



**2023**

**Jim and Katie Krause  
CNR Student Research  
Symposium**



# **Jim and Katie Krause CNR Student Research Symposium**

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

Front Cover Photo: Cory Galvan  
Back Cover Photo: Sandee Lefebvre  
Booklet Layout: Grace Wieland

## MISSION

The University of Wisconsin-Stevens Point College of Natural Resources provides education, research and outreach in integrated natural resources management, environmental education, and in paper science and engineering. The College of Natural Resources:

1. Provides undergraduate and graduate instruction that combines theoretical concepts with practical experience, such as laboratory and field-oriented courses, internships and special projects.
2. Promotes scholarly activities that enhance the creation or application of knowledge or contributes to the resolution of environmental and natural resource management issues, especially through student research.
3. Shares faculty and student expertise with citizens, communities, agencies and industries through outreach, scholarship, and consulting.

## PHILOSOPHY

The University of Wisconsin-Stevens Point College of Natural Resources embraces the philosophy of integrated natural resource management. All students in the college, regardless of major, need to understand and appreciate relations between natural resources and human needs. They need to understand the scientific method and its application to environmental problem solving. Critical thinking and problem solving strategies based on integrated resource management and education will be promoted through the college's teaching, scholarship, and outreach activities.

The college is composed of faculty, staff, and students, each with their own expertise, strengths, attitudes, and values. This diversity contributes to the education offered by the college because of our integrated philosophy. Responsibilities and appointments vary among college faculty and staff. Most have teaching appointments, some have extension appointments, while others serve mainly in research or administrative capacities. Faculty and administrators will capitalize on the strengths and diversity of College personnel to promote integrated resource management through teaching, scholarship, and outreach.

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## Acknowledgments

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

Dean Brian Sloss  
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Volunteer Evaluators and Moderators  
Tom Charlesworth - Photography

# Clive A. David Memorial Research Scholarship Award



Dr. Clive A. David was a driving force in establishing the CNR Student Research Symposium in 2000 (now called the Jim & Katie Krause CNR Student Research Symposium). Dr. David passed away in November 2004 after a lengthy illness. He taught in the CNR from 1989 – 2003 and was considered by his colleagues and students a true champion of student research and cutting edge technology. His leadership and vision were important in making the symposium a success. Throughout his years of teaching, Dr. David encouraged participation in undergraduate research. Some of his projects related to deforestation and soil erosion prevention, windbreaks, and solid waste. Dr. David's excellence in teaching was recognized several times during his career by both colleagues and students, including being named a UW- System Teaching Fellow in 2000.

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

The 2023 recipient of the Clive A. David Memorial Research Scholarship is:

## Amber Smith

Hometown: Pleasant Prairie, Wisconsin  
Major: Wildlife Ecology and Management

### Extra-Curricular Engagement:

- Doug Stephens Boone & Crockett Club Wildlife Research Fellow
- Black Bear Ecology Workshop, Lead Teaching Assistant
- UWSP Summer Field Experience, Teaching Assistant for Wildlife Management Techniques
- Midwest Fish and Wildlife Conference
  - Mercury Exposure in Migrating and Breeding Wood Ducks in Wisconsin
- The Wildlife Society's 29th Annual Conference
  - Mercury Exposure in Migrating and Breeding Wood Ducks in Wisconsin
  - Post-Release Movement and Behavior of Rehabilitated Orphan Female Eastern Black Bears (*Ursus americanus americanus*) in Northern Wisconsin



*“ Dr. David asked the best of students which Amber has done above and beyond. She is an active researcher and leader in many organizations...(in short) she is an academic star in the CNR... We would take her as a leader for life, however, all excellent student leaders must graduate and Amber is now in such a transition.”*

**-Dr. Richard Hauer**



April 2023

Welcome to the 24th Annual Jim and Katie Krause CNR Student Research Symposium! You are about to participate in a rich tradition at the University of Wisconsin-Stevens Point, one that is both an educational experience and an academic celebration.

Student participants—I hope you will find the symposium to be one of your most memorable learning experiences. There is little question your research will enhance the academic value of your overall education at the University of Wisconsin-Stevens Point. You have gained a greater understanding of the world around you, a deeper learning of the subject matter taught in your classes and possibly the opening of new opportunities beyond college.

Attendees and observers, please join me in applauding the drive and initiative of these students. Their work represents exactly what our university means when we encourage our students to “Discover Your Purpose.”

Whether you are here to make a presentation or to witness them, you will be participating in the celebration of these academic achievements. This is a special opportunity for students to share the results of their hard work participating in investigations, projects and research activities. This year’s event features an outstanding group of student researchers representing projects from across CNR majors, a fitting tribute to the level of faculty and student collaboration in and out of the classroom at UW-Stevens Point. Thank you to the faculty members for their mentorship of our students.

Congratulations to all of you! I wish you success in presenting your work today and at future symposiums and conferences.

A handwritten signature in black ink, appearing to read "Thomas Gibson".

Sincerely,  
Thomas Gibson, Ed.D. Chancellor



April 2023

Welcome to the College of Natural Resources! I am pleased to present the 24th annual Jim and Katie Krause CNR Student Research Symposium, featuring and celebrating the scholarly achievements of many of UWSP's finest natural resource students.

Congratulations to our student participants for taking the time and initiative to extend their learning beyond the traditional classroom by depicting their research contributions in these excellent poster and oral presentations. Student participants are building on the knowledge and skills they develop within the College's multi-discipline and integrated curriculum that emphasizes practical and in-the-field learning opportunities. These experiences will help prepare these students for rewarding careers, and ultimately may empower and inspire them to be effective leaders for solving natural resource challenges in the communities they will serve.

Special thanks and congratulations to our Symposium planning committee for their leadership and hard work. This is one of the few symposia of its kind that is planned and organized by students. This year's event features another large turnout of participants: over 100 students presenting 58 poster presentations and 17 oral presentations. This continues a long tradition of success at this annual event. Since 2000, more than 1,500 CNR students have presented research results in posters and oral presentations at this event.

We salute participants for their excellence in critical thinking, inquiry, research and communication demonstrated in their presentations and posters. Let us also recognize the outstanding faculty members who have mentored and motivated students to do their best.

Finally, special thanks to Dr. Jim Krause (BS-Biology, '74) and his wife, Kathleen "Katie" (BS-Mathematics, '75), whose 2017 endowment gift makes this event possible. We are grateful for their belief in the value of higher education, undergraduate research, their alma mater, and the beautiful natural resources of their home state of Wisconsin.

Thank you for participating in this wonderful celebration of scholarly achievement and hands-on, experiential learning. Enjoy the day!

A handwritten signature in black ink, appearing to read "B. L. Sloss".

Brian L. Sloss  
Dean and Professor of Fisheries and Aquatic Science

# From the Student Research Symposium Committee...

From the Student Research Symposium Committee...

Welcome to the 24<sup>th</sup> 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, human dimensions of natural resource management, 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 Dr. Clive A. David, a true friend to students and faculty. David was extremely significant in building and strengthening the undergraduate research program. Although he passed in November 2004, Dr. David's 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 23 years can credit Dr. David for his pioneering efforts.

This year is among the highest for student participation, due largely to the students' initiative, faculty encouragement, and other sources of support including the work of the Student Research Symposium Committee. Our constant challenge is to meet the needs of the student presenters and promote and encourage participation in research and the symposium all year long.

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

Amber Smith (Co-Chair), Jacob Tepsa (Co-Chair), Grace Wieland (Booklet Manager & Web Designer), Catrina Johnson (Judge Liason), Lin-Li Szczesny (Secretary), Hannah Kovalaske (Liason), Ryan Burmester (Liason), Dr. Richard Hauer (Advisor), Dr. Rob Michitsch (Clive A. David Award Chair), Alyssa Gunderson (Coordination and Moderation), Brian Stezenski-Williams (Engagement and Fundraising), Dr. Shelli Dubay (Advisor), Dr. Michael Tiller (Advisor)



# Events Schedule

**April 21st, 2023**

**Oral Presentations**

9:00AM – 10:00AM  
TNR Room 120 and 170

**Poster Presentations**

10:00AM – 11:00AM  
TNR West Lobby, East Lobby, South Hallway

**Keynote Speaker**

Travis Livieri, M.S.  
11:00AM – 11:30AM  
TNR Room 170

**Lunch Break**

11:30AM - 1:00PM  
TNR Central Lobby

**Poster Presentations**

12:00PM – 1:00PM  
TNR West Lobby, East Lobby, South Hallway

**Oral Presentations**

1:00PM – 3:00PM  
TNR Room 120 and 170

**Poster Presentations**

3:00PM - 4:00PM  
TNR West Lobby, East Lobby, South Hallway

# Oral Presentations

## TNR 170

<b>Time</b>	<b>Presenters</b>	<b>Title</b>
9:00AM	Nicole Luoma Abby Mueller	Examining the Apparent Survival and Detection Probabilities of Urban Eastern Gray Squirrels ( <i>Sciurus carolinensis</i> ) in Schmeeckle Reserve, Stevens Point, WI
9:20AM	Dane Friis	Analysis of Land Cover and Water Resource Interactions in Wisconsin
9:40AM	Max Monfort	Yellow Perch Responses Following a Large Scale Centrarchid Removal in McDermott Lake, Wisconsin
1:00PM	Garrett Vetter	Influence of Flow and Water Temperature on Smallmouth Bass Size Structure and Growth in Southwestern Wisconsin Streams
1:20PM	Roxanne Gasperetti Sydney Paoli Rianna Taylor	Internal Parasites of the American Woodcock in the Upper Midwest
1:40PM	Jeremy Murray Kody Woodcock James Doss	Effect of Tree Canopy Coverage and Trap Placement on Southern Flying Squirrel Trap Success in Schmeeckle Reserve
2:00PM	Amber Smith	Mercury Exposure in Migrating and Breeding Wood Ducks in Central Wisconsin
2:20PM	Cece Giesen Amber Smith Alayna Reynolds Abby Mueller Will Watry	Home Range and Habitat Selection of Rehabilitated and Released Female Black Bears in Northern Wisconsin

# Oral Presentations

## TNR 120

<b>Time</b>	<b>Presenters</b>	<b>Title</b>
9:00AM	Gavin Meyer	Analysis on Treatment methods of Northern Red Oak regarding White-Tailed Deer Bud Browse
9:20AM	Dylan Undlin	Effects of Stream Alteration on Aquatic Macroinvertebrate Drift in Buena Vista Creek and the Little Plover River, Portage County Wisconsin
9:40AM	Matthew Bartz	Walleye Spawning Movements and Temperature Cues in Tributary Rivers to Green Bay, Lake Michigan
1:00PM	Luke Trittelwitz Tess Bigalke Shayla Schmitz	Analysis of Waterfowl Browse on Wild Rice ( <i>Zizania aquatica</i> ) in Northwestern Wisconsin
1:20PM	Kayla Reed	Initial Insights on the Thermal Ecology of Lake Whitefish in Northwestern Lake Michigan
1:40PM	Patrick Catalano	Evaluation of Natural and Artificial Habitat on Brook and Brown Trout in Central Wisconsin Streams
2:00PM	Gina Magro	Avian Blood Parasites of Waterfowl in Green Bay, WI.
2:20PM	Selina Walters	Effects of Riparian Habitat on Brook Trout Prey Availability, Diet, and Body Condition in the Little Plover River, Wisconsin
2:40PM	Jeremy Murray	Whitetail Deer Habitat Selection and Predator Encounter

# Poster Presentations

10:00AM

<b>Presenters</b>	<b>Title</b>
Kayla Reed	Initial Insights on the Thermal Ecology of Lake Whitefish in Northwestern Lake Michigan
Jacob Tepsa	Analysis of Environmental Education in Higher Education Programs: Opportunities for Professional Development
Darian Woller	Environmental influences on adaptive genomic variation of Lake Michigan's lake whitefish
Lily Lefebvre	Evaluating Sensors as a Tool for Investigating Effects of Agriculture on a Groundwater Fed Stream
Molly Murr, Catrina Johnson, Emily Knack	Effects of Window Coverage and Cardinal Direction on Urban Bird-Window Collisions on UW-Stevens Point Campus
Nicole Luoma, Katie Carlson, Justin Lechner, Alex Stone	Population Estimates and Capture Probabilities of Urban Eastern Gray Squirrels ( <i>Sciurus carolinensis</i> ) in Schmeckle Reserve, Stevens Point, WI
Jeremy Murray	Correlation of Fawn and Predator Observations
Jeremy Murray, Jake Voigt	University of Stevens Point Student Chapter of Ducks Unlimited
Grant Koch, Ashley Whitis, Jesse Tucker, Beck Mayer	Elevation Use in Woodpeckers and Nuthatches
Gina Magro	Avian Blood Parasites of Waterfowl in Green Bay, WI.
Dylan Undlin	Brook Trout Population Characteristics, McGee Lake, Langlade County, Wisconsin

# Poster Presentations

10:00AM

## Presenters

## Title

John Turczyk, Noah Banach,  
Amy Arrigo, Noah Andexler,  
Jeffrey Edwards, Anna Powers

Preliminary Studies of Bumblebee Populations and  
Species Occupancy in Central Wisconsin

Nicholas Albers,  
Mike Ayensu-Mensah, Tyler Jolin,  
Aster Kabat, Max Kindschuh,  
Mary Joy Relagio, Zach Tower

Phytoremediation with *Cannabis sativa* -  
A comparative analysis of the effects of heavy metal,  
soil type, and fertilizer treatments on plant fitness

Eli Nedden

How Soil Properties Affect Wetland Seed Bank  
Analysis and Reflecting Wetland Restoration Potential

Jacob Tepsa, Grace Wieland,  
Casey Baye, Emily Michalzik,  
Brayden Mueller

Preliminary Study Investigating Nest Box Use  
of Cavity-Nesting Waterfowl Species in Central  
Wisconsin

Dane Friis

Analysis of Land Cover and Water Resource  
Interactions in Wisconsin

Ben Heinen

Effect of Iron and Ammonia on the Chlorination  
of Municipal Well Water in the Village of Sussex,  
Wisconsin

Tou Vue

Breeding Bird Diversity in Managed and Unmanaged  
Forests

Tess Bigalke, Amber Smith,  
Morgan Goff, Samantha Stellmacher

Trap Success of Female and Male Southern Flying  
Squirrels in Schmeckle Reserve 2020-2022

