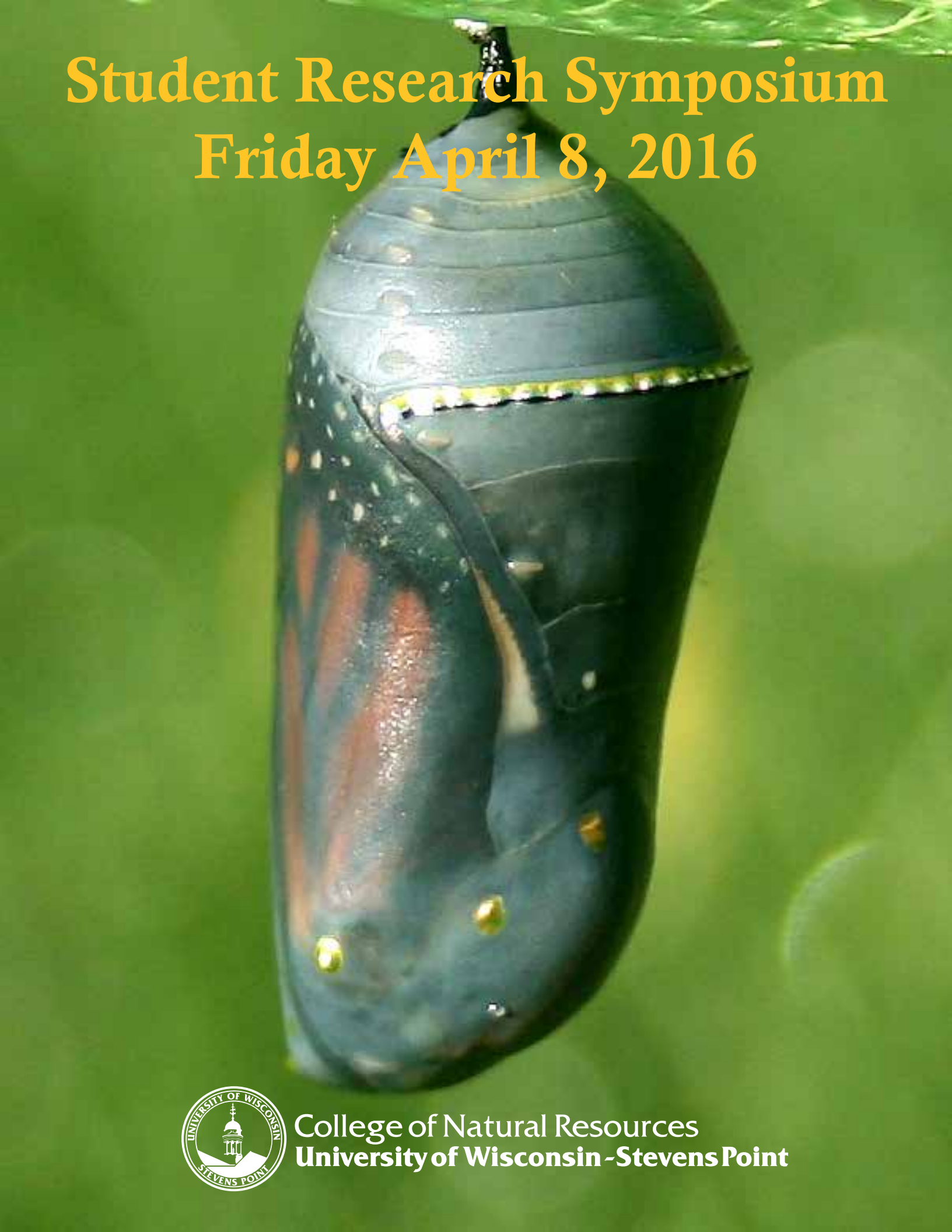
Student Research Symposium
Friday April 8, 2016



College of Natural Resources
University of Wisconsin-Stevens Point

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Student Research Symposium
April 8, 2016

This booklet and the CNR Student Research Symposium have been made possible by support from the John and Anne Meyer Fund for the CNR.

Booklet Layout: Abbie Lee and Elise Worthel
Booklet Editing: Abbie Lee and Elise Worthel
Cover Design and Photo: Abbie Lee and Anna Schneider

COVER PHOTO: ***Chrysalis: Anna Schneider***

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 though 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.

Table of Contents

University of Wisconsin-Stevens Point
Office of the Chancellor

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April 8, 2016

Welcome to the 17th 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, and I wish you success in presenting your work today and at future symposia and conferences.

Sincerely,

Bernie L. Patterson
Chancellor

University of Wisconsin-Stevens Point
College of Natural Resources
Stevens Point WI 54481-3897
715-346-4617; Fax 715-346-3624

April 8, 2016

The UWSP College of Natural Resources is pleased to present the 17th 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: 108 students and 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 1,100.

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.

Christine L. Thomas
Dean and Professor of Natural Resource Management

From the Student Research Symposium Committee...

