

Student Research Symposium

Friday April 7, 2017



College of Natural Resources
University of Wisconsin - Stevens Point



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Student Research Symposium

April 7, 2017

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COVER PHOTO by **Sarah Johanson**

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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April 7, 2017

Welcome to the 18th Annual College of Natural Resources 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 trust 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—I hope you will join me in applauding the drive and initiative of these students. They and their work are at the core of the university's new path toward creating "*thriving communities*" that are vibrant, healthy, prosperous and sustainable.

Whether you are here to make a presentation or to listen and observe, 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 turnout of participants representing projects from all the CNR majors, a fitting tribute to the level of faculty and student collaboration in and out of the classroom at the University of Wisconsin-Stevens Point.

It is my pleasure to welcome participating students, faculty, families, volunteers and guests to our university. Congratulations to all of you. I wish you success in presenting your work today and at future symposia and conferences.

Sincerely,

A handwritten signature in cursive script that reads "Bernie L. Patterson".

Bernie L. Patterson
Chancellor



April 7, 2017

The UWSP College of Natural Resources is pleased to present the 18th annual CNR Student Research Symposium, featuring and celebrating the scholarly achievement 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. Through their participation in this event, these students 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 experiences. Participation in the symposium ingrains the importance that research plays in promoting a better understanding of our world. Such experiences will undoubtedly help to 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.

This year's Symposium – one of the few of its kind that is planned and organized by students – features one of our ***largest turnouts ever*** of participants: 115 students and over 70 presentations! This continues a long tradition of success at this annual event. Since 2000, the number of CNR students who have presented research results in posters and oral presentations at this event totals over 1,200.

We salute the CNR student participants for their excellence in critical thinking, inquiry, research and communication demonstrated in the abstracts contained in this booklet and in the presentations during today's event. Let us also recognize the outstanding faculty members who have mentored and motivated students to do their best. Finally, let me offer thanks to the late John and Anne Meyer, friends and benefactors of the College, whose establishment of the John R. Meyer Endowment Fund for CNR makes this event possible.

Thank you for attending this wonderful celebration of scholarly achievement and hands-on, experiential learning. Welcome to the College of Natural Resources, and enjoy your day with us.

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

Christine L. Thomas
Dean and Professor of Natural Resource Management

From the Student Research Symposium Committee...

Welcome to the 18th Annual University of Wisconsin-Stevens Point College of Natural Resources 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. 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 sixteen years can credit Dr. David for his pioneering efforts.

This year marks one of the highest years of 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 the late John and Anne Meyer and the John and Anne Meyer Fund for CNR, all of our volunteer evaluators, faculty and staff members in the CNR and Biology department, CNR student organizations, Dean Christine Thomas, Chancellor Bernie Patterson, 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,

Committee Chair: Abbie Lee

Secretary: Emily Weiler

Booklet Editor: Abbie Lee and Andrew Ziel

Web Weaver: Rozalyn Maney

Judge Coordinator: Holly North

Committee Members: Emmett Wiegel, Caitlin Alba

Faculty Advisors: Rich Hauer (Faculty Chair), Steve Menzel and Rob Michitsch

Clive and Beverley David Research Scholarship Award



Dr. Clive A. David was a driving force in establishing the CNR Student Research Symposium in 2000. 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.

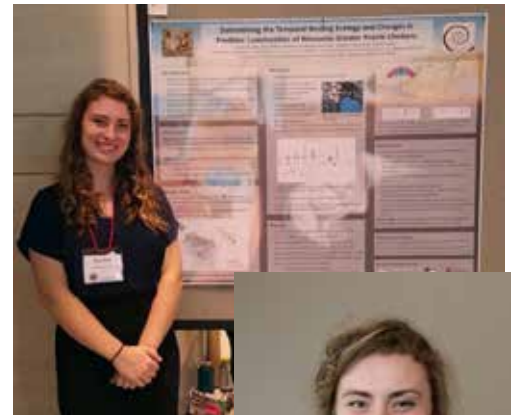
This award is funded by the Clive and Beverley David Research Scholarship Endowment, made possible through generous gifts in Clive's memory from the David family, alumni and friends.

The 2017 recipient of the Clive and Beverley David Research Scholarship is:

Rachel Konkle

Majors: Wildlife Ecology and Management; Communication)
Minor: Professional Writing

Rachel is a Wildlife Major who "began scraping the surface of research" during her first year at UWSP. She began by volunteering and assisting with projects and research, such as small mammal trapping and bird-related studies. Dr. Jason Riddle then got her involved in more intensive research, which she then championed for herself. She has gone on to present her work at several venues. After being awarded the Doug Stephens Boone & Crockett Club Wildlife Research Fellowship in 2016-2017, she expanded on her work and has presented it and is working on publishing a manuscript. She has been very active in the The Wildlife Society.



"Rachel is one of the most skilled undergraduate researchers with whom I've ever worked. Last year she presented her preliminary results, 'Estimating the Time of Greater Prairie-Chicken Nest Failure,' to the annual meeting of the Wisconsin Chapter of The Wildlife Society. One audience member stood up after her talk and said, 'I've been coming to these meetings for 30 years and I've never seen a statistics talk this good.' She won the Best Undergraduate Presentation Award."

Dr. Jason Riddle
Gerald and Helen Stephens Professor of

Acknowledgements

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

Dean Christine Thomas

Chancellor Bernie Patterson

Kevin Lawton - Computer Assistance

Marshall Lee and UW-Stevens Point Catering

Jerry Kummer, John Oestreich - Building and Support

Jake Smith and Tammy Naczek - Financial and Purchasing

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University Relations and Communications Office - Publicity

CNR and Biology Faculty - Mentoring and Support

Biology Department - Room Accommodations

Anastasia Wolfe-Flasch - Planning Assistance

Volunteer Evaluators and Moderators

Tom Charlesworth - Photography

Symposium Support Volunteers

Schedule of Events

Registration

8:00AM

West Lobby

Oral Presentations

9:00 - 10:00

Rooms 120, 170 and 110F

Poster Presentations

10:00 - 11:00

West Lobby, South Hallway and Central Lobby

Keynote Speaker

11:00

TNR 170

Welcome and Introduction: Dean Christine Thomas

Keynote: Dr. Julia Burton (BS-Forestry, '02) - Research Assistant Professor,
Utah State University (see bio on page 9)

- 11:30AM to 1:00PM Lunch -

Poster Presentations

12:00 - 1:00

West Lobby, South Hallway and Central Lobby

Oral Presentations

1:00 - 2:00

Rooms 120, 170 and 110F

CNR Rendezvous, SentryWorld Atrium

Donor Recipient Meet & Greet and Social Hour: 4:30

Awards Program: 5:30

Keynote Speaker

Dr. Julia Burton

Research Assistant Professor
Wildland Resources Department
Ecology Center
Utah State University



We welcome Dr. Julia Burton back to the College of Natural Resources (CNR) as this year's Keynote Speaker for the CNR Student Research Symposium. Dr. Burton is no stranger to the CNR Student Research Symposium, having been both an active presenter and part of the initial cohort of students who developed the CNR Student Research Symposium since 2000. As an undergraduate student, Julia studied the effects of severe windstorms in the Great Lakes Pine Transition Forest. This work highlighted the outcome of a significant July 4th, 1999 windstorm that struck northern Minnesota. Julia graduated from UWSP in 2002 as a Forestry Major specializing in Forest Ecosystem Management and Restoration with a Minor in Conservation Biology. Dr. Burton studied forest ecology at the University of Minnesota and completed her M.S. in 2004. For her thesis, she compared and contrasted old-growth and younger second-growth northern hardwood forests in the North Shore of Lake Superior. Julia earned her Ph.D. at the University of Wisconsin in 2011 where she studied responses of rich northern hardwood forest ground-layer plant communities to experimental manipulations in order to investigate ways of restoring old-growth characteristics in younger stands. She was a Faculty Research Associate from 2011 – 2016 in the Department of Forest Ecosystems & Society, Oregon State University. Since 2016, Julia has worked in the Wildland Resources Department at Utah State University. Julia has taught students in dendrology, forest ecosystems, and silviculture. Dr. Burton's current research focuses on how forest disturbance and succession interact with the contemporary challenges of climate change, migration and invasion. Her goal is to relate her investigations to the tradeoffs and synergies among different management objectives such as ecological restoration and biodiversity maintenance. Please welcome Julia, who will give a presentation entitled "McCloud Memorial Forest, the Oregon Coast Range, and everything in between: How undergraduate research at UWSP influenced my path".



*The 2001 CNR Student Research Symposium Planning Committee. **Julia Burton**, pictured second from the left, was a junior majoring in Forest Ecosystem Management and Restoration with a minor in Conservation Biology.*

Schedule of Oral Presentations: TNR Room 120

Time	Presenters	Title
9:00AM	Brett Yonker	Long Term Effects of Fishing Regulations on Walleye and Sauger growth, size structure and abundance in Lake of the Woods, Minnesota
9:20AM	Taylor Beaman	Influence of Prey Community on the Growth and Body Condition of Lake Trout in Northern
9:40AM	Kate Carpenter	Precision of Otolith and Dorsal Spine Age Estimates for Walleye Sander vitreus in Northern Lake Michigan
1:00PM	Brandon Johnson and Matthew Parsons	Micro Plastic Presence in Dabbling and Diving Ducks of Central Wisconsin
1:20PM	Trenton Rohrer, Ben Murley and Stuart Fetherston	Abiotic Factors Influencing Nest Box Use by Waterfowl in George Mead wildlife Area in Central Wisconsin
1:40PM	Meghan Pluemer	Canine heartworm infection in urban coyotes and red foxes in Madison, Wisconsin

Schedule of Oral Presentations: TNR Room 170

Time	Presenters	Title
9:00AM	Cole Walli	Seasonal variance in river otter (<i>Lontra canadensis</i>) diet in Sandhill Wildlife Area of central Wisconsin
9:20AM	Courtney Cordova	Nest Abandonment in Whooping Cranes (<i>Grus americana</i>) and Greater Sandhill Cranes (<i>Grus canadensis tabida</i>) at Necedah National Wildlife Refuge
9:40AM	Lisa Zoromski	Effects of distance from water control structures on furbearer occupancy on track plates in Crex Meadows Wildlife Area, Grantsburg, Wisconsin
1:00PM	Bridget Walker	Parasite abundance and richness using three fecal flotation solutions
1:20PM	Holly North, Jeff Williams, Sam Lau and Ben Tjepkes	Ruffed Grouse (<i>Bonasa umbellus</i>) Drumming Log Characteristics Near Tomahawk, Wisconsin
1:40PM	Logan Hubbard and Janelle Taylor	Microhabitat Use of Migrating Northern Saw-whet Owls

Schedule of Oral Presentations: TNR Room 110F

Time	Presenters	Title
9:00AM	Tyler Hein	Influence of Diel and seasonal Movements of Brook Trout in the Little Plover River, Wisconsin.
9:20AM	Katherine Miller and Alison Kuhne	Correlating GRACE, groundwater and precipitation in the High Plains Aquifer
9:40AM	Kaira Kamke	Effects of drawdown history and vegetation type on aquatic invertebrate metrics in George W. Mead Wildlife Area
1:00PM	Cori Semler, Riley Hall, Jeremiah Kaminski, Paul Priestley and Kelley Harkins	Effects of Prescribed Fire on Plant Community Structure and Diversity in Berard Oaks of Schmeeckle Reserve
1:20PM	Cori Semler	The application of prescribed burns and food plots with white-tailed deer in Northern Wisconsin.

Poster Presentations from 10:00 to 11:00

Presenters	Title
Cori Semler, Riley, Jeremiah Kaminski, Paul Priestley and Kelley Harkins	Effects of Prescribed Fire on Plant Community Structure and Diversity in Berard Oaks of Schmeckle Reserve
Caitlin Alba and Paul Priestley	Comparison of Restoration Treatments on Plant Community
Paul Priestley, Alissa Johnson and Ethan Robers	Potential Effects of Prescribed Fire on Habitat Restoration for the Federally Endangered Karner Blue Butterfly
Alex Catalano	Preliminary Assessment of Walleye, Lake Whitefish, and Yellow Perch Diets in Green Bay
Kathleen Klow	Influence of Substrates on Walleye Spawning Habitat Selection in Minnesota Lakes and Egg Survival in a Laboratory Setting
Emily McParlane	Walleye Growth Following Implementation of Strict Regulations on Escanaba Lake, WI
Taylor Beaman	Influence of Prey Community on the Growth and Body Condition of Lake Trout in Northern
Kate Carpenter	Precision of Otolith and Dorsal Spine Age Estimates for Walleye Sander vitreus in Northern Lake Michigan
Rozalyn Maney and Dylan Wenker	Survival and Longevity of Street Trees Over Four Decades in Stevens Point, WI
Benjamin Schleppebach	Genetic Origin of Walleye Stocked in the Manitowish Chain of Lakes, Vilas County, WI
David Viet, Dylan Beyersdorf, Tyler Englebert and Spaeth Levi	Formation Improvement on 30 gsm Sheet
Kurt Bennett	Vegetation Within and Bordering Ephemeral Ponds in Schmeckle Reserve
Derek Potratz, Zachary Leitner and Lindsey Laskowski	Analysis of Key Soil Nutrients and Physical Properties on a Managed Grazing Operation in Junction City, WI
Brooke Bembeneck	Effects of Vermicompost Application on Ginseng Production and Quality at 3 Wisconsin Sites

Poster Presentations from 10:00 to 11:00

Presenters	Title
Alex Thomas and Lindsey Weiss	Use of biochar to increase microbial growth from compost tea inoculation
Katherine Miller and Alison Kuhne	Correlating GRACE, groundwater and precipitation in the High Plains Aquifer
Macayla Greider	Relationships between stream characteristics and Mermithid infection rates in midge (Chironomidae) specimens in northwestern Wisconsin
Ryan Eastman, Justin Kowalski and Abbie Lee	An analysis of water quality and water level fluctuations on the fish population and reproduction of Wind Pudding Lake.
Katherine Rexroad, Jacob Hewitt and Cassidy Hamilton	Distribution of Flying Squirrels in Schmeckle Reserve 2016
Stuart Fetherston, Grant Waala and Zac	Population Estimate of Painted Turtles (<i>Chrysemys picta</i>) Using Count Data and N-Mixture Models in Lake Joanis, Stevens Point, Wisconsin
Bridget Walker, Mary Sheihing, and Will Reckhemmer	Detection of <i>Strongyloides robustus</i> in Illinois southern flying squirrels (<i>Glaucomys volans</i>) using fecal flotation
Logan Hennlich	Factors affecting Wood Duck and Hooded Merganser Nest Box Usage and Success
Nathaniel Yost, Jacob Shurba and Heidi Putnam	The Influence of Environmental Variables, Age, and Sex on Eastern Gray Squirrel Capture Probability
Shanell Budleski and Haylee Stangler	Habitat Suitability for Cheetah (<i>Acinonyx jubatus</i>), Leopard (<i>Panthera pardus</i>), and Wild Dog (<i>Lycan pictus</i>) in Northern Botswana Using Prey Biomass Estimates
Nick LaLuzerne and Ben Murley	Are Foam Track Plates an Effective Method for Detecting Small and Medium-sized Mammals?
Bonnie Richards, Matthew Hanneman and Katerina Boatman	Osprey Seasonal and Hourly Foraging Success Rate on Hatchery-Reared Muskellunge
Jason Wogsland and Kaylie Petersen	Effects of temperature and wind on woodpecker distribution around North Bluff at Sandhill Wildlife Area, Babcock, WI.
Logan Hubbard and Janelle Taylor	Microhabitat Use of Migrating Northern Saw-whet Owls