# Poster Presentations

12:00PM

<b>Presenters</b>	<b>Title</b>
Claire Jensen, Nathan Stremcha, Emily Gilbertson	Development of In-field Diagnostic Methods for Identification of Spodic Materials
Cody Hagloch	Walleye Size Structure in Mississippi River Pools 11 and 13 Relative to Changes in Harvest Regulations
Parker Kreie, Kody Woodcock, Julie Nasiatka	Small Mammal Diversity Comparison Between Forests in Northern Wisconsin
Patrick Catalano, Garrett Vetter, Isaac Cavanaugh, Colton Sime, Darian Woller	Evaluation of Natural and Artificial Habitat on Brook and Brown Trout in Central Wisconsin Streams
Luke Trittelwitz, Reece Lisowski, Andrew Mehus, Jessica Bielak	Yearly Survival and Growth Rates of Propagated Fatmuckets ( <i>Lampsilis siliquoidea</i> ) in Central Wisconsin
Luke Trittelwitz, Tess Bigalke, Shayla Schmitz	Analysis of Waterfowl Browse on Wild Rice ( <i>Zizania aquatica</i> ) in Northwestern Wisconsin
Ashley Whitis, Alyse Erenberger, Julia Nasiatka, Amelia Shingle	Laysan Albatross ( <i>Phoebastria immutabilis</i> ) Bolus Ratio of Organic vs. Inorganic Materials
Sam Korducki, Garret Brown	Determining Proper Nutrient and Heavy Metal Contents in WI Septage to Manage Current WI Regulations
Ava Cross-Weisbeck, Catrina Johnson, Zachary Cason	Modeling Sound Propagation of Ruffed Grouse ( <i>Bonasa umbellus</i> ) from Drumming Logs in Northern Wisconsin
Roxanne Gasperetti, Sydney Paoli, Rianna Taylor	Internal Parasites of the American Woodcock in the Upper Midwest
Nicole Luoma, Dana Lotz, Sophie Hauser, Sophie Reid	Differential Timing of Migrating Northern Saw-Whet Owls ( <i>Aegolius acadicus</i> ) Based on Age Categories

# Poster Presentations

12:00PM

## Presenters

## Title

Jeremy Murray

Whitetail Deer Habitat Selection and Predator Encounter

Trevor Howe

Anthropogenic Sound in Wisconsin

Trent Kloopping, Selina Walters

Effects of Riparian Habitat and Canopy Cover on Macroinvertebrate Drift in the Little Plover River, Wisconsin

Bella Kirkpatrick,  
Olivia Greymount,  
Rebecca Swenson

Seed Bank Study of the Island in Lake Joanis in Schmeeckle Reserve

Hailey Trompeter, Kaj Fritsch

Effects of Climate Change on Microbial Communities in Restored Wetlands

Lizzi Gizzi, Aidan Matson

Assessing the Effectiveness and Environmental Impacts of Alternative Deicers in Comparison to Standard NaCl-Based Road Salt

Gavin Meyer

Analysis on Treatment methods of Northern Red Oak regarding White-Tailed Deer Bud Browse

Tess Bigalke, Morgan Goff, Amber Smith, Samantha Stellmacher

Abundance Estimates of Southern Flying Squirrels (*Glaucomys volans*) in Schmeeckle Reserve 2022

Claire Jensen, Emily Gilbertson

Analysis of Key Soil Nutrients and Physical Properties on a Managed Grazing Operation in Junction City, WI

# Poster Presentations

3:00PM

<b>Presenters</b>	<b>Title</b>
Gabby Michlig, Julia Nasiatka, Nick Larson, Gabby Eklund	Sex abundance of Rusty crayfish ( <i>Orconectes rusticus</i> ) in Mill Creek, WI at different times of day
Jackson Mikel, Olivia Stellpflug	Modulator Dependent PFAS Adsorption Within a Porous Solid
Claire Harwood, Amber DeValk, Trevor Pike, Samantha Stellmacher, Reece Lisowski, Lydia Dobberstein, Brayden Mueller	Densities of White-tailed Deer on Forests in North- Central Wisconsin
Jessica Bjornson, Sophia Halverson, Cassie Loeffler	Using Stomach Content Analyses to Identify Diets of Male and Female Bobcats
Caden Jungbluth	Muskellunge epigenetic clock: non-lethal DNA-based aging
Shelby Sterken	The influence of prescribed fire on trap success of Southern Flying Squirrels ( <i>Glaucomys volans</i> ) and Eastern Gray Squirrels ( <i>Sciurus carolinensis</i> ) in Schmeckle Reserve, WI.
Amber Smith	Composting Deactivation of Chronic Wasting Disease Prions: Final Results
Patrick Catalano	Evaluating the Resident Bull Trout Density in Fourth of July Creek
Molly Moder, Shelby Sterken, Parker Kreie	Influence of Calorically Dense Bait on Urban Eastern Gray Squirrel ( <i>Sciurus carolinensis</i> ) Body Condition in Schmeckle Reserve, Stevens Point, WI
Kayla Reed Blake Raymer	Smallmouth Bass Diet Analysis in a Warmwater Central Wisconsin Stream Using the Aquatic Community Assemblage

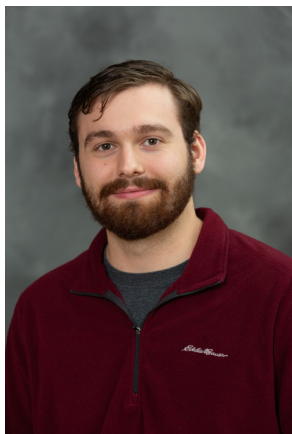


# Poster Presentations

3:00PM

<b>Presenters</b>	<b>Title</b>
Roxanne Gasperetti, Sydney Paoli, Shayla Wagner	Wetland Management Practices Associated with Parasite Diversity
Reece Lisowski	Relation between body temperature and response to surveyor disturbance in <i>Sistrurus c. catenatus</i>
Alana Spang	Phragmites ( <i>Phragmites australis ssp. australis</i> ) removal and native plant recolonization in Schmeckle Reserve
Michael Weaver	Exploring the use of the Foundry Byproduct Slag to Remove Phosphorus from Water
Ava Cross-Weisbeck, Scott Lindenberger, Austin Wallin, Zachary Cason, Catrina Johnson, James Doss, Everly Eldeen	Analysis of the Impact of Stem Density on Ruffed Grouse Drumming Direction in Northern Wisconsin
Connor Jaloszynski, Gregor Willms	Little Plover River Headwaters Wetland Restoration Remnant Seedbank Study, Plover, Wisconsin
Jacob Beer	Impacts of Diet Availability and Composition on Condition and Abundance of Post-larval Walleye
Elise Bass	Macrophyte Coverage Improves Largemouth Bass Abundance and Size-Structure: a RAD Application for Aquatic Plant Management in Wisconsin Lakes
Tess Bigalke	Estimating Home Ranges of Southern Flying Squirrels ( <i>Glaucomys volans</i> ) Using Encounter Histories in Schmeckle Reserve

# Modulator Dependent PFAS Adsorption Within a Porous Solid



Jackson Mikel  
Chemical Engineering



Olivia Stellpflug  
Chemical Engineering

Per- and poly-fluoroalkyl substances (PFAS) are a class of man-made chemicals containing at least one  $-CF_3$  moiety. Thousands of unique PFAS have been manufactured because they exhibit properties (including non-stick behavior as well as heat-, stain-, and water-resistance) that are desirable for a wide variety of practical applications. Unfortunately, these properties make PFAS extremely stable and persistent in the environment, and, as such, PFAS have been linked to adverse human health effects. Strategies are therefore needed to remove these compounds from point sources and the environment. One promising strategy is called adsorption, a phenomenon that relies on a pollutant (e.g., PFAS) sticking to the surface of a solid. Porous solids are particularly attractive for adsorption because they contain void spaces, and therefore large internal surface areas, which significantly increases their adsorptive capacity. Here we describe how the porous solid MOF-808 containing trifluoroacetic acid (TFA) compares to other solids with anionic modulators in affecting the adsorption of PFAS.

**Advisor:** Joseph Mondloch, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Assessing the Effectiveness and Environmental Impacts of Alternative Deicers in Comparison to Standard NaCl-Based Road Salt



Aidan Matson  
Hydrology



Lizzi Gizzi  
Hydrology

The use of road deicers is necessary in the northern United States to mitigate the impacts of winter storms. These efforts are more intensive in urban areas and typically involve the use of rock salt, which is commonly a NaCl-based salt. NaCl-based road salts are corrosive and can damage vehicles and cement structures over time. In addition, research has found that NaCl-based road salts can impact adjacent water bodies. Specifically, the chloride ( $\text{Cl}^-$ ) in the NaCl-based road salts is responsible for the harm of aquatic biota. There are alternative salting methods available, such as salt brine of rock salt and alternative salt formulations such as calcium magnesium acetate (CMA), but these alternative methods are not widely used. Our objective is to compare these alternative methods to conventional rock salt to determine the effectiveness and the amount of  $\text{Cl}^-$  runoff from each technique. To achieve our objectives, cement pavers were created and placed outside to be exposed to natural precipitation. Three pavers are being treated with standard NaCl-based road salt, three pavers are treated with a brine solution of road salt, and three pavers are treated with CMA. After each precipitation event, melt effectiveness is measured along with the amount of  $\text{Cl}^-$  in the runoff from each paver. We hypothesize that salt brine and CMA will have similar melt efficiencies but have less  $\text{Cl}^-$  runoff than the conventional NaCl-based road salt. Results from this study can be used to adjust best management practices for snow and ice mitigation on campus.

**Advisor:** Kyle Herrman, Ph.D

**Presentation Style:** Poster

*Considered for Judging*

# Brook Trout Population Characteristics, McGee Lake, Langlade County, Wisconsin



Dylan Undlin  
Fisheries and Aquatic Sciences

Spring ponds are unique, fertile aquatic systems important for native cold-water organisms such as Brook Trout *Salvelinus fontinalis*. Langlade County has the highest density of spring ponds in Wisconsin, many are surrounded by Wisconsin Department of Natural Resources (WDNR) property. Trophy Brook Trout (I.e., >14 in) are infrequent across Wisconsin due to non-native fishes, harvest, and habitat alterations. McGee Lake, a 23-ac spring pond in Langlade County, has produced trophy Brook Trout approaching 20 in for decades. McGee Lake has been managed for various purposes and received two chemical treatments for removal of non-native fishes. Our objectives were to determine absolute growth, estimate survival using Fabens model, and observe trends in length frequency histograms in relation to estimated abundance. Brook Trout were sampled during annual double run boom electrofishing surveys conducted mid-October from 2017-2022. Individuals were measured for total length, examined for sex, spawning stage, and the presence of a Passive Integrated Transponder (PIT) tag, with new individuals being tagged. Size structure was evaluated with length- frequency histograms while growth was examined with recaptured individuals. Analyses revealed an abundance of trophy fish with high growth rates. Average length across all years was 12.64 in with a growth co-efficient of 0.40. Studying the unique Brook Trout population characteristics in McGee Lake is critical for its conservation and the conservation of northern Wisconsin spring ponds.

**Advisors:** Joshua Raabe, Ph.D., Dave Seibel

**Presentation Style:** Poster

*Considered for Judging*

# Effect of Iron and Ammonia on the Chlorination of Municipal Well Water in the Village of Sussex, Wisconsin



Ben Heinen  
Fisheries and Aquatic Sciences

Municipal well water often undergoes significant treatment to ensure it is safe to drink and free from any displeasing taste or odor. Raw well water contains many contaminants, and in the Village of Sussex, it contains iron, radionuclides (most prominently radium), ammonia, and many harmless minerals and compounds. Sussex treats drinking water using a sodium hypochlorite solution (12.5% concentrate) as a disinfecting agent, physical filtration through pyrolusite media, and a hydrous manganese oxidation (HMO) process for iron and radium removal. The Village of Sussex monitors the treatment process daily by conducting chemical tests of the influent and effluent water. When these tests indicate deviation in the composition of the influent water, operators adjust the chemical dosage for appropriate effluent quality. Not all of the chlorine injected in the tank is available in the effluent water, because contaminants will bind to the dosed chlorine and make it ineffective for continual disinfection in the distribution system. “Total chlorine” measures the full treatment dosage, and “Free chlorine” is a measurement of chlorine left for continual disinfection. The purpose of this project is to understand the effect that iron and ammonia have on residual chlorine. If the gap between total chlorine and free chlorine widens, this should indicate higher ammonia and iron concentrations in the influent water. This gap between chlorine concentrations should be attributed to higher binding to and disabling of chlorine by these contaminants.

**Advisor:** Daniel Keymer, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Effects of Riparian Habitat and Canopy Cover on Macroinvertebrate Drift in the Little Plover River, Wisconsin



Trent Kloopping  
Fisheries and Aquatic Sciences



Selina Walters  
Fisheries and Aquatic Sciences

Trout species and other cold-water stream inhabitants are heavily dependent on energy inputs of surrounding riparian habitats. Riparian habitats, buffer zones in between terrestrial and aquatic ecosystems, are influenced by land management and canopy cover. Different degrees of canopy cover and riparian habitat can impact prey availability for cold water fishes. Aquatic and terrestrial macroinvertebrates are an important source of food for trout and other stream inhabitants. The composition and abundance of aquatic macroinvertebrates of the drift can act as an indicator of stream health and the impact of riparian habitat. We determined if different riparian habitat and degrees of canopy cover affected abundance and composition of terrestrial and aquatic macroinvertebrates drift of the Little Plover River, a Class 1 trout stream in central Wisconsin. The Little Plover River flows through agricultural land, restored wetlands, and urban forests, all which have differing impacts on those stretches of the stream. Study sites looked at distinct riparian zones as well as having designations of low, medium, and high canopy cover. Macroinvertebrate drift was sampled using drift nets at each of the study sites. The lowest canopy cover site was dominated by aquatic macroinvertebrates, and had the highest number of total invertebrates, but lowest diversity. The other sites were still dominated by aquatic macroinvertebrates but had increased proportions of terrestrial invertebrates. This research provides insight into how riparian habitat and stream canopy cover may affect stream macroinvertebrate drift and prey availability for Brook Trout (*Salvelinus fontinalis*) in the Little Plover River.

**Advisors:** Jeffery Dimick, Jered Studinski Ph.D., Joshua Raabe Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Effects of Riparian Habitat on Brook Trout Prey Availability, Diet, and Body Condition in the Little Plover River, Wisconsin



Selina Walters  
Fisheries and Aquatic Sciences

Coldwater streams and their inhabitants are dependent on terrestrial energy inputs from riparian habitats. Brook Trout (*Salvelinus fontinalis*) feed on both aquatic and terrestrial invertebrates that drift downstream, and prey availability potentially varies by habitat type. This study occurred on the Little Plover River, a Class 1 Brook Trout stream in Central Wisconsin, that has varying riparian habitats. We selected a site in each habitat type: Agricultural, wetland, and forested. Our study objectives were to determine if invertebrate taxonomic composition and occurrence were proportional in Brook Trout diets and drift and varied among sites. Invertebrate taxonomic richness, abundance, and origin were quantified from drift to represent prey availability at each site. Following diet and drift analysis, Brook Trout body condition was calculated and compared among the sites. Brook Trout diets and macroinvertebrate drift samples were collected in the falls of 2019, 2021, and 2022. The forested site exhibited the highest numbers of available prey in drift and prey items in diet; contained the most aquatic and terrestrial invertebrates and expressed the greatest taxonomic richness. Gammaridae were the most abundant invertebrates in drift and diet among all sites. Although the sites exhibited differences in prey availability and number of prey items in diets, body condition showed little variation throughout sites. This study provides insight into how riparian land management influences Brook Trout prey availability and associated body condition.