Welcome to the 16th 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: Anna Schneider

Committee Vice Chair: Abbie Lee

Secretary: Caitlin Alba

Booklet Editor: Abbie Lee

Web Weaver: Cody Kamrowski

Committee Members: Anastasia Wolf-Flasch, Emily Weiler, Holly North and Emmett Wiegel

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

Clive and Beverley David Research Scholarship Award

Dr. Clive David
1947 - 2004

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 2016 recipient of the Clive A. David Memorial Research Scholarship is:

Bradley Erdman

Majors: Fisheries and Biology
Minors: Aquaculture and Water Resources

Brad has been conducting research as a primary contributor in the Molecular Conservation Genetics Laboratory (MCGL) as part of the CNR's Wisconsin Cooperative Fishery Research Unit (WCFRU) for the past two years, averaging 10-15 hours of research each week. His work has focused mainly on walleye and brook trout, but he has also conducted research relating to muskellunge, lake sturgeon and American hazelnut. He has made research presentations (oral and poster) at the 2015 CNR Student Research Symposium (honorable mention - oral), the 44th Annual Meeting of the Wisconsin Chapter of the American Fisheries Society in Eau Claire, WI, and the 45th Annual Meeting of the Wisconsin Chapter of the American Fisheries Society in La Crosse, WI. Brad will also be presenting his research at this year's CNR Student Research Symposium as well as at the UW-System Symposium for Undergraduate Research and Creative Activity.

Brad is a member of the UWSP student chapter of the American Fisheries Society. After graduating this May, he plans to continue his education at South Illinois University at Carbondale where he will seek a master's degree in zoology. His research there will focus on developing molecular markers to more easily differentiate between the common shovelnose sturgeon and the federally endangered pallid sturgeon. He eventually hopes to obtain a doctoral degree and move back to the Midwest where he can conduct research to improve our fisheries.

"...his undergraduate research is some of the best I have ever witnessed. Brad is truly a prime example of what an award winning undergraduate researcher and leader should represent."
- Dr. Justin VanDeHey

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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Elise Worthel ('15) – Booklet and Planning Assistance

CNR and Biology Faculty - Mentoring and Support

Biology Department - Room Accommodations

Volunteer Evaluators and Moderators

Tom Charlesworth - Photography

Symposium Support Volunteers

Schedule of Events

Keynote Speaker:
Dr. Joshua Lallaman, BS-Water Resources-Fisheries & Limnology, '00
8:30AM
TNR 170

Oral Presentations
9:00 - 10:00
Rooms 120, 122, and 170

Poster Presentations
10:00 - 11:00
South Hallway and Central Lobby

Oral Presentations
11:00 - 12:00
Rooms 120, 122, 170

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

Poster Presentations
12:00 - 1:00
South Hallway and Central Lobby

Oral Presentations
1:00 - 2:00
Rooms 120 and 170

CNR Rendezvous, SentryWorld Atrium
Donor Recipient Meet & Greet and Social Hour: 4:30
Awards Program: 5:30

Schedule of Oral Presentations: TNR Room 120

Time	Presenters	Title
9:00AM	Brandon Maahs	Scales or Otoliths: Does it Matter When Making Decisions about Black Crappie Harvest Regulations?
9:20AM	Kayla Fuller, Taylor Remington and Colton Branville	Exploring Aquaponics: Comparing Walleye (*Sander vitreus*) and Tilapia (*Oreochromis niloticus*) Production to Plant Growth and Nutrient Removal
9:40AM	Sean Piette	Plover River Watershed Preservation Research
11:00AM	Nathaniel Rice and Marco Mascitti	Group Size and Vigilance Behavior of Wildlife at Anthropogenic Food Waste Site**s**
11:20AM	Bridget Walker, Elizabeth Hill and Brandon Stedman	The Effect of Urbanization on Parasite Abundance and Species Richness in Urban Versus Rural Eastern Cottontail Rabbits (*Sylvilagus floridanus*)
11:40AM	Elizabeth Hill and Andrew Sella	Differences in Parental Care Behavior Between Whooping Cranes (*Grus americana*) and Greater Sandhill Cranes (*Grus canadensis tabida*) at Necedah National Wildlife Refuge
1:20PM	Kennan Bruening	Effects of Water Temperature on the Distribution of Salmonids in Cold Water Tributaries to the Snake River with a Focus on Salvelinus confluentus

Schedule of Oral Presentations: TNR Room 122

Time	Presenters	Title
9:00AM	Trent Delehanty, Brandon Johnson,Connor Selvey and Matthew Parsons	Analysis of Microbeads Presence in Gastrointestinal Tract of Duck Species of Central Wisconsin
9:20AM	Drake Hardman and Courtney Cordova	Nest Abandonment in Whooping Cranes (*Grus americana*) and Greater Sandhill Cranes (*Grus canadensis tabida*) at Necedah National Wildlife Refuge
9:40AM	Bradley Erdman	Analysis of Potential Brood Sources for Wisconsin Brook Trout Propagation
11:00AM	Emma Doden and Margaret Nannenhorn	Effects of Culling and Lion (*Panthera leo*) Reintroduction on a Black-backed Jackal (*Canis mesomelas*) Population in Mountain Zebra National Park, South Africa
11:20AM	Tara Buehler, Sam Lau and Anna Schneider	Do Adult Female Porcupines (*Erethizon dorsatum*) Increase in Activity as Winter Transitions into Spring?
11:40AM	Rachel Konkle	Estimating the Time of Greater Prairie-Chicken Nest Failure