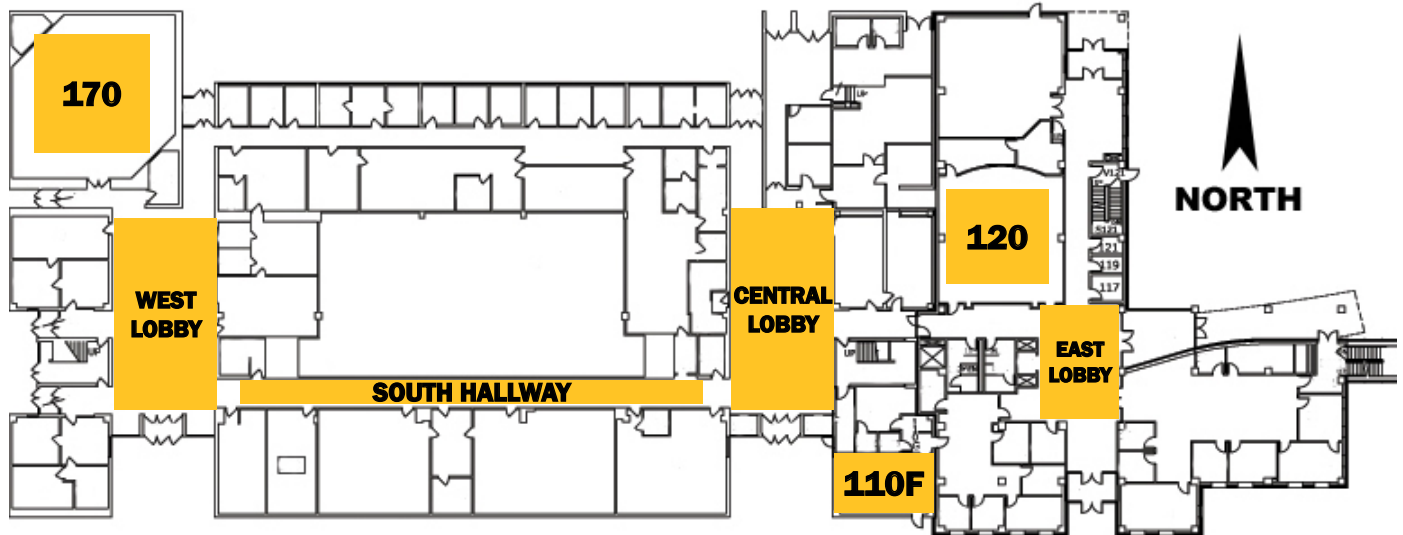
Poster Presentations from 12:00 to 1:00

Presenters	Title
Krista Bryan and Richard Imp	The Effects of Prescribed Burns on Soil Characteristics
Cori Semler	The application of prescribed burns and food plots with white-tailed deer in Northern Wisconsin.
Andrew Zabel	Influence of Flow and Temperature on Brook Trout Movement in the Little Plover River, Wisconsin
Hunter Distad	Growth Differences Between Sexes and Among Stocks of Lake Whitefish in Lake Michigan
Jordan Meyers and Nick Dudek	Do Oak Leaves Act Like Bud Parka Coats? Effects of Oak Leaf Retention and Bud Water Content of Northern Pin Oak Trees.
Joel Gebhard and Caroline Rice	Examination of Moses Creek Wetland Restoration for Mycorrhizal Fungi
Justin Kreuser, Brad Piotrowski and Alex Stuplich	Optimization of the operation of the cleaners and pressure screen
Nika Wanserski, Stephen Neleson and Wesley Vann	A design for a very rudimentary second head box to demonstrate a proof of concept
Alissa Johnson	Uncovering Plant Community Dynamics in Anoka County, MN
Zachary Leitner, Derek Potratz, Trevor Martinsen and Nate Nelson	Analysis of Change in Soil Fungal-Bacterial Ratio and Physical Soil Parameters Over Time on a Rotational Grazing System in Cornell, WI
Simon Stevenoski	The use of biochar and biosolids as soil amendments in a greenroof system.
Andrew Schneyer, Adair Ebright, Abby Lichtscheidl, Sawyer Schmidt and Ben Gutknecht	Is labile carbon the key to unlocking soil quality assessment?
David Palme, Adam Meade, Cavan Denning and Jordan Kissinger	Storm Hydrograph Analysis and Wetland Remediation Proposal for Moses Creek in Stevens Point, WI.
Julia Petreshen, Eleanor Ludkey and Katherine Miller	Streamflow trends in the Ogallala Aquifer evaluated by gauging stations and compared to Gravity Recovery and Climate Experiment (GRACE) data

Poster Presentations from 12:00 to 1:00

Presenters	Title
Andrew Wick and Nick Salewski	Uranium Concentrations in Central Wisconsin Groundwater and Their Relationship to Groundwater Chemistry
Brandon Johnson and Matthew Parsons	Micro Plastic Presence in Dabbling and Diving Ducks of Central Wisconsin
Trenton Rohrer, Ben Murley and Stuart Fetherston	Abiotic Factors Influencing Nest Box Use by Waterfowl in George Mead wildlife Area in Central Wisconsin
Nathaniel Fore, Adelyn Hanchette, Emma Meyer and Cole Walli	Bat Sonogram Analysis: Assessing the Performance of Kaleidoscope Pro and EchoClass Auto-Identification Software Packages
Eric	Diet analysis of coyote (<i>Canis latrans</i>) in central Wisconsin
Logan Hennlich and Paul Schwabenbauer	Predation of Ground Nesting Birds Over Wetlands
Haylee Stangler	Habitat Suitability for African lion (<i>Panthera leo</i>) and Spotted Hyena (<i>Crocuta crocuta</i>) in Northern Botswana Using Prey Biomass Estimates
Lisa Zoromski, Katherine Rexroad and Sabrina Claeys	Seasonal parasite prevalence of Eastern cottontail rabbits (<i>Sylvilagus floridanus</i>)
Ben Murley and Nick LaLuzerne	Testing the Habitat Suitability Index Model for Fisher (<i>Martes pennanti</i>)
Nathaniel Yost	Using a Closed Population Model to Estimate Eastern Gray Squirrel Population in Sandhill Wildlife Area
Jillian Demus and Grant Waala	Vivarium Behavior Project
Emily Masterton	The Anthropogenic Effects on the Urban and Rural Coyote Diet
Matthew Hanneman, McKenna Hammons and Timothy Zappa	Spatial and Temporal Use of Canids Using Camera Trap Surveys
Holly North, Jeff Williams, Sam Lau and Ben Tjepkes	Ruffed Grouse (<i>Bonasa umbellus</i>) Drumming Log Characteristics Near Tomahawk, Wisconsin

Trainer Natural Resources Building Map



Symposium Presentations

Oral Presentations

are held in rooms 120, 170 and 110F.
See schedule on pages 10-12.

Poster Presentations

are displayed in the West Lobby,
South Hallway and Central Lobby

Canine heartworm infection in urban coyotes and red foxes in Madison, Wisconsin



Meghan Pluemer

Majors: Wildlife Ecology: Research and Management, Captive Wildlife and Biology

Oral

Advisors: Marcus Mueller (UW-Madison), Dr. David Drake (UW-Madison), Dr. Shelli Dubay, and Dr. Shawn Crimmins
Consider for Judging

Red fox and coyotes are habitat generalists existing in sizeable and increasing populations within urban areas in North America. In urban areas, interactions between wild canids and domestic pets can promote direct and indirect disease transmission across species but little is known about how urbanization influences wildlife disease transmission. In 2014, the UW Urban Canid Project began investigating the health of coyotes and red fox in Madison, WI. Our objective was to identify the prevalence of canine heartworm in urban coyotes and red fox to determine if specific habitat characteristics explain the presence or absence of heartworm. Canine heartworm (*Dirofilaria immitis*), a parasite transmitted by mosquitoes, produces respiratory symptoms and pulmonary hypertension in domestic dogs, but can also infect coyotes and red foxes. We hypothesized that coyotes would have a higher prevalence of canine heartworm than red foxes because coyotes concentrate their time in natural areas in the urban landscape where more mosquito habitat is present. No foxes were infected, while all infected coyotes inhabited the University of Wisconsin Arboretum, a 1,300 acre natural area. Infected coyotes avoided developed areas and selected for woody wetland land cover within the study area, suggesting that habitat for the mosquito vector influences infection status for coyotes. Foxes, on the other hand, selected for developed habitats where mosquitoes lack the wetland habitat to thrive and mosquito control methods reduce the abundance of the vector, therefore possibly reducing the prevalence of canine heartworm.

Seasonal Variance in River Otter (*Lontra canadensis*) Diet in Sandhill Wildlife Area of Central Wisconsin



Cole Walli

Majors: Biology and Psychology

Advisor: Dr. Justin T. Sipiorski

Consider for Judging

River otters (*Lontra canadensis*) are a keystone predator in North American aquatic ecosystems, and understanding their diet is crucial to understanding their season-to-season impact in the surrounding community. River otter scat was collected approximately once per month from 2014 to 2016 from Sandhill Wildlife Area in southern Wood County of central Wisconsin. The scat was then processed and analyzed to determine seasonal variance in river otter fish consumption. We extracted fish cleithra (the major bone in the pectoral girdle of fish) from otter feces and used a guide on fish cleithra recently published by the Michigan Department of Natural Resources to identify fish remains to species. Current data from 83 scat samples shows *Salmo trutta* composing the largest portion (37.48%) of river otter diet, while *Umbra limi* (30.83%) and *Lepomis gibbosus* (21.12%) contribute the second and third largest compositions. The substantial presence of *Salmo trutta* remains in the scat samples suggests either larger-than-anticipated river otter ranges or currently undocumented brown trout populations in closer proximity to Sandhill Wildlife Area than previously found. We are also curious about any potential seasonal shifts in diet that occur from season to season.

Nest Abandonment in Whooping Cranes (*Grus americana*) and Greater Sandhill Cranes (*Grus canadensis tabida*) at Necedah National Wildlife



Courtney Cordova

Major: Wildlife Ecology:
Research and Management

Oral

Advisors: Dr. Shelli Dubay and
Jessica Jaworski

Consider for Judging

Whooping cranes (WHCR) are federally endangered, and only 16 WHCR remained in one population in the 1940's. In 2001, WHCR were reintroduced into Necedah National Wildlife Refuge (NNWR) in central Wisconsin on an experimental basis. Both greater sandhill (SACR) and WHCR breed at NNWR beginning in April and incubation lasts about a month. We aimed to evaluate behavior of nesting SACR and WHCR to identify if behaviors differed with fate of nest. Fate of nest was defined as successful (one egg hatched out of a nest), abandoned, and failed from predation. During nesting season in 2014, 2015 and 2016, trail cameras were placed at WHCR (N = 30) and SACR (N = 34) nests. Cameras took one photo every five minutes for the entire nesting period. We identified behaviors exhibited by cranes in each photograph. For each unsuccessful nest, photos were evaluated to determine cause of failure. We compiled data for predation events and abandonments. Nests were identified as abandonments when an adult crane was not observed yet eggs were present on the nest. We evaluated incubation, or a crane sitting on eggs at a nest, and if a bird was away from the nest. Photos are being evaluated, but we hypothesize that cranes that abandoned their nests will be away from nest more often than cranes from successful nests or failed as a result of predation. Data will be analyzed using a multivariate approach with species and fate as dependent variables and behaviors as explanatory variables.

Long Term Effects of Fishing Regulations on Walleye and Sauger Growth, Size Structure and Abundance in Lake of the Woods, Minnesota



Brett Yonker

Major: Fisheries and Biology

Oral

Advisors: Dr. Justin VanDeHey
and Tom ich

Consider for Judging

In fisheries management, it is important to understand the effects that regulation changes have on a fishery, and to quantitatively assess a fishery before and after regulation changes. This is especially important with species that are highly sought after for harvest, such as Walleye *Sander vitreus* and Sauger *Sander canadensis*. The objectives of this paper were to determine if (1) relative abundance of Walleye above and below 19.5" differed after implementation of a protected slot limit, (2) growth rates of male and female Walleye differed before and after the protected slot was implemented, (3) size structure of Walleye differed after the implementation of the protected slot, and (4) relative abundance of Sauger differed after the implementation of the reduced bag limit. Data were collected from the Minnesota portion of Lake of the Woods from 1991 through 2015 using experimental gillnets. Catch per unit effort (CPUE), size structure (PSD and RSD-19.5), and growth rates (mean length at age) were assessed. We found no change in CPUE of Walleye above and below 19.5" after the implementation of the protected slot, but there was a significant change relative abundance of Sauger after the reduced bag limit was implemented. Mean length at age was significantly lower for most ages of both male and female Walleye after the regulation change. Overall size structure of Walleye was similar after the implementation of the protected slot. It appears that these regulation changes have met the goals of implementation; maintain a high quality Walleye and Sauger fishery in light of recent increases in fishing effort.

Effects of Distance from Water Control Structures on Furbearer Occupancy on Track Plates in Crex Meadows Wildlife Area, Grantsburg, Wisconsin



Lisa Zoromski

Major: Wildlife Ecology:
Research and Management

Oral

Advisors: Dr. Cady Sartini and
Dr. Jason Riddle

Consider for Judging

Non-invasive sampling techniques may be impacted by site-specific variables such as prey availability. Track plates with the aid of lure or bait are relatively inexpensive and a commonly used non-invasive technique for sampling furbearers. Aquatic prey of many furbearers appear to congregate around water control structures, making these structures attractive areas to sample furbearer populations through non-invasive means. The purpose of this study was to compare furbearer occupancy at varying distances from water control structures at four wetland flowages at Crex Meadows Wildlife Area in Grantsburg, Wisconsin. Chalked track plates with lure were placed along the dikes in 50-m increments up to 250-m away from water control structures. Track identification with plate distance from structures was recorded each morning from July 1-11, 2016. Chalk and lure were reapplied daily after each plate check. This sampling technique was shown as a simple and effective way of detecting furbearer tracks, with 13 plates visited, mainly by raccoon (*Pryocyon lotor*). We predicted that across the four flowages, track plates closer to structures will show higher occupancy of furbearers. Data were analyzed through AIC models, and showed a negative track plate occupancy trend as distance to water control structures increased. Understanding site-specific factors that impact detection can help improve non-invasive sampling techniques, such as track plate placement from water control structures.

