis cultivation is one of the most rapidly growing industries in the world. While the profits from cultivation can be generous, there are only a few opportunities per year for harvest in a single growing season. This leaves growers with the dilemma of how to get the highest quantity and quality yield while also utilizing growing space effectively. Some studies have been conducted on the effects of fertilizer on cannabis growth, but this is not a well examined topic. This topic has not been explored especially in regard to plants experiencing the stress of competition. Our methods explored whether and to what extent soil amendments (a typical NPK ratio of 10:10:10) as well as con-specific competition interact to influence plant fitness and levels of phytochemicals using the industrial hemp cultivar Colorado Cherry Wine (*Cannabis sativa*). Throughout the trial process, we exposed plants to different levels of competition and fertilizer and collected data on plant height and biomass as well as cannabinoid and terpene production. Our work provides valuable insights into the effects of competition and fertilizer on the fitness of *Cannabis sativa*. Our data could be useful for growers trying to maximize their yields at a minimal cost to them as well as providing insights of optimal growth conditions for a desired yield.

Advisors: Brian Barringer, Ph.D., Ann Impullitti, Ph.D., Shannon Riha, Ph.D.
Presentation Style: Poster
Considered for Judging

A Collaborative Research on Synthesis of Graphene Oxide (GO) from Sustainable Resources and Its Application for Removal of Per- and Polyfluoroalkyl Substances (PFAS) from Water

Olivia Stellpflug
Chemical Engineering

Michael Lilla
(not pictured)
Paper Science and Engineering

Christopher Tomaszewski
(not pictured)
Paper Science and Engineering

PFAS, or per- and polyfluoroalkyl substances, are man-made chemicals designed to be heat, water, grease, and oil resistant. These properties allow them to be used in adhesives, fire-fighting materials, non-stick cooking surfaces, food packaging, clothing, and more. Due to the resistive properties of PFAS, when they are introduced to the environment they don't break down. PFAS spread in the environment and humans and animals are exposed to them which causes a variety of negative health effects to be studied. Our goal is to use materials including commercial activated carbon, graphene, graphene oxide, nitrogen sulfur co-doped graphene, biochar from corn cob, and activated carbon from Douglas fir wood for PFAS adsorption. The adsorption capacity of different adsorbents was measured in batch systems in room conditions. We tested both short chain PFAS like PFBA and long chain PFAS like PFOA. Current sampling shows the best adsorption capacity by activated carbon from Douglas fir wood.

Advisors: Seyed Amirfakhri, Ph.D.
Presentation Style: Poster
Considered for Judging

PFAS Adsorption Utilizing Metal-Organic Frameworks

Ashley Authement
Biochemistry

Anna Hahn
Chemistry

Grace Versnik
Biochemistry

Jackson Mikel
Chemical Engineering

Per- and poly-fluoroalkyl substances (PFAS) are a class of man-made chemicals that have been manufactured as they exhibit properties (including nonstick behavior as well as heat-, stain-, and water-resistance) that are desirable for a wide variety of practical applications. These manufactured properties make PFAS extremely stable and persistent in the environment. With their impacts being linked to human health concerns, strategies are needed to remove PFAS from the environment and waste streams. Adsorption, a method that relies on a pollutant (e.g. PFAS) sticking to the surface of a solid, is promising. Our research focuses on the group of porous solids known as metal-organic frameworks (MOFs) and how MOFs can remove PFAS from water-based solutions. We specifically look at MOF-808 containing acetic acid (AA) and how this compares to other solids with anionic modulators in affecting adsorption of different PFAS.

Advisors: Joseph Mondloch, Ph.D.
Presentation Style: Poster
Considered for Judging

Chemistry

Chelex vs DNeasy in qPCR Genetic Sexing of Lake Sturgeon

Rose Wicherson
(not pictured)
Fisheries and Aquatic Sciences

Determining the sex of lake sturgeon (*Acipenser fulvescens*) can be challenging for field biologists and wildlife managers. Current methods used to determine the sex of lake sturgeon are often expensive or invasive, and include the use of ultrasound technology, morphological measurements, or surgery to physically examine gonadic tissue. None of these phenotypic methods are sufficient to accurately identify the sex of juvenile lake sturgeon, whose gonadic tissue takes three or four years to differentiate. Accurately sexing juvenile sturgeon can provide critical data regarding lake sturgeon recruitment success, changes in sex ratios over time, and possible genetic diversity outcomes. Determining sex via genetic sampling is minimally invasive, does not require special field equipment, and is the only method currently able to accurately sex juvenile sturgeon. But while genetic sexing methods have been proven to be reliable, they can also be expensive, which may prevent smaller management agencies or conservation groups from being able to access these techniques. If the cost of genetic sexing of lake sturgeon could be lowered, it would make genetic sexing of lake sturgeon a more practical and affordable approach for management agencies. In this study, we test whether the cost of genetic sexing via quantitative polymerase chain reaction (qPCR) assays can be lowered by using Chelex 100 resin rather than Qiagen DNeasy Blood & Tissue kits for DNA extraction. Chelex 100 resin is a safer, faster, and substantially more affordable alternative for DNA extraction, but can produce lower quality DNA extracts. Here, we will test whether DNA extracted with Chelex 100 resin is of high enough quality to produce reliable genetic sexing results in quantitative polymerase chain reaction (qPCR) assays. If Chelex 100 is a viable DNA extraction alternative to Qiagen DNeasy Blood & Tissue kits, then genetic sexing of lake sturgeon could be offered to management agencies and researchers at a far lower cost.

Advisors: Amy Springer, Ph.D., Jared Homola, Ph.D.
Presentation Style: Poster

Effectiveness of a Lake Sturgeon qPCR Sexing Assay for Sex Determination in the American Paddlefish

Lee Hetzel
Wildlife Ecology and Management

The American paddlefish (*Polyodon spathula*) is a Mississippi River Basin fish species of great conservation concern. In 2022 their only living relative, the Chinese paddlefish, went extinct, making the American paddlefish the only remaining extant member in the family Polyodontidae. Due to the effects of stream channeling, levee construction, dam construction, illegal poaching, overharvesting and invasive pressures, many paddlefish populations are in decline. Today, many populations of paddlefish are maintained exclusively through stocking of hatchery-produced fish. But because juvenile paddlefish are unable to be sexed by phenotype and no genetic sexing methods have yet been developed for this species, we are currently unable to accurately determine the sex of paddlefish until they are three or four years of age. Sex ratios can provide critical data about population viability, broodstock suitability, and rates of stocking success. Skewed sex ratios lower effective population sizes, potentially increasing levels of inbreeding and reducing broodstock suitability. Research suggests that paddlefish likely have a Z/W sex determination system as seen in other Acipenseriform fish species such as lake sturgeon (*Acipenser fulvescens*). A genetic method for sexing lake sturgeon has been developed, and has been shown to be effective for multiple species of sturgeon. In this study, we will test whether this assay is effective not just across sturgeon species, but across the broader phylogenetic group including paddlefish as well. First, we will use paddlefish tissue samples taken from known-sex fish to determine whether primers developed for genetic sexing of lake sturgeon also produce qPCR amplification in paddlefish. If amplification occurs, we will then measure the accuracy of the assay for sexing paddlefish. The results of this study could provide further evidence of the paddlefish sex determination system, and provide new tools that conservation agencies can use to track demographic changes and population risks in this threatened species.

Advisors: Amy Springer, Ph.D., Jared Homola, Ph.D.
Presentation Style: Poster
Considered for Judging

Fisheries and Water

An Assessment of Depreciative Behavior on the Green Circle Trail

Violet Schafer
Environmental Education and Interpretation

The Green Circle Trail is a 27-mile-long loop that surrounds the city of Stevens Point, Wisconsin, and is a hub of community activity. Depreciative behaviors can significantly impact experiences and resources, even in small quantities, meaning that even local trails can experience significant impacts. Reasons for engaging in depreciative behavior can vary from not being informed of rules to intentional violations. This issue is an ongoing challenge for outdoor recreation managers, but can be addressed through proper management. To help inform the issue, board members collaborated with forest recreation seminar students from UWSP to gather observations regarding safety and behaviors along the trail. Observations occurred on weekends, including Fridays, from early October through early November of 2023 along the riverfront section of the Green Circle Trail. Students recorded group size, number of children and dogs, and primary activity. Additionally, students documented safety violations such as helmet usage, reckless riding, speeds exceeding 12 miles an hour, and unannounced passing. For recreationists with dogs, observations included whether dogs were off-leash and if trail users picked up their pet's waste. This study found that 80% of recreationists followed the rules of the Green Circle Trail, with the most common violation being not wearing a helmet. Though dogs were a central topic of conversation, dogs being off-leash and pet waste being left behind were only observed a handful of times. Using these findings, we can propose management recommendations to the Green Circle board and suggest future research to enhance trail conditions and experiences.

Advisors: Laura Anderson McIntyre, Ph.D.
Presentation Style: Poster
Considered for Judging

Environment and Society

Effectiveness of a Roving Interpretation Program in Schmeeckle Reserve

Emily Lee
Fisheries and Aquatic Sciences

Roving interpretation is an under-researched area of environmental interpretation. Its definition is, "Roving interpretation is a technique where interpreters move around site to site to informally engage with visitors face-to-face as they are experiencing resources," according to The Interpreter's Guidebook (2015). However roving interpretation can also be still, and a small informal table set up on the trail. This study focused on the effectiveness of an informal interpretation program in Schmeeckle Reserve, on the busiest trail, the Lake Loop, and how guests interacted with the program. Observation techniques were used to collect data, for 2 hours each observation day at the busiest times. The information recorded included the time spent interacting with the program, and the content of the visit whether it was Schmeeckle-related questions, the program, or other miscellaneous topics. On average 5.75 people stopped daily to engage with the naturalist, and 18.75 on average did not stop. With all of the days combined, it was found that a roving interpretation program was not the most effective form of interpretation for Schmeeckle.

Advisors: Becca Franzen, Ed.D., Kendra Liddacoat, Ph.D.
Presentation Style: Poster

Climate Change Impacts on the Accessibility of Downhill Skiing in Wisconsin

Hannah Higgins
Wildlife Education

Climate change is impacting various aspects of life in Wisconsin, especially the tourism industries that rely on winter weather and snowy conditions. However, there is little research analyzing the impacts of climate change on downhill skiing in general and less literature focusing on the US Midwest. Because of this, the Wisconsin Initiative on Climate Change Impacts (WICCI) team and I wanted to understand how/if climate change is affecting downhill skiing in Wisconsin. To complete this objective, we conducted semi-structured interviews with individuals who own or operate downhill ski hills in Wisconsin. Once interviews were completed, we analyzed the results using qualitative methods. The larger project examined the current impacts, adaptations, and views on the future of downhill skiing in Wisconsin. For this poster, I analyzed participants' perspectives on climate change's impact on 1) Wisconsinites' relationship with natural resources and 2) the accessibility of downhill skiing. This research highlights key stakeholders' thoughts about the future of downhill skiing in Wisconsin and can inform the decisions supporting this important social and economic aspect of life in Wisconsin.

Advisors: Austin Holland, Ph.D.
Presentation Style: Poster
Considered for Judging

A GIS MCDM Approach to Identify Site Suitability for Utility Scale Solar Energy in Wisconsin, USA

Jordan Campbell
Natural Resource Planning

As anthropogenic climate change continues to alter our environment, the need for supplementing fossil fuel consumption with sources of renewable energy such as solar increases. The objective of this study was to identify suitable sites for utility-scale solar across Wisconsin using Multi-Criteria Decision Making (MCDM) techniques. Both Geographic Information Systems (GIS) and analytical hierarchy process (AHP) were used to assess 7 factors of environmental, economic, and social energy siting criteria. Data used in this study was obtained from governmental organizations such as the Wisconsin DNR, the USGS (Protected Areas and National Land Cover Data {NLCD}), and the U.S. Department of Homeland Security Homeland Infrastructure Foundation-Level Data (HIFLD). The analysis consisted of constraint and evaluation criteria. USGS-protected areas, NLCD open water and developed areas, and slopes greater than 10% were combined into a constraint layer. Evaluation factors were compared to one another using the AHP method by way of a pairwise comparison matrix and Saaty's scale of relative importance. Finally, a Weighted Sum of each evaluation factor and the constraint layer was performed to produce a suitability map with a spatial resolution of 30x30 meters. Raster values range from 0 to 10, with 10 being most suitable for utility-scale solar development. This work will aid large sustainability projects such as the Wisconsin Board of Regents Renewable Energy Project, in identifying properties most suitable for utility-scale solar.