**Advisors:** Jeffrey Dimick, Jered Studinski, Ph.D., Joshua Raabe Ph.D.

**Presentation Style:** Oral

*Considered for Judging*

# Effects of Stream Alteration on Aquatic Macroinvertebrate Drift in Buena Vista Creek and the Little Plover River, Portage County Wisconsin



Dylan Undlin  
Fisheries and Aquatic Sciences

The Central Sands region of Wisconsin contains many cold-water streams expressing varying degrees of anthropogenic stream alterations driven by row crop agriculture. Stream alterations are a form of environmental stress that can affect overall abundance and taxonomic composition of aquatic macroinvertebrate communities. Taxa richness and the percentage of Ephemeroptera, Plecoptera, and Trichoptera (%EPT) orders are expected to decrease with increasing environmental stress while the percentage of Chironomids and Amphipods are expected to increase with increasing environmental stress. Buena Vista Creek has been highly altered including channelization for irrigation and most riparian habitat being cleared while the Little Plover River has not been altered or has had in-stream and riparian restoration efforts. I examined the effect of stream and riparian alterations on aquatic macroinvertebrate drift composition. Drift nets were deployed in late September 2022 for 24 hours at four sites on Buena Vista Creek and three sites on the Little Plover River to encompass habitat changes along the longitudinal stream channel. Riparian habitat type and the sinuosity index for sampled reaches were used as metrics for environmental stress. The percentage of Chironomids and Amphipods was higher in Buena Vista Creek than in the Little Plover River. %EPT was higher in the Little Plover River than Buena Vista Creek. Macroinvertebrate metrics responded as expected; however, Trichoptera taxa richness was higher in channelized reaches of Buena Vista creek compared to sinuous reaches. Correlations between aquatic macroinvertebrate drift and the degree of environmental stress could be more durable with additional observations of abiotic factors such as substrate and velocity.

**Advisors:** Jeffrey Dimick, Joshua Raabe, Ph.D., Jered Studinski, Ph.D.

**Presentation Style:** Oral  
*Considered for Judging*



# Environmental influences on adaptive genomic variation of Lake Michigan's lake whitefish



Darian Woller  
Fisheries and Aquatic Sciences

Local adaptation is an evolutionary process where natural selection leads populations to become better suited to survive and reproduce in their proximate environment. Through time, local adaptation can generate a spatial patchwork of adaptive genetic variation, leading to a variety of ecological and evolutionary outcomes pertinent to population persistence. For instance, evolutionary diversification across interconnected subpopulations can boost resiliency of both the individual subpopulations as well as the population at large, making them more robust to future challenges such as climate change and habitat alterations. Our objective was to determine whether lake whitefish (*Coregonus clupeaformis*) adaptive genomic variation that occurs across Lake Michigan is associated with specific environmental characteristics that vary throughout the lake. To identify potential environmental features correlated with genomic signals of selection, we used genotype-environment association (GEA) analysis, which quantifies relationships between local allele frequencies and abiotic metrics. We used zonal statistics in ArcGIS Pro to quantify variation of nine environmental attributes in relation to 17 lake whitefish spawning locations - both at local (5km) and regional scales (50km). Redundancy analysis was used to compare allele frequencies at nearly 200,000 single nucleotide polymorphism genetic loci with our collected environmental variables. Preliminary analyses identified 788 loci that were significantly associated with environmental characteristics. Of those, most putatively adaptive genetic variation was linked to local mean depth, local spring rate of warming, and local surface temperature. In general, local factors had more significant relationships than regional ones, which may indicate that selection pressure is occurring more widely at early life history stages for lake whitefish rather than later stages. These analyses may help managers better understand the drivers of population structure that underlie Lake Michigan's lake whitefish fishery.

**Advisor:** Jared Homola, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Evaluating Sensors as a Tool for Investigating Effects of Agriculture on a Groundwater Fed Stream



Lily Lefebvre  
Water Resources

Agricultural practices in the Central Sands region involve using significant fertilizer inputs. This causes the mobile ions such as nitrogen and chloride to enter groundwater and leach through the soil profiles, eventually ending up in groundwater fed water bodies. It is valuable to monitor surface water quality throughout the year to capture the effects agriculture has on water quality throughout each season. This study was conducted at Isherwood Lateral, in Plover, Wisconsin, a groundwater fed stream. It will show the effects of agriculture on the stream, and how sensors can aid in the spatial and temporal analysis of the groundwater quality entering the stream. The land use on the north side of the creek is predominantly rotational agricultural fields, while the south side is a mix between forest and prairie. A cross section of ten mini piezometers were placed in the stream bed to allow for sampling of nitrate, chloride, and electrical conductivity (EC) flowing into the stream. EC was found to have an R-squared value of 0.75 when compared to the sum of nitrate and chloride (mmol of charge). Our results confirm nitrate, chloride, and EC values are higher on the agricultural side of the stream (p-value =  $2.2 * 10^{-16}$ ). Two data loggers with sensors measuring temperature, water content, and pore water EC were installed in the stream bed to compare to lab results. The correlation between water quality values obtained by the piezometers and sensor values will help evaluate the real-time data. This continuous data will allow for observation of seasonal and weather-related events, rather than collecting a sample from one point in time. This study found a correlation value of 0.62 when comparing EC measured in the lab and pore water EC from the sensors.

**Advisor:** Kevin Masarik  
**Presentation Style:** Poster  
*Considered for Judging*

# Evaluating the Resident Bull Trout Density in Fourth of July Creek



Patrick Catalano  
Fisheries and Aquatic Sciences

Climate change and associated warming temperature is affecting multiple aquatic species across the globe, with cold water species especially vulnerable. Warming stream temperatures are concerning for Bull Trout *Salvelinus Confluentus*, a sensitive, cold water, federally threatened trout species. The purpose of this study was to evaluate the abundance of Bull Trout. My objectives were to determine if Bull Trout abundance was decreasing in Fourth of July Creek over a span of 23 years, located in the Salmon-Challis National Forest, and to determine if Bull Trout density correlated with temperature. Bull Trout were sampled with multiple passes of backpack electrofishing until 80% depletion was reached; temperature was also recorded. Bull Trout were measured to total length (mm) and density was calculated (fish/100 m<sup>2</sup>). Regressions were used to evaluate density relative to time and water temperature. Interestingly, Bull Trout density increased over the study period, but did not correlate with temperature. To gain more insight on Bull Trout and climate change, further research would be to install temperature loggers in the stream to evaluate temperatures throughout the summer rather than just at sampling, evaluate movement patterns, and sampling areas outside the Salmon-Challis National Forest. While the Bull Trout population is increasing in Fourth of July Creek, density is still relatively low and increasing temperature may reverse this pattern, so continued monitoring and research is necessary to aid conservation of vulnerable species under changing conditions.

**Advisors:** Joshua Raabe, Ph.D., Keats Conley, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

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



Patrick Catalano  
Fisheries and Aquatic Sciences

Garrett Vetter  
Fisheries and Aquatic Sciences

Isaac Cavanaugh  
Fisheries and Aquatic Sciences



Colton Sime  
Fisheries and Aquatic Sciences

Darian Woller  
Fisheries and Aquatic Sciences

Trout stream habitat restoration and enhancements receive considerable efforts in the United States (>\$1 billion annually), but the effects of these projects are rarely evaluated. Therefore, our objectives were to determine if Brook Trout *Salvelinus Fontinalis* and Brown Trout *Salmo Trutta* demographics (e.g., body condition, length, abundance) differed between natural and artificial habitat sites in three central Wisconsin streams. Each stream had a natural (i.e., no restoration/enhancement) and an artificial (i.e., brush bundles, overhead structures) habitat site that were approximately one mile apart. Sites (200 meters in length) were sampled using barge electrofishing in October 2022, with length and weight measured for all trout. Preliminary analyses indicate Relative body condition was significantly different between artificial and natural habitat types for both Brook ( $p=0.02$ ) and Brown ( $p=0.0001$ ) Trout, with trout growing plumper in artificial habitats. For artificial habitat, Brook Trout had a significantly ( $p=0.0003$ ) higher relative condition in overhead structure sites compared to brush bundle sites, but Brown Trout condition did not have a significant ( $p=0.75$ ) difference. Total length for Brook Trout was significantly higher ( $p=0.003$ ) in natural sites compared to the artificial sites, but Brown Trout did not have a significant ( $p=0.49$ ) difference in total length between the artificial and natural habitat sites. Trout had higher or similar catch rates in the artificial sites compared to the natural sites. Trout stream restoration appears to improve body condition of both Brook and Brown Trout in central Wisconsin streams, but additional research such as other seasons, systems, and other habitat types is necessary. This study provides valuable information to managers on how stream restoration techniques affect Brook and Brown Trout in central Wisconsin streams.

**Advisor:** Joshua Raabe, Ph.D.

**Presentation Style:** Poster and Oral

*Considered for Judging*

# Exploring the use of the Foundry Byproduct Slag to Remove Phosphorus from Water



Michael Weaver  
Fisheries and Water Resources

Poor land management practices can lead to excessive phosphorus levels in water bodies and harmful algal blooms. Our research is exploring the use of a foundry byproduct called slag to remove phosphorus from water. The objective of this study is to determine the most effective way of deploying slag in a waterbody and in such a way so that it can be replaced when needed. We have been conducting pilot projects using mesocosms to examine the efficacy of slag when it is held in fine mesh bags. In our first trial the bags of slag were held vertically in the water column, and we flowed water through the material for 40 days. With an average incoming phosphorus concentration of  $250 \mu\text{g L}^{-1}$  and a residence time of 27 hours, the slag had an average phosphorus removal rate of 39%. Over the trial, removal rates steadily declined from around 50% to 20%. The pH of the water increased by roughly 1.5 units from 7.7 to 9.2 after coming in contact with the slag and this will require future monitoring. A second trial, in which the bags of slag are oriented horizontally with the water flow, is currently underway. In this trial the residence time of the water has been significantly decreased (2-3 hours) to more closely match the expected field conditions. Results from this study will inform us as we plan to use the slag in a sedimentation basin being built in eastern Wisconsin.

**Advisor:** Kyle Herrman, Ph.D.

**Presentation Style:** Poster

# Impacts of Diet Availability and Composition on Condition and Abundance of Post-larval Walleye



Jacob Beer  
Fisheries and Aquatic Sciences

Walleye *Sander vitreus* are considered one of the most culturally and economically important fish species in North America, yet Walleye populations are declining across much of North Central North America. Declines in Walleye recruitment and potential limits of Walleye prey availability have been seen as the main causes of Walleye decline. Numerous laboratory and mesocosm experiments have been done regarding Walleye prey preference, yet field data is noticeably lacking. I collected and analyzed the diet contents of post-larval Walleye collected from northern Wisconsin lakes to assess importance of prey abundance and composition in regards to Walleye condition, density, and prey selectivity. Sampling took place in 2021 and 2022 across five lakes in northern Wisconsin using boat electrofishing, mini-fyke nets, and micro-mesh gill nets. Samples were frozen and later processed with diets being enumerated and identified. Prey fish were found to be a preferred prey item across all lakes, while zooplankton and invertebrates were only a preferred prey item in one lake each. Big Arbor Vitae Lake appears to be a specialized system with invertebrates being the preferred prey item above prey fish. Prey fish were the only prey item to have a positive correlation with Walleye condition. No significant relationship was found between Walleye condition and prey composition, suggesting prey preference may not be the primary factor in declining populations. Nearly 90% of samples were collected from Escanaba Lake and Big Arbor Vitae Lake, biasing the data towards those systems. My findings were similar to laboratory and mesocosm research, however due to a relatively low sample size, results should be interpreted with caution and further field research is necessary.

**Advisor:** Justin VanDeHey, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Influence of Flow and Water Temperature on Smallmouth Bass Size Structure and Growth in Southwestern Wisconsin Streams



Garrett Vetter  
Fisheries and Aquatic Sciences

Identifying relationships with abiotic factors such as water temperature and streamflow are crucial to managing and understanding fish populations. Smallmouth Bass *Micropterus dolomieu* were sampled from seven low-order streams in southwestern Wisconsin from 2010-2015 with the objectives of determining if temperature related to growth (mean length at age-0,1,2,3), and if flow related to size structure (proportional size distribution, PSD). Each stream was sampled annually at a fixed site in August or September. Summer water (May-August) temperature and stream depth (i.e., surrogate for flow) were collected by data loggers in each stream. Average summer water temperature appeared to have variable effects on Smallmouth Bass growth, as mean length for ages-0 ( $p=0.03$ ) and ages-2 ( $p=0.03$ ) had a significant, positive relationship but other ages did not. Age-0 ( $p=0.015$ ), and age-1 ( $p=0.04$ ) growth (mean length) were significantly higher with elevated maximum summer water temperatures. Size structure (PSD) had a significant, positive relationship with average depth ( $p=0.0006$ ), minimum depth ( $p=0.02$ ), and maximum depth ( $p=0.003$ ). Thus, higher annual flow indicated a higher size structure of (larger) fish. Higher average summer water temperatures appeared to benefit age-0, and age-1 growth. Future research could use mark-recapture to evaluate individual growth relative to temperature, flow, and other abiotic and biotic (e.g., density, prey) factors. Influences of temperature and flow will become inherently important abiotic factors to understand when managing fish populations due to changing climate, as some species will decline and others, such as Smallmouth Bass, may increase.

**Advisor:** Joshua Raabe, Ph.D.

**Presentation Style:** Oral

*Considered for Judging*

# Initial Insights on the Thermal Ecology of Lake Whitefish in Northwestern Lake Michigan



Kayla Reed  
Fisheries and Aquatic Sciences

Lake whitefish *Coregonus clupeaformis* are a native coldwater species supporting important recreational and commercial fisheries in the Laurentian Great Lakes. Climate-related changes in water temperature may have important implications for the future sustainability of these fisheries. However, projecting future habitat availability is difficult because limited information is available on lake whitefish thermal ecology in the region. In this study, archival temperature loggers were implanted into 400 lake whitefish from northwestern Lake Michigan, including Green Bay, during October-November 2017. Loggers recorded temperature for 11 months at 4-hr intervals. Thirteen recovered temperature loggers were used in analyses. In winter (1 December-31 March), temperatures occupied by lake whitefish ranged from 0 to 8.0°C, while in spring (1 April-31 May) temperatures ranged from 0 to 20.0°C. In summer (1 June-15 September) and fall (16 September-7 November), lake whitefish occupied temperatures of 21.5 and 21.0°C, respectively. Average temperatures in the summer (10.8°C) were within the previously proposed optimal temperature range (10-14°C) and broad thermal niche (7-17°C); however, 58% of observations were outside the optimal temperature range and 11% of observations were outside the broad thermal niche. Our results suggest that lake whitefish from northwestern Lake Michigan inhabit temperatures both above and below previously reported expected temperature ranges. This study provides initial insights on lake whitefish thermal ecology in Lake Michigan and can be used as a baseline for future work aimed at determining how lake whitefish habitat availability may change in the future.

**Advisors:** Daniel Isermann, Ph.D., Lisa Izzo, Ph.D., Scott Hansen, Todd Hayden, Ph.D., Tom Binder, Ph.D., Daniel Dembkowski, Ph.D., David Caroffino, Ph.D., Charles Krueger, Ph.D., Christopher Vandergoot, Ph.D.