Schedule of Oral Presentations: TNR Room 170

Time	Presenters	Title
9:00AM	Sam Schaick	Influence of Supplementary Walleye Stocking on Year-Class Strength in Six Minnesota Lakes
9:20AM	Janel Scharhag	Black Bear Home Range Response to Dog Training in Northern Wisconsin
9:40AM	Anna Schneider and Jacob Shurba	Potential effects of Gapeworm on Greater Prairie Chickens (*Tympanuchus cupido*) in Central Wisconsin
11:00AM	James Hansen, Sarah Johanson and Janelle Taylor	Microhabitat use of Migrating Northern Saw-Whet Owls (*Aegolius acadicus*)
11:20AM	Amanda Kyle	Determinants of Composting Behavior in College Students
11:40AM	Nathan Klopmeier and Shaylee Church	Cavity Proximity in Relation to Gray Squirrel Capture Success in Sandhill Wildlife Area, Babcock, WI
1:00PM	Ashley Steadman	White Noise Disturbance and Pair Bond Strength in Zebra Finches (*Taeniopygia guttata*)

Poster Presentations from 10:00 to 11:00

Presenters	Title
Janel Scharhag	Black Bear Home Range Response to Dog Training in Northern Wisconsin
Sean Piette	Plover River Watershed Preservation Research
Elizabeth Hill and Andrew Sella	Differences in Parental Care Behavior Between Whooping Cranes (*Grus camericana*) and Greater Sandhill Cranes (*Grus canadensis tabida*) at Necedah National Wildlife Refuge
Ashley Steadman	White Noise Disturbance and Pair Bond Strength in Zebra Finches (*Taeniopygia guttata*)
Nathaniel Rice and Marco Mascitti	Group Size and Vigilance Behavior of Wildlife at Anthropogenic Food Waste Sites
Trent Delahanty, Brandon Johnson, Connor Selvey, and Matthew Parsons	Analysis of Microbeads Presence in Gastrointestinal Tract of Duck Species of Central Wisconsin
Kayla Fuller, Taylor Remington, and Colton Branville	Exploring Aquaponics: Comparing Walleye (*Sander vitreus*) and Talapia (*Oreochromis niloticus*) Production to Plant Growth and Nutrient Removal
Jackson Beck and Megan Eames	Development and Validation of Leaf Area and Biomass Models for Urban Trees
Kurt Bennett	Variation in Fall Plant Species Diversity Within and Bordering Ephemeral Ponds of Schmeeckle Reserve
Lauren Steinkamp and John Foshag	Fire and Thinnin Effects on Vegetation of the Great Lakes Region
John Foshag, Lauren Steinkamp and Mike Jungen	Small Mammal Community Dynamics in Red Pine and Mixed Conifer Hardwood Stands
Simon Stevenoski	The Use of BioSolids in Greenroof Substrates
Jacob Livingston	Creating Methods for Testing Germination in the Presence of Ash
Zachary Witzel	Relative Precision of Northern Pike Ages Estimated from Multiple Calcified Structures: Preliminary Results from an Ongoing Statewide Evaluation

Poster Presentations from 10:00 to 11:00

Presenters	Title
Matthew Hanneman, McKenna Hammons, Timothy Zappa, and Emma Doden	Comparing Scent-post Stations and Camera Trap Surveys as Methods to Detect Canids and Other Species in Central Wisconsin
Allison Earl, Solimar Garcia, and Isaiah Stone	Evaluation of the Moses Creek Restoration
Amy Sandel	Crop Type and Soil Texture Effects on Nitrogen Leaching from Irrigated Agroecosystems in the Wisconsin Central Sands
Adam Garlie and Zach Mohr	A Historical Study of the Mud Minnow (*Umbra lima*) Over a 40 Year Period in Wisconsin
Holly North, Jeffrey Williams, Benjamin Tjepkes, and Samuel Lau	Relationships Between Home Range Size, Age and HabitatQuality for Ruffed Grouse
Katherine Miller and Brandon Lee	Impacts of Delineation Methods Using Curve Number RUnoff on Watersheds Containing Internal Drainage
Lisa Zoromski	Parasite Presence of the South Dakota Nature Conservancy Free-roaming American Bison (*Bison bison*)
Caitlin Alba and Kelsey Forrest	Comparison of the Vegetation in a Burned and Unburned Wet Meadow
Shanell Budleski and Emily Weiler	A Survey of Common Parasites in Greater Prairie Chickens (*Tympanuchus cupido*) of Central Wisconsin
Erik Halverson, Zach Leitner, and Derek Potratz	Analysis of Key Soil Nutrients and Physical Properties on a Managed Grazing Operation in Junction City, WI
Aaron Pershern and Alec Dix	Impacts of Gypsum Applications on Phosphorus Availability in Soil
Natalie Lirette, Markie Rodgers and Caitlin Shaw	Indentifying Spatial and Temporal Patterns of Anthropogenic Nitrogen Deposition and the Influence on Aquatic Community Change in Wisconsin Lakes
Kelly Adlington	Effects of Compostable Food Service Packaging on Second Generation Growth of Wisconsin Fast Plants