Parasite Abundance and Richness Using Three Fecal Flotation Solutions



Bridget Walker

Majors: Biology, Wildlife Ecology and Pre-Vet

Oral

Advisor: Dr. Cady Sartini

Consider for Judging

Accurately detecting the number of parasites in a fecal sample can determine the level of infection in the host animal. Fecal flotation is a common technique used to determine the presence of gastrointestinal parasites in an animal host. Fecal flotation separates fecal material from parasitic objects in fecal samples. The specific gravity of a flotation solution determines the size and weight of the objects that are floated to the top of a solution where they can then be removed and examined. Thus different specific gravities can select for different species and stages of parasites. This study aims to determine which of three fecal flotation solutions, zinc sulfate, modified Sheather's and sodium nitrate, gives the highest abundance and species richness of parasites in Eastern cottontail rabbits (*Sylvilagus floridanus*). Rabbit fecal samples will be collected from urban locations of the Stevens Point area. After collection fecal flotations will be performed using a flotation method developed by Faust et al. (1938). This study will determine which of the three flotation solutions detect the highest abundance and species richness in Eastern cottontail rabbits. I predict that modified Sheather's solution will provide the highest parasite abundance and species richness due to its high specific gravity. The ability to predict the maximum level of parasitism present in an intermediate host species may yield a more accurate prediction of parasitism in the overall ecosystem. These predictions will allow researchers to take action against pathological parasites especially in ecosystems containing endangered species.

Influence of Diel and Seasonal Movements of Brook Trout in the Little Plover River, Wisconsin.

Tyler Hein

Major: Fisheries and Biology

Oral

Advisor: Dr. Joshua Raabe

Movement is an important aspect of fish life history, in flowing systems habitat and resource distribution motivates this behavior. Understanding factors that influence movement is especially important in degraded and imperiled systems. The Little Plover River is situated within Portage County, Wisconsin and contains a naturally reproducing population of brook trout. Recent drying events and changing land use practices have raised concerns about the native brook trout population. Little information exists on the population of trout in this river. For this reason, the objective of this study was to determine if brook trout movement differs daily and annually. Trout were sampled using backpack electrofishing in fall of 2015 and spring and fall of 2016. Fish larger than 125 mm were implanted with a PIT tag creating a detectable sub population. Movements of the tagged individuals were passively recorded, from spring to fall 2016, via paired PIT antenna sites. Brook trout movement was stored at each antenna, collected, organized, and examined relative to time of day and season. Season appeared to influence brook trout diel patterns, as detections increased during the day during the fall spawning season. This differs from the Spring and Summer movements that occurred primarily at night. Seasonal brook trout movement in this system is likely influenced by the importance of gaining a competitive reproductive advantage. A future change in behavior could indicate an alteration to the stress on the Little Plover River.

Effects of Vegetation Type on Aquatic Invertebrates for Waterfowl Diet



Kaira Kamke

Majors: Water Resources and Soil
Science

Oral

Advisor: Dr. Kyle Herrman

Consider for Judging

Aquatic invertebrates constitute a base level of the food web and can also be used to measure biological activity of water bodies such as lake and wetland habitats. As a primary food source for ducks and other waterfowl, these organisms provide a key source of protein during breeding and migration seasons. This study examined the abundance, diversity, and biomass of aquatic invertebrates sampled in managed flowages at George W. Mead Wildlife Area in Milladore, Wisconsin. Samples were taken from four flowages with different drawdown years between 2012 and 2015 in shallow areas of emergent, floating, and submersed vegetation communities to determine the effects of hydroperiod history and vegetative type on invertebrate metrics. Samples were taken using a fixed-volume cylinder and net sweeps with three replicates of each vegetation community within each flowage. This presentation will focus on samples from North Townline flowage, which was drawn down in 2013. Preliminary data shows that the highest abundance of invertebrates are present in areas with floating vegetation or floating and emergent vegetation. Further data analysis and replication will help determine definitive trends in the effect of hydroperiod history on macroinvertebrate communities. Final results of optimal vegetation types and drawdown cycles could have implications for management strategies across the Midwest to provide ideal invertebrate habitat, which will increase waterfowl usage of migratory and nesting habitats.

Management of Glossy Buckthorn (*Frangula alnus*) in Schmeeckle Reserve



Rob Knauber

Major: Forest Ecosystem
Restoration and Management

Oral

Advisors: Dr. Michael Demchik
and Jim Buchholz

NOT PRESENTING

Glossy buckthorn spread from the community of Stevens Point into the University's school forest, Schmeeckle Reserve, around 20 years ago. Populations of glossy buckthorn (*Frangula alnus*) established in several parts of the Reserve and have persisted to this day. Glossy buckthorn is an exotic plant species from the Mediterranean region of Eurasia, introduced as an ornamental shrub for lawns and gardens. This species has many properties that make it an invasive species. Schmeeckle Reserve is mostly lowland/wetland habitat in the western, southern, and central sections, with some drier upland habitat in the northeast section. Glossy buckthorn is a lowland-adapted plant species, meaning it prefers to grow in a wetland or a soil with a high water table. Over the past two decades, glossy buckthorn has infested the understory plant community in the wetter areas of the Reserve. In certain areas, where the conditions proved ideal, the forest understory has become a dense patch of glossy buckthorn. Control of this exotic invasive plant species within the Reserve was minimal before 2016; the summer of 2016 was the start of a long-term management plan created and administered by the Schmeeckle Reserve Invasive Species Crew. The plan outlines the efforts needed to control invasive plant populations within Schmeeckle Reserve, with glossy buckthorn being the highest priority. I will use this presentation to highlight the observations and strategies of the Invasive Species Crew in the growing season of 2016.

Ruffed Grouse (*Bonasa umbellus*) Drumming Log Characteristics Near Tomahawk, Wisconsin



Left to Right: **Sam Lau** (Wildlife), **Jeffrey Williams** (Wildlife) and **Holly North** (Wildlife and Biology)
Not Pictured: **Benjamin Tjepkes** (Wildlife)

The ruffed grouse (*Bonasa umbellus*) is an important game species in Wisconsin. We trapped and radio-marked male grouse at drumming sites near Tomahawk, Wisconsin as part of a UW- Stevens Point TWS chapter research project. We located radio-marked grouse from April through August 2016. Next, we identified the number of drumming logs near each drumming grouse. We also identified logs within home ranges that were not being used for drumming. We compared the following variables between used and unused logs: log dimensions, level of decay, surface of the log (moss or bark), and indicators of grouse activity. Our findings can be used to identify potential limiting factors with regard to log characteristics at our study area.

Poster and Oral
Advisor: Dr. Jason Riddle
Consider for Judging

Influence of Prey Community on the Growth and Body Condition of Lake Trout in Northern Minnesota Lakes



Taylor Beaman

Majors: Fisheries and Biology

Poster and Oral

Advisor: Dr. Joshua Raabe

Consider for Judging

Lake Trout (*Salvelinus namaycush*) are primarily piscivorous when deepwater forage fish are available, and non-piscivorous when that prey is lacking. Piscivorous Lake Trout often rely on Cisco *Coregonus spp.* as prey, so the decline and extirpation of Cisco populations in many lakes may negatively influence Lake Trout growth and body condition. Therefore, the objectives of this study were to determine if growth and body condition differed between piscivorous and non-piscivorous Lake Trout populations. Lake Trout were collected during standard gill net assessments in 2011-2014 from six lakes (three piscivorous, three non-piscivorous) with naturally occurring and self-sustaining populations in northern Minnesota. We back-calculated total length (mm) from scales and quantified individual growth rates and body condition (relative weight) in all lakes. Von Bertalanffy growth models showed much higher growth potential (i.e., larger L_{∞}) for piscivorous populations. In addition, back-calculated length at age-7 was significantly greater ($F = 3.583$, $p = 0.041$) in piscivorous (mean = 433.76 mm) compared to non-piscivorous (mean = 415.42 mm) Lake Trout. Piscivorous Lake Trout began to show larger increases in annual growth increments at age-5, revealing a possible ontogenetic shift to piscivory. All populations had healthy body conditions (mean relative weights > 98), but individual body condition tended to increase with total length for piscivorous populations and decline for non-piscivorous populations. Overall, piscivorous Lake Trout grew larger and displayed better body condition than non-piscivorous Lake Trout, highlighting the importance of deepwater forage such as Cisco.

The Application of Prescribed Burns and Food Plots with White-tailed Deer in Northern Wisconsin.



Cori Semler

Majors: Wildlife Ecology and
Wildland Fire Science

Poster and Oral

Advisor: Dr. Ron Masters

Consider for Judging

The dietary needs of white-tailed deer vary not only among the region of the country, but the season of the year. These nutrients factor into growth, development and maintenance of white-tailed deer. Prescribed fire can enhance certain nutrient cycles as well as increase plant diversity. Food plots are used on many properties as a high quality food source, pattern mature males, and keep white-tailed deer on properties for harvest goals. I hypothesized that there would be no difference in the number of deer captured between the prescribed burns and food plots along with the variation of the months.

This is an ongoing study in Fence, WI. Two prescribed burns of equal size were conducted and compared to two food plots. In system, the first food plot contained a mixture of perennial clovers, and food plot two contains a mixture of annual forbs. A camera was placed on each site with observations being made in June, July, and August and totaled 30 trap hours, 360 observations each set and 1080 observations overall. For each hour a white-tailed deer was photographed, it was recorded. For multiple pictures of white-tailed deer within an hour, the observation was recorded as the maximum number of white-tailed deer in one picture during that hour. Three Z tests were run to compare the two systems separately and combined. Two one way ANOVAs were used to compare the observations taken in each month for the separate systems. Observational data analyzed showed multiple variations based on the forage type.

Vegetation Within and Bordering Ephemeral Ponds in Schmeckle Reserve



Kurt Bennett

Major: Forest Ecosystem
Restoration and Management

Poster

Advisor: Dr. Michael Demchik
Consider for Judging

Ephemeral Ponds, also known as vernal pools, are shallow isolated bodies of water usually found in forested areas of the Eastern United States, and along the West Coast. Due to snowmelt and rainfall these ponds are inundated with water during spring, sometimes fall, and are dry the remainder of the year. The moisture regime in ephemeral ponds differ from that of the surrounding forest, causing the formation of a unique habitat that supports vegetation not otherwise found on the forest floor. The Chilla Woodlot of Schmeckle Reserve has many small ephemeral ponds. There was no data of what species were growing in the ponds nor if the species differ from the rest of the forest floor. The objective of this study was to compare plant species and species diversity of the ephemeral ponds to the surrounding forest matrix in Schmeckle Reserve, during both spring and fall. The study selected 20 ephemeral ponds in the Chilla woodlot which were inventoried by randomly placed 1/2 square meter plots within the ponds and on their upland border. These measurements were taken during the middle of the fall and spring growing season. The findings were then combined tabulated and the variation in plant species diversity of the varying conditions were found.

Micro Plastic Presence in Dabbling and Diving Ducks of Central Wisconsin



Left to Right: **Brandon Johnson** (Wildlife Ecology) and **Matthew Parsons** (Wildlife Ecology, Biology and Law Enforcement)

Microbeads and micro plastics are small (less than 5mm in diameter) plastic debris, which elude traditional waste-water treatment practices and thereby pollute water systems around the world. Some of the water systems affected by micro plastics are freshwater lakes, rivers, and wetlands. Lakes and wetlands are habitat to greater than 30 waterfowl species in Wisconsin that forage on small food items and may potentially ingest micro plastics. To examine incidence rates, we categorized ducks based on species and feeding habitats; dabbling or top feeding ducks, and diving or predatory ducks. The ducks we examined were harvested in Winnebago, Portage, and Marathon Counties of Wisconsin. Our sample from 2016 included a total of 68 ducks: 49 of which were dabbling, and 19 were diving species. In 2016 we found no significant statistical evidence supporting feeding habits resulting in a higher micro-plastic presence between dabbling and diving species. In 2017, we added a total of 114 additional ducks to our overall sample: of which 89 were dabbling, and 25 were diving species. We will explore both years of data to determine if any differences exist between years. The results of this study could lead to future analysis of possible residence time of the plastics. There would also be a reason for investigation of bodily damage to the ducks, possibly accomplished through tissue sample analysis. This study may also allow us to determine primary indicator species for plastic presence within certain ecosystems.

Poster and Oral

Advisors: Dr. Jason Riddle and

Dr. Jacob Straub

Consider for Judging

Precision of Otolith and Dorsal Spine Age Estimates for Walleye *Sander vitreus* in Northern Lake Michigan



Kate Carpenter
Major: Fisheries

Northern Lake Michigan supports the largest recreational fishery for Michigan's Upper Peninsula, with Walleye *Sander vitreus* being a popular species during the majority of the year. Effective management of this Walleye population requires accurate and precise age estimates to understand recruitment, growth, and mortality rates. Precision of ages estimated from dorsal spines and otoliths was evaluated to assess current age estimation protocols of the Michigan Department of Natural Resources. The objective of this study was to determine if age estimates and between-reader precision differed between dorsal spines and otoliths for Walleye in four locations of Green Bay: Big Bay de Noc, Little Bay de Noc, and two tributaries, the Menominee and Cedar rivers. Walleye were sampled during August-September 2015 with gill nets; two independent readers estimated ages from dorsal spines and otoliths. Coefficients of variation (CV) were calculated to estimate precision between structures, and paired t-tests were used for comparisons. Exact and ± 1 year reader agreement rates (%) were also calculated. Precision did not differ between structures for the two rivers combined ($t = -1.74$, $P = 0.10$) or for the two bays combined ($t = -1.20$, $P = 0.23$), but dorsal spine precision was higher than otoliths for Little Bay de Noc ($t = -2.62$, $P = 0.01$). For both structures, exact reader agreement was $\leq 50\%$, but ± 1 year agreement was $\geq 80\%$. For both readers, dorsal spines generally underestimated age of older Walleye (otolith ages ≥ 10) in comparison to otoliths. Therefore, otoliths may need to be considered for older Walleye in this population. A combination of structures may be beneficial for the MI-DNR age estimation protocols. Further assessment can determine a size-specific benchmark for Walleye in this population when using a combination of structures.

Poster and Oral

Advisor: Dr. Daniel Isermann, Troy Zorn, Connie Isermann¹ and Dan Dembkowski¹

Consider for Judging

Correlating GRACE, Groundwater and Precipitation in the High Plains Aquifer



Left to Right: **Katherine Miller** (Hydrology) and **Alison Kuhne** (Hydrology)

NASA's Gravity Recovery and Climate Experiment (GRACE) has produced a remotely sensed data set that detects change in terrestrial water storage by detecting monthly earth mass anomalies. We examine two years of summer GRACE, groundwater and precipitation data for both a drought year (2012) and a normal year (2009). A comparison of GRACE data and precipitation data in a drought year shows a lack of precipitation in the northern section of the High Plains Aquifer, yet a gain in terrestrial water storage in the same area. We examine different parts of the aquifer to detect trends in water elevation over summer periods in herbaceous land cover versus cultivated land cover. We hypothesize that the groundwater in the northern section of the High Plains Aquifer will show less of a decline due to herbaceous or pastureland requiring less irrigation in summer months.