Advisors: Austin Holland, Ph.D., Anna Haines, Ph.D.
Presentation Style: Poster
Considered for Judging

Environment and Society

The Role of Conservation Easements for Protecting Land in Wisconsin

Morgan Goff
Conservation and Community Planning

Riley Hubanks
Natural Resource Planning

Nature preserves, parks, and sanctuaries are types of conserved lands that provide various benefits. In addition to the latter, private land conservation in the form of conservation easements are another method to protecting land in Wisconsin. Conservation easements are voluntary agreements between a landowner and a governmental or non-governmental organization that permanently protects land. These agreements provide tax benefits, ecosystem services, and social functions like recreation. However, there are some environmental equity concerns and issues with conservation easements such as ensuring compliance with land management requirements, restricted land access, public availability to vital resources, and the relationship between public and private conservation efforts on several levels of government. Additionally, research in North Carolina has found that privately conserved parcels were not significantly more "natural" relative to their paired public and non-conserved parcels. Our objective is to investigate the effectiveness of conservation easements to protect land in Wisconsin. To accomplish this objective, we are guided by two research questions. First, what are the overall landscape characteristics of conservation easements in Wisconsin? Second, are conservation easements protecting similar land as other protected and nonprotected areas within Wisconsin? We plan to answer these questions through geospatial analysis of land characteristics using the National Land Cover Database and National Conservation Easement Database. By doing this study, we will gain an overall understanding of the role conservation easements play in protecting land in Wisconsin.

Advisors: Austin Holland, Ph.D.
Presentation Style: Poster
Considered for Judging

Environment and Society

Evaluating Relationships between Body Condition of Larval Sea Lamprey (*Petromyzon marinus*) and Environmental Conditions

Elise Bass
Fisheries and Aquatic Sciences

Sea lamprey (*Petromyzon marinus*) is a parasitic fish species, that uses an oral sucking disk to attach and feed on the bodily fluids of other fish. Native to the Atlantic Ocean, sea lamprey have invaded the Great Lakes through human-made canals, causing severe negative impacts on native fish populations. Adult sea lamprey spawn in Great Lakes tributaries, where the larvae reside for 3-10 years as filter feeders before undergoing metamorphosis into their parasitic phase. During this extended larval stage, environmental factors may play a significant role in the body condition, or the residual of the length to weight relationship. Our objective was to explore potential relationships between body condition of larval sea lamprey and stream conditions in Great Lakes tributaries. We hypothesized that stream features associated with higher productivity, such as stream geomorphic features and substrate type, produce larger larval sea lamprey. We found significant differences in body condition of larval sea lamprey between transects with different geomorphic features, like pool, riffle, and run, and different substrate types. Transects with a greater proportion of unsuitable habitat types characterized by impermeable substrate produced larvae with lower body condition. Since metamorphosis in sea lamprey is believed to be triggered by body size, understanding the stream features affecting sea lamprey growth is important in understanding the timing of transformation into a parasitic form. This may help managers fine-tune the timing of lampricide treatments and prioritize streams on the basis of suitable larval habitat.

Advisors: Sam Straus, Ph.D., Jared Homola, Ph.D.
Presentation Style: Poster
Considered for Judging

Fisheries and Water

Effects of Lake Trout removals on a Bull Trout population in a northern Idaho lake

Tyler Hoffman
Fisheries and Aquatic Sciences

Lake Trout *Salvelinus namaycush* are a popular sport fish native to the Great Lakes region, and due to their popularity have been introduced into many systems in the western United States. In some systems, Lake Trout have had negative effects on native Bull Trout *Salvelinus confluentus* populations. Specifically, Bull Trout have experienced significant declines in abundance in Upper Priest Lake (UPL), Idaho. To suppress Lake Trout in UPL, Idaho Department of Fish and Game (IDFG) has conducted gill net removals since 1998, while simultaneously monitoring Bull Trout abundance through redd counts in UPL tributaries. Catch per unit effort of Lake Trout in UPL increased until 2012, then decreased until 2015, and has been relatively stable since 2015. During the same period, Bull Trout redds increased until 2017, but decreased significantly from 2017-2023. Lake Trout from Priest Lake (PL) are likely immigrating into UPL through the Thorofare and may be exhibiting compensatory recruitment in the system. Bull Trout appeared to initially respond positively to Lake Trout removals, with 98 redds observed in 2017, but declined to as few as 10 observed redds in 2023. The decline in redds, coupled with low adult abundance, suggests Bull Trout may be in danger of being extirpated from UPL. Managers should consider implementing a bubble curtain as a barrier in the Thorofare to mitigate Lake Trout movement into UPL or consider managing both PL and UPL as one fishery and removing Lake Trout from both basins to improve odds of increasing Bull Trout abundance.

Advisors: Justin VanDeHey, Ph.D.
Presentation Style: Poster
Considered for Judging

Fisheries and Water

Evaluation of Natural and Artificial Habitat on Brook and Brown Trout in Central Wisconsin Streams

Tyler Olson
Fisheries and Aquatic Sciences

William Weber
(Not pictured)
Fisheries and Aquatic Sciences

Brook Trout and Brown Trout Species are a popular sport species in central Wisconsin streams. Artificial structures have been built in some streams to improve the habitat for the trout. To determine if artificial habitat is making a difference on Brook and Brown trout abundance, total length, and relative weight. Data were collected on 22 September and 15 October 2023 on the Big Roche a Cri Creek, Flume Creek, and the Tomorrow River with each stream having a section of natural habitat and artificial habitat sites. To determine if there is a difference between natural and artificial habitat the trout were collected using barge electroshocking. Data was then combined by species and whether it was caught in natural or artificial habitat. Catch rates, total length, and relative weight are used to compare the difference between habitats. There was a higher catch rate in artificial habitat for Brook and Brown Trout. There was no significant difference in total length and relative weight for Brook and Brown Trout. This shows that the artificial habitat is able to allow more space for trout to live. It cannot be determined if artificial habitat increases total length and relative weight, more data is needed to conclude if artificial habitat is affecting total length and relative weight.

Advisors: Joshua Raabe, Ph.D.
Presentation Style: Poster

Evaluation of Panfish demographics in 6 central Wisconsin River flowages

Joseph Lemancik
Fisheries and Aquatic Sciences

Panfish, popular in Wisconsin for recreation, exhibit temporal and spatial variations in abundance and size structure, so sampling is necessary to inform management decisions. Fyke net surveys in Wisconsin River flowages can have considerably high panfish relative abundance (catch per unit effort (CPUE)), making comparisons to state-wide surveys challenging. Flowages may experience winter water level drawdowns, and the influence on panfish populations is unknown. I evaluated fyke net data from six Wisconsin River flowages (half with drawdowns) from 2009-2023, with two years of data for each flowage. My objectives were to determine if panfish relative abundance and size structure differed among flowages and between flowages with and without drawdowns. Nets were set in early April and checked every 24 hours until early May. All fish were identified and length was measured for all individuals exceeding the species stock length. The mean (± 95% CI) CPUE was 7.6 ± 1.1 for Black Crappie *Pomoxis nigromaculatus* (n = 17,109), 10.9 ± 4.0 for Bluegill *Lepomis macrochirus* (n = 23,598), and 2.7 ± 0.6 for Yellow Perch *Perca flavescens* (n = 5,055). Mean species CPUE was significantly different (p-value < 0.05) across flowages and significantly higher in flowages without winter drawdowns. The pooled proportional size distribution was high for Black Crappie (81) and Bluegill (76) and lower for Yellow Perch (31). Wisconsin River flowages seem to support robust panfish communities, and management should consider demographic variations, including winter drawdowns. Additional research is required to understand these factors and improve comparability among state-wide surveys.

Advisors: Joshua Raabe, Ph.D.
Presentation Style: Oral

Gizzard Shad *Dorosoma cepedianum* movement and overwinter survival in a Missouri River reservoir

Kayla Reed
Fisheries and Aquatic Sciences

Gizzard Shad *Dorosoma cepedianum* are an important prey fish for recreationally important species like Walleye *Sander vitreus* and Smallmouth Bass *Micropterus dolomieu*. At northern latitudes (e.g., South Dakota) Gizzard Shad often experience high overwinter mortality. Lake Sharpe, a mainstem Missouri River reservoir located in central South Dakota, supports an important Walleye and Smallmouth Bass fishery with Gizzard Shad being the primary prey fish. Previous work has suggested Hipple Lake, a backwater embayment connected to Lake Sharpe, may be an important overwinter location for Gizzard Shad; however, movement and overwinter survival rates between Lake Sharpe and Hipple Lake were unknown. To understand overwinter survival and movements of Gizzard Shad, 40 adults (20 in 2014 and 20 in 2015) were implanted with acoustic telemetry tags with a 2-year battery life. Tagged individuals were at large in Lake Sharpe from 5 May 2014 through 11 April 2017. Each winter over 50% of tagged Gizzard Shad overwintered in Hipple Lake. Overwinter survival was higher in Hipple Lake compared to the Main Lake; however, it was not significant. Hipple Lake was primarily inhabited in late fall through spring months. Gizzard Shad moved considerable distances in the summer and fall months but did not move substantially during winter and spring months. Fish total length, winter severity, and the rate of temperature decline did not affect survival or movement of Gizzard Shad. Overall, Hipple Lake appears to be an important habitat for Lake Sharpe Gizzard Shad and should be prioritized for habitat conservation.

Advisors: Justin VanDeHey, Ph.D., Mark Fincel, Ph.D., Robert Hanten, M.S., Hilary Morey, M.S.
Presentation Style: Poster
Considered for Judging

Fisheries and Water

Impact of a Warm-Water Tributary on Intolerant Fish Species Distribution in a Northern Wisconsin Cold-Water Stream

Brandon Frank
Fisheries and Aquatic Sciences

Zephyr Lopez
Water Resources

Increasingly, riverine tributaries and confluences are being recognized beyond their alteration of environmental conditions as important sites of habitat heterogeneity and ecosystem services. At these confluences, abiotic factors such as water volume, water chemistry, nutrient load, and substrate type can be starkly different from the mainstem. This shift can alter the species composition of invertebrates, fish, and other organisms at these confluences. We hypothesized that the distribution of intolerant species in a Northern Wisconsin Class I trout stream would be different downstream of a confluence with a Cool (Warm-Transition) stream. Using student collected electrofishing data, we compared the distribution of intolerant fish species before and after the confluence. Physical, chemical, and biological characteristics of both streams were compared. We determined a statistically significant difference ($p<<0.001$) in the number of intolerant fish species before and after the confluence. Discriminant function was used to identify the major contributing physical, chemical, and ecological factors responsible for the difference in biological composition. With future research, these key factors could be used as indirect indicators of intolerant species composition as conditions change within a stream. As air temperatures rise and summer precipitation decreases, confluences with warming, shallow tributaries can decrease presence of intolerant species in trout streams downstream of warm water influxes. Our findings support the growing body of evidence demonstrating the ecological significance of confluences on biological communities.

Advisors: Justin Sipiorski, Ph.D.
Presentation Style: Poster
Considered for Judging

Multivariate Approaches to Assess Johnny Darter (*Etheostoma nigrum*) Body Condition within the Plover and Tomorrow Rivers, Wisconsin

Lin-Li Szczesny
Fisheries and Aquatic Sciences

The Johnny Darter (*Etheostoma nigrum*) serves as an indicator species in aquatic ecosystems that can reflect the health and integrity of freshwater habitats. Understanding their body condition, which refers to the overall physical state of a fish assessed by observing its size, weight, shape, and appearance; can be essential for the monitoring of ecosystem health and environmental changes. Our study objective was to determine if body condition was significantly different for Johnny Darters sampled in two agriculturally exposed streams in the Central Sands region of Wisconsin. The Plover River, predominantly composed of outwash, is prone to warmer water and groundwater contamination. While the Tomorrow River, primarily moraine, encompasses cooler waters. Individuals were sampled and preserved over a 58-year period. From these samples, body condition was estimated using multivariate methods with collected length-weight measurements to run a multi-linear regression. By employing these statistical measures, we can better understand the relationship between factors that determine body condition variability between two systems in Wisconsin. Through the integration of body measurements, analyses, and ecological characteristics, we can delve into the extrinsic (habitat quality, water temperature, land use practices, etc.) and intrinsic factors (length, weight, age) that may influence body condition. This multidimensional approach underlies the importance of considering diverse factors in assessing the body condition of aquatic organisms within dynamic ecosystems, and how we can use that information to better manage these systems.