**Presentation Style:** Poster and Oral

*Considered for Judging*



# Little Plover River Headwaters Wetland Restoration Remnant Seedbank Study, Plover, Wisconsin



Connor Jaloszynski  
Soil Science and Land Management

Gregor Willms (Not Pictured)  
Soil Science and Land Management

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

**Advisor:** James Cook, Ph.D.

**Presentation Style:** Poster

# Macrophyte Coverage Improves Largemouth Bass Abundance and Size-Structure: a RAD Application for Aquatic Plant Management in Wisconsin Lakes



Elise Bass  
Fisheries and Aquatic  
Sciences

Climate change is predicted to alter north-temperate ecosystems via lake warming, which could be followed by an increase in macrophyte production, forcing managers to decide whether to resist, accept, or direct these changes. Though warmer waters and more macrophytes are beneficial to some native species (e.g., Centrarchidae), this habitat change may negatively affect others (e.g., walleye *Sander vitreus*). Centrarchids (e.g., largemouth bass *Micropterus salmoides*; LMB) are known to win competitive and predatory interactions with walleye in warmer, more macrophyte dominant systems. Thus, in warming lakes unlikely to support walleye, macrophyte management could be a tool to accept ecosystem changes and provide robust centrarchid fisheries. Our objective was to explore potential relationships between LMB electrofishing catch-per-unit-effort (CPUE; fish/miles shocked), proportional size distribution (PSD), and the proportion of the littoral zone that is vegetated (PLV) across the Ceded Territory of Wisconsin. We found that LMB CPUE, PSD-Preferred (proportion of stock-length fish that are also preferred length), and PSD-Memorable were significantly positively related to PLV. We also found a significant inverse relationship between PSD-Quality and PLV while no relationship was found between PSD-Stock and PLV. Weighted binomial logistic regressions show that PLV was a significant predictor of PSD-Quality, -Preferred, and -Memorable. Results suggest increasing macrophyte coverage may promote an increase in LMB relative abundance and, on average, an increase in size structure. Given the negative (and cascading) effects of climate change on native coolwater species (e.g., walleye), some systems are likely to become dominated by LMB. Macrophyte management may therefore represent a strategy to accept these changes and improve expanding LMB fisheries, providing an example of how Resist-Accept-Direct (RAD) decision-making may be integrated into aquatic ecosystem management.

**Advisor:** Joseph Mrnak, Ph.D.

**Additional Authors:** Zachary Feiner, Levi Feucht, Joseph Mrnak, Ph.D., Stephanie Shaw

**Presentation Style:** Poster

*Considered for Judging*

# Muskellunge Epigenetic Clock: Non-lethal DNA-Based Aging



Caden Jungbluth  
Biology

Current fish aging methods are largely based on counting annuli on otoliths, fin rays, scales, and other hard structures. Otoliths, which are often the most reliable aging structure, can only be read if they are extracted from the fish. For most species and aging structures, annuli group closely together as the fish approaches its full-grown size, which can lead to inaccuracies in older fish. Methylation-based aging has been demonstrated to be an accurate alternative means for non-lethally aging fish. As fish age, there are methyl groups added to their DNA at a predictable rate, which can then be detected using a bisulfate treatment followed by DNA sequencing. This technique has been developed and validated for several fish species, including zebrafish, lungfish, and red snapper; however, the approach has not yet been applied to a North American freshwater fish species. Our current research aims to develop and validate a methylation-based aging model for muskellunge, *Esox masquinongy*. We have identified regions in the muskellunge genome that are synonymous with age-associated methylation sites in zebrafish and have begun optimizing a technique for genotyping those targets. We will calibrate our model using known-age hatchery-reared muskellunge samples that were PIT tagged upon release and later collected by the Wisconsin Department of Natural Resources from Lake of the Pines, Middle Eau Claire Lake, and Sand Lake. Known age samples, and therefore aging model applicability, currently span ages from one to twelve years old. Once further optimized, this technique may provide fishery biologists with an alternative means for accurate non-lethal aging of muskellunge and serve as a proof-of-concept for development of methylation-based aging models for other Wisconsin fishes.

**Advisors:** Paul Albosta, Ph.D., Jared Homola, Ph.D.

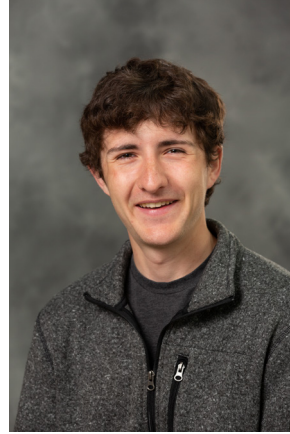
**Presentation Style:** Poster

*Considered for Judging*

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



Kayla Reed  
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 systems. They are one of the only warmwater gamefish in smaller lotic systems, and the number of suitable streams is expected to increase as water temperatures rise with climate change. However, information is limited regarding important diet items, especially in the upper Midwest. Therefore, our objectives were to determine if certain prey were more common in SMB diets, and if prey differed based on total length. In fall 2022, we sampled the Pigeon River, in central Wisconsin, due to its relatively high abundance of SMB. We used backpack electrofishing to sample all fish species at two different sites in the Pigeon River, totaling 1,400 yards. All fish were identified and measured for total length (mm). SMB were also weighed (g) and if >130 mm, a PIT (passive integrated transponder) tag was inserted, and gastric lavage conducted. Macroinvertebrates were collected with kick nets and a representative sample was collected 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 (remnants), and insects all occur with high frequency in SMB diets. However, based on the IRI and rIRI, SMB <200 mm rely heavily on aquatic insects, specifically trichopterans and ephemeropterans, while SMB >200 mm rely heavily only on crayfish. When comparing macroinvertebrate diet items to the community assemblage, SMB appear to select for both ephemeropterans and trichopterans. However, when comparing piscivorous diet items to the community assemblage, we were unable to determine selectivity due to low occurrence of identifiable fish species in SMB diets. 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:** Josh Raabe, Ph.D., Jeff Dimick

**Presentation Style:** Poster

*Considered for Judging*

# Walleye Size Structure in Mississippi River Pools 11 and 13 Relative to Changes in Harvest Regulations



Cody Hagloch  
Fisheries and Aquatic Sciences

Size structure provides managers with valuable information on recruitment, growth, and survival of fish populations that can be used to set regulations. Biologists can implement changes to regulations to reduce harvest or protect certain sizes, potentially improving size structure and increasing the population in numbers. Walleye *Sander vitreus* regulations in the Mississippi River Pool 11 and 13 were 15” minimum length and a daily bag limit of 6 with a possession limit of 12 until 2004, when a protected slot between 20-27” was included in Pool 13. The same protected slot was put into place for Pool 11 in 2021. The objectives were to 1) have little/no difference for the harvestable Walleye (15-19.9 in), 2) increase the proportion of spawning Walleye (20-26.9 in) in Pool 11 and 13 after the implementation of the new regulation, and 3) increase PSD-P (20-26.9 in) after implementation of the protected slot. Walleye were sampled in the summer months from 2001-2022 using electroshocking with a boat, with upstream side of wing dams targeted. Sampled Walleye were measured for total length (mm). PSD-P was calculated for each pool. There appeared to be no changes to the harvestable size Walleye before and after the protected slot was put in place for both pools. The proportion of spawning Walleye increased in Pool 11 (19% increase) and Pool 13 (21% increase) after the protected slot limit was implemented. PSD-P had increased in both pools (Pool 11 slope = 0.85, Pool 13 slope = 1.28) after protected slots were set in place. Pool 13 slope is likely greater due to the regulation being in place for longer. This study indicates a change in harvest regulations could create positive feedback of a fishery’s size structure.

**Advisor:** Joshua Raabe, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Walleye Spawning Movements and Temperature Cues in Tributary Rivers to Green Bay, Lake Michigan



Matthew Bartz  
Fisheries and Aquatic Sciences

Walleye *Sander vitreus* use tributary rivers to Green Bay, Lake Michigan for all life stages including as vital spawning habitat. Spawning movements are cued by environmental factors (e.g., temperature, flow), but specifics and potential differences among Walleye and Green Bay tributaries are largely unknown. Therefore, our objectives were to determine if the arrival timing and temperature for Walleye entering tributary rivers from Green Bay differed among systems, sex, or total length. A subset of Walleye ( $n = 384$ ) collected in the Green Bay system in fall 2017 and spring 2018 were implanted with an acoustic transmitter and archival temperature logger. Movements of tagged fish were monitored with an acoustic receiver array while temperature loggers required physical recaptures. Sampling and angling through fall 2019 recovered 40 of these individuals that were detected in the Menominee, Peshtigo, Fox, Cedar, and Escanaba tributaries, but some individuals were river residents or had short durations at large so were excluded from analyses. Preliminary analyses indicated no significant differences for mean arrival date or temperature between sexes, total length groups (i.e., medium, large), or systems; low sample sizes may have limited statistical comparisons. Telemetry detections indicated different behaviors among systems, and additional individuals will be included in analyses. Understanding spawning movements is necessary to guide management of temperature dependent species in changing environments, including for Walleye in Green Bay.

**Advisors:** Joshua Raabe, Ph.D., Lisa Izzo, Daniel Dembkowski, Daniel Isermann

**Presentation Style:** Oral

# Yellow Perch Responses Following a Large Scale Centrarchid Removal in McDermott Lake, Wisconsin



Max Monfort  
Fisheries and Aquatic Sciences

Proliferation of warmwater fish in northern lakes has significant implications for food web structure and fisheries management. Specifically, proliferation of centrarchids (e.g., largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus*, and black crappie *Pomoxis nigromaculatus*) could have important implications for yellow perch *Perca flavescens*, a species that serves important roles in lake ecosystems as both predators and prey. However, relationships between centrarchids and yellow perch are poorly understood. A large-scale experiment that resulted in removal of 285,000 centrarchids from McDermott Lake in northern Wisconsin provided a unique opportunity to examine the response of the yellow perch population to the removal relative to yellow perch population trends in Sandy Beach Lake, which served as a reference system. Metrics of interest used to describe yellow perch population trends in each lake included catch-per-unit effort (CPUE), mean age and mean length at age, and size structure indices (PSD). Spring fyke net data has shown that the McDermott Lake yellow perch relative abundance, growth, and size structure have increased after removal began. Completion of ongoing age-based analyses will provide additional insights regarding how the yellow perch population in McDermott Lake responded to the removal of centrarchids.

**Advisor:** Daniel Isermann, Ph.D.

**Additional Authors:** Steve Carpenter, Giancarlo Coppola, Daniel Dembkowski, Holly Embke, Jason Folstad, Joseph Hennessy, Becca Henningsen, Daniel Iserman, Zachary Lawson, Quinnlan Smith, Christopher Sullivan  
Jake Vander Zanden

**Presentation Style:** Oral

*Considered for Judging*

# Analysis on Treatment methods of Northern Red Oak regarding White-Tailed Deer Bud Browse



Gavin Meyer  
Ecosystem Restoration and Management

Northern red oak (*Quercus rubra*) is a significant northern hardwood species within the lake states region due to its timber value, ecosystem services, and wildlife habitat for various species. Bud browsing from white-tailed deer (*Odocoileus virginianus*) is a common issue associated with propagating this species, as dense populations of deer can lead to regeneration failure. Many methods of prevention have been formulated to help reduce bud browsing, but the efficacy of these methods is poorly understood. We used a randomized block design to compare the efficacy of various methods of browse deterrence and prevention. Northern red oak seedlings were planted in 17 blocks of 40 seedlings (680 total) during the spring of 2020 at the Treehaven Field Station in Tomahawk, WI. Within each block there were 3 treatment methods and a control including included tree shelters (made of plastic mesh), bud caps (paper over terminal bud), and applications of spray deterrent (Plantskydd). Seedlings were observed in the spring and fall for survival, browse, height growth, and dieback. We used ANOVA to test whether there were significant differences in height growth between the treatments and found that tree shelters were the only treatment with significant positive height growth. We used logistic regression to test whether the species of competing vegetation or shrub coverage surrounding seedlings had any influence on browse probability but did not find any statistically significant differences. Using logistic regression, we tested whether there were significant differences in browse occurrence between the treatments and found that tree shelters were highly effective in reducing browsing, while bud caps and spray deterrent provided only modest reductions in browsing relative to the control group. From this, we have concluded that while tree shelters show significant protection against bud browse for northern red oak from white-tailed deer, the other treatment methods (bud caps and spray deterrent) are not significant enough to be effective methods for resolving this issue.

**Advisor:** Eli Anoszko

**Presentation Style:** Poster and Oral

*Considered for Judging*



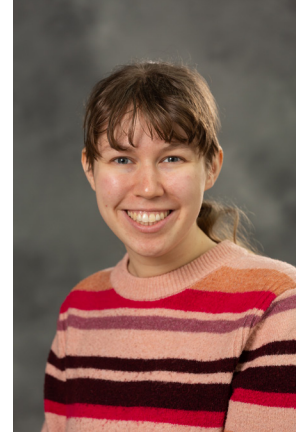
# Seed Bank Study of the Island in Lake Joanis in Schmeckle Reserve



Bella Kirkpatrick  
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Ecosystem Restoration and  
Management

Lake Joanis is a man-made lake containing a man-made island in UWSP's Schmeckle Reserve. This island has invasive buckthorn (*Rhamnus cathartica*) among grey dogwood (*Cornus racemosa*) and bush honeysuckle (*Diervilla lonicera*). The island's overstory has paper birch (*Betula papyrifera*) and aspen (*Populus spp.*) on the east half, and red pine (*Pinus resinosa*) trees on the western half. In an effort to predict what will grow back on the site after buckthorn removal, we initiated a seed bank study. To do this, we sampled 20 plots at two depths (10 cm and 20 cm). We took these samples and placed them in 3.5-inch pots and watered them 3 times a week. We recorded the number of plants per pot and the species type. We predict that there will be a significant difference between the number of plants that germinate from the 10 cm sample and the number of plants that germinate from the 20 cm sample. We also predict that there is going to be a significant difference between the number of species of plants that germinate from the 10 cm sample and the number of species that germinate from the 20 cm sample. The results of this study can help predict what plants will grow in place of the buckthorn and demonstrate which plants will stay in a seed bank after an invasion and subsequent removal of a woody invasive species.

**Advisor:** Michael Demchik, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Analysis of Environmental Education in Higher Education Programs: Opportunities for Professional Development



Jacob Tepsa  
Wildlife Ecology and Management

Higher education programs across the continent address environmental education (EE), but how these programs incorporate EE is highly dependent on what resources they rely on. While some educators align their coursework with themes from the North American Association for Environmental Education (NAAEE) Guidelines for the Professional Development of Environmental Educators, there is an existing need for support to improve environmental education integration. Our research compiled responses from surveys and interviews of higher education members. The survey assessed the integration of EE in higher education programs, exploring topics, strategies, priorities, and networks. A database of faculty members who've integrated EE into their classes were contacted to take the survey. This study explored which strategies faculty members are currently using to teach their students such as inquiry-based learning activities, inclusivity approaches, modeling environmental education activities, and teaching outdoors. This includes some of the supports they draw on to do so and the overall design of university programs themselves. Survey results were then compiled and reviewed for descriptive analysis which included coding for themes. Survey respondents ranked sharing, standardizing, and improving EE professional development as a top benefit for statewide networks of higher education professionals. Respondents also indicated example assignments and opportunities to talk with other professors would help improve the delivery of EE in their contexts. Active statewide networks create opportunities for faculty to share resources such as syllabi, curriculum ideas, and to provide connecting points with other EE supporters. This study provides insights for the creation of these networks and creating professional development experiences for faculty members.