Poster and Oral

Advisor: Dr. Katherine Clancy

Consider for Judging

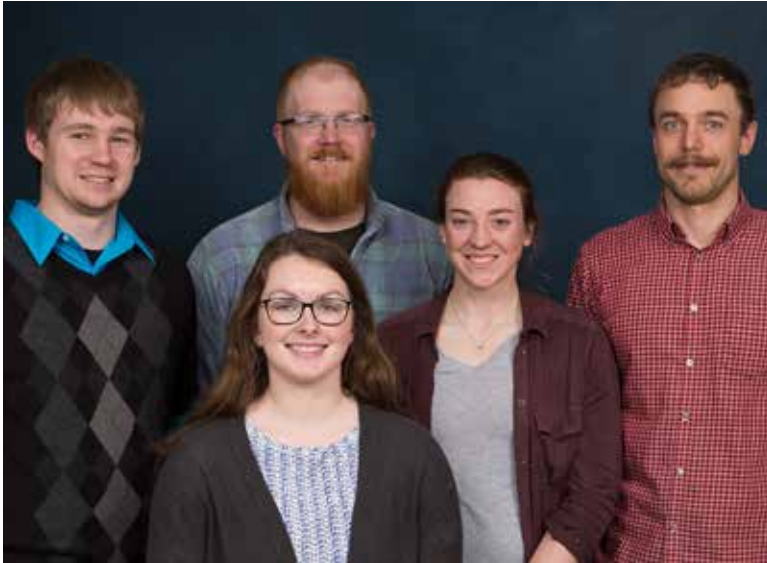
Microhabitat Use of Migrating Northern Saw-whet Owls



Left to Right: **Logan Hubbard** (Wildlife Ecology and Biology) and **Janelle Taylor** (Wildlife Ecology)

The Northern saw-whet owl (*Aegolius acadicus*) (NSWO) is a mesopredator within upland ecosystems. NSWO's migrate in fall from September until December, peaking in around mid-October. During migration this species encounters a wide variety of habitat types. Little is known about fine-scale habitat use of migrating NSWO's within migration corridors. We utilized data from the University of Wisconsin - Stevens Point student chapter of The Wildlife Society's long-term saw-whet owl banding project at Sandhill Wildlife Area in Babcock, Wisconsin from fall 2007 to 2015. NSWO's were lured and captured using call playback devices and mist-nets and were banded using USGS aluminum leg bands. Trapping occurred in 7 microhabitat types: late successional (LS) red oak, LS white pine, LS big-tooth aspen, grass, seral stage pine/oak mix, and oak savanna. We used a Chi Square test to assess the effect of number of owls caught in a season on the homogeneity of habitat use during the fall migration.

Poster and Oral
Advisor: Dr. Jason Riddle
Consider for Judging



Effects of Prescribed Fire on Plant Community Structure and Diversity in Berard Oaks of Schmeckle Reserve

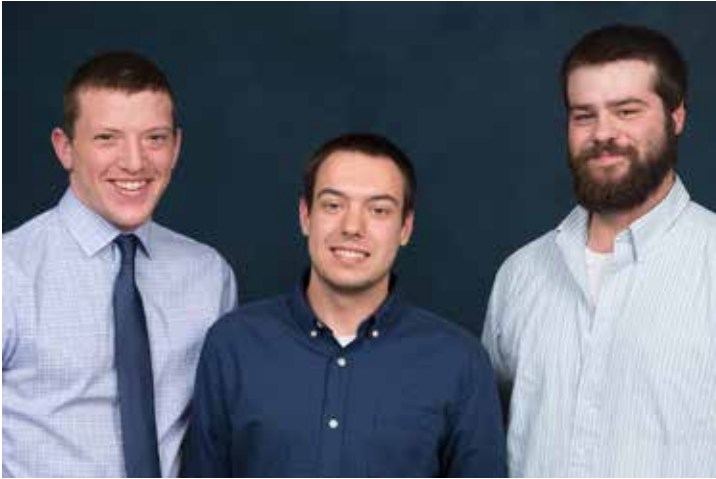
Left to Right: **Riley Hall** (Wildlife Ecology, Biology and GIS) **Paul Priestley** (Wildland Fire Science and Forest Ecosystem Restoration and Management), **Kelley Harkins** (Wildland Fire Science and Forest Ecosystem Restoration and Management) **Cori Semler** (Wildlife Ecology and Wildland Fire Science), and **Jeremiah Kaminski** (Wildland Fire Science)

Poster and Oral
Advisor: Dr. Ron Masters
Consider for Judging

Globally, oak savannas are critically imperiled, and at risk of extinction. These ecosystems are characterized by open areas with scattered trees dominated by grasses and forbs creating high quality forage and cover for wildlife. Plant community structure and composition are dependent upon frequent disturbance, such as fire for maintenance. The objective of this study is to compare changes over time in herbaceous plant community structure, composition, and diversity under various fire frequencies. We hypothesize that a fire frequency of three to seven years is a major contributor to maintaining plant diversity and preventing woody encroachment in oak savannas. In quantifying the effects of variable frequency and seasonality of prescribed fire, this data can help determine the treatment to maintain ecosystem function.

In fall 2014, UWSP Fire Crew established 6 permanent 1m² sample plots in of the two savanna unit in Berard oaks. Berard oaks is located in Schmeckle Reserve, Stevens Point, Wisconsin. At each plot, we sampled number of stems, and percent cover by species and functional group cover. The first survey provided baseline data about the herbaceous and woody plant community. Plant surveys have been and will be conducted each semester throughout the growing season. Prescribed fire was applied to both units in November 2007, to the East unit in the spring of 2015, and the West unit in the fall of 2015. Comparisons are made about the effects of time since fire on community composition richness and diversity using the Shannon Diversity Index.

Abiotic Factors Influencing Nest Box Use by Waterfowl in George Mead wildlife Area in Central Wisconsin

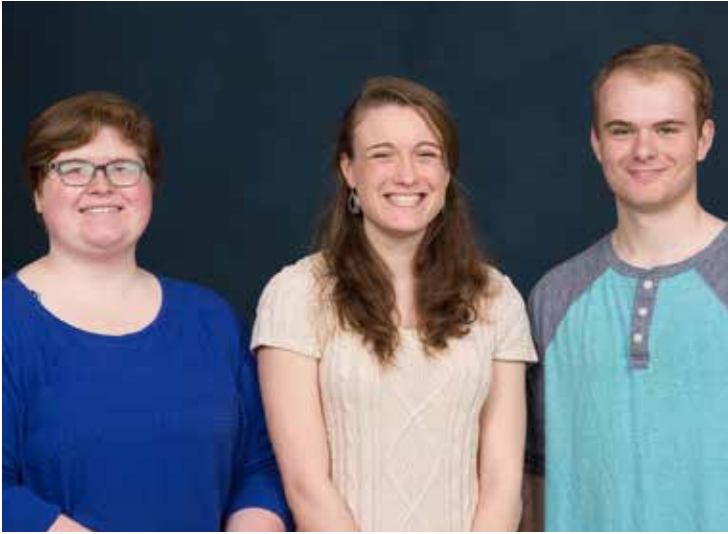


Left to Right: **Trenton Rohrer** (Wildlife Ecology and Biology), **Stuart Fetherston** (Wildlife Ecology and Biology), and **Ben Murley** (Wildlife Ecology and Biology)

In the George W. Mead Wildlife Area there are 120-130 nest boxes which are maintained by UWSP students and WI DNR staff annually. We collected data use by both wood ducks and Hooded Mergansers (*Lophodytes cucullatus*), nest success, box height, distance from nearest water source, distance from Little Eau Pleine River, distance to road, and box opening orientation. We then built 24 a-priori biological hypotheses that might explain box use and used model selection in Program R to determine if there is a correlation between one of these factors and nest selection behavior by cavity nesting waterfowl. Over a 13-year period, our data showed that less than half of the boxes we looked at had been used by cavity nesting waterfowl. Our models found that the parameters most strongly correlated to box use were the distance to the nearest box for wood ducks, and the distance to the river for hooded mergansers. Although these were our strongest models there was only a slight difference from our next strongest models, including the control for wood ducks. This study and subsequent studies could help managers in deciding where to place boxes, considering abiotic factors, to maximize waterfowl use.

Poster and Oral
Advisor: Dr. Jacob Straub
Consider for Judging

Distribution of Flying Squirrels in Schmeeckle Reserve 2016



Left to Right: **Cassidy Hamilton** (Wildlife Ecology), **Katherine Rexroad** (Wildlife Ecology: Research and Management), and **Jacob Hewitt** (Wildlife Ecology)

The Northern flying squirrel (*Glaucomys sabrinus*) is a species of concern in Wisconsin, and populations in the Midwest and eastern United States are declining, possibly because of competition with the Southern flying squirrel (*Glaucomys volans*). Additionally, global climate change may exacerbate this effect. Frequent observations of the Northern and Southern flying squirrels were reported in Schmeeckle reserve in studies conducted before 2002. In 2002, no Northern flying squirrels were captured in the reserve and no trapping had been conducted since. Our objective was to calculate a population estimate of the Southern flying squirrel population in the Chilla woodlot area of Schmeeckle Reserve and to determine if the Northern flying squirrel currently inhabits the reserve. We hypothesized Southern flying squirrels would be abundant and that Northern flying squirrels would not be trapped. We trapped flying squirrels at night in September 2016 using a modified trap design where traps are set 3 m up in trees and attached to a pulley system. Traps were baited with peanut butter, oats, and bacon grease. Squirrels were weighed, identified to species using color of belly fur, and ear tagged with unique numbers. We then used a Schnabel population estimator to calculate population size. We captured a total of 11 individual Southern flying squirrels and the Schnabel estimate was 11 squirrels. More research is necessary to determine if Northern flying squirrels were not trapped because of climate change and competition with Southern flying squirrels.

Poster

Advisor: Dr. Shelli Dubay

Consider for Judging

Bat Sonogram Analysis: Assessing the Performance of Kaleidoscope Pro and EchoClass Auto-identification Software Packages



Nathaniel Fore
Major: Wildlife Ecology and
GIS & Spatial Analysis



Cole Walli
Major: Biology and
Psychology



Adelyn Hanchette
Major: Wildlife Ecology

Bats provide important ecological services, from pollination to pest control. With the recent discovery of White Nose Syndrome (WNS), a lethal disease caused by the fungus *Pseudogymnoascus destructans*, researching bat activity is crucial to understanding the effects of WNS on bat populations. Auto-identification software programs speed up the analysis of data, but the accuracy of such programs is often called into question. A Wildlife Acoustics' SongMeter 4 (SM4Bat) acoustic monitoring device was deployed at Wildwood Park and Zoo in Marshfield, Wisconsin and collected bat acoustic data from April 8th to October 3rd, 2016. The auto-identification software programs Kaleidoscope Pro and EchoClass were used to analyze the data, and assessments were conducted to determine the accuracy of each program.

Poster

Advisor: Dr. Chris Yahnke

Consider for Judging

Not Pictured

Emma Meyer

Major: Wildlife Ecology

Relationships between Stream Characteristics and Mermithid Infection Rates in Midge (Chironomidae) Specimens in Northwestern Wisconsin



Macayla Greider

Major: Wildlife Ecology

Poster

Advisors: Dr. Justin VanDeHey;

Jeff Dimick; Dr. Shelli Dubay

Consider for Judging

Mermithid nematodes are generally considered biological control agents for pest species like mosquitoes, but also may influence Trout (Salmonidae) food sources because they cause mortality in both midge (Chironomidae) larvae and mayfly nymphs. Mermithid effects upon hosts include host reproductive failure and host death when mermithids erupt from the host upon completion of the parasitic juvenile life stage. Pre-parasitic juvenile mermithids enter the host by direct penetration but some hosts may ingest early stages of the mermithid. My objective was to identify environmental characteristics associated with mermithid presence in Wisconsin streams. In the Aquatic Biomonitoring Laboratory, midges (Chironomidae) were examined and presence or absence of mermithids were recorded. I used data from 66 streams collected from 2010 through 2014 from Dunn, Polk, Barron, and St. Croix counties in northwestern Wisconsin. Logistic regression was used to compare stream characteristics such as temperature, stream order, substrate, and HBI score, as well as year and location with presence or absence of mermithids within each stream. To date, I have identified mermithids in 3.2% of the specimens from 2010. If mermithids are found more commonly in streams with Trout, perhaps the parasite could affect Trout diets. This research will contribute knowledge to how Mermithid presence can affect food webs within Wisconsin streams.

Examination of Moses Creek Wetland Restoration for Mycorrhizal Fungi



Joel Gebhard

Major: Forest Ecosystem
Restoration & Management

Not Pictured:

Caroline Rice

Major: Water Resources

Poster

Advisors: Dr. Daniel Keymer
and Dr. James Cook
Consider for Judging

Mycorrhizal fungi form mutualistic relationships with plants by using their hyphae to increase water and nutrient uptake for the plants. In return, plants give the fungi sugar compounds for food. Historically, most fungi do not tolerate fully saturated conditions, but recent studies show that some hydrophytic vegetation form relationships with arbuscular mycorrhizae. It has not yet been determined what the full effects of these relationships might be, but research of wetland mycorrhizae is needed to learn more about the relationships and their implications on wetland systems. This study first examined Moses Creek Wetland to look for any mycorrhizal relationships. The experiment was designed in a way that if mycorrhizae were found, the influence on plant composition might be determined. Moses Creek is a recently restored wetland and was chosen as the site for this experiment because of its proximity, extensive vegetation data, and the potential value to other restoration efforts. Based on vegetation surveys conducted by students in past years, we know that Woolgrass (*Scirpus cyperinus*) is the most dominant plant species, with the genus *Juncus* as a close second. In this study, we extracted soil cores from areas the plant cover was either 100 percent Woolgrass, *Juncus, spp.*, or >90% subdominant species. Then, each soil core was washed to obtain the fine roots from each sample. The fine roots were dried for storage, and later cleared and stained. The roots were viewed at 1000x magnification under a compound light microscope using the magnified intersection method to look for arbuscular mycorrhizal structures inside the fine roots. Results are not complete yet.

Comparison of Restoration Treatments on Plant Community Composition, Diversity, and Abundance of Invasives in Northern Mixed Forests of Standing Rocks



Caitlin Alba
Major: Forest Ecosystem
Restoration/Soil Science



Paul Priestley
Major: Wildland Fire Science and
Forest Ecosystem Restoration

The objective of this study was to compare the differences between structure, composition, and richness of the herbaceous layer in response to various restoration treatments. This information can be used to monitor the presence and spread of non-native invasive species, such as garlic mustard (*Alliaria petiolata*), which is a threat to native plant communities. Its ability to reproduce and colonize a site quickly decreases native diversity of understory flora. In efforts to reduce the spread, Standing Rocks and the UWSP Fire Crew have worked together to apply periodic prescribed fire, while the park has also used manual removal. By quantifying the effectiveness of treatments on garlic mustard and understory composition, these data may be of use to determine the ideal frequency of prescribed fire and to prioritize areas of concern where treatment would most likely reduce spread.