Advisors: Justin Sipiorski, Ph.D.
Presentation Style: Poster
Considered for Judging

Fisheries and Water

Population dynamics of Brook and Brown Trout in the Tomorrow River across differing harvest regulation boundaries

Tyler Hoffman
Fisheries and Aquatic Sciences

Native Brook Trout *Salvelinus fontinalis* and introduced Brown Trout *Salmo trutta* are popular sport fish in cold-water Wisconsin streams. Brown Trout can reach larger sizes and tolerate slightly warmer water. In the Tomorrow River, Portage and Waupaca Counties, Wisconsin, Brown Trout were first stocked in 1972 and have increased in abundance, while Brook Trout have declined. A 12-inch minimum length limit regulates harvest of both species; one downstream reach has an 18-inch minimum length limit to manage for trophy Brown Trout. My objectives were to determine if Brook and Brown Trout abundance and size structure differed among sites and regulations or changed over time. I conducted electrofishing and habitat surveys in fall 2023 at three sites with differing harvest regulations (upstream, midstream, downstream) and obtained Wisconsin DNR summer electrofishing data from 2001-2023 at three comparable locations. In fall 2023, no Brook Trout were sampled, while 6% of Brown Trout exceeded 12 in and less than 1% exceeded 18 in. Since 2001, Brown Trout sampled per mile has remained stable or slightly increased, while Brook Trout were consistently lower and have decreased significantly in the upstream site. No Brown Trout exceeded 18 in during fall 2023 sampling in the downstream reach where the 18-inch length minimum persists. The Tomorrow River is likely to continue to support more Brown Trout with Brook Trout restricted to upstream reaches. Managers could consider changing harvest regulations due to lack of trout above minimum length-limits observed in surveys if anglers are looking to harvest Brown Trout.

Advisors: Joshua Raabe, Ph.D.
Presentation Style: Oral
Considered for Judging

Preliminary Steps in the Development of an Aquaponics System: A Comprehensive Overview

Lin-Li Szczesny
Fisheries and Aquatic Sciences

Frankie Gonzalez
Fisheries and Aquatic Sciences

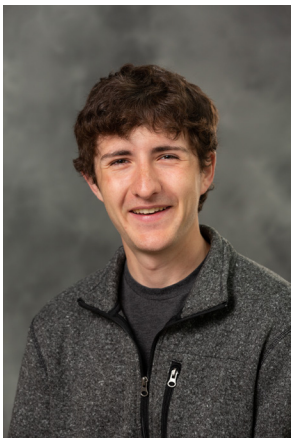
Henry Gray
Fisheries and Aquatic Sciences

Aquaponics is an innovative and sustainable agricultural technique, integrating the practices of aquaculture and hydroponics. Aquaculture is the cultivation of aquatic organisms, such as fish for food, within various types of water environments. Hydroponics is the growing of plants in water without soil. Combining these two components can establish a symbiotic relationship between the fish and plants being grown. The fish provide these nutrients that the plant uptakes which cleans the water for them. For this project, we designed and constructed an aquaponics system for a 450 gallon fish tank at the University of Wisconsin – Stevens Point to raise and grow plants such as lettuce for fish food and for future research and educational opportunities. The system uses a nutrient film technique where water is pumped from the fish tank and circulated through shallow channels that allow for the plants to be submerged in nutrient-rich water. Fish species in the tank such as various gar species (*Lepisosteidae*) and bowfin (*Amia calva*) can produce a relatively high bio-load including high concentrations of nitrates providing ample nutrients for plants. Addressing the challenge of plants keeping up with this involves the integration of a sump tank within our design. The main components used to assemble this system were 2” SCH 40 PVC pipe, strut channels, and 90-degree elbows. We plan to evaluate the variables within our constructed system to ensure success for both fish and plants, as well as address the growing need for sustainable, food-supplying systems like these in the future.

Advisors: Justin Sipiorski, Ph.D.
Presentation Style: Poster
Considered for Judging

Fisheries and Water

Smallmouth Bass Diet Analysis in a Warmwater Central Wisconsin Stream Using the Aquatic Community Assemblage



Kayla Reed
Fisheries and Aquatic Sciences

Jamie Cahalan
Fisheries and Aquatic Sciences

Blake Raymer
Fisheries and Aquatic Sciences

Smallmouth bass *Micropterus dolomieu* (SMB) are an important opportunistic top predator and highly sought after gamefish in a variety of warm and cool water systems. The number of suitable SMB streams is expected to increase as water temperatures rise with climate change; however, limited information exists regarding important SMB diet items in smaller streams. Our objectives were to determine if certain prey were more common in SMB diets, if prey differed based on SMB total length, and if SMB showed prey selectivity. In fall 2022 and 2023, we sampled the Pigeon River in central Wisconsin. We used backpack electrofishing to sample all fish species at two distinct sites, totaling 1,400 yards each year. All fish (n = 1,229) were identified and measured for total length. If SMB were >130 mm, a gastric lavage was conducted (n = 103). Macroinvertebrates were collected with kick nets to obtain a representative sample at each site based on available habitats. We calculated an Index of Relative Importance (IRI) and a reduced IRI (rIRI), along with making community comparisons. Results indicate that crayfish, fish (including remnants), and insects all occur with high frequency in SMB diets. However, based on the IRI and rIRI, SMB <200 mm feed heavily on aquatic insects, specifically ephemeropterans and trichopterans, while SMB >200 mm feed heavily on crayfish. When comparing macroinvertebrate diet items to the community assemblage, SMB selected for ephemeropterans, hemipterans, and trichopterans. When comparing piscivorous diet items to the community assemblage, a larger sample size appears necessary as all species found in diets were selected for (n = 11 individuals). Our results contribute to baseline data on SMB in small streams including important diet items and available prey, aiding in future management as small streams respond to climate change impacts.

Advisors: Joshua Raabe, Ph.D., Jeff Dimick
Presentation Style: Poster
Considered for Judging

Fisheries and Water

Stream Flow Drought Index Model for Great Lake's Region

Sawyer Schnettler
Hydrology

Alexis Sonnemann
Hydrology

Drought indices rely heavily on precipitation data, but in regions where shallow groundwater is abundant, precipitation data alone are not adequate to capture drought recovery or initiation. In areas with abundant shallow groundwater, surface water and groundwater levels are connected. USGS daily streamflow and groundwater data from over 140 sites in Wisconsin, Minnesota, and Michigan were obtained. We separated the flow data into surface runoff and groundwater baseflow components, determined annual averages, and calculated the standard departure for each year from the period of 1960 to 2022. Surface watersheds were delineated using ArcGIS Pro and digital elevation models, while groundwater watersheds were determined from existing published spatial data. Baseflow and groundwater standard departure data were converted to spatial data models (rasters) using spatial interpolation from the watersheds and groundwater watersheds. These spatial models were then used to develop a regional spatial drought index to evaluate drought initiation and recovery. Areas with shallow groundwater are more likely to recover from drought periods more easily than areas without. The drought index we developed is compared to the Standardized Precipitation Evapotranspiration Index (SPEI) for the 12-month time scale. We examine lag times to determine how well our drought index predicts drought recovery and initiation. By creating this drought index, we will be able to better predict how these watersheds will react to various periods of drought.

Advisors: Katherine Clancy, Ph.D.
Presentation Style: Poster
Considered for Judging

Fisheries and Water

Breaking Ground: Gathering baseline recreation ecology data along a section of the Ice Age Trail

Andrew Rasch
Forest Recreation

Amelia Shingle
Ecosystem Restoration and Management

This study explores the ecological implication of trail building within forested areas by examining recently constructed (October 2022) and newly constructed (August 2023) portions of the Ice Age Trail (IAT), specifically the Iola Ski Segment near the Iola Winter Sports Club in Iola, Wisconsin. There are two main components of this study. First, we assessed conditions and ecological impacts on the constructed trail segments. Second, we surveyed the vegetation and habitat along these segments. In total, 58 points were sampled along the IAT. At each point, trail width, slope, and erosion were measured and recorded. Trail width, slope, and erosion were then compared to the IAT trail guidelines, seeing if the trail continues to meet guidelines, or if it changes over time. Vegetation coverage was also surveyed at each point. The type of vegetative cover was recorded in three feet increments, starting with 0-3 feet off the trail, then at 3-6 feet off the trail, and finally at 6-9 feet off the trail on both sides. Disturbance-based plants and native, productive site indicators were noted and recorded. This set of data will serve as the baseline data of trail measurements, erosion, and vegetation on this section of the Ice Age Trail. Our hope is that these measurements can be repeated in the future to understand how trails change over time and how they can impact surrounding environments. Though more will be known in the future, we will share some preliminary findings.

Advisors: Laura Anderson McIntyre, Ph.D.
Presentation Style: Oral
Considered for Judging

Carbon Storage in Restored Prairies: How carbon storage changes with sampling depth, sampling location, and age of restored prairie

Amelia Shingle
Ecosystem Restoration and Management

As carbon dioxide levels in the atmosphere are being recognized as a global problem, more people are working to utilize landscapes to function as carbon sinks. One way to test the success of these conservation practices is through sampling soil carbon content. Typically, soil carbon is tested from samples taken within the first meter below the surface and sampling the interstitial areas (areas without vegetation directly above it) of the prairie. This study's objective was to test different soil carbon sampling methods in restored prairies to account for their unique structure. This was done in three different ways. 1.) Soil samples were collected at various depths ranging from topsoil to two meters 2.) Sample areas included both clumped vegetation and the interstitial areas and 3.) Samples were taken from prairies of varying ages. Six prairies, located throughout Wisconsin, were used in this study ranging in age from five years old (recently restored) to >200 years old (remnant prairie). Five agriculture sites were also sampled as controls. Three clumped areas and three interstitial areas were sampled at each site. For each sample, a six-foot bucket auger was used to take soil cores in 20 centimeter increments. Percent soil organic carbon content was calculated from each 20-centimeter sample using the loss on ignition method (LOI). These percentages were then used to compare carbon storage between a one-meter core vs a two-meter core, a clump of vegetation vs and interstitial area, and young restored prairies vs older restored or remnant prairies.

Advisors: Jeb Barzen, M.S., Michael Demchik, Ph.D.
Presentation Style: Oral
Considered for Judging

Forestry

Effects of Various Methods of Deer Browse Deterrence and Exclusion on Survival of Planted Northern Red Oak Seedlings

Josiah McLean
Ecosystem Restoration and Management

Northern red oak (*Quercus rubra*), is a commercially and ecologically valuable timber species in the Lake States that is predicted to have increased habitat suitability in Northern Wisconsin under climate change. Northern red oak is a preferred browse species for white tailed deer (*Odocoileus virginianus*) and high deer densities have often prevented successful regeneration or establishment of oaks. This study tested three different methods of browse deterrence and exclusion, including paper bud caps, deer repellent spray, rigid mesh tree shelters, vs. a control on recently planted northern red oak seedlings as part of a randomized complete block experiment established at the Treehaven field station in Tomahawk, WI during May of 2020. Data were collected on seedling survival, deer browse, and dieback every successive fall. Previous analysis of this dataset has shown that tree shelters can provide a meaningful reduction in deer browse and increased height growth relative to control. I was interested in whether the treatments led to differences in seedling survival over time so I utilized a logistic regression model to test for differences in survival between treatments. Tree shelters were the most effective at promoting survival, with a 92% survival rate relative to 84% survival of control seedlings. Deer repellant spray had no significant effect when compared to control. Bud capped trees had lower rates of survival at 73% compared to the control. The poor bud cap survival rate indicates that they may increase oak seedling mortality and could be counterproductive in planting efforts.