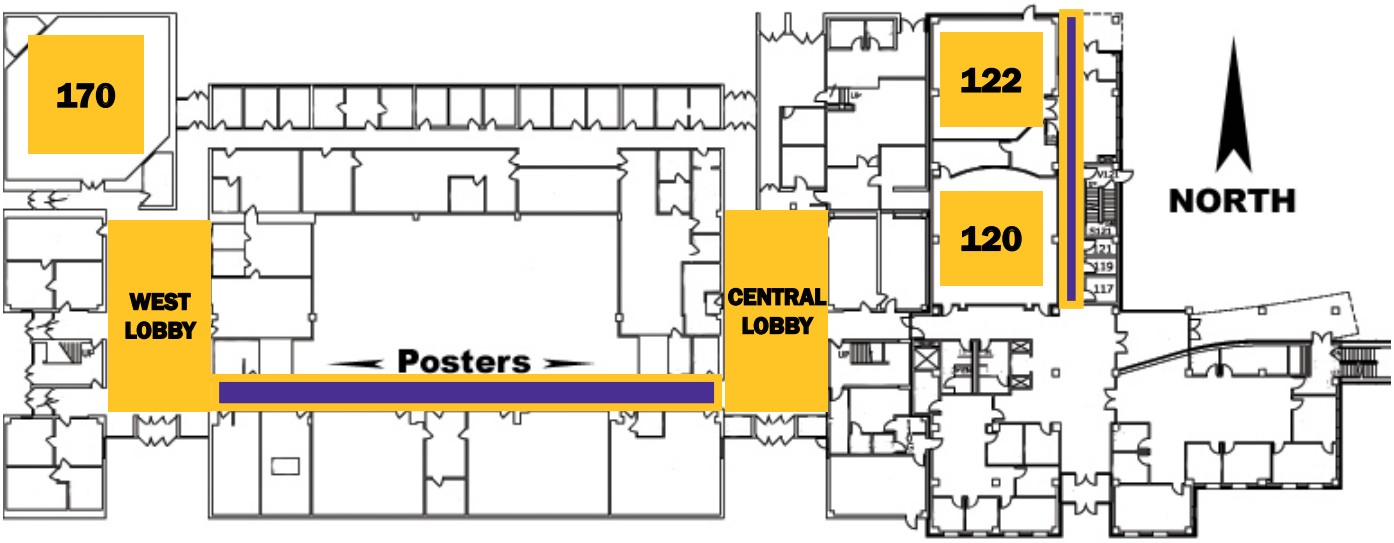
Poster Presentations from 12:00 to 1:00

Presenters	Title
Paul Priestley, Ethan Robers, and Alissa Johnson	Effects of Prescribed Fire on Habitat Restoration for the Federally Endangered Karner Blue Butterfly
Eric Canania and Brittany Henderson	Invertebrate Abundance Sampling on Different Management Types Found at Buena Vista Grasslands
Kirsten James, Katherine Miller, and Chase Bayer	Areas of Potential Phosphorus Loading in the Pecatonica River Watershed
Jacob Rocke	Change in Condition of Bluegill in Man-made Pond in Central Wisconsin
Wednesday Jordan	Lead Distribution is Correlated with Urbanization in the Chicagoland Area
Eric Canania, Dana Jarosinski, Anne Vierling, Garett Downing, and Dylan Wenker	Population Demographics of White-tailed Deer in Schmeeckle Reserve: Overabundance and Potential Impacts on Native Plant Communities
Kaira Kamke	Characterization of Aquatic Macroinvertebrate Communities in Four Central Wisconsin Wetlands
Katie Youngberg and Sara Pederson	Detection of Fisher (*Martes pennanti*) in Association with Stand Characteristics in Central Wisconsin
Cole Walli, Madison Hodge, Michelle Sauers and Michelle Willis	Seasonal Variance in River Otter (*Lontra canadensis*) Diet in Sandhill Wildlife Area, Central Wisconsin
Alissa Johnson	Greenhouse Gas Emissions in Two Restored and One Natural Wetland
Bradley Erdman	Analysis of Potential Brood Sources for Wisconsin Brook Trout Propagation
Samuel Schaick	Macroinvertebrates on Utilized and Unutilized Walleye Spawning Substrates