In the summer of 2016, a baseline vegetation survey of Standing Rocks Park was completed. Circular plots with a 10m radius were located approximately 158m apart using a fishnet sampling design that was manually modified to work around trails. Within the 100 plots sampled, 78 species were identified in the understory and the percent cover of each was estimated. Additionally, tree species within the plot area were identified and counted. The invasive species with the largest ecological impacts within Standing Rocks is garlic mustard, and was found in 46% of the plots surveyed. Canopy cover and plot richness (% garlic mustard) within four units will be compared based on following treatments: control (no treatment) / one year post fire / 7 years post fire / manual removal.

Poster
Advisor: Dr. James Cook
Consider for Judging

Preliminary Assessment of Walleye, Lake Whitefish, and Yellow Perch Diets in Green Bay



Alex Catalano

Major: Fisheries and Aquatic Science

Poster

Advisor: Daniel Isermann

Consider for Judging

Lake whitefish, walleyes, and yellow perch support some of the most important fisheries in Green Bay, but managers have limited information on how these three species interact in terms of predation and diet overlap. In 2016, we initiated a collaborative effort to gain more information on diets and potential interactions among these three species. To this point, we have examined diets from 298 walleye, 205 lake whitefish, and 189 yellow perch collected in Wisconsin DNR gill nets placed in 3 locations during the spring and from a few Wisconsin DNR electrofishing runs conducted in the fall. Round gobies have represented the most common prey item observed in walleye and yellow perch diets, while benthic invertebrates have dominated lake whitefish diets. Additional prey items we have observed with some regularity include rainbow smelt and gizzard shad in walleye diets, isopods in yellow perch, and round gobies in lake whitefish diets. Our current sampling has been limited in time and space, so additional work will be needed to better describe diets of these three fish.

Detection of *Strongyloides robustus* in Illinois southern flying squirrels (*Glaucomys volans*) using fecal flotation

Not Pictured: **Bridget Walker** (Biology, Wildlife Ecology and Pre-Vet), **Mary Sheihing, Will Reckhemmer, Sean Jenkins** and **Christopher Jacques**

Strongyloides robustus is an parasitic intestinal nematode that infects both Northern and Southern flying squirrels in North America. Past studies have shown that infections of *S. robustus* is more prevalent in the southern species. Northern flying squirrels are decreasing over much of their range, possibly because of this parasite. Our aim was to identify if *S. robustus* occurs in Illinois to better understand distribution of the parasite. Southern flying squirrels were trapped in the Alice L. Kibbe Field Station near Western Illinois University. Fecal samples were collected from each flying squirrel and sent to the University of Wisconsin-Stevens Point for fecal flotation. The samples were floated using the zinc sulfate fecal flotation method developed by Faust et al. (1938). Eggs were identified using XX (reference). Prevalence of *S. robustus* was 56% so the parasite is prevalent in southern flying squirrels in Illinois.

Poster

Advisor: Dr. Shelli Dubay
Consider for Judging

Survival and Longevity of Street Trees Over Four Decades in Stevens Point, WI

Not Pictured: **Rozalyn** (Urban Forestry and Soil Science) and **Dylan Wenker** (Urban Forestry and Sustainable Energy)

This study examined the survivability and condition rating of street trees in Stevens Point, WI. Trees originally planted in the mid 1970's were assessed for their presence in 2017. This data set, which was originally developed by Randy Miller as part of a M.S. study at the University of Wisconsin – Stevens Point catalogued the various tree species that were transplanted in city-owned tree lawns. An additionally tree inventory from 2005 provides further details on tree longevity of street trees planted 3 to 4 decades ago. We measured tree lawn width, recorded which species was present, and measured the diameter (DBH, 1.37 meters) of each tree, as well as rating condition according to a scale set by the Council of Tree and Landscape Appraisers and the International Society of Arboriculture. We determined survival by tree species and overall survival. A t-test was used to test the hypothesis that tree condition will have a positive relationship with tree survival DBH, and also a positive relationship among tree lawn width. Results are useful for urban forest managers in making decisions on which trees to plant and implications tree health and tree planting sites on urban tree growth and longevity.

Poster

Advisor: Dr. Richard Hauer

Consider for Judging

Diet Analysis of Coyote (*Canis latrans*) in Central Wisconsin



Eric Van Beek
Major: Wildlife Ecology:
Research and Management

The coyote (*Canis latrans*) is one of the most versatile and adaptive carnivores. Coyotes are able to adapt to a wide range of environments, in part, because of their opportunistic dietary patterns and innate ability to acquire food resources under different conditions. This is especially important during the winter when food resources may be reduced compared to other times of the year. Although many coyote diet studies have been conducted across the country, few have attempted to describe feeding habits of coyotes in central Wisconsin. To explore this further, we analyzed the content of stomachs collected from hunter-harvested coyotes to discover what species of prey were present in their diet. We used two common metrics for describing carnivore diets, percent occurrence and relative percent occurrence, to quantify the occurrence of 15 popular prey items in the diets of coyotes in central Wisconsin. Our data provides insights into which prey species were the most commonly consumed by coyotes.

Poster

Advisor: Dr. Robert Lonsinger

Consider for Judging

Potential Effects of Prescribed Fire on Habitat Restoration for the Federally Endangered Karner Blue Butterfly



Left to Right: **Ethan Robers** (Wildland Fire Science and Forest Ecosystem Restoration), **Alissa Johnson** (Forest Ecosystem Restoration, Spanish and Wildlife), and **Paul Priestley** (Wildland Fire Science and Forest Ecosystem Restoration)

Our objective is to explore the effects of different restoration techniques, particularly different prescribed fire regimes to maintain suitable jack pine barren habitat for the federally endangered Karner Blue Butterfly (KBB) (*Lycaeides melissa*). The KBB has a unique relationship with wild lupine (*Lupinus perennis*) as it is the sole food source for the larval stage of its offspring. Fire suppression and development have led to the decline of this habitat type within the Great Lakes region.

The Society of Ecological Restoration (SER) student chapter and UWSP Fire Crew have teamed up to perform restoration on the Little Plover River Fisheries site managed by the Wisconsin DNR. The restoration involved mechanically thinning a .81 hectare stand of jack pine (*Pinus banksiana*) down to 8.36 sq. meters of Basal area for the 40 meters on the perimeter and completely open in the center. The SER will be seeding a mixture of wild lupine, combined with other nectar producing forbs and native grasses. The study area is composed of five equal size plots that will receive different prescribed fire treatments including: a control (non-treatment), an annual spring burn (1YS), a two-year rotation fall burn (2Yf), a two-year rotation spring burn (2YS), and a three-year rotation spring burn (3YS). Pre and post vegetation sampling will be conducted to monitor the abundance of desired plant species in each plot. The butterfly population survey will and be completed during the two flights of its life cycle using specialized transects.

Poster

Advisors: Dr. Michael Demchik, Dr.

James Cook, Dr. Ron Masters

Consider for Judging

Population Estimate of Painted Turtles (*Chrysemys picta*) Using Count Data and N-Mixture Models in Lake Joanis, Stevens Point, Wisconsin



Grant Waala

Major: Wildlife Ecology and Biology



Stuart Fetherston

Major: Wildlife Ecology and Biology

Not Pictured: **Zac Venchus**
Major: Wildlife Ecology

Other researchers have examined the ecology of freshwater turtles in urban environments with an emphasis on population dynamics. However, we are not aware of any work with the painted turtle (*Chrysemys picta*) in Lake Joanis of Stevens Point, WI. We collected count data on basking turtles from September through to early October to estimate population size. Specifically, we used Program PRESENCE to construct N-mixture models to provide an estimated abundance of painted turtles in different portions of Lake Joanis. Given the abundance of data of on the community within and around Lake Joanis it provides an opportunity to compare population dynamics and behaviors of the painted turtles in this urban location to those studied in different parts of their range and assess differences. The data we collected can give us a better understanding of painted turtle abundance as well as where basking behavior is most present. Now with local population estimates available, future population dynamics research can be conducted.

Poster

Advisor: Dr. Jason Riddle

Consider for Judging

Factors affecting Wood Duck and Hooded Merganser Nest Box Usage and Success



Logan Hennlich

Major: Wildlife Ecology Research
and Management

Wood ducks are a common waterfowl species in Wisconsin and across large portions of the US. They are one of the few cavity nesting waterfowl species and because of the massive deforestation in the early 20th century saw large losses of nesting habitat. This led to the rise of wood duck houses and helped largely with the recovery of the species, but the real question is that are these boxes still useful and effective. This leads to a conservation topic if the usage of boxes is effective or if it is a waste of resources. I am comparing the annual Wisconsin wood duck population estimates and the data that is compiled from Black Slough Conservation Club to see if there is a relationship or correlation at all with duck numbers and nesting box success. With this data the hope is that it will provide a better insight if this is a useful management tool for wood ducks or if managers are better off focusing their efforts elsewhere with wood ducks.

Poster

Advisor: Dr. Jacob Straub

Consider for Judging

Influence of Flow and Temperature on Brook Trout Movement in the Little Plover River, Wisconsin



Andrew Zabel
Major: Fisheries

Brook Trout are affected by various environmental factors including water temperatures, stream flows, and photoperiods, all of which can influence spawning, recruitment, survival, mortality, and movements. The Little Plover River in Portage County, Wisconsin, provided a prime study site as the small stream has a self-sustaining Brook Trout population and variable flows, including dry reaches in recent summers. Therefore, the objectives of this study were to determine if variations in flow levels and stream temperatures influenced movements of Brook Trout in the Little Plover River. Brook Trout were captured with electrofishing and individuals over 120 mm received 12mm PIT tags that provided unique identification numbers. To monitor Brook Trout movements, PIT antenna stations that recorded when tagged individuals moved through an antenna were strategically placed throughout the stream beginning in the Spring of 2016. Linear regressions were used to analyze potential relationships between daily detections and associated stream flow and temperature. Preliminary results from spring through early fall indicated detections were significantly, positively related to stream flow but not stream temperatures; fall and winter data will also be analyzed. Based on these results, consideration should be given for management of stream levels to allow natural movements of Brook Trout in the Little Plover River and other streams.

Poster
Advisor: Dr. Josh Raabe
Consider for Judging

Analysis of Change in Soil Fungal-Bacterial Ratio and Physical Soil Parameters Over Time on a Rotational Grazing System in Cornell, WI



Left to Right: **Zachary Leitner** (Soil Science) and **Derek Potratz** (Soil and Land Management)

Not Pictured: **Trevor Martinsen** (Soil and Land Management) and **Nate Nelson** (Soil and Land Management)

The study takes place on a farm in Cornell, Wisconsin that is currently undergoing changes to become 100 percent rotationally grazed, switching over from conventional farming. Currently, they have fields that are being farmed conventionally, seeded 1 and 2 years, and a long term continuous grazed pasture. The converted fields have been seeded down with a mixture of meadow fescue, timothy, festulolium, and red and white clover. This study aims to measure the changes in the microbial community over time on these 4 fields using a randomized block design. Each field will be split into 12 sections for sampling. In each of the 12 sections a composite sample composed of 10 cores at 3 inch depth for microbial analysis and 6 inch depth for physico-chemical properties will be taken to encompass the heterogeneity of the samples in each section.

The significance of this study is to determine how both the microbial community and physicochemical properties of soil responds after changing from a conventional to rotational grazing setting. This study consists of fields that were planted at different times allowing us to analyze how the microbial community progresses over time, along with other physical and chemical qualities. Little attention has been given to fungal bacterial ratios in rotational grazing operations. A lot of research has been done showing that microbial communities will shift from a bacterial to a fungal dominated community after tillage practices have been reduced, although fungal and bacterial dominance is not always in line with general expectations. This means that conflicting differences are still found from study to study creating a need for more precise and relative data. To resolve this question, we aim to provide another study looking at soil management effects on fungal to bacterial ratio. What we are looking to do is to provide more data on fungal to bacterial ratios in a managed grazing setting along with investigating a rate at which the fungal and bacterial communities change over time in the seeded fields compared to conventional and long term grazed fields.

Poster

Advisor: Dr. Daniel Keymer

Consider for Judging

Predation of Ground Nesting Birds Over Wetlands



Logan Hennlich

Major: Wildlife Ecology:
Research and Management



Paul Schwabenbauer

Major: Wildlife Ecology:
Research and Management

Nest predation by carnivores represents one of the largest causes of nest failure for ground nesting birds. Understanding patterns of nest predation, in terms of habitat influences and species-specific behavior, could provide managers with information for reducing the impacts of nest predation. We will construct artificial nests ($n = 10$) in three distinct habitat types at Mead Wildlife Area and monitor their status using repeated visits and remote cameras. We will re-visit nests every 2 days for 10–12 days to assess nest status (predated – not predated) and to re-establish artificial nests that display evidence of predation. The species responsible for each predation event will be identified using time-stamped imagery from the remote cameras placed at each site. We hypothesize that 1) predation rates will be higher in refuge areas with limited human activity, 2) mammalian predators will be the primary source of nest predation, 3) predation rates will be positively associated with clutch size, and 4) predation rates are unequal between prairie habitats and dike habitats on wetlands. This information will provide wildlife managers with empirical information on factors affecting predation of ground nesting birds and may prove useful in developing management actions to improve nesting success for such species.

Poster

Advisor: Dr. Shawn Crimmins

Consider for Judging

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



Left to Right: **Zachary Leitner** (Soil Science), **Derek Potratz** (Soil and Land Management), **Lindsey Laskowski** (Natural Resource Management)

Rotational grazing is an agricultural practice which provides long-term ecological, environmental, and soil benefits. The goal of this project is to assess soil quality on a rotational grazing farm over time. This study is a long term-club research project through the UW - Stevens Point Soil and Water Conservation Society. The research crew analyzes the impact of rotational grazing on soil physical and chemical properties on a local managed grazing operation development. Soil Nitrogen, Phosphorus, Potassium, Carbon, Organic Matter, pH, and Electrical Conductivity will be measured. Fields were broken up into five acre parcels and grid points were allotted to each parcel. A control field was sampled, which is not rotationally grazed, as well as a newly converted conventionally farmed field. Soil samples (6") were collected within a ten-meter radius around each point in fall 2015. Fields will be sampled four years from now in fall of 2019 and tested for the same soil properties as listed above. Samples are currently undergoing testing and will conclude in spring of 2019.

Poster

Advisors: Dr. Robert Michitsch,
Dr. Jacob Prater

Do Oak Leaves Act Like Bud Parka Coats? Effects of Oak Leaf Retention and Bud Water Content of Northern Pin Oak Trees.