Advisors: Eli Anoszko, Ph.D.
Presentation Style: Poster
Considered for Judging

Evaluating Areas of Urban Tree Species Change from Emerald Ash Borer (*Agrilus Planipennis*) in Wausau, Wisconsin, using ArcGIS

Maverick Lange
Forest Management

The invasive insect Emerald Ash Borer (*Agrilus Planipennis*) first appeared in southeast Wisconsin in 2008 and since then has been detected in 69 out of 72 counties. With White Ash (*araxinus Americana*), Green Ash (*Fraxinus pennsylvanica*), and Black Ash (*Fraxinus nigra*) being prominent right-of-way trees in municipalities, county and city forests are often the most affected by EAB. During the summer of 2023, Marathon County forestry re-surveyed their right-of-way trees and was able to determine 3598 total *Fraxinus* species in the city of Wausau. With trees already infested with EAB in the city, the county foresters have been undergoing treatment on the Ash trees to prevent spread and severity of the infested. There are different chemical injection methods for offsetting the effects of the beetle but, for larger cities, it is not logistically possible to treat and monitor every tree within the city every year. With that, the best long term course of action is to slowly transition away from *Fraxinus* species and plant new urban trees. Furthermore, with a high number of *Fraxinus* species within the city, there will be a significant change in right-of-way tree species. This study will provide estimates on what areas of Wausau will experience the most change in species, in addition to information on the citizen density and demographics within those areas. Included with this study are ArcGIS maps highlighting the levels of change organized by census tracts with the population data included. These maps and analysis will aim to give city foresters information that will contribute to more informed decisions on EAB management within Wausau.

Advisors: Austin Holland, Ph.D., Holly Petrillo, Ph.D.
Presentation Style: Poster
Considered for Judging

Forestry

A Practical Guide to Seam Defects in *Quercus rubra*

Alice Maas
Ecosystem Restoration and Management

Additional Authors
Hannah Kovalaske, Forest Management, Eric Alfredson, Forest Management

Northern Red Oak (*Quercus rubra*) is an economically important species in the Lake States. Seams, a common defect, occur from cracks in the bark and wood, causing discoloration from decay. Seams result from mechanical injury, wind stress, and "frost crack" due to rapid changes in temperature during winter. Seams' straightness, depth, length, and quantity impact log quality. For this reason, seams are classified into straight, spiral, and weeping. The research objective was to provide loggers with a tool for making better merchandising decisions in the field. Trees with seams were selected from a site in Shawano County. Prior to felling, tree height and DBH were measured, and trees were photographed to show the seams' height and extent. Logs were milled, defect up, into 1-inch thick boards. Boards were photographed, and the area of defect was calculated as a percentage of total board area. Straight seams had the least impact, but deep spiral and weeping seams with associated degradation lowered lumber quality. For straight and spiral seams, the defect appeared within the first inch and cleared up at 10 inches and 13 inches, respectively. The weeping seam appeared at 1-inch and never cleared up. For straight, spiral, and weeping seams, respectively, the maximum affected area of a board was 18% at 1-inch depth, 19% at 9-inch depth, and 14% at 1-inch depth, and total board area affected in the log was 9%, 9%, and 7%. Seams are potentially a high-impact defect, often persist throughout the rotation length, and affect log quality.

Advisors: Les Werner, Ph.D., Michael Demchik, Ph.D., Megan Espe, M.S., Paul Koll, M.S., Ben Knaack
Presentation Style: Oral
Considered for Judging

A Practical Guide to Epicormic Sprouts in *Quercus rubra*

Eric Alfredson
Forest Management

Additional Authors
Hannah Kovalaske, Forest Management, Alice Mass, Ecosystem Restorations and Management

Northern Red Oak (*Quercus rubra*) is an economically important species in the Lake States. Red oaks are susceptible to the defect epicormic sprouts, which are caused by tree stress, increased sunlight to the bole, and injury. After epicormic sprouts occur, a branch knot forms, which can severely limit the number of clear cuts in a log. The objective of this research was to provide loggers with a tool for making better merchandising decisions in the field. Trees with epicormic sprouts were selected from a site in Shawano County. Prior to felling, tree height and DBH were measured, and trees were photographed to show the height and extent of the epicormic sprouts. Logs were milled, defect up, into 1-inch thick boards. Boards were photographed, and the area of defect was calculated as a percentage of total board area. Defects were problematic and prevalent throughout the entirety of each log. For this study, the epicormic sprout defect in one of the logs first appeared at 1 inch. Defect impact was lowest at 5 inches, which is close to the center of the tree. The maximum affected area of an individual board was 17% at a 9-inch depth. In the log, total board area affected was 10%. Because epicormic sprouts are potentially a high-impact defect, red oaks with a strong history of epicormic sprouting are often removed from the grade lumber market and absorbed into the railroad tie market.

Advisors: Megan Espe, M.S., Les Werner, Ph.D., Michael Demchik, Ph.D., Ben Knaack, Paul Koll, M.S.
Presentation Style: Oral
Considered for Judging

Forestry

A practical analysis of tearout-related defect in *Quercus rubra*

Hannah Kovalaske
Forest Management

Additional Authors
Eric Alfredson, Forest Management, Alice Mass, Ecosystem Restorations and Management

Northern Red Oak (*Quercus rubra*) is an economically important species in the Lake States. A common defect is branch tearout. For trees with branch tearout, decay behind the point of attachment, included bark, or codominant stems are often contributing factors. After branch failure, decay will alter the quality of wood in the tree, particularly below the point of attachment. The objective of this research was to provide loggers with a tool for providing better merchandising decisions in the field. Trees with tearouts were selected from a site in Shawano County. Prior to felling, tree height and DBH were measured and trees were photographed to show the height and extent of the tearout. Logs were milled, defect up, into 1-inch thick boards. Boards were photographed and the area of defect was calculated as a percentage of total board area. For each log, defect was restricted to the side of the log where the tearout occurred and new wood added after defect was unimpacted. For one tearout example, defect first appeared at 1 inch. Defect cleared up at 7 inches, which is approximately the center of the tree. The maximum affected area of an individual board affected was 70% at a 3-inch depth. In the log, total board area affected was 14.3%. While tearout is potentially a high-impact defect, red oak's ability to compartmentalize wounds allows for these logs to still produce a significant volume of quality product.

Advisors: Michael Demchik, Ph.D., Les Werner, Ph.D., Megan Espe, M.S., Paul Koll, M.S., Ben Knaack
Presentation Style: Oral
Considered for Judging

Updating the UWSP campus tree map to evaluate Periodic Annual Increment growth of trees based on proximity to buildings and by shade tolerance

Alex Wolf
Forest Management

Campus tree and street inventories are a way of representing overall tree quantity and quality of urban trees. These maps are extremely important because they allow urban foresters to measure tree growth over time and develop plans to manage species independently. The UWSP campus tree map was created between 2017-2019 and was updated over a 2-month period at the end 2023. This allowed us to compare radial tree growth between two sampling periods. ArcGIS collector was used to update the campus tree map and tree diameter at breast height. We were interested in determining whether a tree's shade tolerance and proximity to a building influence periodic annual increment (PAI) growth. We compared PAI growth of American basswood (*Tilia americana*), honey locust (*Gleditsia triacanthos*) green ash (*Fraxinus pennsylvanica*), and white spruce (*Picea glauca*), which have different shade tolerances ranging from tolerant to intolerant. Tree proximity to buildings and open growing conditions were also recorded. A tree's proximity to a building can influence the degree of shading at different times of the day, soil compaction, root growth, and soil moisture. In general, shade intolerant trees that were open grown had the highest growth rates, whereas shade tolerant trees had higher growth rates near buildings. In the future this data could be used to help urban foresters and landowners determine better placement of trees to maximize overall growth.

Advisors: Michael Tiller, Ph.D., Holly Petrillo, Ph.D., Melinda Vokoun, Ph.D.
Presentation Style: Poster
Considered for Judging

Forestry

Why Volunteer?: Motivations and place attachment among Ice Age Trail builders

Andrew Rasch
Forest Recreation

Amelia Shingle
Ecosystem Restoration and Management

Volunteers are often the key factor in the successful completion of a project. However, there are many questions about what motivates volunteers to give their time and effort to help complete a project. This study is aimed at gaining an understanding of volunteers, specifically Ice Age Trail volunteers. This study was conducted during the Ice Age Trail building event held in August 2023 at Iola Winter Sports Club in Iola, Wisconsin. The study focuses on indicators of a quality volunteer experience, personal and social motivations for volunteers, and place attachment to the Ice Age Trail among volunteers. In total, 28 volunteers were surveyed through an interview designed to gather both qualitative and quantitative data. Responses were recorded and later entered into a spreadsheet for analysis. Open ended responses were coded and crosschecked for reliability using multiple coders. Frequencies, crosstabs to compare findings by groups, and statistical tests were used to examine close ended responses. Preliminary findings suggest that the vast majority of volunteers had volunteered previously, with nearly a third volunteering for more than 10 years. Additionally, almost half of volunteers traveled two hours or more to attend the event. The most important motivations for volunteers were being close to nature, seeing other volunteers, and giving back. Volunteers demonstrated positive attachment to the Ice Age Trail, expressing greater emotional and symbolic attachment than functional dependence.

Advisors: Laura Anderson McIntyre, Ph.D.
Presentation Style: Poster
Considered for Judging

A Compost Application Rate for Sustainable Hemp Agriculture in Wisconsin

Natalie Gruben
Soil Science and
Land Management

Alaina Hart
Biology Pre-Veterinary

Gregor Wilms
Soil Science and
Land Management

Sydney Paoli
Soil Science and
Land Management

Maya Desai
(not pictured)
Soil Science and
Land Management

Addison Pfeil
(not pictured)
Biochemistry

Hemp (*Cannabis sativa*) is an alternative crop that can be used for the production of fiber and cannabinoids (CBD, CBDA, THCA). From 1970 to 2018, hemp was illegal in Wisconsin. Consequently, modern Wisconsin farmers lack the knowledge and research background to grow hemp in a sustainable manner. Compost amendments are known to positively influence soil quality and are considered one of the tenants of sustainable agriculture. This experiment was conducted to determine an ideal compost application rate for hemp. The experiment contained three different compost application rates and measured the soil quality and plant health (plant biomass and cannabinoid concentrations) responses to compost. Our findings suggest compost application does significantly ($P<0.05$) increase soil quality and plant health. Based on our research, we have determined an ideal compost application rate for hemp. This research can be utilized by Wisconsin farmers to grow hemp in an economically and environmentally feasible approach.

Advisors: Bryant Scharenbroch, Ph.D., Brian Barringer, Ph.D., Ann Impullitti, Ph.D., Shannon Riha, Ph.D., Logan Brice, Rosalind Remsen.
Presentation Style: Poster
Considered for Judging

Soil and Waste

A Relative Comparison of Student-Performed Wetland Delineations

Ethan Davis
Water Resources

Wetlands are essential ecosystems as they are biodiversity hotspots, store carbon, and filter and store water. Wetland delineation is important for protection of these ecosystems and involves identification of wetland hydrology, hydrophytic vegetation, and hydric soils. These skills are taught to students in the Wetland Soils and Delineation (Soil/Water 366) at the University of Wisconsin – Stevens Point. The objective of this research was to assess the accuracy of students to identify wetland hydrology, hydric soils, and the wetland boundary. This research was conducted in the Moses Creek Wetland Restoration in the Schmeeckle Reserve on the UWSP campus. Assessments were done on 96 plots randomly located on transects throughout the wetland. Each student group was assigned 6 plots. Students collected soil samples on each plot. Samples were analyzed for comparison to the field assessments. Hydric soil assessment includes identification of soil color (Munsell hue, value, and chroma) and texture (organic, mucky-mineral, or mineral). Soil colors were measured with a soil color meter and organic matter was determined in the laboratory to assign proper texture class. The accuracy of student identification of wetland hydrology, hydric soils, and wetland boundary was determined by comparison to the Soil Survey and Wetlands Map (USFWS). Statistical analyses included chi-squared and linear regression analysis. Students accurately identified soil color (Munsell value = 19% and chroma = 41%), soil texture (66%), hydric soils (34%), wetland hydrology (36%), and wetland plot (69%) of the time. The data suggests students are understanding the applied skills to properly identify wetlands.

Advisors: Bryant Scharenbroch, Ph.D.
Presentation Style: Poster

Phytoremediation using *Cannabis sativa L.* - A comparative analysis of the effects of lead and arsenic on the fitness of six lineages of hemp

Elizabeth VanDomelen
Biology

Mary Joy Relagio
Biology

Tyler Jolin
Biology

A large portion of the world's soil is polluted in some capacity by heavy metals. This is especially true for soils used in agriculture. Growing crops in contaminated soil can reduce overall yield as well as pose risks to consumers. One possible solution to remove heavy metals from soil is phytoremediation, the use of plants to remove and sequester toxins. Hemp (*Cannabis sativa*) has been shown to be a successful phytoremediator in multiple studies. In this study, we examined differences among six lineages of industrial hemp, including three modern day lineages and three older lineages growing feral in Wisconsin. Plants were grown from seeds in soil that was either uncontaminated, contaminated with lead, or contaminated with arsenic (lead and arsenic are common soil contaminants). We collected data on height, vegetative and floral biomass, and cannabinoid and terpene concentrations. We also collected data on the concentrations of heavy metals in both vegetative and flower tissues. Our work provides valuable insights into the phytoremediation properties of hemp, which could be applied to develop lineages of hemp that are both efficient in their phytoremediation properties and able to produce a profitable yield for farmers.