Poster Presentations from 12:00 to 1:00

Presenters	Title
Jacob Cerminar	Biochar and Biosolids as Potential Urban Soil Amendments
Shaylee Church, Nathan Klopmeier, Nathaniel Yost, and Addison Swenson	Eastern Gray Squirrel Population Demographics in Different Aged Timber Stands
Erik Halverson and Richard Mahoney	Examining Total Nitrogen and Phosphorus Levels Found in Tellow Perch (*Perca flavescens*) Waste Water and Comparing the Effects of Tomato Seedling Growth Under Fish Waste Water Versus Commercial Fertilizer Treatments
Erik Halverson, Richard Mahoney, Andrew Zabel, and Johnathon Butkus	Historical Analysis of Black Spot Parasite Prevalence in Common Shiners (*Luxilus cornutus*) Throughout Wisconsin
Trenton Rohrer, Stuart Fetherston, and Ben Murley	Waterfowl Project
Chase Gadbois, Michelle Murawski, and James Hanson	Differences in Ruffed Grouse (*Bonasa umbellus*) Home Range Sizes Between Summer and Spring Months
Brandon Lee and Mason Johnson	Mapping Stream Alterations Enhance Watershed Scale Water Quality Indicators
Ava Boswell, Tara Buehler, and Sarah Rothe	A Comparison of Temporal and Spatial Small Mammal Community Stability in Schmeeckle Reserve, Stevens Point, WI
Kaira Kamke and Ethan Robers	Developing a Baseline Assessment Undergraduate Study for Effects of a Fire Regime on Invasive Wetland Flora
Bridget Walker, Elizabeth Hill, and Brandon Stedman	Effect of Urbanization on Parasites of Eastern Cottontails
Holly North and Trenton Rohrer	Can Citizen Science be Used to Collect Data on Radio-marked Ruffed Grouse?
Dana Jarosinski, Eric Canania, Dylan Wenker, Anne Vierling, Garett Downing and Kurt Stetzer	Home Range Comparison of Urban White-tailed Deer During the Winters of 2014/15 and 2015/16

Trainer Natural Resources Building Map



Symposium Presentations

Schedule of Oral Presentations in rooms 120, 122, and 170 on pages 9-11.

Poster Presentations are displayed in the South Hallway and Central Lobby.

Microhabitat use of Migrating Northern Saw-Whet Owls (*Aegolius acadicus*)

Left to Right: **Sarah Johanson** (Wildlife Ecology: Research and Managment), **James Hansen** (Wildlife Ecology: Information and Education) and **Janelle Taylor** (Wildlife Ecology: Research and Managment)

Oral
Advisors: Dr. Jason Riddle and Richard P. Thiel
Consider for Judging

The Northern saw-whet owl (*Aegolius acadicus*) (NSWO) is a mesopredator within upland ecosystems. NSWO's migrate in the fall from September until December with peaks 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 their migration corridors. We utilized data from the student chapter of The Wildlife Society's long term saw-whet owl project, at Sandhill Wildlife Area in Babcock, Wisconsin from Fall 2007 to Fall 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. Analysis is on-going, however, we plan on using a single-factor ANOVA to test for significance of NSWO use between microhabitat types. We will discuss our findings and associated management implications.

Influence of Supplementary Walleye Stocking on Year-Class Strength in Six Minnesota Lakes

Sam Schaick
Major: Fisheries

Walleye Sander vitreus are a highly targeted fish species in the Midwestern United States and Canada. To satisfy angler demand, stocking is a common management practice to create and maintain fisheries, or to supplement natural reproduction. Previous evaluations of Walleye supplementary stocking have produced variable results. My objective was to determine if supplemental stocking influences Walleye year-class strength in six Minnesota lakes. Walleye were sampled using gillnets and stocking records were obtained from the Minnesota Department of Natural Resources database. Ages were estimated from a combination of scales and otoliths and year-classes were determined by subtracting age from capture year. Year-class strength was determined using residuals by subtracting the expected catch proportion of a year-class from the observed catch proportion of that year-class across all surveys for the corresponding lake. Expected catch proportions were determined by the age of the year-class at the time of survey. T-tests indicated that no significant (p-value > 0.05) differences occurred when year-class strength was pooled across lakes or when lakes were individually analyzed. In general, I recommend less frequent Walleye stocking for the lakes in this study.

Oral
Adviors: Dr. Joshua Raabe
and Dr. Justin VanDeHay
Consider for Judging

Do Adult Female Porcupines (*Erethizon dorsatum*) Increase in Activity as Winter Transitions into Spring?