Left to Right: **Nick Dudek** (Forest Management), and **Jordan Meyers** (Urban Forestry)

The research was developed to test the question, “Why do oak trees keep their leaves in the winter?” There are many ideas and theories as to why. This research was done to test the theory that the leaves act as a wind break for buds, therefore causing the buds to retain more water. The buds were collected in mid-December, and weighed for the wet mass and the dry mass to quantify relative water content. This same procedure was done two months later in mid-February. The leaf cover of branches was ranked on a scale from 0-100% (0% = no leaves and 100% = total leaf coverage of buds). A total of 20-60 buds were collected per branch. Two sites within Schmeekle Reserve were studied with 13 Northern Pin Oak (*Quercus ellipsoidalis*) within the plots. Each study tree had one to three branches per tree that buds were collected from. The trees were flagged, given a number, and later revisited to again collect buds and measure bud water content (fresh, dry, and relative water content) for each individual branch being studied. A subset of branches had leaves removed to contrast water content with branches that did not have leaf removal. The research hypothesis was leaf presence (and percent leaf cover) was positively related to bud water content and relative water content of buds. Trees with removed leaves will also experience a greater water loss than trees that had leaves surrounding buds.

Poster

Advisor: Dr. Richard Hauer

Consider for Judging

Reptilian Behavior in the Trainer Natural Resources Vivarium at the University of Wisconsin-Stevens Point



Left to Right: **Grant Waala** (Wildlife Ecology: Research and Mangement and Biology) and **Jillian Demus** (Wildlife Ecology: Research and Mangement)

Animals in captivity are popular for personal enjoyment, education and research. The UW-Stevens Point Vivarium offers habitat variability for the coexistence of six rescued reptiles providing an excellent opportunity to study the behavior, relationships and microhabitats that may be preferred by the animals. The vivarium houses five reptilian species: a Chinese water dragon (*Physignathus cocincinus*), a green iguana (*Iguana iguana*), an ornate box turtle (*Terrapene ornate*), 2 three-toed box turtles (*Terrapene Carolina triunguis*), and a red-eared slider (*Trachemys scripta*). From February 21th to April 28th, 2017, we are recording the location, microhabitat and behavior for each reptile at every hour from 8 am to 5pm Monday through Friday. Observations are made from outside of the vivarium to minimize our influence on animals' behaviors. Our results will display differences in activity and location of each animal. From the information gathered, we can conclude behaviors, social interactions, abiotic and biotic relationships, and microhabitat preferences at different times of the day. This will give us a better understanding of how these animals utilize their environment in captivity and provide information about caring for each species.

Poster

Advisor: Jaimie Klemish, PhD

Consider for Judging

Genetic Origin of Walleye Stocked in the Manitowish Chain of Lakes, Vilas County, WI



Benjamin Schleppenbach
Major: Fisheries

The Manitowish Chain of Lakes is a renowned walleye fishery consisting of 10 connected lakes located in Vilas County, WI. In an effort to augment walleye numbers in the Manitowish Chain, a local private organization stocked 35,420 large fingerlings (mean = 6.9 inches). All lakes in the chain were stocked with up to 10 fingerlings per acre and the chain total stocking rate was 8.3/acre. The fingerlings were from a private hatchery in Minnesota with a declared northern Wisconsin strain of origin. The introduction of non-native walleye in the Manitowish Chain of Lakes could introduce future walleye fitness and recruitment problems. Our objective was to determine the genetic origin of the walleye fingerlings stocked into the Manitowish Chain of Lakes during the fall of 2016. A total of 140 walleye tissue samples from 4 separate stocking events were genotyped at a standard suite of nine microsatellite loci. We used a reference dataset containing 2,026 walleye from 11 Minnesota and Wisconsin strains and the programs ONCOR and STRUCTURE to test the origin of the stocked fingerlings. Individual assignments determined that 0% of the fingerlings stocked into the Manitowish Chain of Lakes were from a genetic strain native to Wisconsin, and more than 96% assigned to a genetic strain similar to Lake Vermilion, MN in the Hudson Bay drainage. The results provide baseline information to help managers to investigate potential future genetic consequences in the Manitowish Chain of Lakes walleye population.

Poster

Advisors: Keith Turnquist, Wes Larson

Uranium Concentrations in Central Wisconsin Groundwater and Their Relationship to Groundwater Chemistry



Andrew Wick
Major: Water Resources



Nick Salewski
Major: Hydrology

Poster
Advisors: Dr. McGinley and
Amy Nitka
Consider for Judging

Uranium is a naturally occurring element in the environment that can occur in groundwater at concentrations above the drinking water standard. Uranium has toxic effects when consumed by humans at concentrations above the MCL of 30 ppb. When ingested it attacks the kidneys causing acute kidney failure and possibly cancer. Very little is known about what controls uranium concentrations in groundwater.

The concentration of uranium in groundwater may be related to the overall chemistry of groundwater. Uranium is found in the granite rich bedrock throughout the state of Wisconsin. Past research has pointed to evidence of granite bedrock having higher concentrations compared to other types of bedrock. Excess amounts of nitrate from agricultural fertilizers and other sources can penetrate the soil and enter the groundwater, potentially increasing the amount of uranium that is released into the groundwater.

This study is examining uranium and nitrate concentrations from wells in Central Wisconsin in areas where uranium and/or elevated nitrate has been detected in groundwater. In addition to uranium and nitrate, samples will be analyzed for pH, conductivity, chloride, alkalinity, and metals to further characterize the water chemistry of these areas. We have received preliminary results that indicate high levels of nitrates and uranium in multiple test sites. Further results will be used to evaluate the spatial and geochemical relationships between uranium and nitrate. The results of this study will address the implications for household water treatment, and will be used to develop information for homeowners, municipalities and well drilling contractors in these regions regarding uranium and other elements of emerging concern in private water wells.

The Influence of Environmental Variables, Age, and Sex on Eastern Gray Squirrel Capture Probability



Left to Right: **Jacob Shurba** (Wildlife Ecology Management and GIS & Spatial Analysis), **Heidi Putnam** (Wildlife Ecology Management, Biology and GIS & Spatial Analysis), and **Nathaniel Yost** (Wildlife Ecology Management, Applied Mathematics and Biology)

The eastern gray squirrel (*Sciurus carolinensis*) is a common game species that inhabits primarily forested habitats with adequate mast production. Since 2012, students with the UWSP chapter of The Wildlife Society have trapped gray squirrels in Sandhill Wildlife Area near Babcock, Wisconsin to identify relationships between timber harvest and gray squirrel abundance. Environmental variables, sex, and age can influence the number of squirrels captured per year. Three separate trapping grids were placed in timber stands harvested in different years: Mature (1932), Intermediate (1996), and Young (2011). We record sex, age, and weight for each squirrel, as well as record trap number, and trapping instance such as open bait absent, tripped bait present, tripped bait absent, and captures of non-target species. We live trap squirrels during the winter months from late January through March, until the snow melts. We will analyze the relationship between environmental conditions and capture probabilities using 2012-2017 trapping years, and predict that a larger number of captures occurred in years with warmer mean average temperatures than in colder years. We also predict that a larger number of captures occurred in years with more adult males.

Poster

Advisors: Dr. Shelli Dubay
and Dr. Jason Riddle

Consider for Judging

Influence of Substrates on Walleye Spawning Habitat Selection in Minnesota Lakes and Egg Survival in a Laboratory Setting



Kathleen Klow

Major: Fisheries & Forest Management

Walleye (*Sander vitreus*) recruitment rates depend highly on survival of eggs and larvae that initially are influenced by the quality of spawning habitat. Recent case studies have quantified used spawning habitat, but determining the quality of spawning habitat can be difficult in natural settings. Therefore, my objectives were to determine preferred spawning substrates in two south-central Minnesota lakes and to determine if egg survival was influenced by substrate type in a controlled laboratory setting. In the 2014-2016 field study, data were collected along numerous transects in each lake in spring to determine egg presence and associated substrate composition and in summer to quantify available habitat. Logistic regression models ($\alpha = 0.05$) evaluated the probability of egg presence on different substrates. In the April 2016 laboratory study, eggs incubated on three different substrate types (silt, sand, and gravel; $n = 12$); mortality rates were monitored over a 10-day period and analyzed through ANOVA and multiple pairwise comparison tests ($\alpha = 0.05$). Logistic regression models found that in both lakes eggs were more likely to occur on coarse substrates (i.e., gravel and cobble) and less likely to occur on fine substrates such as silt or sand, coinciding with previous studies. Interestingly, egg mortality was significantly higher in coarse substrate than in sand and silt during the laboratory study, suggesting lower quality of coarse substrates. However, higher mortality may have been due to a lack of water movement in tanks, limiting dissolved oxygen exposure to eggs incubating within interstitial space in the coarse substrate. This result suggests that water movement is important at spawning habitat sites. This study suggests that spawning habitat, along with associated biotic and abiotic factors, should be considered when evaluating annual success of walleye reproduction and recruitment.

Poster

Advisor: Dr. Joshua Raabe

Consider for Judging

The Use of Biochar and Biosolids as Soil Amendments in a Greenroof System.



Simon Stevenoski

Majors: Waste Management and Soil Science

Greenroofs are constructed gardens on top of structures that help to improve energy use efficiency and increase greenspace in urban areas. Lightweight aggregates and non-natural soils must be used on roofs due to structural loading limitations. These soils have a limited ability to retain water and nutrients. Some studies have shown improvements may be attainable with amendments like biochar (BC), a charcoal-like substance that has been created through the process of pyrolysis. Biosolids (BS) from municipal wastewater treatment were used as the feedstock for producing the biochar for this experiment. This beneficial reuse helps to divert them from landfills while potentially improving greenroof substrates.

For this experiment greenroof mesocosms were constructed and each fitted with a greenroof drainage system. They were then filled with clean greenroof substrate (control) and three amendments, BS at 5%, BC at 5% and BC at 20% by volume. Sunflowers (*Helianthus annuus*) planted in the mesocosms grew at significantly ($P=0.0495$) greater rates with the BC-5% treatment compared to the control and BC-20%. In addition, leachate volume, nitrate and SRP was significantly lower with BC-5% compared to BC-20% and BS-5%. BC-20% resulted in the greatest volume of water leached through the system, counter to what was expected. An inverse relationship was found between the concentration of nutrients (N, P) in the leachate and total plant biomass, while substrate organic matter and magnesium concentration showed a positive relationship with plant biomass. These findings suggest that the BC added at 5% improves greenroof substrate nutrient availability, plant growth and also limits nutrient losses in leachate. Future research and practice should consider BC as a component of substrates to improve growth of plants and limit nutrient losses in greenroof systems.

Poster

Advisor: Dr. Bryant Scharenbroch

Consider for Judging

Habitat Suitability for Cheetah (*Acinonyx jubatus*), Leopard (*Panthera pardus*), and Wild Dog (*Lycaon pictus*) in Northern Botswana Using Prey Biomass Estimates

Shanell Budleski

Major: Wildlife Ecology and Biology

Poster

Advisor: Dr. Scott Hygnstrom

Western Ngamiland in Botswana, Africa is a very dry and deserted area which has not had many wildlife surveys conducted. There are a plethora of livestock and wilderness areas that are important for maintaining connectivity between portions of the Kavango-Zambezi Transfrontier Conservation Area. If the amount of natural prey in the study area are feasible for these subordinate large carnivores' survival, then they should avoid livestock, reducing predation. The purpose of this study is to estimate the biomass (in Large Stock Units) of natural prey in Western Ngamiland, which was broken down into six agricultural and conservation zones, to determine habitat suitability in the study area for Cheetah (*Acinonyx jubatus*), Leopard (*Panthera pardus*), and Wild Dog (*Lycaon pictus*). We conducted 1,872.22 kilometers of transect counts by vehicle from June through late August of 2016 to assess the biomass of eleven prey species, ranging in size from steenbok (*Raphicerus campestris*) to giraffe (*Giraffa camelopardalis*). Each spoor (track) that was fresh within twenty- four hours of the prey we came across on the transects were recorded on a software called "CyberTracker". Using this data, we were able to assess the prey density and biomass for the large carnivores within the agriculture and conservation zones. Smaller prey species seemed to be killed more by leopard and cheetah within the zones, while larger prey species were preyed more by wild dog. Since wild dogs hunt within a group, it is easier to survive on a single, larger prey. Prey density and biomass between the conservation and agriculture zones varied with each carnivore depending on their home range and habitat suitability from the prey available.

Habitat Suitability for African Lion (*Panthera leo*) and Spotted Hyena (*Crocuta crocuta*) in Northern Botswana Using Prey Biomass Estimates



Haylee Stangler

Major: Wildlife Ecology and
Biology

Western Ngamiland in Botswana, Africa is a very dry and deserted area, which has not had many wildlife surveys conducted. There are a plethora of livestock and wilderness areas that are important for maintaining connectivity between portions of the Kavango-Zambezi Transfrontier Conservation Area. If the amounts of natural prey in the study area are feasible for large carnivores survival, then they should avoid livestock, reducing predation. The purpose of this study is to estimate the biomass (in Large Stock Units) of natural prey in Western Ngamiland, which was broken down into six agricultural and conservation zones, to determine habitat suitability in the study area for African lion (*Panthera leo*) and Spotted Hyena (*Crocuta crocuta*). We conducted 1,872.22 kilometers of transect counts by vehicle from June through late August of 2016 to assess the biomass of eleven prey species, ranging in size from steenbok (*Raphicerus campestris*) to giraffe (*Giraffa camelopardalis*). Each spoor (track) that was fresh within twenty-four hours of the prey we came across on the transects were recorded on a software called "CyberTracker". Using this data, we were able to assess the prey density and biomass for the large carnivores within the agriculture and conservation zones. Larger prey species were preyed more by spotted hyena and lion. Since spotted hyenas hunt within a group, it is easier to survive on a single, larger prey. Prey biomass between the conservation and agriculture zones varied with each carnivore depending on their home range and habitat suitability from the prey available.

Poster

Advisor: Dr. Scott Hygnstrom

Storm Hydrograph Analysis and Wetland Remediation Proposal for Moses Creek in Stevens Point, WI.



From Left to Right: **David Palme** (Hydrology), **Jordan Kissinger** (Hydrology), **Adam Meade** (Hydrology) and **Cavan Denning** (Hydrology)

Moses Creek is a low order stream that originates just north of Stevens Point, Wisconsin. It flows through Schmeckle Reserve and is then channeled underground through the city's storm water drainage system into the Wisconsin River. The objective of our study is to monitor the water quality of Moses Creek during a storm event and to quantify the urban input during these events. If the water quality from these events is deemed poor, a proposal to construct a remediation wetland would be made. To achieve this objective, two sampling sites were selected along Moses Creek; one upstream and one downstream of a major storm water pipe that drains into the channel. At both sites during the first major rain event in early spring of 2017, water chemistry will be analyzed in 2 or 3-hour increments. The parameters chosen for the chemical analysis included: phosphorus, nitrogen, total suspended solids, and a variety of heavy metals. These parameters were selected because of their association with urban runoff. They are known to have negative effects on both human and ecosystem health. We hypothesized that at our downstream sampling site we would have higher discharge due to storm water runoff resulting in higher pollutant loads. Results from this study will provide a magnitude of pollution being delivered by urban land use and a detailed understanding of the timing of pollution export in urban watersheds as well.