Advisors: Brian Barringer, Ph.D., Shannon Riha, Ph.D., Ann Impullitti, Ph.D.
Presentation Style: Poster
Considered for Judging

Soil and Waste

The Study of Hydrophobic Soils in Relation to Forest Fires

Lane Bowman
Urban and Community Forestry

The phenomenon of hydrophobic soils after forest fire presents a runoff and erosion problem. While it is known that hydrophobic soils may form after intense wildfire it is not often observed after prescribed fire. The mechanism for this formation and/or lack of is not well documented. Certainly, fire intensity may play a role, but we hypothesize that the water content of the soil upon the condensation of volatile organics in smoke may play a role as well. As a first step we have investigated the influence of initial water content in 4 soils on the formation of a hydrophobic coating simulating the volatile organics from smoke with silicone water proofing spray. Our testing of the principle has shown that indeed the greater the water content at treatment the less hydrophobic the soil as evidenced in our measurements of soil wetting angle. Future steps will be testing the same 4 soils using smoke generated from dry aspen chips.

Advisors: Jacob Prater, Ph.D., Mick Veum, Ph.D.
Presentation Style: Poster

Costa Rica Tropical Ecology Interpretive Poster Session

Presenters:

Marianna Axtman, Heather Ceranske, Pierce Davidson, Emily DeVetter, Lydia Dobberstein, Hunter Janitch, Kiley Komperud, Emily Lee, Raelynn LeFevre, Dana Lotz, Emily Michalzik, Raymie Miller, Emily Sinclair, Will Smith, Sophia Sperduto, Shelby Sterken, Jonah Tamez, Nick Wachowiak, Evan Wichman

This winter break, 20 students travelled to Costa Rica as part of a Tropical Ecology course. Each student chose a topic to explore related to tropical ecology and presented a short talk on that topic to the group during the trip. Students were then asked to apply the 3-30-3 Rule to create an informational poster on that topic. This rule states that you have only 3 seconds to grab the attention of the audience through your poster. Once the audience decides to initially engage, you then have 30 seconds to keep them engaged as they quickly scan the poster and its overall message. Finally, the presenter must be able to create a clear, concise message that gives the take-home information in 3 minutes. The posters will be presented together to provide students with the opportunity to share their adventure with the symposium attendees. Topics in the poster session include sloths, monkeys, bats, toucans, macaws, hummingbirds, strangler figs, insects of Costa Rica, damselflies, leaf cutter ants, ecosystems of Costa Rica, ecotourism, water resources, and more.

Advisors: Christopher Yahnke, Ph.D., Becca Franzen, Ed.D.
Presentation Style: Posters, presented during all poster times in TNR 157

Analysis of Developed Areas' influence on Diurnal and Nocturnal Movement Patterns in Northern Wisconsin Rehabilitated Black Bears

Emily DeVetter
Wildlife Ecology and Management

Dalton Zingshiem
Wildlife Ecology and Management

William Watry
Wildlife Ecology and Management

Alayna Reynolds
Wildlife Ecology and Management

Tia Stanton
Wildlife Ecology and Management

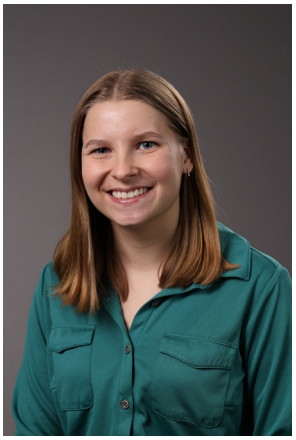
Cece Giesen
Wildlife Ecology and Management

Abby Mueller
Wildlife Ecology and Management

The Eastern American Black Bear (*Ursus americanus americanus*) is a valued species among many for its biological, intrinsic, and cultural significance. The Wisconsin black bear population has grown from around 9,000 individuals in 1989 to more than 24,000 individuals today. Black bears in environments not dominated by humans tend to be most active during crepuscular and daytime hours but are more active during the night in human dominated landscapes. The objective of this study is to analyze and compare the daily and nightly movements of rehabilitated black bears in developed and undeveloped areas. Two rehabilitated bears have been fixed with GPS collars in northern Wisconsin. Daily movement patterns will be analyzed through the comparison of the distance traveled in established diurnal and nocturnal periods of the day. Data from this study will expand the knowledge on the differences between daily and nightly movement patterns in proximity to developed areas, of the Eastern American Black Bear and help determine if rehabilitated bears are changing their circadian movement around human activity.

Advisors: Cady Sartini, Ph.D.
Presentation Style: Oral
Considered for Judging

Analysis of Neotropical Bat Species in Costa Rica from Autonomous Recording Units



Dana Lotz
Wildlife Ecology and Management

There are about 120 species of bats in Costa Rica. Within the order Chiroptera, over half of the species are found in the family Phyllostomatidae. This includes insectivores, carnivores, frugivores, nectivores, and sanguivores. The non-phyllostomatid bats (nine families) are mainly aerial insectivores and piscivores. Bats provide many economic and ecosystem services in Costa Rica such as pollination, ecotourism, seed dispersal, and pest management. During the Tropical Ecology – Costa Rica study abroad trip, we had the opportunity to deploy two Audiomoth bat detectors at five different locations, each with varying ecosystems and elevations, throughout the country. We collected data in tropical wet forest (Chilamate, Selva Verde), premontane wet forest (Finca 360), tropical moist forest (Hacienda Baru), and high montane forest (Villa Mills). Elevation varied throughout the sites with the highest elevation of 2851 meters in high montane forest and the lowest elevation of 5 meters in tropical moist forest. Data was collected from 7 pm to 4 am from acoustic monitors placed in areas optimal for intercepting bat acoustic signals. It is important to note that the Wildlife Acoustic bat analysis package for Costa Rica can only identify 30 of 120 species, with most detectable species being insectivores. Of these 30 species, we detected 29 of them. We predict that species richness will decrease with increasing elevation, species richness will differ by ecosystem, and species activity will differ by ecosystem. We performed a linear regression model to compare species richness and elevation. We also ran a Chi-Square Goodness of Fit (GOF) test to determine if species richness will differ by ecosystem, as well as a Kruskal-Wallis test to determine if species activity differs by ecosystem. The linear regression revealed a strong correlation that as elevation increases, species richness decreases ($R2 = 0.947$, $P = 0.027$). The Chi-Square GOF test revealed a significant difference in species richness by ecosystem. The Kruskal-Wallis test determined a significant difference in species activity by ecosystem. These findings provide insights for understanding variation in bat species richness and activity within a geographically diverse country.

Advisors: Christopher Yahnke, Ph.D.
Presentation Style: Oral
Considered for Judging

Wildlife

Analysis of Trap Design Characteristics of Fisher Monitoring Stations

Erik Holterman
Wildlife Ecology and Management

Tyler Rasmussen
Wildlife Ecology and Management

Kayla Allred
Wildlife Ecology and Management

Rachel Boehlke
Environmental Science and Management

Rebecca Grichnik
Wildlife Ecology and Management

Camera traps are a non-invasive wildlife sampling method, offering constant surveillance of multiple locations. Capturing pictures of wildlife provide opportunities including identifying individuals in a population, providing data on home ranges, and analyzing population dynamics. This project aims to identify individuals which directly affects our ability to estimate population size, connectivity between populations, and help wildlife managers develop conservation plans. Focusing on fishers (*Pekania pennanti*), our team installed Fisher Monitoring Stations (FMS) throughout the Mead Wildlife Area. FMS are designed to attach to trees, where we expect fisher to climb on, touch, or reach out across a stabilizing bar to interact with bait hanging above the FMS. Our camera traps then take pictures of the underbelly of fishers to capture markings that help identify individuals within the population. This was the first implementation of FMS, so we are analyzing trap characteristics such as bait type and height of the stabilizing bar in relation to the FMS platform. All pictures taken this field season are in the process of being graded on a numerical scale based on image quality in relation to identifying individuals. We hypothesize that a height of 60 cm and the implementation of beaver meat as bait will yield higher quality pictures than a height of 50cm and jam as bait. In the future, we hope to continue to test more characteristics of trap design, including additional heights of the stabilizing bars, FMS distance to camera, distance to bait, and improved hair snare design.

Advisors: Cady Sartini, Ph.D.
Presentation Style: Poster
Considered for Judging

Analysis of Trapping Interference by Non-target Species on Eastern Gray Squirrels (*Sciurus carolinensis*) in Central Wisconsin

Molly Moder
Wildlife Ecology and Management

Nicole Luoma
Wildlife Ecology and Management

Ella Follman
Wildlife Ecology and Management

Eastern gray squirrels (*Sciurus carolinensis*) are commonly found in forests and urban areas across the Midwest and are in abundance in Stevens Point, Wisconsin. Since 2020, students with the Wildlife Society have been trapping squirrels at two sites in Schmeeckle Reserve during February and March. We trap squirrels in Tomahawk live traps baited with peanut butter and oats. Traps are baited and opened at 6am and checked at 9am, 12pm, and 3pm. Peanut butter and oats also attract non-target species such as white-tailed deer (*Odocoileus virginianus*) that interfere with traps, rendering them unable to catch squirrels. Additionally, smaller animals such as mice (*Peromyscus spp*.) and chickadees (*Poecile atricapillus*) consume bait without triggering the trap mechanism. Mice are crepuscular, but white-tailed deer demonstrate activity spikes immediately after sunrise during winter months. Therefore, we hypothesize that trap interference (tripped and/or bait absent) frequency will correlate with non-target species' daily activity patterns. When a squirrel is trapped, we measure weight and ear length and record age and sex of each individual. We also record whether unsuccessful traps are tripped and whether the bait is still present. We intend to use ANOVA and t-tests to determine differences between trap interference frequency at each check time that corresponds with interfering species' daily activity patterns.

Advisors: Shelli Dubay, Ph.D., Ben Sedinger, Ph.D.
Presentation Style: Poster
Considered for Judging

Wildlife

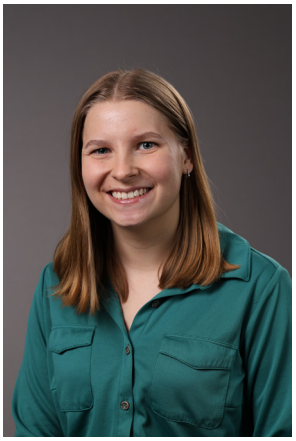
Analyzing Sound Variations of Drumming Male Ruffed Grouse

Ava Cross-Weisbeck
Wildlife Ecology and Management

Ruffed Grouse (*Bonasa umbellus*) are an important ecological, cultural, and economic game species throughout North America, especially in Wisconsin and the upper Midwest. Male ruffed grouse perform a breeding display called drumming, which typically takes place on elevated platforms such as a fallen log. A method commonly used for monitoring ruffed grouse populations is conducting auditory point count surveys for drumming males during the spring breeding season. The objective of this study is to understand acoustical differences between drumming male ruffed grouse. Sound meters were deployed during the late spring of 2023 on the University of Wisconsin – Stevens Point Treehaven property. The sound meters captured auditory data on multiple drumming male ruffed grouse. Individual drumming events were isolated using an acoustic analysis program. Variations in sound variables from different ruffed grouse and their drumming events were analyzed. The information gained by understanding differences in sound produced by drumming ruffed grouse will aid in modeling the extent of drumming audibility by humans, impacting monitoring techniques in the future.