**Advisor:** Becca Franzen, Ed.D.

**Presentation Style:** Poster

*Considered for Judging*

# Avian Blood Parasites of Waterfowl in Green Bay WI.



Gina Magro  
Biology

Starting in the mid-1980s, Greater (*Aythya marila*) and Lesser (*Aythya affinis*) Scaup populations have been declining. Previous research focused on flatworm and tapeworm diversity living in these hosts, linking major die-offs to non-native flatworms in the Mississippi flyway. However, there is very little research on haemosporidian populations (avian blood parasites) in waterfowl, particularly in diving ducks like Scaup. When compared to dabbling ducks, our data on Scaup show low prevalence. Our research objective is to survey haemosporidian prevalence and diversity in Scaup from Green Bay, WI. We obtained all birds for our study through hunter donations, totaling 67 Scaup and 16 other waterfowl representing seven additional species over the 2019-21 hunting seasons. These birds were dissected, liver samples collected, preserved in 95% ethanol, and frozen. We extracted DNA from the liver samples and then amplified parasite DNA sequences through Polymerase Chain Reaction (PCR) using established protocols. This method allowed us to detect the presence of haemosporidians parasites and identify them to the genus level, including Haemoproteus, Leucocytozoon, Parahaemoproteus, and Plasmodium. Greater Scaup had lower overall haemosporidian prevalence (15.8%) than Lesser Scaup (27.6%). Scaup had 18 total infections from 14 birds, the majority (61%) of parasites were Leucocytozoon. In all dual infections, at least one species of Leucocytozoon was detected. We discovered 4 new lineages: two from Scaup, and one each from a Wood duck and a Goldeneye. To further investigate patterns of diversity and host-associations, we reconstructed a phylogenetic tree that revealed a lack of host specificity across waterfowl species. A multiple logistic regression showed that none of our demographic factors (species, age, sex, or year of collection) were statistically associated with parasite infection ( $p > 0.05$ ). Our findings may be representative of the larger Scaup population that uses the Mississippi Flyway as previous studies indicate these parasites may be transferred at breeding grounds. Our results provide evidence for transmission at breeding grounds with similar prevalence in both juveniles and adults. Monitoring these parasites in Scaup is important for waterfowl management to better describe the distribution of potentially pathogenic species.

**Advisors:** Sarah Orlofske, Ph.D., Jadin Robert, Ph.D., Jeffrey Bell, Ph.D.

**Presentation Style:** Poster and Oral

*Considered for Judging*

# Analysis of Land Cover and Water Resource Interactions in Wisconsin

Dane Friis  
Natural Resource Planning

There is a relationship between land and water resources. Previous research has demonstrated that land cover and practices can impact water quality. For example, excess nutrients from various land uses have been shown to be present in streams and groundwater. These nutrients have been found in streams with adjacent land covers of impervious surfaces and crop agriculture. This can have impacts on human health and recreation activities. To better understand this, I used geospatial analyses to examine the relationship between water resources and land cover in Wisconsin. For the land cover data, I used the USDA Cropland data layer and National Land Cover Dataset. The Wisconsin DNR assessed stream data and private well water data viewer was used for the water datasets. The analysis highlighted these relationships and produced useful maps for planners, which can be useful for the people of Wisconsin's health and recreation opportunities.

**Advisor:** Austin Holland, Ph.D.

**Presentation Style:** Poster and Oral

*Considered for Judging*

# Anthropogenic Sound in Wisconsin

Trevor Howe  
Environmental Science and Management

Spending time outdoors is great for your health and mind, but with too many anthropogenic noises, the quality of recreation is decreased. The aim of this project was to create a map that shows where the lowest amount of sound occurs in Wisconsin based on anthropogenic sound for use in planning and public recreation. We conducted a suitability analysis to identify the loudest landscapes in Wisconsin. The four contributors that we focused on were transportation, land use, population density, and slope. This data was then processed in GIS. The data was then transformed into the suitability map. This allows us to clearly see where in Wisconsin anthropogenic noises are more prevalent than others. Certain recreational areas may be more impacted by noise than others. This analysis could also be very useful when designing parks and wilderness areas. The end product shows us what spots would likely be least affected by anthropogenic sound.

**Advisor:** Austin Holland, Ph.D.

**Presentation Style:** Poster

# How Soil Properties Affect Wetland Seed Bank Analysis and Reflecting Wetland Restoration Potential



Eli Nedden  
Fisheries and Aquatic Sciences

Understanding the composition of viable seeds within a seed bank can show the historical plant community that existed and help with ecological restoration efforts. Wetland seed bank analysis is done by germinating soil samples in a controlled greenhouse setting under saturated soil conditions to reflect wetland species present in the seed bank. A total of 35 soil samples were collected along 7 equally spaced transects from an agricultural field adjacent to the Little Plover River. This site has been selected for a stream and wetland restoration project that will be completed in the next 2 or 3 years. Two samples were collected from a sedge meadow in Schmeekle Reserve as a reference. At each site, 4 soil cores were taken from the top 10 cm of the profile and homogenized. The objectives of this research project are two-fold. One is to determine if wetland plant species are present in the seedbank. The second objective is to see if soil properties correlate with the germination results. The project is currently underway but preliminary results have found germination in 21 of the 35 soil samples collected at the site and 210 specimens have emerged across 23 different species. We have observed numerous wetland plant species emerging from the soil cores and currently 80.1% of the specimens that have emerged and identified are wetland specialists (assuming all *Carex spp.* and *Scirpus spp.* are wetland specialists). Thus far, it does not appear that any soil properties correlate with the germination results.

**Advisors:** Kyle Herrman, Ph.D., Scharenbroch, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# **Phragmites (*Phragmites australis* ssp. *australis*) removal and native plant recolonization in Schmeckle Reserve**

Alana Spang  
Ecosystem Restoration and Management

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

**Advisor:** Paul Skawinski, M.S.

**Presentation Style:** Poster

*Considered for Judging*

# Analysis of Key Soil Nutrients and Physical Properties on a Managed Grazing Operation in Junction City, WI



Claire Jensen  
Soil Science and Land  
Management



Emily Gilbertson  
Soil Science and Land  
Management

Rotational grazing is an agricultural practice that provides long-term ecological and soil benefits. Our project objective is to assess soil quality on a rotational grazing farm over a 20-year period. We hypothesize that soil quality and soil fertility will gradually improve the longer a field is rotationally grazed. This long-term research project, conducted through the UW-Stevens Point Soil and Water Conservation Society, analyzes a rotationally grazed operation in Junction City, Wisconsin. The fields are broken up into five-acre parcels and grid points are randomly allotted to each parcel. A control field that is not rotationally grazed, as well as newly converted conventionally farmed fields, are also sampled. Soil samples (6") were collected within a ten-meter radius around each grid point in fall 2015. Physical and chemical testing has been completed for 2015 soil samples, which includes: bulk density, Carbon:Nitrogen ratio, total Carbon and Nitrogen, pH, Phosphorus, Potassium, electrical conductivity, organic matter, and biomass yield. Fields are to be resampled every four years and tested for the same soil properties as listed above. Testing of 2019 samples will conclude in fall 2023, when resampling will occur again.

**Advisor:** Rob Michitsch, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*



# Composting Deactivation of Chronic Wasting Disease Prions: Final Results



Amber Smith  
Wildlife Ecology and Management

Through hunting, or ingestion of Chronic Wasting Disease (CWD) infected cervids, exposure to specified risk materials is considered an exposure route to prions that might lead to infection. Prions cause transmissible spongiform encephalopathy (TSE) diseases in animals and humans. The composting process has proven effective for the biodegradation of recalcitrant organic contaminants, and the high number of microorganisms and high temperatures achieved during composting have prompted interest in this process for inactivating prions; however, literature on the survival of prions in composting systems is limited. Since thermophilic temperatures do not definitively cause pathogen reduction, multi-barrier approaches in composting are employed to improve pathogen inactivation. As such, primary-phase duration, C-substrate, anaerobic conditions, drying, storage, antagonistic microorganisms, ammonia evolution, microbial inoculants, and other degradation methods have been used to establish an unstable habitat for pathogen survival. Compost piles offer or complement these different approaches, which may prove useful for degrading infectious prions. The objectives of this study were to compost CWD infected deer remains in Summer and Winter Midwest climates, affirm pathogen reduction through the use of *E. coli* NAR, and analyze CWD reduction among composting, burial, and composting effluent. To test this hypothesis, we utilized five composting cells: four CWD positive cells and one control cell that were monitored by temperature sensors and by effluent flow meters. Effluent samples were gathered routinely for CWD and *E. coli* NAR analysis. The Real Time-Quaking Induced Conversion (RT-QuIC) method was utilized to measure the CWD seeding activity within the piles. The findings of this experiment suggest that static compost piles did not completely break down the CWD prion.

**Advisors:** Rob Michitsch, Ph.D., Alex Thomas, Joel Pedersen, Ph.D., Stuart Lichtenberg, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Determining Proper Nutrient and Heavy Metal Contents in WI Septage to Manage Current WI Regulations



Sam Korducki  
Hydrology



Garrett Brown  
Soil Science and Land Management

Land application of septage from private onsite wastewater treatment systems (POWTS) is a practice used to dispose of waste that is generated from the general maintenance of POWTS. This waste source consists of wastewater and solids that contain nutrients, heavy metals, and potentially fecal pathogens. When septage is land applied, nutrients become available for beneficial reuse. An over application of these nutrients could result in environmental harm through nutrient contamination of surface water and groundwater resources. In 1992, the United States Environmental Protection Agency (EPA) regulated the land application of domestic septage through volume restrictions designed to limit the maximum nitrogen loading rates on land application sites. This formula assumes 100 lbs. of available nitrogen per acre when domestic septage is applied at 39,000 gallons per acre, which was based on only a few analyzed samples to create the EPA regulation. The present nutrient and metals content of septic waste in Wisconsin is relatively novel and otherwise unknown. In this study 360 septic samples were collected from 36 counties across Wisconsin and analyzed for a complete nutrient and heavy metals characterization by the Environmental Microbial Analysis and Research Laboratory (EMARL), an extension of the University of Wisconsin Stevens Point (UWSP) College of Natural Resources (CNR). Analyses of these samples showed, on average, a 60% reduction in nitrogen contents compared to the 1992 EPA regulations, along with other inferences. The results of this study will further inform management decisions by industry professionals and regulatory bodies.

**Advisors:** Rob Michitsch, Ph.D., Alex Pliska

**Presentation Style:** Poster

*Considered for Judging*

# Development of In-field Diagnostic Methods for Identification of Spodic Materials



Emily Gilbertson  
Soil Science and Land  
Management



Claire Jensen  
Soil Science and Land  
Management



Nathan Stremcha  
Soil Science and Land  
Management

Using field methods to determine a soils specific properties has been used for many years. Spodic soil horizons in particular are often identified in the field via the Munsell color chart and by looking for eluviation in the horizons layered above the suspected spodic material. Spodic horizons have rich concentrations of sesquioxides (iron and aluminum) chelated with organic matter, and they are often identified by a reddish hue indicating these sesquioxides. Plus, darker colors may indicate an especially high accumulation of humus (organic matter). The portable x-ray fluorescence (pXRF) is an instrument that detects specific elements within a soil sample and tells the user the abundance of each element. The pXRF has the capability to accurately measure iron and aluminum content within a soil sample. Eight sites suspected of having spodic materials in Schmeckle Reserve, Stevens Point, WI were dug out and a sample from each horizon was collected. The samples were then described via typical field sampling methods. The samples were then ground down and the lab analyses of pH, loss on ignition and pXRF were performed. A comparison was made between the results from the field methods and the lab methods. If the in-field soil description methods of Munsell color, organic matter estimation via color, and Hellige-Truog pH estimation can be accurately correlated to the laboratory methods of loss on ignition, pH by electrode and portable x-ray fluorescence for sesquioxide concentrations and organic matter, then these stated in-field methods can be trusted for identifying spodic materials. Utilizing these field methods could conserve time, money, and labor by reducing duplicate tests that me be performed in the field and then again in the laboratory.

**Advisor:** Bryant Scharenbroch, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Effects of Climate Change on Microbial Communities in Restored Wetlands



Hailey Trompeter  
Hydrology



Kaj Fritsch  
Hydrology

Nutrient cycling in wetlands is largely driven by the microbial communities found within their soil. Research suggests that following restoration, newly established wetlands are not able to cycle nutrients as effectively as older, more established sites most likely due to a more active microbial community in older wetlands. Research on the resiliency of microbial communities in wetlands, however, is scarce. As climate change continues to increase air temperatures and alter precipitation patterns, it is important to understand how nutrient cycling in wetlands will respond to different climatic conditions. Thus, the objective of our study is to examine the resiliency of microbial communities in restored wetlands. To achieve this objective, we will expose soils from three different aged, restored wetlands and one natural wetland to different climatic conditions (10°C and saturated, 10°C and dry, 25°C and saturated, and 25°C and dry) over a period of 28 days. We will measure carbon respiration, nitrogen mineralization, and denitrification rates to assess nutrient cycling. We hypothesize that the natural wetland site will have the highest rates of nutrient cycling across all the climate regimes indicative of a more resilient microbial community. Results from this study will help us understand if restored wetlands can provide similar nutrient cycling capabilities to natural wetlands under variable climatic conditions.

**Advisor:** Kyle Herrman, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Phytoremediation with *Cannabis sativa*

## - A comparative analysis of the effects of heavy metal, soil type, and fertilizer treatments on plant fitness



Tyler Jolin  
Biology

Nicholas Albers (Not Pictured)  
Biology

Mike Ayensu-Mensah (Not Pictured)  
Philosophy/Psychology

Aster Kabat (Not Pictured)  
Ecosystem Restoration and Management

Max Kindschuh (Not Pictured)  
Biology

Jacob Ollarzabal (Not Pictured)  
Biology

Mary Joy Relagio (Not Pictured)  
Biochemistry

Zach Tower (Not Pictured)  
Biology

Heavy metal contamination negatively impacts a third of arable soils. Soils polluted with heavy metals can reduce agricultural productivity and pose an indirect risk to consumers because crops can take up and sequester dangerous levels of these contaminants. At the same time, phytoremediation, the sequestration of toxins in plant biomass, has the potential to be an economically viable and environmentally friendly method for decontaminating soil. Hemp (*Cannabis sativa*) has been shown to function as an effective phytoremediator, and studies suggest that hemp might retain the potential for industrial use after sequestering soil contaminants. To the extent this is true, hemp farmers would be able to generate a profit while cleaning up the environment. However, the extent to which hemp can tolerate heavy-metal exposure is not well understood. In the Fall of 2022, plants from the industrial hemp cultivator Colorado Cherry Wine were grown in the University of Wisconsin Stevens Point greenhouse. We explored questions related to the effects of various soil treatments (soil type and heavy metal and fertilizer concentrations) on the phenological, physiological, and morphological features of the plants. Prior to harvesting, plant height, internode length, chlorophyll production, and photosynthetic rates were measured and recorded. After harvesting, the concentrations of heavy metals in the roots and soil were assessed, as were both vegetative and floral biomass. Our results offer insight into the use of hemp as both a phytoremediator and a cash crop. Increasing our understanding of the soil conditions that hemp can tolerate will further our capacity to clean up the environment while maintaining economic viability for Wisconsin hemp farmers.