Poster

Advisor: Dr. Kyle Herrman

Consider for Judging

Seasonal Parasite Prevalence of Eastern Cottontail Rabbits (*Sylvilagus floridanus*)



Left to Right: **Sabrina Claeyes** (Wildlife Ecology), **Lisa Zoromski** (Wildlife Ecology: Research and Management) and **Katherine Rexroad** (Wildlife Ecology: Research and Management)

Eastern cottontail rabbits (*Sylvilagus floridanus*) are hosts to many endo-parasites. Many seasonal environmental factors impact parasite populations. There is limited research on parasite prevalence in Eastern cottontails, especially in Wisconsin. The purpose of this study is to compare parasite prevalence of cottontail rabbits between the four northern meteorological seasons. Cottontail fecal samples will be collected from winter (December 1 - February 28), spring (March 1 - May 31), summer (June 1 – August 31), and fall (September 1 – November 30) from 2016 – 2017. A modified zinc sulfate centrifugal floatation technique will be used to observe parasite species. Data will be analyzed using a chi-squared test for heterogeneity between seasons. We predict that there will be significant heterogeneity between the seasons. Researching how parasite prevalence may be influenced by seasons would further enhance our understanding of Eastern cottontail rabbit parasites.

Poster

Advisor: Todd Huspeni

Consider for Judging

The Effects of Prescribed Burns on Soil Characteristics



Krista Bryan
Major: Soil and Land
Management

Not Pictured: **Richard J. Imp**
Major: Ecosystem Restoration
and Management/Soil Science

Poster
Advisor: Dr. Kyle Herrman

The UWSP Chapter of the Society for Ecological Restoration and the UWSP Fire Crew have been part of a group effort working to restore habitat for the Karner blue butterfly on a 1.8 acre site just outside Plover, Wisconsin. The original project seeks to test the effect of different burn regimens on the maintenance of Karner blue butterfly habitat, with four different burn regimens being tested, in addition to a control area which will not be burned. Our project is an outgrowth of that effort, and seeks to obtain more data on the effect of fire on the characteristics of soil. We are specifically concerned with potassium, nitrogen, phosphorous, organic matter content and pH. We aimed for a sampling procedure with equal effort in each of the sample areas. We achieved an equal sampling effort of 10 by sampling at the intersections of grids created using GIS software. The end goal is to obtain baseline data in order to catalog the effects of the burn on the soil at the site as subsequent treatments occur.

Are Foam Track Plates an Effective Method for Detecting Small and Medium-sized Mammals?



Left to Right: **Nick LaLuzerne** (Wildlife Ecology) and **Ben Murley** (Wildlife Ecology)

Hair snares and sooted track plates are common noninvasive methods used to detect the presence of mammals. However, these methods have drawbacks: snared hairs may be difficult to accurately identify, and tracks on sooted track plates can be destroyed by adverse weather. In this study we looked at the use of BIO-FOAM® orthotic casting foam as a weatherproof alternative to traditional sooted track plates and as a replacement or supplement for traditional hair snares.

Six hair snares consisting of a wooden box with barbed wire in a Z-pattern across each entrance were placed in various stands around the Treehaven property. These snares had successfully detected a variety of small and medium-sized mammals in a previous study. For this study, the floor of each trap was lined with foam track plates approximately 1cm in depth. Each snare was checked and reset once a week.

Our goal in this study is to determine whether foam track plates can detect mammal presence as effectively as traditional hair snares. If they can, we should have identifiable tracks to match every hair we capture. Any disparity could indicate higher effectiveness of one or the other as well as differences in detection effectiveness for different mammals.

Poster

Advisors: Dr. Cady Sartini, Kevin Burns

Consider for Judging

Testing the Habitat Suitability Index Model for Fisher (*Martes pennanti*)



Left to Right: **Nick LaLuzerne** (Wildlife Ecology) and **Ben Murley** (Wildlife Ecology)

The Habitat Suitability Index Model for fisher (*Martes pennanti*) is a model created by the U.S. Fish and Wildlife Service to determine quality of fisher habitat based on four key variables. Those variables are percent tree canopy closure, average diameter at breast height of overstory trees, tree canopy diversity, and percent of overstory canopy comprised of deciduous species, which give tested habitats a score from 0-1 with 1 being the most suitable. Our ongoing study started in January of 2017 and takes place at the Treehaven Field Station outside of Tomahawk, WI. The study focuses on testing the validity of this HSI model by using non-invasive methods, specifically hair snares and foam track plates, to determine whether or not fisher presence is detected at higher rates in areas on the higher end of the HSI scale. We placed 2 hair snares/foam track plates in an area that ranked from .80-1 on the scale, 2 in areas that ranked .75-.79 on the scale, and 2 in areas that ranked .70-.73 on the scale.

Poster

Advisors: Dr. Cady Sartini and Kevin Burns

Consider for Judging

Using a Closed Population Model to Estimate Eastern Gray Squirrel Population in Sandhill Wildlife Area



Nathaniel Yost
Major: Wildlife Ecology
Management, Applied
Mathematics and Biology

The eastern gray squirrel (*Sciurus carolinensis*) is a common game species that inhabits primarily forested habitats with adequate mast production. Since 2012, students with the UWSP chapter of The Wildlife Society have trapped gray squirrels in Sandhill Wildlife Area near Babcock, Wisconsin to identify relationships between timber harvest and gray squirrel abundance. Three separate trapping grids were placed in timber stands harvested in different years: Mature (1932), Intermediate (1996), and Young (2011). We record sex, age, and weight for each squirrel, as well as record trap number. We live trap squirrels during the winter months from late January through March, until the snow melts. A closed population model will be used to estimate the population of eastern gray squirrels each year using 2012-2017 trapping years.

Poster

Advisors: Dr. Shelli Dubay and
Dr. Jason Riddle

Osprey Seasonal and Hourly Foraging Success Rate on Hatchery-Reared Muskellunge



Left to Right: **Bonnie Richards** (Wildlife Ecology and Biology), **Katerina Boatman** (Wildlife Ecology and Biology) and **Matthew Hanneman** (Wildlife Ecology)

Osprey (*pandion haliaetus*) are diurnal raptors that forage exclusively on fish. Muskellunge (*Esox masquinongy*) are large, popular sport fish that are native to Wisconsin. Wild populations of muskellunge are supplemented with hatchery-reared populations that are stocked in Wisconsin's lakes and rivers. Avian predators are a contributing factor to fish mortality at hatcheries. The Governor Tommy Thompson State Fish Hatchery in Spooner, Wisconsin is conducting a broad, ongoing study to determine causes of depredation within the hatchery. Our study focuses on the seasonal and hourly foraging success rate of osprey on the muskellunge ponds in the hatchery. We hypothesized that the seasonal foraging success rate would decline over time and the hourly foraging success rate would decrease during normal hatchery operating hours. We collected data from June to September 2016 using visual observation techniques to record foraging attempts on muskellunge ponds within the hatchery. We performed a regression analysis of the data describing hourly and seasonal foraging success rate of osprey. Hatchery and state managers can utilize these results along with continued research to implement more effective predator abatement protocols for fish hatcheries around the region.

Poster

Advisor: Dr. Jason Riddle

Consider for Judging

Growth Differences Between Sexes and Among Stocks of Lake Whitefish (*Coregonus clupeaformis*) in Lake Michigan



Hunter Distad
Major: Fisheries

Lake Whitefish *Coregonus clupeaformis* have been of great economic and ecological importance to all the Great Lakes since the 1800's. Recent studies suggest that Lake Whitefish growth rates are in decline, and may be attributed to higher catch rates, food web changes, and invasive species such as Sea Lamprey *Petromyzon marinus*. My objectives were to determine if growth differs between sexes and among genetic stocks in Lake Michigan as few studies have examined these potential growth factors. Length was measured and age estimated for fish purchased from commercial fishing boats in October (prior to spawning) in 2012 and 2013. Length at age models were created for both sexes and stock, and t-tests, ANOVA, and pairwise comparisons were used to evaluate mean total length at selected ages as well total length of sexes and stocks. Mean total length was significantly different (p-value <0.05) between males and females in 2012 and both years combined, but not 2013; females were larger in both instances. Significance differences were also found between younger and older males and females, but not middle aged. Mean total length was significantly different among stocks, and all stocks differed from one another except for Green Bay from Southern, and Northeast from Northern. However, there were no statistical differences (p > 0.05) among stocks for mean length at different ages. Overall, results indicate Lake Whitefish size and growth can display sexual dimorphism and difference among genetic stocks in Lake Michigan, but only in some instances. Managers may use this information to implement when considering plans such as minimum length limits to protect larger fish, or increase harvest limits to reduce density dependence and increase growth rates.

Poster

Advisors: Dr. Bill Fisher and

Dr. Joshua Raabe

Consider for Judging

Is Labile Carbon the Key to Unlocking Soil Quality Assessment?



Left to Right: **Adair Ebright** (Soil Science and Land Management), **Abby Lichtscheidl** (Waste Management and Soil Science), **Andrew Schneyer** (Water Resources and Soil Science), **Ben Gutknecht** (Natural Resource Planning) and **Sawyer Schmidt** (Soil and Land Management and Water Resources)

Soil quality is important for human and animal health, biological stability and environmental sustainability. Accurate soil quality assessments require extensive expertise. Practical soil quality assessments exist, but they are often not accurate enough. Labile carbon (C) might be an accurate and practical measurement for soil quality. Labile C is the portion of soil organic matter that is actively being used by the soil organisms. Soil organisms have a strong influence on the physical, chemical and biological soil properties driving soil quality. Our research objective is to measure labile C with four different approaches to see which best relates soil quality. We will measure labile C with physical (particulate organic matter), chemical (permanganate oxidizable C) and biological (via respiration with Solvita© paddles and NaOH base traps) methods. Soil quality in our research is defined by the ability to promote plant growth and health. We hypothesize the amount of labile C in soil will significantly correlate with plant growth and health. We will test this hypothesis by examining correlations of labile C with the growth and health of Wisconsin Fast Plants growing in 20 different soil horizons from six soil types, spanning a wide range of textures and organic matter contents. We hypothesize that all four measurements of labile C will correlate with plant growth and health. We will consider the practicality of each and make recommendations on which would be ideal for in-field soil quality assessment. An accurate and practical labile C tool could be used by all ecosystem managers and researchers to better assess soil quality.

Poster

Advisor: Bryant Scharenbroch

Consider for Judging

The Anthropogenic Effects on the Urban and Rural Coyote Diet



Emily Masterton

Major: Wildlife Ecology and Management

With the human population growing in Wisconsin, wildlife is more likely to encounter some type of anthropogenic waste. The more contact with anthropogenic waste can often lead to change in the diet of wildlife, including coyotes (*Canis latrans*). This study is comparing the amount of anthropogenic waste between the sites. The study believes it will find that urban coyotes are eating more anthropogenic waste compared to rural coyotes. This study also believes urban coyotes will have less of a diverse diet. The purpose of this study is to compare the diet of urban and rural coyotes to see how coyote habitats affected their diet. Scats were collected from two urban (Stevens Point, Wisconsin Rapids) and two rural (George W. Mead Wildlife Area, Buena Vista Prairie Chicken Meadow) sites. The scat was collected from footpaths, parks, dikes, roads, and bike trails, from September 2016 – March 2017. The content of the scat is currently being identified using keys and a reference collection. Early results show Rodentia (27.96%) and vegetative matter (34.41%) are the largest classes of food items in both urban and rural areas. The number of scats collected so far is thirty-eight. Contrary to the expectations, there were also more traces of anthropogenic waste in the rural areas than the urban. This new data can help with future studies on coyote behavior and diet in urban areas. This can lead to a better understanding of how to manage coyotes in both urban areas.

Poster

Advisor: Dr. Cady Sartini

Consider for Judging

Effects of Temperature and Wind on Woodpecker Distribution Around North Bluff at Sandhill Wildlife Area, Babcock, WI.



Kaylie Petersen
Major: Wildlife Ecology

Not Pictured: **Jason Wogsland**
Majors: Wildlife Ecology and
Biology

Poster
Advisor: Dr. Jason Riddle
Consider for Judging

Daily fluctuations in temperature and weather may impact the distribution of organisms on the landscape. Downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Picoides villosus*), red-bellied woodpecker (*Melanerpes carolinus*), and white-breasted nuthatch (*Sitta carolinensis*) are winter residents in Wisconsin. These species have been trapped around North Bluff at Sandhill Wildlife Area from late January to the middle of March since 2009. 23 modified potter traps were placed in two concentric rings around the bluff and were set on weekends over the study period. We investigated how daily changes in weather affected how these species used the bluff. Specifically, we looked at how temperature and wind direction impacted area of the bluff these species were using. Data is currently being analyzed. The results of this study can provide insight on daily habitat use and movement on the landscape for these species. It can also be used to help make decisions to maximize trapping efficiency in the future.

Streamflow Trends in the Ogallala Aquifer Evaluated by Gauging Stations and Compared to Gravity Recovery and Climate Experiment (GRACE) Data



Left to Right: **Julia Petreshen** (Hydrology) and **Eleanor Ludkey** (Hydrology)



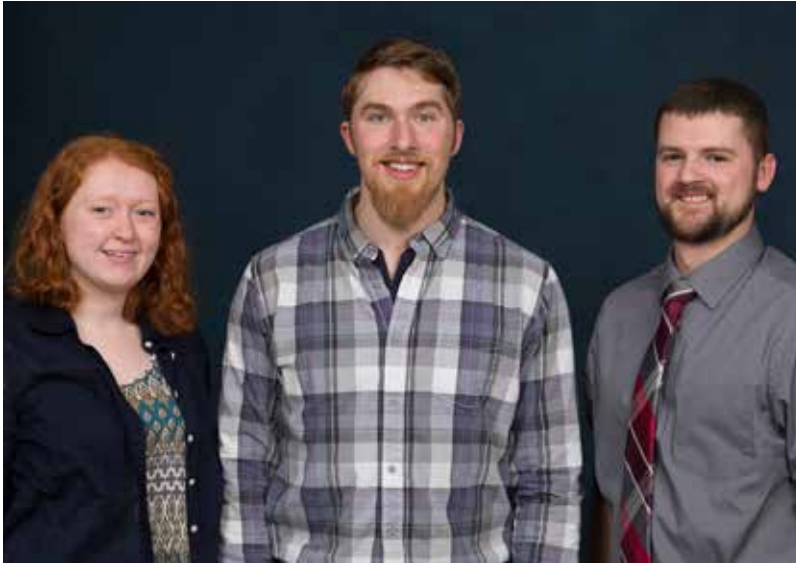
Katherine Miller
Major: Hydrology

NASA's Gravity Recovery and Climate Experiment (GRACE) remote sensing data have been used to evaluate the change in storage in the water budget across the world. The Ogallala Aquifer, located in the central United States, is heavily relied upon for irrigation. Despite increased use, research using GRACE have determined that the aquifer shows an overall net gain. With increased concerns over the sustainability of the aquifer, a more robust data set needs to be developed using several measured variables. This study examines GRACE's correlation to surface water using USGS gaging station data in the aquifer. GRACE data are available from March 2002 through December 2015 at a monthly time scale. We used average and total flow changes to compare with GRACE data for heavily irrigated summer months (June – September). Trends were determined using the Kendall Tau Trend test and the strength of the trend and direction were compared with GRACE data. We suspect GRACE data will reveal an inversely proportional relationship to stream flow changes which could be associated with heavy irrigation. We hypothesize that heavy irrigation is a covariate that is not well accounted for in the GRACE remote sensing product.