Advisors: Jason Riddle, Ph.D.
Presentation Style: Poster
Considered for Judging

Behavioral Analysis of Novel Object Test on Group-Living Fish



Dana Lotz
Wildlife Ecology and Management

Social context, such as group size, sex, age, and status, can play a major role in an animal's willingness to interact with foreign objects. In terms of group size, being a member of a group can lead to advantages in optimal decision making, such as reduced exposure to danger. However, it can also be maladaptive, such as reduced exploration of food resources. The novel object test is a behavioral testing procedure that quantifies an animal's reaction to unfamiliar objects. This test helps to understand differences in behavior among individuals or groups in terms of boldness, avoidance, exploration, or neophobia. The data for this study was collected from the Behavioral Ecology course lab experiment running a novel object test on group living fish in 2023 and 2024. Our study's goal is to understand how group size in group-living fish impacts how much time they spend in proximity to a novel object. In 2023, we predicted that groups of coptodon fish will spend more time in the dangerous zone than a singular coptodon fish. Our experiment included three tanks holding five fish and three tanks holding one fish. We ran a one-tailed t-test and failed to reject the null hypothesis ($P > 0.05$). Group fish spent an average time of zero seconds in the dangerous zone, whereas singular fish spent an average time of 208 seconds in the dangerous zone. In 2024, we will be conducting a second novel object test with a different species of group-living fish to compare to our 2023 data. Studying boldness in different species of group-living fish can help us better understand how group behaviors can be advantageous or disadvantageous to survival and if these behaviors are species specific.

Advisors: Cady Sartini Ph.D.
Presentation Style: Poster
Considered for Judging

Wildlife

Bison Selection in Regards to Prairie Dog Colonies

Logan Maier
Wildlife Ecology and Management

Matthew Rutschow
Wildlife Ecology and Management

Bison and Prairie dogs have been linked together throughout years of research on the prairie ecosystem. Previous studies have shown that Bison will select for Prairie dog colonies in New Mexico (Chipault and Detling 2013). Grasses grazed by prairie dogs have much higher nitrogen content than plants away from colonies, which is more advantageous to Bison to graze on colonies. Bison surveys were conducted using focal methods. Bison locations were determined using coordinates from a GPS unit and triangulated using compass angles and distance from a range finder. Behaviors were studied and recorded using binoculars and spotting scopes to avoid disrupting the herd. Bison locations were charted in a GIS document to determine if the Bison were selecting for Prairie dog colonies. Data was removed to include only locations including large herds, and removed lone bulls or small groups, so locations with 5 or fewer individuals were discarded. Once 49 locations were randomly selected, they were entered into a GIS program to show the locations in the study area. These locations were then analyzed for selecting for prairie dog colonies, with a 1 for selecting for prairie dog colonies, and a 0 for not selecting for prairie dog colonies. Analysis of this data found a weak selection for prairie dog colonies, which could be due to selections being random from the dataset.

Advisors: Travis Livieri, Ph.D.
Presentation Style: Poster
Considered for Judging

Bow-Riding Behavior of Indo-Pacific Bottlenose Dolphins (*Tursiops aduncus*): Insights to Dolphin Behavior in the Context of Anthropogenic Disturbance

Abby Mueller
Wildlife Ecology and Management

Bow-riding is a behavior observed in at least 22 species of cetaceans, of which bottlenose dolphins (*Tursiops spp.*) commonly participate. Animals position themselves in the bow pressure waves of moving vessels to become propelled alongside the boat, allowing the individual to travel with minimal additional movement. As recreational boating, commercial shipping, and wildlife tourism are on the rise, concerns have been raised about an increased risk of boat related injuries to dolphins. These risks may not affect each dolphin equally because individual dolphins may not approach vessels equally. It has been widely presumed that juvenile male dolphins bow-ride more frequently, but this has yet to be confirmed. Further, the behavioral state of dolphins prior to a boat interaction may predict bow-riding activity, but this is still poorly understood. Thus, the goal of the present study is to determine how age, sex, and behavioral context influence bow-riding activity. Behavioral surveys from 2003-2022 were analyzed from the Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) population in Shark Bay, Australia. Individual identity, age, and sex is known for each dolphin. Age and sex ratios of bow-riding dolphins were compared to the known ratios of the Shark Bay population. The initial behavioral state (forage, social, rest, or travel) was analyzed for bow-riding activity within the same survey. Preliminary results suggest juvenile dolphins bow-ride most frequently, and females are more likely to bow-ride than males. Results from this study provide insight to dolphin behavior in the context of anthropogenic disturbance, of which is becoming increasingly relevant.

Advisors: Verena Conkin, Ph.D.(c), Janet Mann, Ph.D.
Presentation Style: Oral
Considered for Judging

Wildlife

Collecting Bat Data from Private Organizations can Yield More Information on Bat Population Trends

Sam Coleman
Wildlife Ecology and Management

Maggie Handfelt
Wildlife Ecology and Management

Elyse Gabriel
Wildlife Ecology and Management

Elizabeth Grove
Wildlife Ecology and Management

Gabby Shulfer
(Not pictured)
Wildlife Ecology and Management

82.2% of Wisconsin's land is privately owned. Working with or researching on private land can be difficult as you have to obtain permission from the land owners. Building trust with landowners is a multiple year process that requires an ability to see a different perspective and a willingness to learn from both parties. With enough learning, comes an interest with how this land is being utilized. This interest can come in the form of aid from private organizations and continuous cooperation. For our project, we worked with three private organizations, the Catholic Ecology Center, the Marshfield Zoo, and a land owner on Chamber's Island to collect 356,456 files of acoustic bat (*Chiroptera*) data that spans from 2017-2023. Working with private organizations allots us the opportunity to work with higher grade and regularly maintained equipment that we can't consistently obtain from public organizations. Little brown bats (*Myotis lucifugus*, MYLU) are considered keystone species among other species of the insectivorous, evening bats (*Vespertilionidae*). The five other Wisconsin bats can eavesdrop on the frequencies emitted by MYLU as a way to identify where insects are, as MYLUs are the lowest fliers. The recent drop in bat population numbers, due to the fungal disease white-nose syndrome and collisions with windmills, can be seen across the state with the MYLUs and Northern long-eared bats (*Myotis septentrionalis*) being the most impacted. It is important to find out presences and absences of these bats to assess proper land management and what areas to further research.

Advisors: Christopher Yahnke, Ph.D.
Presentation Style: Poster
Considered for Judging

Comparing metrics derived from manual photo processing to artificial intelligence when identifying wildlife from a camera trap project

Parker Kreie
Wildlife Ecology and Management

Camera traps are vital tools for ecological research across the world. Although this technique allows biologists to collect a variety of data but proves challenging to process the results from thousands of photos. Use of Artificial Intelligence (AI) as a photo identification system claims to reduce effort in photo processing. My objective was to assess the accuracy of an AI program, MegaDetector (MD), by establishing the realized number of photos with animals compared to the total number of photos the AI program classified as having animals. My second objective was to then compare the performance of MD to manual processing (MP) conducted by Minnesota Department of Natural Resources (MNDNR) staff and volunteers. The photo database used for this project was provided by the MNDNR deer research team's camera trap study. Their study was conducted in the Chippewa National Forest and Deer Management Area (DPA) 268. Data collected to achieve objectives includes false positive rate, false negative rate, accuracy rate, and mean detection difference between the two processes. Photos were processed with Time Lapse (TL), a program that organizes camera trap photos and is compatible with MD. MD for both study sites had a false positive rate of 98.3%, false negative rate of 0.02%, and an accuracy rate of 1.7%. The mean detection difference between manual MP and MD was 1.67 photos per camera. Processing took 33 hours and 45 minutes with MD, while MP took approximately 6 months. Future research will focus on the benefits of using both methods.

Advisors: Eric Michel, Ph.D.
Presentation Style: Oral
Considered for Judging

Wildlife

Comparing Wolf and Coyote Call Response Success Rate with an Electronic Predator Call

Logan Maier
Wildlife Ecology and Management

Parker Kreie
Wildlife Ecology and Management

Jillian Hesse
Wildlife

Helena Stoflet
Wildlife

Pierce Davidson
Wildlife

Adrienne Cohoon
Wildlife Ecology and Management

Alex Stone
Wildlife Ecology and Management

Zephyr Lopez
Water Resources

Howling is a stimulated response in canids to distinguish territory. Species of the canidae family tend to respond to other species via howling. So in our study, we wanted to compare which canid species would respond to each call/howl we used. Howl surveys take place in two different sites/wildlife reserves (Buena Vista and Mead). We used a predator call device where we would play a male gray wolf (*Canis lupus*) call and a male coyote (*Canis latrans*) call on transects we assign ourselves. When playing both calls, we would play three male wolf calls at one point on the transect, and then drive down the transect for a mile and switch to the coyote call at our next point. At each survey we bring a data sheet where we write the following: the date, location, road name, latitude/longitude, time of when responses are heard, the species that is responding, compass bearing, estimated distance of where canids are located, number of adults heard, whether or not we heard pups, and ambient noises. There were 46 calls that were played (24 wolf calls and 22 coyote calls) where there were no responses from species, 6 calls (5 coyote calls and 1 wolf call) where coyotes would respond, 1 call where a domestic dog responded to a wolf call, 1 wolf call where we would hear a wolf response, and 1 wolf call where we heard both wolves and coyotes responding at the same time.

Advisors: Christopher Yahnke, Ph.D.
Presentation Style: Poster
Considered for Judging

Determining the Adult Sex Ratios of Observed Wild Turkey Populations in the George W. Mead Wildlife Area using Road Transects

Logan Maier
Wildlife Ecology and Management

Parker Kreie
Wildlife Ecology and Management

Jillian Hesse
Wildlife

Jacob Bork
Wildlife

Zack Wilson
Wildlife

Grace Burhop
(*Not pictured)*
Forest Recreation

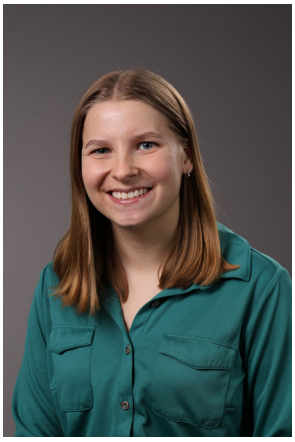
Ruby Valadez
(Not pictured)
Wildlife

The George W. Mead Wildlife Area is located northwest of Stevens Point, WI. It encompasses both Wood, Portage, and Marathon counties. This wildlife area is home to a large variety of ecosystems including wetlands, grasslands, and old growth forests that are home to a diverse range of wildlife. Among this diverse community of wildlife is the eastern wild turkey (*Meleagris gallopavo*). We examined these turkeys and hypothesized that there would be a significant difference in the observed male and female turkey populations in the George W. Mead Wildlife Area. We collected turkey data using observational counts along predetermined transects from February 4, 2023 - April 2, 2023. Three road transects were developed to cover the majority of the George W. Mead Wildlife Area. We traversed two transects on each trip starting at 7:30am. We placed coordinates of encountered flocks into ArcGIS Pro to display the distribution of turkey flocks in the wildlife area. Throughout the study, we observed 42 males and 169 females. We calculated sex ratios using NMales / NMales + NFemales. We calculated significance using a chi-squared test resulting in a chi square value of 76.4, chi critical value of 3.8, and a p-value of 2.269E-18. The data support our biological hypothesis that there is a significant difference in the number of observed male and female turkeys in the George R. Mead Wildlife Area.

Advisors: Jason Riddle, Ph.D.
Presentation Style: Poster
Considered for Judging

Wildlife

Differential Timing of Migration in Northern Saw-whet Owls (*Aegolius acadicus*) in Central Wisconsin Based on Age and Sex Categories



Nicole Luoma
Wildlife Ecology and Management

Sophie Hauser
Wildlife Ecology and Management

Dana Lotz
Wildlife Ecology and Management

The Northern Saw-whet Owl (*Aegolius acadicus*; hereafter NSWO) is one of the smallest owls in North America. It is found as far north as central Canada and Alaska and migrates as far south as central Mexico. The annual fall movements of NSWOs are highly variable across regions, age, and sex, as well as the number of owls migrating. The purpose of this study was to determine NSWO sex and age-related patterns of migration in central Wisconsin. From 2006 to 2022, we captured over 1100 NSWOs in central Wisconsin. NSWOs are captured using call-playback devices and mist-nets, then banded. Wing and tail chords, weight, age, and sex of birds are recorded with each capture. Migration date was standardized to a Julian date so that all years could be analyzed with the same test. The mean migration date was compared between age and sex groups using a 2-sample independent t-test (=0.05). We found that AHY birds migrated approximately 1.28 days earlier than HY birds, while female birds migrated later than males by approximately 2.22 days.