**Advisors:** Brian Barringer, Ph.D., Ann Impullitti, Ph.D., Shannon Riha, Ph.D., Bryant Scharenbroch, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Sex abundance of Rusty crayfish (*Orconectes rusticus*) in Mill Creek, WI at different times of day



Gabby Michlig  
Wildlife Ecology and Management

Julia Nasiatka (Not Pictured)  
Wildlife Ecology and Management

Nick Larson (Not Pictured)  
Wildlife Ecology and Management

Gabby Eklund (Not Pictured)  
Wildlife Ecology and Management

The Rusty crayfish (*Orconectes rusticus*) is an invasive species of invertebrate that is native to the Ohio River Basin. The crayfish has been introduced outside of its native range by anglers. The nocturnal Rusty crayfish causes extensive damage to native ecosystems by damaging aquatic food webs and displacing native crayfish species. Our study focuses on obtaining more information on when Rusty crayfish are most active and their breeding and feeding patterns. We aim to determine sex abundance at different times of day (morning vs. evening) to help managers find the best methods of managing this invasive species. We hypothesize that the sex abundance of Rusty crayfish (*Orconectes rusticus*) will be significantly different in the morning than in the evening at Mill Creek, located in Portage County, WI. We sampled crayfish 10 times from October 8, 2022, to October 22, 2022, with five morning and five evening samples. Using a two-factor ANOVA to analyze our data, we found a significant difference in the overall abundance of the species between morning and evening. Additionally, we found no significant difference between sex abundance in the morning vs. in the evening. Finally, we did not find any significant interaction between sex abundance and time of day, concluding that sex abundance is not dependent on the time of day. From these results, we determined that managers should remove the invasive Rusty crayfish at night; however, we still need more information on what times of year would be best to remove reproducing females with eggs.

**Advisor:** Jason Riddle, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Abundance Estimates of Southern Flying Squirrels (*Glaucomys volans*) in Schmeeckle Reserve 2022

Tess Bigalke  
Wildlife Ecology and Management



Morgan Goff  
Natural Resource Planning



Amber Smith  
Wildlife Ecology and Management



Samantha Stellmacher  
Wildlife Ecology and Management



The southern flying squirrel (SFS, *Glaucomys volans*) inhabits hardwood forests in Wisconsin. Within these forests, SFS disperse fungi, seeds, and nuts, thereby increasing forest stand health and improving ecosystem function. Since 2020, students with the SFS project of the student chapter of The Wildlife Society have trapped SFS in the Berard Oaks of Schmeeckle Reserve. The number of SFS trapped varies significantly per year. Our goal was to estimate the abundance of SFS in Schmeeckle Reserve during 2022. We capture SFS using a semi-permanent trapping grid of 20 Sherman traps affixed to trees. In 2022, we also set traps at the base of each tree that had a semi-permanent arboreal Sherman trap. All traps were baited with a mix of peanut butter, bacon grease, and oats and set at approximately 6:00pm and checked at 10:00pm. Upon capture, we anesthetize the SFS with isoflurane, affix a uniquely numbered ear tag, identify sex, and weigh all individuals. We captured 29 individuals 57 times over 914 trap nights from September 13th to October 11th, 2022. We ran six models in R studio to determine which variables affect initial capture and recapture. Then, we used the canonical estimator of abundance to determine abundance of SFS. We found that capture probability differs between first and subsequent captures and between males and females. Females were more likely to be caught initially, but males are more likely to be recaptured. We calculated abundance of females to be 16.1 (+ 0.3) and males to be 13.8 (+ 1.4). We will discuss why more females were captured in 2022 when compared to previous years.

**Advisors:** Shelli Dubay, Ph.D., Ben Sedinger Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

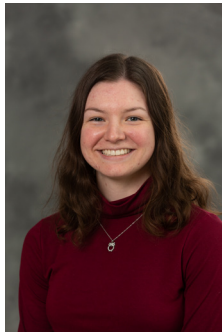
# Analysis of the Impact of Stem Density on Ruffed Grouse Drumming Direction in Northern Wisconsin



Ava Cross-Weisbeck  
Wildlife Ecology and Management

Scott Lindenberger  
Wildlife Ecology and Management

Austin Wallin  
Wildlife Ecology and Management



Zachary Cason  
Ecosystem Restoration and Management

Catrina Johnson  
Wildlife Ecology and Management

James Doss  
Wildlife Ecology and Management

Everly Eldeen (Not Pictured)  
Wildlife Ecology and Management

Ruffed grouse (*Bonasa umbellus*) are an important game bird in the Great Lakes region. Males perform a unique auditory display, known as drumming, atop fallen logs to attract females and maintain their territory throughout the spring. Drumming can be heard for up to a half mile away depending on various factors. As part of a UW - Stevens Point Wildlife Society undergraduate research project, drumming locations were identified using auditory surveys. Then drumming direction was determined by the direction perpendicular to the log with the least droppings. We will examine if forest type and stems per acre determine the direction that ruffed grouse drum. This information could improve knowledge of ruffed grouse during mating season and change how habitat is managed for ruffed grouse.

**Advisor:** Jason Riddle, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*



# Analysis of Waterfowl Browse on Wild Rice (*Zizania aquatica*) in Northwestern Wisconsin



Luke Trittelwitz  
Wildlife Ecology and  
Management



Tess Bigalke  
Wildlife Ecology and  
Management

Shayla Schmitz (Not Pictured)  
Wildlife Ecology and Management

In Northwestern Wisconsin, wild rice (*Zizania aquatica*) not only serves as an important food source for people and animals, but it is also a particularly important cultural grain. Wild rice is an abundant and nutrient-rich food source used by several waterfowl species including swans and geese. Although wild rice grows in a cyclic pattern, the increased presence of swans and geese on flowages in Northwestern Wisconsin may affect wild rice availability in the area. For example, waterfowl species have been observed eating wild rice stands and they appear to have been mechanically mowed in Crex Meadows State Wildlife Area. The effects of waterfowl on wild rice production is unknown. To measure the possible effects of these waterfowl species on wild rice, we constructed exclusionary fences on three flowages. We compared weight, height, density, and substrate samples from inside and outside the exclusions to investigate the possible overgrazing by swans and geese. We collected 10 samples from inside each fence and 10 outside (N = 60 plants) across all three flowages monitored. A sample plant was taken within each study quadrat at random, washed, dried, and weighed. Samples were processed in the herbarium at the University of Wisconsin - Stevens Point. We predict that wild rice variables will be higher within the exclusionary fencing than the wild rice outside the exclusions that is actively available to browse by resident waterfowl species. We will discuss the management implications and impacts of waterfowl overgrazing on wild rice stands in Northwestern Wisconsin.

**Advisor:** Cady Sartini, Ph.D.

**Presentation Style:** Poster and Oral

*Considered for Judging*

# Breeding Bird Diversity in Managed and Unmanaged Forests

Tou Vue  
Ecosystem Restoration and Management

Maximizing species richness is one of the common measures for managing an ecosystem. Species richness is also used to determine the impacts of management actions and ecosystem health. In this study we compared and contrasted species richness of breeding bird diversity between managed and unmanaged forests in central and southern Wisconsin. We wanted to see if there was a difference of species richness by a managed forest that had been burned and had invasive species controlled. We used the Point Count Method with a 100m radius to collect the data. The data was analyzed using a pairwise t-test to compare the Shannon Diversity Index of breeding bird diversity in managed and unmanaged forests. The results showed that there were no differences in species richness ( $t\text{-test} = 2.57, df = 5, p = 0.2487$ ). Although we did not find a significance in species richness, this does not mean that management actions should halt but be compared in a different way, such as conservation status of bird species. Conservation status should be considered due to the importance of early succession in many of the current conservation bird species. Because the managed forests had been burned, we may see more conservation status species in managed forests. In our study we found no significance between breeding bird diversity in managed and unmanaged forests. With more trials we may possibly see a difference in breeding bird diversity and conservation species in managed and unmanaged forests.

**Advisor:** Jeb Barzen, M.S. Biology

**Presentation Style:** Poster

*Considered for Judging*

# Correlation of Fawn and Predator Observations

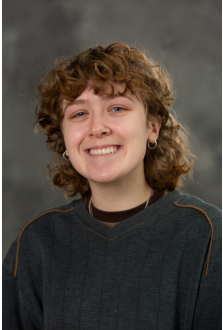


Jeremy Murray  
Wildlife Ecology and Management

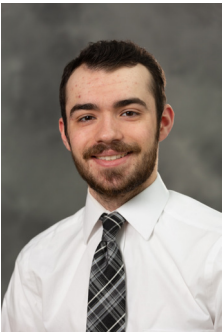
White-tailed Deer (*Odocoileus virginianus*) has interactions with many different objects in their environment throughout their lives. Just like their interactions with the ecosystem, White-tailed deer interact with and influence predators. The use of cameras allow us to study the interactions of white-tailed deer with little influence from human interference. I used 35 trail cameras in Michigan's Upper Peninsula to study the relationship between White-tailed deer fawns and predators. I hypothesis that with the increase of White-tailed deer observations there will be more predator observations.

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

# Densities of White-tailed Deer on Forests in North-Central Wisconsin



Claire Harwood  
Wildlife Ecology and Management  
Amber DeValk  
Wildlife Ecology and Management  
Trevor Pike  
Wildlife Ecology and Management  
Samantha Stellmacher  
Wildlife Ecology and Management



Reece Lisowski  
Wildlife Ecology and Management  
Lydia Dobberstein  
Wildlife Ecology and Management  
Brayden Mueller  
Wildlife Ecology and Management

Abundances of white-tailed deer (*Odocoileus virginianus*) in Wisconsin has steadily risen from 2002 to 2022. Associated concerns have emerged relative to deer-vehicle collisions, agricultural crop damage, and forest health and regeneration. To understand changes in deer density over time, we conducted deer pellet-group surveys every April-May from 2018 through 2022 on 11 forest management demonstration sites across North-Central Wisconsin. These sites, located in Clark, Eau Claire, Lincoln, Marathon, Marinette, and Portage Counties were in varying stages of planned timber harvest including none, thinning, shelterwood harvest, and coppice cut. The objective of this study was to evaluate trends in deer density across sites and time and apply those findings to known forest management practices, soil quality, predation, and vehicle collisions. The mean value of deer/sm was statistically different across sites ( $\bar{x}=193.09$ ,  $v=39562.29$ ) with highest (222 deer/sm) at Central Wisconsin Environmental Station, and lowest (3 deer/sm) at Emmons Creek Fishery Area. Densities of deer within sites varied much less across time indicating site specific factors influenced density more than time. Densities of deer typically were greater on demonstration sites with no or limited hunting. We were not able to determine any long-term increases in deer densities due to forest management practices.

**Advisors:** Scott Hygnstrom, Ph.D., Michael Demchik, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Differential Timing of Migrating Northern Saw-Whet Owls (*Aegolius acadicus*) Based on Age Categories



Nicole Luoma  
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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 is interested in studying the migrational patterns of these owls. 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. In 2019, our project performed 2-sample independent t-tests comparing the mean day of migration of each of the age groups. There was a significant difference between the hatch-year (HY) birds and after-hatch-year birds (AHY), demonstrating that adult birds are likely to migrate 0.37-2.70 days earlier than hatch-year birds ( $p=0.01$ ). We also observed the same trend of adult birds migrating 0.99-3.68 days earlier than juvenile birds in the subset of female birds only ( $p=0.001$ ). The trend for AHY birds migrating earlier in the season may be the result of AHY birds gaining previous migration experience from former years. We hypothesize that we will continue to see AHY birds migrate earlier in the season than HY individuals, and plan to re-run analyses with data from 2020-2022.

**Advisor:** Jason Riddle, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Effect of Tree Canopy Coverage and Trap Placement on Southern Flying Squirrel Trap Success in Schmeeckle Reserve



Jeremy Murray  
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James Doss  
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Kody Woodcock  
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Southern flying squirrels (SFS, *Glaucomys volans*) occupy mixed forest stands in Eastern North America. The TWS flying squirrel project has been trapping SFS in the Berard Oaks and surrounding woods of Schmeeckle Reserve since 2020. We use a semi-permanent trapping grid of 20 Sherman traps affixed to trees. In summer 2022, students at Summer Field Experience caught 52 SFS in traps placed on the ground. As a result, we wanted to investigate characteristics at trap sites, including canopy cover and trap placement, that might influence trap success. We hypothesized that traps on the ground in areas with closed canopy would capture more SFS. In 2022, we set one trap on the ground at the base of each semi-permanent trap affixed to a tree. Both traps were baited with peanut butter, oats, and bacon grease and set at 6:00 pm and checked around 10:00 pm. Additionally, we quantified percent canopy closure at each trap location using a densiometer. We identified sex of all squirrels trapped and also placed an ear tag with a unique number in their ear. We used an ANOVA to determine if canopy closure differed among traps that caught 0, 1-2 and 3 or more SFS. Additionally, we used a t-test to determine if flying squirrels were caught more often in ground traps or in traps affixed to trees. SFS were trapped at 18 (90%) trap sites and were not trapped at 2 (10%) trap sites. Squirrels were not caught more often in traps with greater canopy closure ( $F = 0.0005$ ,  $df = 19$ , and  $t = 0.9995$ ), likely because canopy closure was very similar at all trap sites. We caught 29 squirrels 57 times and 92% of the squirrels were caught in trees and 8% were caught on the ground. More squirrels were trapped in the trees (Mean of 2.6 squirrels 52/20 traps) than on ground (Mean of 0.25 squirrels by 5/20 traps,  $t = -4.40$ ,  $df = 19$ ,  $p = 0.0003$ ). As a result, we will continue to place traps in trees, which is more difficult and takes more time than setting traps on the ground.

**Advisors:** Shelli Dubay Ph.D., Ben Sedinger Ph.D.

**Presentation Style:** Oral

*Considered for Judging*

# Effects of Window Coverage and Cardinal Direction on Urban Bird-Window Collisions on UW-Stevens Point Campus



Molly Murr  
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Management



Catrina Johnson  
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Management



Emily Knaack  
Wildlife Ecology and  
Management

Anthropogenic urbanization impacts birds. An estimated one billion birds die from window collisions annually in the United States. We analyzed window percentages to the nearest 10% and conducted carcass surveys for each side of six buildings on the University of Wisconsin-Stevens Point campus. We walked around each building and determined the side of the building (north, south, east, west) where bird carcasses were found. We used a linear regression model to determine if there was a relationship between window percentage and number of bird mortalities. Additionally, we used a one-way ANOVA test to compare the number of dead birds on each side of the buildings. We found a positive relationship between window percentage and bird mortalities ( $R^2 = 0.678$ ,  $P = 0.003$ ), but number of dead birds did not vary by side of the buildings ( $F_{0.05,3} = 1.577$ ,  $P = 0.226$ ). Urban developers should consider management tools that can be implemented to mitigate bird collisions.