Poster

Advisor: Dr. Katherine Clancy

Consider for Judging



Spatial and Temporal Use of Canids Using Camera Trap Surveys

Left to Right: **Matthew Hanneman** (Wildlife Ecology: Research and Management), **McKenna Hammons** (Wildlife Ecology and Management) and **Timothy Zappa** (Wildlife Ecology and Management)

Poster

Advisor: Dr. Cady Sartini
Consider for Judging

Dominant carnivores, such as wolves (*Canis lupus*), establish and defend very defined territories and can influence the spatial and temporal movements of subordinate carnivores such as coyotes (*Canis latrans*). The Canine Project of the Wildlife Society Student Chapter is exploring the spatial and temporal movements of coyotes and wolves at two separate locations in northern and central Wisconsin. Camera trap grids consisting of 8 game cameras spaced 1 kilometer apart. The cameras were deployed within the George W. Mead Wildlife Area in Milladore, WI and on the Treehaven property near Tomahawk, WI from February to March 2017 and November 2016 to March 2017 respectively. Pictures will be analyzed using MapView Professional™ to determine the presence or absence of coyotes and wolves in the designated locations. A comparison of trap success for each species at each location will be made. We hypothesize that if the dominant species is present at specific site then the subordinate species will avoid that site or surrounding sites for a given time period.

Uncovering Plant Community Dynamics in Anoka County, MN



Alissa Johnson

Majors: Ecosystem Restoration and Management

Ecosystems are known to be dynamic and change on a regular basis, especially after disturbance. Fire is known to be one of the major disturbance factors in oak savanna and prairie settings. However, very little research has been done looking to determine why certain species remain, and others are lost from the ecosystem. For this research project, data were taken from a long-term survey at Cedar Creek Ecosystem Science Reserve, University of Minnesota. A series of burn units are spread throughout the 900 acre reserve with burn frequencies ranging from no burns to frequently burned units. Records on plant species richness were taken from the beginning and ending sampling periods for each plot were made of the present species in plots located inside the units. Species were classified as gained, lost or constant from the unit based on their presence or absence. Tree diameters were measured and from these, canopy closure was estimated. This was further compared to the gained and lost species to identify any trends. The species that were gained or lost were further described by seed dispersal and ecosystem affiliation. No correlation was found between the canopy closures and gained or lost species. The species gained or lost did not differ among ecosystems. Results have yet to be collected on the seed dispersal hypothesis. These trends could have significant impact on management techniques and decisions for restoration and management of ecosystems.

Poster

Advisor: Dr. James Cook

Consider for Judging

Use of Biochar to Increase Microbial Growth from Compost Tea Inoculation



Alex Thomas

Major: Waste Management and Soil Science



Lindsey Weiss

Major: Soil and Land Management

Compost teas have been marketed as a foliar disease suppressant, a plant superfood, and a source of microbes beneficial to plant development and growth. Created by aerating a compost sample in water for over 24 hours, compost teas have gained a great amount of popularity and interest in fields ranging from industrial agriculture to silviculture to home scaled gardening. Despite its popularity however, the mechanisms behind compost tea and its benefits have not been definitively identified within the scientific literature. Some studies suggest that the application of compost tea provide an increase in available nutrients for plant growth. Other studies suggest that the tea acts as an inoculate, spreading beneficial microbes to the soil, leading to more available carbon and other essential nutrients for plant growth. A few studies have even documented no effect on plant growth when applying compost teas. Identifying which affects compost teas have on plants and what drives those benefits are important if this technology were to be scaled to an industrial level. This experiment ran four treatments using a sanitized sand substrate, with two treatments being amended to be 10% biochar by volume. One treatment of each substrate was then inoculated with a compost tea sample, creating the four separate treatments. Given a 40-day growth period, Wisconsin Fast Plants (*Brasica spp.*) were then analyzed for microbial respiration, microbial biomass, and aboveground plant biomass. Despite a positive trend, there was no significant difference between the trials. Extremely poor plant growth, possibly due to the quality of the sand as a substrate, made any conclusions difficult.

Poster

Advisors: Dr. Rob Michitsch
and Dr. Bryant Scharenbroch
Consider for Judging

An Analysis of Water Quality and Water Level Fluctuations on the Fish Population and Reproduction of Wind Pudding Lake.



Left to Right: **Ryan Eastman** (Fisheries and Water Resources), **Abbie Lee** (Water Resources), and **Justin Kowalski** (Fisheries and Biology)

Poster

Advisors: Dr. Joshua Raabe, Dr. Bill Fisher and Dr. Kyle Herrman

Consider for Judging

Wind Pudding Lake in Oneida County, Wisconsin began to experience a considerable water level drop in 2002 due to decreases in precipitation. The decreased water level nearly eliminated the fish population in the western basin and may have changed the water quality, which unlike the eastern basin is shallow and does not seasonally stratify. The water level began to rise between 2010 and 2013, but still has not recovered to pre-2002 levels. In 2014, the Wind Pudding Lake Association was granted permission to transport fish from the eastern basin to the western basin. Our objectives are to determine if the fish community in the western basin is recovering and if water quality differs between the two basins. We began collecting data in October 2016 and will continue until May 2018. We will collect fish using fyke nets to examine species composition and abundance in both basins. We will monitor water quality to determine suitability for fish survival and potential influences of water level fluctuations. This will be done using installed temperature loggers, a multiparameter sensor and water samples for nitrogen, phosphorus and chlorophyll analysis. Our preliminary results from fall 2016 found 5 fish species are present in the western basin and include small and larger individuals, indicating fish survived stocking and are reproducing in the western basin or are moving from the eastern basin. Preliminary results for water quality indicate that both basins would classify as meso-oligotrophic (western: TN = 0.53 mg L⁻¹; TP = 14 µg L⁻¹; eastern: TN = 0.29 mg L⁻¹; TP = 13 µg L⁻¹) but oxygen profiles in the winter of 2017 show the western basin having low oxygen (<5 mg L⁻¹) in the lower half. Overall, lake water levels may fluctuate naturally (e.g., droughts) or due to human actions (e.g., water withdrawals), so understanding the influence of fluctuations on ecosystems and water quality is important.

Effects of Vermicompost Application on Ginseng Production and Quality at 3 Wisconsin Sites

Not Pictured: **Brooke Bembeneck**
Major: Soil and Land Management

Poster

Advisor: Dr. Jacob Prater

Consider for Judging

Research on ginseng production is sparse and the history of ginseng methods of production is clouded in secrecy. The purpose of this study is to investigate the utility of vermicompost and compost tea in an effort to improve cultivation of ginseng (*Panax quinquefolius*). Ginseng growth promotion and root quality are hypothesized to improve based on the modification of the soil microbial community and the physical condition of the soil. Beneficial microorganisms should be enhanced in number and soil-borne phytopathogens could be inhibited as a result. This hypothesis is formed on the idea that microbial competition and/or community alteration will reduce disease occurrence. The addition of vermicompost will likely alter water retention and allow roots to proliferate in the near surface (leading to branched roots, a plus!). Initial results show root morphology is altered with vermicompost application, as are berry production, and ginseng yield.

Walleye Growth Following Implementation of Strict Regulations on Escanaba Lake, WI



Emily McParlane
Major: Fisheries

Walleye; *Sander vitreus* are important ecologically and economically as a highly-sought after angling species. With interest of harvesting larger and numerous walleye, many studies help to maintain healthy walleye populations. Escanaba Lake in Vilas County, Wisconsin was uniquely set aside for research over sixty years ago. Research focused on understanding effects of liberalized regulations including no bag limits, closed seasons, or minimum length limits from 1946 until 2002. However, walleye regulations became strict in 2003, changing to a bag limit of one, and a minimum harvest size of 28 inches. Drastic change in regulations provided an opportunity to determine if walleye growth changed. My hypothesis was that walleye will grow faster, and smaller in length due to the lack of harvest and available prey. Length was recorded and age estimated for over 35,000 walleye sampled by electroshocking and fyke-net surveys from 1946 to 2014. Data were analyzed using von Bertalanffy models. As predicted, walleye weren't reaching as large of potential sizes (pre-regulations $L_{\infty} = 652.59$, post-regulations $L_{\infty} = 532.41$), but were growing faster as juveniles post-regulation change. Walleye abundance still needs to be examined to determine the potential influence on growth. Overall, results indicated that strict regulations may not result in larger walleye.

Poster

Advisor: Dr. Joshua Raabe

Consider for Judging

Formation Improvement on 30 gsm Sheet



Left to Right: **Dylan Beyersdorf** (Paper Science and Engineering), **David Veit** (Paper Science and Engineering), **Spaeth Levi** (Paper Science and Engineering), and **Tyler Englebert** (Paper Science and Engineering)

The main objective of this project is to improve the formation of a 30 gsm sheet on the UW Stevens Point Pilot Paper Machine. In the past, a 30 gsm sheet was successfully made on the machine, but it did not have the desired formation. Improving the formation of the sheet could provide a more marketable product for the university. With this improved formation, it will also open up more opportunities for outside industries to come run trials on our paper machine. Another benefit to this project is that it will allow future students to run more trials on light weight grades on the pilot paper machine. A baseline formation will first be determined through a trial on the pilot paper machine. 30 gsm handsheets will be made in order to compare the baseline formation on the paper machine verses the theoretical “perfect” formation of the handsheets. Our group will utilize the formation analyzer in the paper testing lab on campus along with an evaluation panel of our peers. Based on the results we get from our first paper machine run, our group will utilize the equipment we have along with some wet end chemical addition to further improve upon the formation. Our group plans on optimizing the dandy roll, table shake, pressure screen, headbox consistency, pulp furnish, and other physical/mechanical changes. Our group expects to see a visible improvement in formation from the initial paper machine run. The goal is to get as close to the theoretical “perfect” formation of a handsheet as possible.

Poster

Advisor: Dr. Malek Alkasrawi

Optimization of the Operation of the Cleaners and Pressure Screen



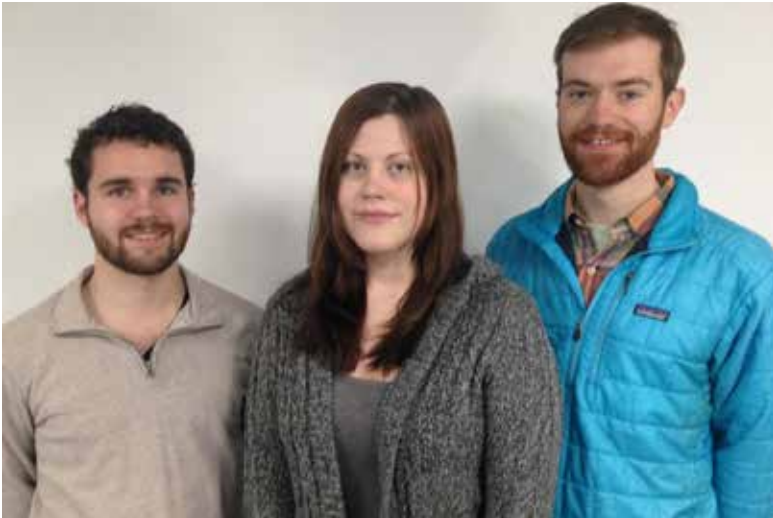
Left to Right: **Justin Kreuser** (Paper Science & Engineering), **Brad Piotrowski** (Paper Science & Engineering) and **Alex Stuplich** (Paper Science & Engineering)

The UW-Stevens Point Pilot Paper Machine has a dual cleaner system involving cleaner cones and a pressure screen. The goal of this project is to optimize the cleaner system. We believe that optimization of any process can come from improving efficiency and reducing downtime. The pressure screen is notorious for plugging during machine runs; therefore, we are predominantly focusing on reducing and/or eliminating plugging that is occurring on the pressure screen. We have a variety of different proposals aimed at tackling the problem. First, we will review the operating and maintenance manual of the pressure screen and verify that the correct procedure is being followed. The manual also has trouble shooting methodology listed. Numerous trials will be performed in order to pinpoint any variables that may be the cause of the plugging including, but not limited to, flow rate, consistency, and pressure drop. The next proposals, after consulting with the Lab Specialists, would be looking into a new screen basket and/or a new rotor to increase the capacity of the screen and reduce plugging. In the end, we expect that a new SOP in the operation of the pressure screen will alleviate the problem. We also expect to be able to reduce and possibly eliminate plugging in the pressure screen during machine operations. With this design proposal, we should be able to complete the project at minimum budget. Reducing plugging will improve the efficiency of machine time, whether it is for industrial trials or for student learning. Overall, this would be a great benefit for the University.

Poster

Advisor: Dr. Malek Alkasrawi

A Design for a Very Rudimentary Second Head Box to Demonstrate a Proof of Concept



Left to Right: **Stephen Neleson** (Paper Science & Engineering), **Nika Wanserski** (Paper Science & Engineering) and **Wesley Vann** (Paper Science & Engineering)

As the paper industry evolves, there exists a demand to introduce new products to the market and a demand to optimize the existing ones. Producing paper grades with different or multiple furnishes is often a solution to reducing the cost of manufacture of paper products through utilization of cheaper or lower quality raw materials. Unfortunately, the lower quality paper produced with these cheaper materials may hinder important sheet qualities such as strength or printability. Producing a sheet with multiple layers is a solution to this problem as industrial innovations have allowed manufacturers to produce a high quality top layer on top of a lower quality bottom layer in a paper sheet. This multi-layer sheet of paper can provide unique optical and physical properties that cannot otherwise be attained using a single layer sheet with the same materials. The goal of this project is to divert flow from an existing stock tank to a rudimentary secondary headbox that will be placed over the vacuum section on the wet end of the machine. The headbox will be manufactured on site using cost effective materials which are safe and easy to work with. While the main principle of this project is to prove that it is possible to produce a multi-ply sheet on the UWSP pilot paper machine, it is our team's goal to meet requested specifications made by potential customers of WIST. Various clients have requested trials to verify if WIST may produce multi-ply paper, and have supplied product specifications that they wish to meet. If the project is successful, WIST would be able to apply the outcomes and produce multi-ply sheets for these clients and future clients. Additionally, successfully accomplishing this

Poster

Advisor: Dr. Malek Alkasrawi

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