Left to Right: **Anna Schneider** (Wildlife Ecology: Research and Management & Biology), **Tara Buehler** (Wildlife Ecology: Research and Management & Biology) and **Sam Lau** (Wildlife Ecology: Research and Management, Biology & Captive Wildlife)

Oral
Advisor: Dr. Cadi Sartini and Evan Wilson
Consider for Judging

Porcupines (*Erethizon dorsatum*) rest during the day and forage at night. During the winter they can be found feeding on the cambium and needles of conifer trees. They prefer to feed on the herbaceous material of early successional species of trees, such as aspen, when leaves and buds become available in the spring. We propose that porcupines in Sandhill Wildlife Area will be found in early-successional habitat more often at night than the daytime during late winter and early spring. Thirteen adult female porcupines were radio-collared in Sandhill Wildlife Area as part of a doctorate research program out of UW-Madison. For this project, we located collared porcupines multiple times from March through April 2016 to compare the frequency of their locations during both day and night time periods. This information could give us a better understanding of what habitat porcupines use as food resources become more available in the spring.

Scales or Otoliths: Does it Matter When Making Decisions about Black Crappie Harvest Regulations?

Brandon Maahs
Major: Fisheries and Biology

Scales are typically used to estimate the age of black crappies in northern lakes, but among-readers precision is low and scales may underestimate crappie age, especially for older fish. Otoliths (inner ear bones) generally provide ages that are more accurate and precise. However, otolith extraction requires fish sacrifice. Age and growth data are commonly used to evaluate the potential effects of crappie length limits using yield-per-recruit models. Use of different structures for age estimation could result in different conclusions regarding the potential effectiveness of minimum length limits. Our objectives were to determine if estimates of growth and mortality differed when using scales and otoliths to estimate the age of black crappies in northern Wisconsin lakes and if these differences resulted in different model-based conclusions regarding the effectiveness of harvest regulations for these fisheries.

Oral
Advisor: Dr. Dan Isermann
Consider for Judging

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

Drake Hardman
Major: Wildlife Ecology: Research and Management

Courtney Cordova
Major: Wildlife Ecology: Research and Management and Environmental Education

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 Wisconsin on an experimental basis. Both greater sandhill (SACR) and WHCR breed at Necedah National Wildlife Refuge in central Wisconsin. Nesting begins in April with incubation lasting 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 and 2015, 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.

Deer Occupation on an Island Versus Mainland Site

Jeremiah Ulrich
Major: General Resource Management

The objective of the project is to determine the relative abundance of white-tailed deer and predators of deer on an island, as compared to a similar habitat on the mainland. Examining predator detection on the island, as well as deer detection, will give us an idea of deer occupation. Randomly placed cameras will be used to indiscriminately detect deer and predators at both sites. Due to the island's proximity to the mainland it is unlikely that there is any standing carnivore population, but it is possible that the island is visited by predators opportunistically. If the island's predator abundance is relatively lower than the mainland's it stands to reason that deer are more likely to remain there for longer periods of time, and thus could have a potentially greater impact on plant life. Conversely, if the predator abundance is similar or higher, that would indicate that the reason for differences in plant life on the island may be something other than deer. Early results indicate that there are significantly more deer on the island than the mainland site.

Poster
Advisor: Dr. Cady Sartini

Effects of Water Temperature on the Distribution of Salmonids in Cold Water Tributaries to the Snake River with a Focus on Salvelinus confluentus

Kennan Bruening
Major: Fisheries

Salmonid distributions in headwater mountain streams of Eastern Oregon are driven by both biotic and abiotic factors. Resident fish distributions are especially susceptible to fluctuations due to their small suitable habitat area and limited resource availability. More information about the distributions of salmonids in mountain streams is needed to fully understand their interactions. Therefore, the objectives of this study were to determine if Salmonid distribution changed from 1994 to 2013 and to determine the effect of water temperature and natural barriers on salmonid distribution. A summer electrofishing survey was conducted on Clear Creek in Baker County, Oregon. Catch data and average river kilometer (RKM) of Bull (*Salvelinus confluentus*), Rainbow (*Oncorhychus mykiss*) Brook Trout (*Salvelinus fontinalis*) and Bull x Brook Hybrids was compared between years using t-tests Bull (t = , d.f. = P =) and Rainbow Trout (t = , d.f. = P =) distributions changed significantly but Brook Trout (t = , d.f. = P =) and Brook Trout x Bull Trout hybrids (t = , d.f. = P =) did not. Average RKM of Bull Trout shifted nearly 3 km upstream over the past 20 years. Bull Trout catch per unit effort increased as average daily temperature decreased and RKM (upstream) decreased. The shift in distribution of Bull Trout upstream suggests that the downstream temperatures may be unsuitable for Bull Trout.

Oral
Advisors: Dr. Justin VanDeHey
and Richard Wilkison
Consider for Judging

Cavity Proximity in Relation to Gray Squirrel Capture Success in Sandhill Wildlife Area, Babcock, WI

Left: **Shaylee Church** (Wildlife Ecology: Research and Management)
Right: **Nathan Klopmeier** (Wildlife Ecology: Research and Management)

The eastern gray squirrel (*Sciurus carolinensis*) is an important game species in many states. In Wisconsin, the hunting season for eastern gray squirrels is open between mid-September and late January. Since 2012, research in Sandhill Wildlife Area, Babcock, Wisconsin, has been focused on the live capture of eastern gray squirrels in consistent trapping grids. Individual trap row and number are recorded with each capture. Some traps exhibited more frequent captures than other traps. These traps were denoted as "hot-spot" traps. Cavities and dreys were surveyed around each trap in our grid to determine trap proximity to available den sites. We hypothesized that hot-spot traps would have a greater proportion of cavities and dreys in close proximity to them than the less active traps would. Research and statistical analysis are ongoing. If we identify certain locations in proximity to cavities and dreys, we may be able to determine more successful grid locations and help optimize squirrel hunter success rates.