**Advisor:** Shelli Dubay, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Elevation Use in Woodpeckers and Nuthatches

Grant Koch  
Wildlife Ecology and Management



Ashley Whitis  
Wildlife Ecology and Management



Jesse Tucker  
Wildlife Ecology and Management



Beck Mayer  
Wildlife Ecology and Management



Many overwintering species of birds occupy Sandhill Wildlife Area in Central Wisconsin. The focus of this study is on Downy woodpeckers (*Picoides pubescens*), Hairy woodpeckers (*Picoides villosus*), Red bellied woodpeckers (*Melanerpes carolinus*), and White-breasted Nuthatches (*Sitta carolinensis*), which are common inhabitants of woodlands throughout North America. These birds are trapped in a 31.5 hectare grid of wire tree traps and caught between January and March annually from 2007-2023. These birds are then tagged with a United States Geological Survey (USGS) aluminum band. Home ranges of the birds were determined using the Minimum Convex Polygon estimator. Despite being relatively abundant species that are year round residents, very little research has been conducted on them. The goal of our study this year is to find if the elevation of an area affects the abundance of our target species of birds. Is there a difference in species abundance and composition at areas of high elevation compared to areas of low elevation.

**Advisor:** Jason Riddle, Ph.D.  
**Presentation Style:** Poster



# Estimating Home Ranges of Southern Flying Squirrels (*Glaucomys volans*) Using Encounter Histories in Schmeeckle Reserve



Tess Bigalke  
Wildlife Ecology and Management

An awareness of a species home range is essential for many aspects of wildlife management. Understanding the size and components of a species' home range allows for informed management decisions, analyses of population dynamics, the creation of effective research protocols, and an overall better understanding of the species ecology. Trapping data and encounter histories are currently an underutilized tool for estimating home ranges of many species. The data provided by more popular methods, such as VHF or GPS, comes at an added cost that many small-scale research projects cannot afford. Trapping datasets are another effective and less expensive way to model these home ranges. One consideration of using encounter histories to model home ranges is that the study organism's entire home range may not be included within the trapping grid. This projects trapping grid is located in the Berard Oaks of Schmeeckle Reserve, Stevens Point WI, USA. Southern flying squirrels (*Glaucomys volans*) were targeted using 20 elevated and 20 ground set Sherman traps. These traps were baited with a mixture of oats, bacon grease, and peanut butter. Traps were set at approximately 6:00 pm and checked at 10:00 pm. Over the course of this season, traps were set from September 13th to October 11th, 2022, for a total of 914 trap nights. 29 individuals were caught during the trapping season, with a total of 28 recaptures, one of these being a squirrel that was first encountered in 2020. All squirrels that were captured three or more times overlapped in areas used. Their home ranges have been found previously to range from 23,000 to 53,000 square meters. Upon initial capture, squirrels are anesthetized with isoflurane, weighed, sexed, and affixed with a uniquely numbered ear tag. Any time that squirrels are recaptured, their tag number is recorded, and they are weighed then released. Data collected during this study is being used to estimate home ranges of southern flying squirrels in Schmeeckle Reserve.

**Advisors:** Shelli Dubay, Ph.D., Benjamin Sedinger, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

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



Nicole Luoma  
Wildlife Ecology and  
Management



Abby Mueller  
Wildlife Ecology and  
Management

The Eastern gray squirrel (*Sciurus carolinensis*) occurs 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 of 2020 through 2023, we trapped 136 squirrels at two suitable sites in the Reserve. 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 2020-2022, 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. Survival was 0.27 (95% CI lower-upper) and detection probability was 0.63 (95% CI lower-upper). With an additional year of data collected from the 2023 trapping season, we anticipate results demonstrating that our covariate factors will be more competitive in relation to the null model. We plan to continue this study examining long-term trends in urban gray squirrel population dynamics and reproductive success. Results will increase knowledge of urban wildlife population trends and provide insight for management of abundant urban species.

**Advisors:** Shelli Dubay, Ph.D., Benjamin Sedinger, Ph.D.

**Presentation Style:** Oral

*Considered for Judging*

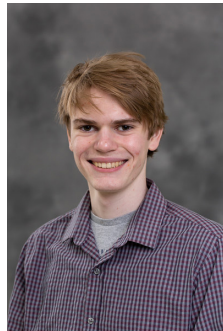
# Home Range and Habitat Selection of Rehabilitated and Released Female Black Bears in Northern Wisconsin



Cece Giesen  
Wildlife Ecology and Management

Amber Smith  
Wildlife Ecology and Management

Alayna Reynolds  
Wildlife Ecology and Management



Abby Mueller  
Wildlife Ecology and Management

Will Watry  
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The Eastern American black bear (*Ursus americanus americanus*) is a valued species among many for its biological, intrinsic, and cultural significance. Black bears are considered habitat generalists, taking advantage of the resources available to them. In the state of Wisconsin, previous studies suggest black bears select habitats in northern hardwood forests and near beaver flowages. Habitat selection data from rehabilitated and released bears is lacking in Wisconsin, although this is a practiced management technique. The purpose of our study is to investigate the home range and habitat selection of rehabilitated and released female black bears in northern Wisconsin. The rehabilitated yearlings are fixed with GPS radio-collars prior to release, and location data is received every four hours. Habitat data from the received GPS points are compared to habitat data from random locations within the bears' home range. Habitat data includes landcover type and distance to nearest road, stream, and open water source. Understanding habitat selection of rehabilitated black bears in comparison to previously known black bear selection behavior is important for determining the impacts of rehabilitation and release as a management technique.

**Advisor:** Cady Sartini, Ph.D.

**Presentation Style:** Oral

*Considered for Judging*

# Influence of Calorically Dense Bait on Urban Eastern Gray Squirrel (*Sciurus carolinensis*) Body Condition in Schmeeckle Reserve, Stevens Point, WI



Molly Moder  
Wildlife Ecology and  
Management



Shelby Sterken  
Wildlife Ecology and  
Management



Parker Kreie  
Wildlife Ecology and  
Management

Small and medium-sized mammals are often trapped to assess reproductive status, measure body mass and condition, and to evaluate food web dynamics. Calorically dense baits such as peanut butter and oats often are used to entice mammals into traps. Additionally, continuous exposure to peanut butter has been correlated to weight gain in rodents. Certain Eastern gray squirrels (*Sciurus carolinensis*) can become accustomed to traps and often are recaptured while trapping. We aim to study the effects calorically dense bait may have on the body condition of frequently captured squirrels. Our study area of Schmeeckle Reserve in Stevens Point, WI is a 113-hectare urban park that is owned by the University of Wisconsin-Stevens Point. Since 2020, we have trapped gray squirrels in two sites of Schmeeckle Reserve and record age, sex, ear length, and weight of the squirrels as well as mark them with uniquely numbered ear tags. Traps are baited with peanut butter and oats at 6am and then checked at 9am, 12pm, and 3pm to reduce the risk of hypothermia from snow melt. We trap from late February through early March 2020-2023. Since 2020, we have had 204 captures, 72 of which have been recaptures. To evaluate body condition, weight is standardized by ear length. In 2022, we found that body condition indices from 14 recaptured individuals trended toward an overall increase between the first and last capture, presumably due to the frequent consumption of bait in the traps. However, this change was statistically insignificant upon exclusion of a single recaptured female. Based on these preliminary findings, we hypothesize that the body condition of recaptured squirrels will increase over the trapping season. With another year of trapping, we anticipate gathering evidence that will increase sample size and provide insight to whether the trend of increasing body condition is truly significant.

**Advisors:** Shelli Dubay, Ph.D., Benjamin Sedinger, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Laysan Albatross (*Phoebastria immutabilis*) Bolus Ratio of Organic vs. Inorganic Materials



Ashley Whitis  
Wildlife Ecology and  
Management

Alyse Erenberger (Not Pictured)  
Wildlife Ecology and Management

Julia Nasiatka (Not Pictured)  
Wildlife Ecology and Management

Amelia Shingle (Not Pictured)  
Ecosystem Restoration and Management

The Laysan albatross (*Phoebastria immutabilis*) is a large seabird with most of the Northwestern Hawaiian Islands as its home range. The diet of this seabird consists of squid, small fish, and the occasional crustacean. Normally, an Albatross will produce a bolus: an accumulated mass of material indigestible to the bird. Most commonly found in boluses are squid beaks and fish eyes. However, with the increase in plastic pollution near the ocean ways, the seabird can also consume large plastics or microplastics, adding inorganic material into their boluses. In this study, we obtained six Laysan Albatross specimens from the Mokupāpapa Discovery Center in Hilo, Hawaii. We then dissected each bolus and separated organic materials and inorganic materials. We measured the total weight of organic and inorganic materials in each bolus in order to determine the overall ratio of materials in each specimen. We ran a two-sample T-test with concluding results that show the two-tailed p-value as 0.22. The study concluded that there was no significant difference in the ratio of organic vs inorganic materials in the six Laysan Albatross specimens. This study ultimately aided in the desire to produce similar studies in the future. Knowing the inorganic material intake for this seabird is crucial in saving these birds from future environmental stressors.

**Advisor:** Krista Slemmons, Ph.D.

**Presentation Style:** Poster

*Considered for judging*

# Mercury Exposure in Migrating and Breeding Wood Ducks in Central Wisconsin



Amber Smith  
Wildlife Ecology and Management

Wood ducks (*Aix sponsa*) are an emblematic waterfowl species that have faced trials and tribulations such as habitat loss and overharvest, resulting in low population numbers in the mid-1800s to early 1900s. Successful conservation and management practices have resulted in population increases across their range, yet there has been a recent shift in these trends in Wisconsin, and wood duck abundance has become annually variable. Exposure to environmental contaminants is a rising concern for wood ducks due to their use of forested wetlands and diet of aquatic invertebrates. Mercury is a widespread environmental contaminant increasing globally because of human activity. Mercury has been found to magnify through food webs, resulting in higher concentrations with increasing trophic positions. While there is growing concern about mercury exposure in wetland birds due to its bioavailability and toxicity in aquatic environments, little is known about mercury exposure in wood ducks in Wisconsin. Mercury exposure can have negative health effects on waterfowl such as immune suppression and neurological changes. The objectives of this study are to 1) examine mercury exposure in wood ducks that use wetlands in Wisconsin and 2) investigate factors influencing feather and blood mercury concentrations in wood ducks. We captured 49 wood ducks in central Wisconsin utilizing swim-in traps, walk-in traps, cannon nets, and nest box checks. After capture, we collected blood samples in addition to breast, flank, and axillary feathers from birds for mercury analysis, and took morphometric measurements. We hypothesize that blood and feather samples collected in this study will have mercury concentrations associated with negative health effects on wood ducks, specifically high parasitic load, high white blood cell count, and poor body condition, measured in a concurrent study. This study aims to fill a knowledge gap and inform wildlife managers of mercury exposure in wood ducks.

**Advisors:** Marie Perkins, Ph.D., Ben Sedinger, Ph.D., Shannon Finnerty

**Presentation Style:** Oral

*Considered for Judging*

# Modeling Sound Propagation of Ruffed Grouse (*Bonasa umbellus*) from Drumming Logs in Northern Wisconsin



Ava Cross-Weisbeck  
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Management



Catrina Johnson  
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Management



Zachary Cason  
Ecosystem Restoration and  
Management

Ruffed grouse (*Bonasa umbellus*) are an important game bird in the Great Lakes region. Males perform a unique drumming display atop fallen logs to attract females and maintain their territory throughout the spring. Drumming logs may be strategically selected based on how sound propagates in that location. As a UW - Stevens Point Student Chapter of The Wildlife Society undergraduate research project, we will evaluate sound propagation as a factor for drumming log site selection in northern Wisconsin. Drumming log locations were identified by use of auditory point count surveys, and male ruffed grouse were captured using mirror box traps in April and May of 2021 and 2022. The locations were compared to randomly selected sites within the study area using SPreAD-GIS, a tool that models how sound travels through space based on multiple environmental factors. This information could improve knowledge about male ruffed grouse mating behaviors and influence habitat management decisions on ruffed grouse management areas.

**Advisor:** Jason Riddle, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Population Estimates and Capture Probabilities of Urban Eastern Gray Squirrels (*Sciurus carolinensis*) in Schmeckle Reserve, Stevens Point, WI

Nicole Luoma  
Wildlife Ecology and Management



Katie Carlson  
Wildlife Ecology and Management



Alex Stone  
Wildlife Ecology and Management



Justin Lechner  
Wildlife Ecology and Management



The Eastern gray squirrel (*Sciurus carolinensis*) is commonly found in forests and urban settings, including Schmeckle Reserve in Stevens Point, WI. Schmeckle is a 113-hectare urban park that is owned by the University of Wisconsin-Stevens Point. 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. We trap squirrels in two sites of Schmeckle Reserve and record age, sex, ear length, and weight of the squirrels as well as marking them with uniquely numbered ear tags. We also record environmental variables such as temperature, wind speed, snow depth, and cloud cover to determine their influence on trap success. Traps are opened when temperatures are between  $-13.5^{\circ}\text{C}$  and  $9.4^{\circ}\text{C}$ , then checked at 9am, 12pm, and 3pm to reduce the risk of hypothermia from snow melt. Since 2020, we have trapped squirrels in late February and March to estimate squirrel abundance using Huggins' closed capture model with individual random effects in Program MARK. In 2020, 55 individuals were caught with 40 recaptures recorded; in 2021 and 2022, 47 and 49 squirrels were caught with only 13 and 14 recaptures recorded, respectively. Our goals are to 1) calculate an updated population estimate of urban eastern gray squirrels in Schmeckle Reserve and 2) investigate environmental variables that influence trap success and gray squirrel activity. We hypothesize that more squirrels will be trapped earlier in the trapping day and when temperatures exceed  $-4^{\circ}\text{C}$ . Population estimates have varied from 112 to 133 individuals, but males are consistently trapped more often regardless of year and trap site. Additionally, the time of day when most squirrels are trapped varies with year. We will discuss possible reasons for these trends and how they can affect squirrel trap success. Results will increase knowledge of urban wildlife population trends and provide insight for management of abundant urban species.

**Advisors:** Shelli Dubay, Ph.D., Benjamin Sedinger, Ph.D.

**Presentation Style:** Poster  
*Considered for Judging*



# Preliminary Studies of Bumblebee Populations and Species Occupancy in Central Wisconsin



John Turczyk  
Wildlife Ecology and Management

Noah Banach  
Ecosystem Restoration and Management

Amy Arrigo  
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Noah Andexler  
Wildlife Ecology and Management

Jeffrey Edwards  
Wildlife Ecology and Management

Anna Powers (Not Pictured)  
Biology

Bumblebee populations are declining nationwide. Of the 20 bumblebee species native to Wisconsin, 6 are considered endangered, vulnerable, or unrankable due to a lack of information. Bumblebees play a vital role in ecosystems as pollinators, contributing to the reproduction of a plethora of native wildflowers. They are unique because they utilize buzz pollination, and many plants that have evolved with them can only be pollinated by bumblebees. With their decline comes an urgency to collect informed scientific data on their populations. In 2021, the combined observations of bumblebees for Portage, Wood, and Marathon counties totaled 43 individuals, which is insufficient to fully quantify and monitor the condition of bumblebee populations and species occupancy in these counties. The Tri-County Bumblebee Project plans to survey pollinator habitat on public and private lands in Central Wisconsin to monitor, record, and establish a dataset for bumblebee populations and bumblebee plant usage in the tri-county area. We will submit data to the Wisconsin Bumblebee Brigade, a citizen science website sponsored by the Wisconsin Department of Natural Resources, to share our data and have our identifications confirmed by professional entomologists. In 2022, we established the project and began laying the groundwork. In 2023, we plan to continue establishing a species inventory for survey sites, including Mead Wildlife Area, Buena Vista Wildlife Area, UWSP Stevens Point Campus, and local farms and private landowners' property. We hope the data collected can be used to create population estimates of native bumblebee species in Central Wisconsin.