Advisors: Jason Riddle, Ph.D.
Presentation Style: Oral
Considered for Judging

Effects of Precipitation on Duck Size in Central Wisconsin

Sam Korducki
Hydrology

Ella Davis
Fisheries and Aquatic Sciences

Parker Wisinski
Soil Science and Land Management

Nick Helms
Finance

Waterfowl are incredibly dependent on aquatic ecosystems for their survival. It is often used as the main source of refuge during long migration flights, breeding grounds, as well as being one of the main sources of food. This study aims to build a long term database that can be used in Central Wisconsin to determine duck demographic rates and phenotypic variation. We plan to analyze the trend between average yearly precipitation in Stevens Point with duck sizes. Measurements will be collected in the Lost Creek Wetland using swim in traps. Ducks will be trapped, measured, banded, and then released. Ideally we aim to collect yearly precipitation data using local USGS data and will then analyze precipitation with our collected sizes in R studio. We will run comparison tests depending on data normality to establish a correlation. We expect to see that wetter years on average will produce larger ducks, as well as a greater diversity of species in our area.

Advisors: Ben Sedinger, Ph.D.
Presentation Style: Poster

Examining the Apparent Survival and Detection Probabilities of Eastern Gray Squirrels (*Sciurus carolinensis*) in Schmeeckle Reserve, Stevens Point, WI

Parker Kreie
Wildlife Ecology and Management

Hunter Janitch
Wildlife Ecology and Management

Dakota Longsine
Wildlife Ecology and Management

Eastern gray squirrels (*Sciurus carolinensis*) occur in high densities in urban parks throughout the Midwestern United States. Schmeeckle Reserve in Stevens Point, WI is a 113-hectare urban reserve owned by the University of Wisconsin-Stevens Point. Land cover is dominated by mature mixed forests, oak savanna, and wetland complexes. In February and March 2020 through 2023, we trapped 162 squirrels at two suitable sites in Schmeeckle. We recorded age, sex, ear length, and weight of individuals before marking them with uniquely numbered ear tags. Our goal was to estimate apparent survival and detection probability for gray squirrels in central Wisconsin using the CJS Live Recapture model in program MARK. We grouped individuals by age, sex, body weight, and year, and evaluated these groups using models on apparent survival and detection. Covariate data were Z-standardized prior to analyses, and we accounted for maturation of juveniles by graduating them to adults when they were one year old. In our preliminary study with data from 2020-2023, competing models showed no significant influence of age, sex, body weight, or year on apparent survival or detection, making the null model our top model. In 2023, survival was 0.26 (95% CI lower-upper) and detection probability was 0.53 (95% CI lower-upper). With another year of data collected from the 2024 trapping season, we anticipate results demonstrating that our covariate factors will be more competitive in relation to the null model. Results will increase knowledge of urban wildlife population trends and provide insight for management of abundant urban species.

Advisors: Shelli Dubay, Ph.D., Ben Sedinger, Ph.D.
Presentation Style: Oral
Considered for Judging

Ex-situ Nesting Ecology of Olive Ridley Sea Turtles (*Lepidochelys olivacea*) in Mayto, Jalisco, Mexico.

Sophie Reid
Wildlife Ecology and Management

Sea turtle populations have been declining throughout the world due to warming sand and ocean temperatures, habitat loss, predation from dogs, and poaching. Additional sources of decline include industrial fishing and plastic pollution. Nesting beaches are critical for their reproduction cycles, therefore intensive beach management (which includes the relocation of naturally laid sea turtle nests into monitored ex-situ environments) is a conservation practice to combat these threats. Olive ridley sea turtles (*Lepidochelys olivacea*) nest on beaches throughout the tropics. In Mexico, sea turtle conservation efforts started in 1966, expanding to approximately 70 different projects throughout the country. This study took place at Campamento Tortugero Mayto on the Pacific coast in Mayto, Jalisco, Mexico. We relocated nests into a protected hatchery on the beach. We attempt to evaluate how sand temperature impacts ex-situ olive ridley sea turtle nests through hatching success rates and hatchling morphometrics. From June 28th to August 13th, 2023, we measured sand temperatures 45cm deep (nest depth) on the periphery and center of the hatchery as well as along two transects within the in-situ beach for comparison. We also collected hatching success data from 45 nests and morphometrics, including curved carapace length (CCL) and weight, of 10 hatchlings from each nest during this timeframe. We found 0% hatching success rate in situ (n=30) and 58% (std ±26%) ex-situ (n=46). These evaluations are important to determine the effects of warming sand temperatures on the success rates of sea turtle nests and whether relocating nests is an effective practice for conservation.

Advisors: Sebastian Ramírez Domínguez Tagle, Mitzi Nuñez, Ph.D.(c), Katherine Comer Santos, M.A., Jason Riddle, Ph.D.
Presentation Style: Oral
Considered for Judging

Wildlife

Foraging Interactions of Sympatric Waterfowl on the Yukon-Kuskokwim Delta in Alaska

Jacob Tepsa
Wildlife Ecology and Management

Some populations of black brant (*Branta bernicla nigricans*) in Alaska are declining because of reduced productivity and juvenile survival. Sympatric species including emperor geese (*Anser canagicus*) and cackling geese (*Branta hutchinsii minima*) have experienced similar population declines in the mid to late 1900's but have since recovered. Grazing lawns made up of short graminoid swards serve as a preferred and shared source of forage for multiple species during brood rearing. Consequently, grazing lawn conditions and foraging behaviors may impact gosling growth rates and survival. Little is known about the role of intra- and inter-specific foraging behaviors in relation to whether species facilitate foraging conditions or compete for resources. We deployed 25 trail cameras among 5 traditional brood-rearing areas on the Yukon-Kuskokwim Delta in Alaska during the summer of 2023. Cameras were placed on grazing lawns of varying size to monitor interactions between sympatric species in comparison to lawn conditions. Videos and photos were then categorized according to the density of each species along with the displayed behavior of each adult goose and gosling. Additionally, point-sampling of vegetation was recorded near the camera-trap locations. Our study aims to understand the influence of interspecific foraging behaviors on food resources and demographic consequences for at-risk species that are also an important subsistence resource on the Yukon-Kuskokwim Delta.

Advisors: Jordan Thompson, Ph.D.(c), Caroline Blommel, M.S., David Koons, Ph.D., Ben Sedinger, Ph.D.
Presentation Style: Oral
Considered for Judging

Hatch and Release of Common Snapping Turtle Eggs at the Dane County Humane Society Wildlife Center, 2021-2023

Ashley Hoth
Wildlife Ecology and Management

Common snapping turtles (*Chelydra serpentina*) inhabit waterways in Wisconsin, consuming prey and aquatic vegetation. They mate from April to November and can lay 20-40 eggs in concave nests dug by the female. Wildlife rehabilitation provides professional temporary care to injured, orphaned, or ill wild animals with the intent to release them back into their natural environment. Common snapping turtles are often admitted to rehabilitation centers because of vehicle collisions. Snapping turtle eggs are harvested from injured gravid females through surgery at Dane County Wildlife Center (DCWC). The eggs are placed in plastic bin incubators until hatchlings are released after 60–90 days following a complete physical exam. Release sites were chosen using the parent's rescue location. We aimed to determine trends in hatch and release success of turtles by year from 2021-2023. We hypothesized that a higher proportion of turtles died before release in 2022 than in 2021 and 2023. Personnel at DCHS incubated 6-12 snapping turtle eggs per plastic storage bin at 69.8-71.6 degrees F with a damp vermiculite substrate. Eggs were labeled and then monitored until they hatched. We analyzed hatch and release data by year using a chi-square test for heterogeneity. We found that 73% fewer snapping turtles were released during 2022, likely because of increased mold on eggs during incubation. Gravid females during 2022 could have been severely injured resulting in more dented eggs affecting the hatch rate. Research must be done to find the best incubation techniques to increase hatch rates for snapping turtle populations.

Advisors: Shelli Dubay, Ph.D.
Presentation Style: Poster

Impacts of Major Red Tide Events on Cownose Ray (*Rhinoptera bonasus*) Catch Rates

Maggie Handfelt
Wildlife Ecology and Management

Cownose rays (*Rhinoptera bonasus*) in the Gulf of Mexico are an infrequently studied species of cartilaginous fish. Significant red tide events are known to cause respiratory irritation and probable fish kills. Our objective for this study was to determine if major red tide events impacted the number of cownose rays caught, and if there was a "lag" associated with their catch rates. We used unbaited tangle nets off the coast of Clearwater Florida to catch cownose rays from May to August in the years 2016 to 2023. Tangle nets were pulled in every 30 minutes. Individual rays were tagged with a unique, four-digit number on their pelvic fin, and then released. We then used a one-way ANOVA to compare the number of cownose rays caught before, during, and after major red tide years. We found a decrease in the number of cownose rays caught the year following the major red tide events of 2018 and 2021 ($p = 0.07$). Further research should be directed toward physiological studies to determine if significant red tide events are having a direct respiratory impact on cownose rays. As cownose rays mature late and have relatively low levels of reproduction, management should consider limiting harvest the year following major red tide events. Maryland is currently the only state that has limits on the commercial or recreational harvest of cownose rays.

Advisors: Ben Sedinger, Ph. D.
Presentation Style: Poster
Considered for Judging

Long-term examination of a northern Wisconsin black bear population

Cecelia Giesen
Wildlife Ecology and Management

Wisconsin's black bear (*Ursus americanus*) population has undergone significant growth from 9,000 in 1989 to 24,000 in 2023 (WIDNR). Black bear hunting has also substantially increased in popularity with total number of applicants reaching upwards of 135,000 in 2023 (WIDNR). The use of bait and dogs are both permitted in our study area, but bait is the primary method used throughout the state. Black bear reproduction is highly sensitive to variations in resource availability and abundance. As a result of increased harvest efforts, specifically baiting, anthropogenic food sources have become more available on the landscape. Using long-term winter capture data provided by the Stephens Family Foundation Wisconsin Black Bear Research Project, we investigated the possible changes exhibited in the population of Wisconsin black bears. We hypothesized that the population has demonstrated yearly effects on body condition and reproductive potential of the population. The study has included 123 individual female black bears, 377 capture events, and 151 litters produced by 80 individuals. Our preliminary results indicate a possible positive relationship between body condition and date, ?date=0.0714 (95% CI: -0.17, 0.312). Models representing litter size have shown a possible positive relationship between litter size and age, age=0.07 (95% CI:0.015, 0.125), but no change in litter size throughout the duration of the study. Average age of first reproduction was temporally dynamic during our study from a low of 3.4 to a high of 4.25. Taking advantage of this robust sample size, we aim to better understand the shifts in black bear populations.

Advisors: Cady Sartini, Ph.D., Ben Sedinger, Ph.D., Tim Ginnett, Ph.D., Maggie Campy, Bruce Prentice
Presentation Style: Oral
Considered for Judging

Wildlife

Parasites of the American Woodcock (*Scolopax minor*) from Wisconsin, USA

Roxanne Gasperetti
Wildlife Ecology and Management

Rianna Taylor
Biochemistry

The American Woodcock (*Scolopax minor*) is a migratory shorebird with a unique ecological niche. In contrast to typical shorebirds in the family, it inhabits young forests and fields in eastern North America rather than shoreline habitats. Their diet, mainly earthworms and other invertebrates, fosters interactions between parasites and woodcock. Our study focused on hunter-donated woodcock specimens from Wisconsin to document parasites. Feathers were examined for ectoparasites, and internal organs were examined for endoparasites. Parasites were identified using morphology and preserved in 80% ethanol. Liver samples were analyzed using molecular techniques to identify haemosporidian infections. Museum specimens from the Stephen J. Taft Animal Parasitological Collection provided a historical baseline and basis of comparisons of parasite identification. Based on 137 museum specimens, 57% were Tetrameres spp., 15% other nematode species, 10% digenean species, and 18% phthirapteran species. Among 26 necropsied woodcock specimens, 14 (53%) had nematode infections, 20 (76%) had cestode infections, 15 (57%) had digenean infections, with 1 (3%) each for mites and lice. Syngamus trachea was found in one specimen; these nematodes could pose harm to woodcocks. Tetrameres were present in 5 woodcocks. We tested 18 liver samples for haemosporidian parasites; none were detected. Molecular and morphological analyses to identify parasites to lower taxonomic levels are underway. Studying these parasites enhances our understanding of host-parasite dynamics in American Woodcock, while also advancing knowledge of the bird's life history and ecology. These results will ultimately inform conservation efforts for this species which has experienced population declines in recent decades.