Oral
Advisor: Dr. Shelli Dubay and Dr. Jason Riddle
Consider for Judging

Potential effects of Gapeworm on Greater Prairie Chickens (*Tympanuchus cupido*) in Central Wisconsin

Left: **Jacob Shurba** (Wildlife Ecology and GIS)
Right: **Anna Schneider** (Wildlife Ecology and Biology)

The Greater Prairie Chicken (*Tympanuchus cupido*) is a state threatened species and overharvest from poaching and hunting decreased species abundance in the early 1900's. Currently, predation and anthropogenic sources of mortality threaten chickens in Wisconsin. From 2013-2016, a graduate research project was aimed at identifying nest and brood survival of prairie chickens in central Wisconsin. Female chickens were radio-marked and dead chickens were collected for necropsy. In 2015, one prairie chicken female necropsied at the National Wildlife Health Center in Madison, WI had a high intensity of gapeworm (*Syngamus trachea*), a gastrointestinal parasite. We hypothesized that gapeworm infection would be common in prairie chickens from central Wisconsin. Adult gapeworms produce eggs in the trachea of birds, and eggs are released in bird feces. The infective larvae hatch and are eaten by earthworms or other invertebrate paratenic hosts. These invertebrates are then eaten by birds and the cycle begins again. We necropsied 13 chickens and 3 (23%) had gapeworm infections. The intensities ranged from 5 to over 75 worms in one bird. Gapeworm infection might influence the health of individual prairie chickens, but additional research is needed to fully identify the effects of gapeworm on populations of chickens in Wisconsin.

Oral
Advisors: Dr. Shelli Dubay and
Dr. Jason Riddle
Consider for Judging

Effects of Culling and Lion (*Panthera leo*) Reintroduction on a Black-backed Jackal (*Canis mesomelas*) Population in Mountain Zebra National Park, South Africa

Left: **Emma Doden** (Wildlife Ecology: Research and Management)
Right: **Margaret Nannenhorn** (Wildlife Ecology: Information and Education)

Two male lions (*Panthera leo*) were reintroduced in April 2013 to Mountain Zebra National Park (MZNP), South Africa to increase the biodiversity of the park and draw in more tourists. In January of 2013, just prior to the release of the lions, and again in January of 2015, wildlife students from the University of Wisconsin-Stevens Point conducted research in MZNP. On both trips sixteen trail cameras were set in a 4x4 grid formation for 6 days. Each trail camera was placed near the center of its 4 km2 grid cell in an area likely to capture animal movements, such as along game trails, roads, or drainages. Black-backed jackal (*Canis mesomelas*) scat surveys were also conducted to determine average deposition rate per kilometer road in each camera grid cell. Previous studies determined the reintroduction of lions did not alter the spatial or temporal distribution of most species throughout the camera grid, with jackals being the exception. A shift in camera clusters of highest jackal activity was observed, however lions may not have been the primary driver. Data analysis will include t-tests of independence, Fisher's exact test, and multi-response permutation procedure (MRPP) to assess these effects. We will discuss the factors that impacted the jackal population between the two study periods.

Oral
Advisor: Dr. Eric Anderson
Consider for Judging

Determinants of Composting Behavior in College Students

Amanda Kyle
Major: Biology
Minor: Environmental
Education and Interpretation

Recently, both Lower DeBot Dining Center and the UWSP residence halls have implemented composting programs. Even though both programs have had initial success, one question still remains: What actually influences an undergraduate student to compost or not? Although there have been some studies, none have focused on college students as a target audience. College students are in end stages of forming their beliefs and values, and social pressures may have a greater influence on their behaviors and decisions. The purpose of this research is to investigate what influences a college student's decision to compost or not to compost their food waste. This will be determined by a survey questionnaire e-mailed to participants. Descriptive and inferential statistics will be used to analyze the data. It is expected that the data will show relationships between composting behavior and student's attitudes toward composting. It is also expected that students who do not compost do so because of lack of convenience or poor marketing, influences that can be easily remedied. Residential Living, the UWSP Office of Sustainability, other university departments and a broader audience beyond the University can use the results of this study to tailor marketing and implementation of future composting programs.