**Advisor:** Holly Petrillo, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Preliminary Study Investigating Nest Box Use of Cavity-Nesting Waterfowl Species in Central Wisconsin



Jacob Tepsa  
Wildlife Ecology and Management

Grace Wieland  
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Casey Baye  
Natural Resource Planning



Emily Michalzik  
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In Wisconsin, there are two cavity-nesting waterfowl species that rely on both natural cavities and nesting boxes; wood ducks (*Aix sponsa*) and hooded mergansers (*Lophodytes cucullatus*). These species use natural nesting cavities and nesting boxes to lay their eggs as it serves as protection from predators and from the environment. Nest boxes are also heavily used for reproduction, particularly when an area has limited natural cavities. We have been collecting data since 2002 by checking nest boxes and determining which species used it along with the amount of successful hatches by examining eggs shells and egg membranes. Our data has been collected by the UWSP Student Chapter of The Wildlife Society at George W. Mead State Wildlife Area (MWA) which is a 13,354-ha wetland in Marathon County. With over 20 years of collection, we have reviewed past data and are looking at ways on how the project can be refined. Moving forward we intend to add an additional study site along the Green Circle Trail in Stevens Point along the Wisconsin River in partnership with the UWSP Student Chapter of Ducks Unlimited. With this expansion, we will compare nest survival and recruitment rates on cavity-nesting waterfowl species in both Portage and Marathon County.

**Advisor:** Ben Sedinger, 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 southern 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 surveyor disturbance. Surveys started on May 26, 2022, and lasted until August 17, 2022, with 7 total surveys taken. This study includes 37 capture events, recaptures did occur and were counted as a capture event. The survey took place in Buffalo County WI. Surveyors began searching for Eastern Massasauga Rattlesnakes (EMRs) at roughly 9:30 each survey day. Once the snakes had been located, temperature was taken and the method of location recorded (visual or sound i.e., rattling). The snakes were then placed in a holding bucket and transferred to a plastic tube to get length measurements as well as implant a PIT tag (the only measurement used in this test is body temperature). A T-test was performed on the dataset and a P value of 0.007 was recorded. This may have major management implementations by altering search patterns to get more accurate population estimates as well as an increase in all other data collected from the massasaugas during data collection.

**Advisors:** Jason Riddle, Ph.D., Cady Sartini, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Small Mammal Diversity Comparison Between Forests in Northern Wisconsin



Parker Kreie  
Wildlife Ecology and  
Management



Kody Woodcock  
Wildlife Ecology and  
Management

Julia Nasiatka (Not Pictured)  
Wildlife Ecology and Management

The Kemp Natural Resource Station located in Woodruff, Wisconsin, was once a mature hemlock stand with low abundance of woody debris and undergrowth. In the year 2000, a derecho passed through the area leaving half the property still a mature hemlock stand, and the other half a blowdown stand. Large disturbances like storms can alter an ecosystem's structure and appearance, creating a secondary succession. This can create changes in vegetation type and wildlife populations. We want to compare the diversity in small mammal populations between habitats with different successional stages. Mammalogy students have been censusing small mammals at Kemp NRS since 2010. Each 1.2 hectare grid used 120 Sherman traps baited with birdseed and oats placed in mature hemlock forest habitat for two days. Traps were then moved to the successional blowdown habitat for two days. Traps open between 5:00 PM to 5:30 AM. The data collected included species, weight, and sex. Each census was conducted between 20 July and 8 August with similar trapping effort across years. We calculated the Shannon Diversity Index, Trap Success, and a Species Effort Curve. Data showed a higher diversity in the blowdown stand than the hemlock stand, which supports the intermediate disturbance hypothesis.

**Advisor:** Christopher Yahnke, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# The influence of prescribed fire on trap success of Southern Flying Squirrels (*Glaucomys volans*) and Eastern Gray Squirrels (*Sciurus carolinensis*) in Schmeckle Reserve, WI.



Shelby Sterken  
Wildlife Ecology and Management

Both Southern Flying Squirrels (*Glaucomys volans*) and Eastern Gray Squirrels (*Sciurus carolinensis*) consume acorns throughout the year and have an overlapping range throughout Wisconsin. Southern Flying Squirrels and Eastern Gray Squirrels can be found throughout Schmeckle Reserve, in Stevens Point, WI and students have been trapping both species through projects with The Wildlife Society since 2020. Berard Oaks, a section of Schmeckle reserve, underwent a prescribed burn in 2021 to restore an oak (*Quercus spp.*) savannah. The burn affected trap success for both species of squirrels. Our goal was to compare the capture probability of Eastern Gray Squirrels to Southern Flying Squirrels in a disturbed environment. Southern Flying Squirrels are trapped in the fall, with their traps being set at 6 pm and checked at 10 pm. Eastern Gray Squirrels are trapped in the spring, with their traps being set at 6 am and checked at 9 am, 12 pm, and 3 pm. All squirrels are tagged, weighed, and sexed before being released. We found that between 2020 and 2021, trap success of both squirrels drastically decreased, presumably because of the prescribed burn, and then between 2021 and 2022, trap success drastically increased again. We hypothesize that because both species are subject to similar habitat disturbance and food availability, their capture probabilities will be positively correlated. Using a simple linear correlation model, we found a correlation coefficient ( $r$ ) of 0.663, and the coefficient of determination ( $r^2$ ) to be 0.44. Utilizing a one-tailed t-test with a P value of 0.05, we found that  $t=0.885$  and  $P>0.05$ . Although we found a positive correlation between flying squirrel and gray squirrel trap success, the data are too variable to be statistically significant. These results can further help wildlife biologists understand the effect prescribed burns have on flying and gray squirrels in a forested environment.

**Advisor:** Shelli Dubay, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Trap Success of Female and Male Southern Flying Squirrels in Schmeeckle Reserve 2020-2022

Tess Bigalke  
Wildlife Ecology and Management



Morgan Goff  
Natural Resource Planning



Amber Smith  
Wildlife Ecology and Management



Samantha Stellmacher  
Wildlife Ecology and Management



The southern flying squirrel (SFS, *Glaucomys volans*) inhabits hardwood forests in Wisconsin, and two litters are produced each year, one in May and the other in late August. In late summer and fall, female flying squirrels are nursing their second litter. Female SFS do not allow any other flying squirrels within the immediate vicinity of their nests. Male SFS play no role in raising young, and therefore may be harassed away from nests by females. Since 2019, we have been trapping SFS in Berard Oaks of Schmeeckle Reserve. The number of squirrels trapped each year varies dramatically. In 2019, we did not catch any SFS, but in 2022, we trapped 29 different individuals 57 times. We aim to investigate if female squirrels are trapped more often than male squirrels and to try to explain why trap success varies by year. We use a semi-permanent trapping grid where Sherman traps are affixed to the same trees each year. We trap in September and October and use a mix of peanut butter, oats, and bacon grease as bait. Traps are set at 6:00 pm and checked around 10:00 pm. We anesthetize squirrels with isoflurane, affix a uniquely numbered ear tag, identify sex, and weigh all individuals upon capture. Since 2020, we have trapped 45 individuals, 21 females and 24 males and had 1,719 trap nights. We will compare males and females trapped by year and determine possible drivers for the variable trap success by year.

**Advisors:** Shelli Dubay, Ph.D., Benjamin Sedinger, Ph.D

**Presentation Style:** Poster

*Considered for Judging*

# University of Stevens Point Student Chapter of Ducks Unlimited



Jeremy Murray  
Wildlife Ecology and Management



Jake Voight  
Wildlife Ecology and Management

The University of Wisconsin Stevens Point Student Chapter of Ducks Unlimited is an organization that focuses on wetland habitat and waterfowl related dynamics. Over the course of the last year, we have been engaging in duck counts and duck banding. We are showcasing some of the data that we have started that is in the preliminary stages that would eventually support a full-fledged research project. As a club, we hope to have some substantial contributions to the scientific community in the next couple of years. Club objectives are outreach/training, as well as determining survival rates, sex ratios and body size indices that infers information about duck population health. To make these determinations we need 2-3 more years of data.

**Advisor:** Ben Sedinger, Ph.D.

**Presentation Style:** Poster

# Using Stomach Content Analyses to Identify Diets of Male and Female Bobcats



Jessica Bjornson  
Wildlife Ecology and  
Management



Sophia Halverson  
Wildlife Ecology and  
Management

Cassie Loeffler (Not Pictured)  
Wildlife Ecology and Management

Bobcats (*Lynx rufus*) in the Midwestern United States primarily eat lagomorphs, rodents, and deer species. Evidence suggests that lagomorphs are usually the most common prey item, but diet can vary based on regional prey availability. Furthermore, bobcat diet typically varies with sex because of average size differences and nutritional requirements between the sexes. We collected 36 bobcats (20 male and 16 female) from throughout Wisconsin that were harvested and received from the Wisconsin Department of Natural Resources in 2019 and 2020. Bobcats were differentiated by location harvested (northern or southern Wisconsin). The hairs were removed in 4 cross sections from each stomach. Hairs were placed on a slide and then covered in xylene to allow visibility of the unique pattern of the medulla. All samples were identified using the book “*Identification of the Dorsal Guard Hairs of Some Mammals of Wyoming*” and hair samples from preserved species (taxidermy). We tested three hypotheses: 1) Lagomorphs will be the most common prey items in both male and female bobcat stomachs, 2) male bobcats will have more deer hair in stomachs than female bobcats, and 3) diets of bobcats harvested in the southern zone will differ from those harvested in the northern zone due to differences in habitat. We divided stomach contents into six categories: murid, leporid, sciurid, cervid, none, and other. No lagomorph species have been found in female bobcats. White-tailed deer and other miscellaneous species (such as porcupine, beaver, and bobcat hair from grooming) had the highest percent occurrence in female stomachs (21% and 32% respectively). A Fisher’s exact test revealed no significant association between zone and diet among female bobcats ( $p = 0.05$ ). Analysis of male bobcat stomach contents is ongoing. We aim to investigate the difference between male and female bobcat diets and overall differences between northern and southern diets.

**Advisor:** Shelli Dubay, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*



# Whitetail Deer Habitat Selection and Predator Encounter



Jeremy Murray  
Wildlife Ecology and Management

White-tailed Deer (*Odocoileus virginianus*) interact with their habitat and the predators with which they co-occur. White-tailed deer may select habitat based on seasonal thermal differences. For example, deer may select habitat in the summer that is cool, while choosing habitat that is warmer in the winter. Regardless of the habitat type, predators may be influenced by deer abundance. Camera studies allow one to observe prey and predators in a variety of habitat types. I used 35 trail cameras to study the relationship between deer, habitat, and predators in northern Michigan. I hypothesize deer habitat use will change seasonally. I also hypothesize there is higher predator activity when there is higher Whitetail Deer activity.

**Advisor:** Jason Riddle, Ph.D.

**Presentation Style:** Poster and Oral

*Considered for Judging*

# Yearly Survival and Growth Rates of Propagated Fatmuckets (*Lampsilis siliquoidea*) in Central Wisconsin

Luke Trittelwitz  
Wildlife Ecology and Management



Andrew Mehus  
Wildlife Ecology and Management



Reece Lisowski  
Wildlife Ecology and Management



Jessica Bielak (Not Pictured)  
Wildlife Ecology and Management

Freshwater mussels are key members of riverine ecosystems and are crucial for improving water quality. Mussels serve as valuable indicator species and suffer from many environmental disturbances, but despite their importance, large gaps remain in knowledge of freshwater mussels in Wisconsin. We measured the survival and growth of mussels exposed to ambient conditions in two streams in Central Wisconsin. Our objective was to determine seasonal survivorship and growth rates throughout our year-long study to better assess reintroduction protocols for future releases. We expected: 1) Mussel growth and survival would be significantly reduced in the winter months, compared to the summer months, and 2) Propagated fatmuckets to grow significantly over time despite being raised to a releasable size in a lab environment. We chose streams that already supported diverse mussel assemblages. On October 29th, 2021, we received 120 Fat Muckets (*Lampsilis siliquoidea*) from the Genoa Fish Hatchery. We measured each one and then released it into a suitable area on either Mill Creek or the Plover River near Stevens Point, WI. We placed 15, 1.5-year-old mussels into a silo at each site and placed the remaining marked mussels into the substrate at the Plover River location. Before release, mussels at the Mill Creek site averaged 1.853 cm in length, 1.03 cm in width, and 0.52 cm in thickness. At the Plover River site, mussels averaged 1.859 cm in length, 1.068 cm in width, and 0.546 cm in thickness. These sites were measured monthly beginning April 21st and lastly October 21st, 2022. All mussels survived the winter in 2021-2022. This is part of an ongoing study through the University of Wisconsin - Stevens Point's student chapter of The Wildlife Society.

**Advisor:** Shelli Dubay, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

# Internal Parasites of the American Woodcock in the Upper Midwest



Roxanne Gasperetti  
Wildlife Ecology and  
Management



Sydney Paoli  
Ecosystem Restoration and  
Management



Rianna Taylor  
Biology

The American Woodcock (*Scolopax minor*) is a beloved gamebird in Wisconsin. Woodcock populations have been declining since the 1980's for unknown reasons. Our research objective is to examine parasite communities in American Woodcock collected in the Upper Midwest using current literature, historical museum data, and dissections of novel host specimens. It is important to understand the ecological interactions between parasites and Woodcock because parasites could reveal interactions with other host species, host diet, and potential pathogens. Currently, little is known about the parasites found in American Woodcock in Wisconsin and the greater Midwest region. Parasites previously reported in *Scolopax* sp. include lice, roundworms, and flatworms. The Woodcock specimens used in this study were hunter donated and harvested in the Central to Northern region of Wisconsin (albeit one specimen that was a window strike fatality from Cook County, IL.) Feathers were examined for ectoparasites, and the internal organs and tissues were separated and examined for endoparasites using standardized methods. Archived museum parasite slide specimens from the Stephen J. Taft Animal Parasitology Collection were used to provide a historical baseline and basis of comparisons of parasite identification. Our dissection data uncovered a wide diversity of parasite taxa including previously unreported taxa and potential pathogens. *Syngamus trachea* was found, and no current published research describes this species utilizing Woodcock as a host. This may potentially pose a threat to the Woodcock population, as *Syngamus trachea* causes severe respiratory issues and may even lead to death. Flatworms in the family Strigeidae were recovered from the Woodcock samples and represent a potentially new species. Future directions of our study include a broader assortment of samples from varying geographic areas. Our research has relevant implications for forest management, wildlife management, as well as parasite taxonomy.

**Advisors:** Sarah Orlofske, Ph.D., Robert Jadin, Ph.D.

**Presentation Style:** Poster and Oral

*Considered for Judging*

# Wetland Management Practices Associated with Parasite Diversity



Roxanne Gasperetti  
Wildlife Ecology and  
Management



Sydney Paoli  
Ecosystem Restoration and  
Management

Shayla Wagner (Not Pictured)  
Wildlife Ecology and Management

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

**Advisor:** Sarah Orlofske, Ph.D.

**Presentation Style:** Poster

*Considered for Judging*

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