Advisors: Sarah Orlofske, Ph.D.
Presentation Style: Poster
Considered for Judging

Population Estimate and Influence of Environmental Variables on Capture Probabilities of Urban Eastern Gray Squirrels (*Sciurus carolinensis*) in Schmeeckle Reserve, Stevens Point, WI

Katie Carlson
Wildlife Ecology and Management

Justin Lechner
Wildlife Ecology and Management

Alex Stone
Wildlife Ecology and Management

The Eastern gray squirrel (*Sciurus carolinensis*) is commonly found in forests and urban settings, including Schmeeckle Reserve in Stevens Point, WI. Schmeeckle is a 113-hectare urban park owned by the University of Wisconsin-Stevens Point. Land cover is dominated by mature mixed forests, oak savanna, and wetland complexes. Squirrel density is often higher in urban parks when compared to rural sites because squirrels are not hunted in urban centers and natural predators are at lower densities. Gray squirrels inhabit forests with canopy closure because of reduced raptor predation. Our goals were to calculate an updated population estimate of urban eastern gray squirrels in Schmeeckle Reserve and investigate environmental variables influencing trap success and gray squirrel activity. We hypothesized that more squirrels will be trapped earlier in the trapping day, when temperatures exceed -4°C, and at sites with greater winter canopy cover. We trap squirrels in two sites of Schmeeckle Reserve using Tomahawk live traps baited with peanut butter and oats. We recorded age, sex, ear length, and weight of each squirrel and affixed a uniquely numbered ear tag to one ear. We recorded temperature, wind speed, barometric pressure, and cloud cover to determine their influence on trap success. We also measured winter canopy cover at each trap using a densiometer. We trapped squirrels in February and March 2020-2024 to estimate squirrel abundance using Huggins' closed capture model with individual random effects in Program MARK. Analyses are ongoing, but time of day and cloud cover have influenced trap success in previous analyses.

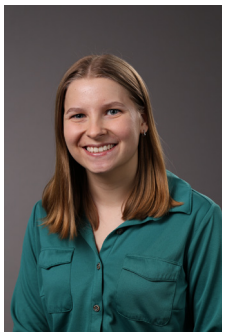
Advisors: Shelli Dubay, Ph.D., Ben Sedinger, Ph.D.
Presentation Style: Poster
Considered for Judging

Wildlife

Preliminary Results for Quantifying Ectoparasite Abundance and Prevalence in Northern Saw-whet Owls (*Aegolius acadicus*) in Central Wisconsin

Josiah Gritter
Wildlife Ecology and Management

Sophie Hauser
Wildlife Ecology and Management



Dana Lotz
Wildlife Ecology and Management

Sophie Reid
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The Northern Saw-whet Owl (*Aegolius acadicus*) (NSWO) is a mesopredator that can be found as far north as central Canada and Alaska and will migrate as far south as central Mexico. NSWOs migrate in the fall from September until December, peaking around mid-October; thus, this species is relatively abundant in central Wisconsin during this time. Our project aims to investigate relationships between ectoparasites and these owls, specifically if a variation in prevalence exists between individuals or by body condition. We hypothesize that there will be a difference in ectoparasite prevalence for NSWOs based on their age categories, and plan to examine body condition compared to parasite abundance. From 2007 to 2022, NSWOs have been researched at Sandhill Wildlife Area, a 9,000-acre wildlife refuge in Babcock, WI, operated by the Wisconsin Department of Natural Resources. We have captured over 1,300 NSWOs at Sandhill over the course of our study. NSWOs are captured using call-playback devices and mist-nets. The birds are banded using USGS aluminum leg bands, contributing to national banding data on Northern Saw-whet Owls. Wing and tail chords, weight, age, and sex of birds are recorded with each capture. For the 2023 field season, we collected ectoparasite samples from each bird encountered. This is done by physically parting feathers to inspect and collect ectoparasites. When present, ectoparasites where removed by hand or with forceps and transferred to a vial with ethanol for preservation. Samples were analyzed and identified throughout the season.

Advisors: Jason Riddle, Ph.D., Sarah Orlofske, Ph.D.
Presentation Style: Poster
Considered for Judging

Relation between body temperature and response to surveyor disturbance in *Sistrurus c. catenatus*

Reece Lisowski
Wildlife Ecology and Management

The Eastern Massasauga (*Sistrurus c. catenatus*) is a small to medium sized rattlesnake that ranges from southern Ontario to western Illinois. This species of rattlesnake is one of only two in the state of Wisconsin and is a state endangered reptile. The goal of this study is to find a relation between snake body temperature and the likelihood of a rattle response to a disturbance made by surveyors. Surveys conducted in Buffalo County, WI began on May 26, 2022, and lasted until August 17, 2022. Additional surveys were conducted between May 17, 2023, and August 1, 2023, for a total of 13 survey days. Surveys typically started at 8 am and lasted until 2 pm. The method of location was recorded (visual or sound i.e., rattling). Snakes found via sound had a higher average body temperature than the snakes found visually. A T-test was performed on the data (set at 0.05) resulting in a P value of <0.0001. During the study, snakes were more likely to be found visually in the morning and by sound in the afternoons. This can have major management implications by altering search patterns to a grid method when temperatures rise to get more accurate population estimates.

Advisors: Cady Sartini, Ph.D., Jason Riddle, Ph.D.
Presentation Style: Oral
Considered for Judging

Wildlife

S. Nasicola and Diet in Wisconsin Weasels

Jaime Tench
Wildlife Ecology and Management

Kevin Heikkila
Wildlife Ecology and Management

Cassie Loeffler
(*not pictured)*
Wildlife Ecology and Management

Short-tailed weasels (*Mustela* erminea), long-tailed weasels (*M. frenata*), and least weasels (*M. nivalis*) inhabit Wisconsin where they are legal furbearers. Their primary diet consists of small rodents such as mice (*Peromyscus spp.*) and insectivores like shrews (*Sorex spp*.). Shrews are intermediate hosts for the nasal nematode Skrjabingylus nasicola, and shrews are infected when they eat mollusk or snail species. Previous research in Wisconsin showed that over 90% of short-tailed weasels were infected with S. nasicola and we aimed to determine if the relationship also occurred in other weasel species and to see if shrews were common in weasel stomachs. We hypothesized that shrews would occur in stomachs of weasels that also contained *S. nasicola*. To study the relationship between weasel diet and parasites, we asked weasel trappers with the Wisconsin Trappers Association to provide weasel carcasses for us to necropsy for parasites. We also identified hairs in the stomachs using a published hair identification guide. We first rinsed each hair and applied xylene to break down the outer layer to look at the medulla (inner core of fur). We found *Sciuridae* (squirrel), *Soricidae* (shrew), and *Leporidae* (rabbit) in weasel stomachs using the patterns of the medulla. Analyses are ongoing, but we will compare the proportion of shrew hairs in infected and uninfected weasels using a Fisher's exact test.

Advisors: Shelli Dubay, Ph.D.
Presentation Style: Poster
Considered for Judging

Southern Flying Squirrel Trap Success in Schmeckle Reserve 2020-2023 in Relation to Mast

Kody Woodcock
Wildlife Ecology and Management

Ryan Burmester
Conservation Law Enforcement

Southern flying squirrels (SFS, *Glaucomys volans*) are arboreal and nocturnal rodents that inhabit hardwood forests of Wisconsin. Southern flying squirrels are omnivorous, with a diet consisting mainly of nuts from mast-producing trees like oaks and hickories. The amount of mast produced by oaks varies with year and the number of SFS captured also varies with year, so we aimed to determine the effect of mast production on trap success. Since 2020, students with the SFS project of the student chapter of The Wildlife Society have trapped SFS in Berard Oaks and the surrounding woods of Schmeeckle Reserve. We hypothesized that southern flying squirrel trap success would be influenced by tree mast production because squirrels are less likely to go into traps in years of high mast production. Our research team captures SFS using a semi-permanent trap grid affixed to 20 trees. Traps are set at approximately 5:00pm and checked between 10:30pm to 12:00 am five days a week during September and October. All traps are baited with a combination of peanut butter, oats, and bacon grease. Upon capture, we use Isoflurane to anesthetize the SFS, administer a numbered ear tag, and record the weight and sex of each individual. We used ANOVA to determine if trap success varies by year, and by amount of mast produced each year. Significantly fewer squirrels were trapped in high mast years when compared to normal mast years ($df=3$, $F=28.11$, $p<0.001$). In the future, we are considering measuring mast each fall while trapping.

Advisors: Shelli Dubay, Ph.D. , Ben Sedinger, Ph.D.
Presentation Style: Poster
Considered for Judging

Wildlife

The effects of pH on the growth of *Helisoma* species

Alaina Hart
Biology

Brenna Bogaczyk
Biology

Eric East
(Not pictured)

Maren Herndon
(Not pictured)
Biology

Hannah Panitzke
(Not pictured)
Biology

George W. Mead State Wildlife Area supports a large population of aquatic snails (*Helisoma sp*.). Snails are an important contributor to the decomposition functions of the boreal-stream ecosystem. Wetlands at Mead average around pH of ~6.5 based on field measurements. There are fluctuations in the pH of Mead aquatic habitats and changes in water conditions from runoff exposure and temperature. The question we are addressing is how does pH impact snail growth. Our hypothesis is that water pH impacts snail metabolism and energy for maintaining homeostasis. We conducted a laboratory experiment representing three different pH environments for the snails (Control-6.5, Neutral 7.33, & Basic 8.26) with three replications of three individuals for each. We measured snail mass, length, width, and height once a week to monitor their growth changes. The preliminary trends from our data suggest the snails' growth rate is optimal in the control conditions (pH 6.5). This translates into important parameter indicators when it comes to the natural snail environment. By understanding the optimal conditions for snail growth and size, we could better understand decomposition processes in freshwater wetlands.

Advisors: Sarah Orlofske, Ph.D.
Presentation Style: Poster

The influence of food availability on trap success of Southern Flying Squirrels (*Glaucomys volans*) and Eastern Gray Squirrels (*Sciurus carolinensis*) in Schmeeckle Reserve, WI

Shelby Sterken
Wildlife Ecology and Management

Katie Carlson
Wildlife Ecology and Management

Both Southern Flying Squirrels (*Glaucomys volans*) and Eastern Gray Squirrels (*Sciurus carolinensis*) consume acorns throughout the year. Our goal was to compare the trap success of Eastern Gray Squirrels to that of Southern Flying Squirrels from 2020 to 2024. We hypothesized that trap success would be affected by yearly mast production because squirrels might be less likely to enter traps if food is abundant. We trapped Flying Squirrels in the fall with Sherman traps and Gray Squirrels in the spring with Tomahawk traps. We standardized the numbers of individuals trapped using catch-per-unit effort (CPUE). 2021 and 2023 were considered high mast years, whereas 2022 and 2024 were normal mast years. We used linear regression to investigate the relationship between CPUE of Flying Squirrels and CPUE of Gray Squirrels by year. We determined if the average number of Gray Squirrels trapped per year varied with each year using a single factor ANOVA and a Tukey's post-hoc test. In years of high mast, more Gray Squirrels were captured, and in years of normal mast, more Flying Squirrels were captured. The number of Gray Squirrels trapped was related to the number of Flying Squirrels trapped ($R2 = 0.991$). The number of Gray Squirrels trapped varied with year ($df =$, $F = 11.42$, $p < 0.0001$). More gray squirrels were trapped in high mast years when compared to normal mast years (Tukey $p < 0.01$). These results can help biologists understand the effect mast production has on rodents in a forested environment.

Advisors: Shelli Dubay, Ph.D.
Presentation Style: Oral
Considered for Judging

Wildlife

Tiger Beetles of the Navarino Wildlife Area and Beilfuss Unit Properties

Emily Michalzik
Wildlife Ecology and Management

Tiger beetles are a type of predatory insect belonging to the family Cicindelidae. Unfortunately, many tiger beetles have faced a loss of habitat due to succession and a lack of natural disturbances. This study was enacted to determine the amount of tiger beetles and species present on both the Navarino Wildlife Area and Beilfuss Unit properties. It was also enacted to determine the ideal tiger beetle habitat by comparing tiger beetle populations in different areas based on sand texture, slope, and vegetation cover. 88 tiger beetles were observed on the property along with 5 different species. Eastern sand tiger beetles (*Cicindela formosa generosa*) were the most prevalent species, and it appears that overall, tiger beetles prefer sand pits with fine to medium sand texture and steeper slopes. The results for vegetation cover were inconclusive and should be studied more in-depth. This data can help to give future managers ideas on how to preserve the tiger beetle population on both properties, especially those containing the threatened ghost tiger beetle (*Ellipsoptera lepida*).

Advisors: Jason Riddle, Ph.D., Jacquelyn Christopher, M.S.
Presentation Style: Poster

Index of Presenters

College of Natural Resources
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