Oral
Advisor: Dr. Becca Franzen
Consider for Judging

Black Bear Home Range Response to Dog Training in Northern Wisconsin

Janel Scharhag
Major: Wildlife Ecology

Hunting of the American Black Bear (*Ursus americanus*) with the use of dogs is a popular sport in the northern third of Wisconsin. Hunters have a period during which they are allowed to train their dogs on public land by chasing live bears. This type of dog training is viewed as a low level, human predation disturbance on black bear (Stillfried et al. 2015). I hypothesized dog training would result in larger home ranges and shift the home range centroid of black bear. The black bears in this study (n=7) were radio collared female bears in the Chequmegon-Nicolet National Forest near Clam Lake, WI. This area receives high dog use during training season. During the summer of 2015 bear locations were obtained by radio telemetry prior to and during the dog training season. Home ranges for each of these periods were estimated using the Minimum Convex Polygon method and tested as a paired sample. The results showed that the areas of the home ranges were significantly larger, by 4,163 acers ($p = 0.026$), during the dog training season. On average the home range centroid shifted 2 kilometers between the pre-training season and the training season but we cannot conclude that this was the result of dog training because other environmental factors such as resource availability could have covaried during this period.

Poster and Oral
Advisor: Dr. Tim Ginnett
Consider for Judging

Plover River Watershed Preservation Research

Sean Piette
Major: Land Use Planning

Poster and Oral
Advisor: Aaron Thompson
Consider for Judging

The goal of this Project is to develop and disseminate materials and educational programs that inform and encourage private landowners to utilize voluntary conservation options as a means to protect priority lands in a Watershed that provides wildlife habitat, ecological services, and recreational opportunities.The Plover River Watershed is a valuable ecological resource to central Wisconsin, providing wildlife habitat, ecological services, and recreational opportunities that enhance the lives of residents. With much of the Watershed privately owned, decisions made by these owners can have long-reaching impacts on the ecological, social, and economic benefits the Watershed provides to all stakeholders.

Differences in Parental Care Behavior Between Whooping Cranes (*Grus americana*) and Greater Sandhill Cranes (*Grus canadensis tabida*) at Necedah National Wildlife Refuge

Poster and Oral
Advisors: Dr. Shelli Dubay and Jessica Jaworski
Consider for Judging

Elizabeth Hill
Major: Wildlife Ecology: Management and Captive Wildlife

Andrew Sella
Major: Wildlife Ecology: Management and Biology

Whooping Cranes (*Grus americana*) are federally endangered with an experimental population reintroduced into Necedah National Wildlife Refuge (NNWR) in Wisconsin in 2001. Cranes released in the Refuge are born and raised in captivity. To prevent improper imprinting, captive cranes are raised be people wearing crane costumes. How behaviors of captively-raised whooping cranes differ from wild cranes is unknown. Both whooping and greater sandhill cranes (*Grus canadensis tabida*) in this population breed in NNWR. Breeding begins in April and colts hatch approximately 30 days after eggs are laid. We evaluated parental care of whooping and Sandhill cranes after colts hatches but remained at nest sites. We hypothesized that wildlife Sandhill cranes would care for colts better than captively-raised whooping cranes, using time away from nest and time spent brooding colts as indices of parental care. Cameras were placed at nests and took one photo every 5 minutes to help identify parental care behaviors. Pictures were sorted and then individually tagged with behaviors exhibited by the birds at the nest. We are using photographs from 26 whooping crane and 21 sandhill crane nests for comparison. Analyses are ongoing, but we will use the percent time each crane pair spend brooding, away from nest, etc. per day in statistical tests. We will use a three-way nested factorial ANOVA with subsampling to identify differences in behavior by species. Our results will inform management at NNWR regarding parental care of whooping crane colts since mortality on the Refuge exceeds 99%.

The Effect of Urbanization on Parasite Abundance and Species Richness in Urban Versus Rural Eastern Cottontail Rabbits (*Sylvilagus floridanus*)

Left to Right: **Bridget Walker** (Wildlife Ecology: Research and Management, Biology and Captive Wildlife Management), **Brandon Stedman** (Wildlife Ecology: Research and Management) and **Elizabeth Hill** (Wildlife Ecology: Research and Management and Captive Wildlife Management)

Poster and Oral
Advisor: Dr. Cady Sartini and Dr. Shelli Dubay
Consider for Judging

Population density influences parasite transmission among individuals in a population. Wildlife in urban environments are often found at higher densities than their rural counterparts. As a result, urbanization may impact wildlife by increasing parasite transmission rates. We aimed to identify if abundance and species richness of parasites differs in Eastern cottontails based in urban or rural environments. We hypothesize that Eastern cottontail feces collected in urban environments would contain a greater number of species and higher intensity of parasites than feces collected from a rural environment. We will collect 25 fecal samples from different locations within the city of Stevens Point and 25 fecal samples from rural areas surrounding the city. We will discuss the ecological implications of high parasite levels in Eastern Cottontail rabbits.

White Noise Disturbance and Pair Bond Strength in Zebra Finches (*Taeniopygia guttata*)

Ashley Steadman
Majors: Wildlife Ecology and Biology

Environmental white noise affects song bird populations because it has the ability to mask any vocalization within the frequency range of the white noise envelope, thus it can mask important vocalizations that signal location, attract mates, and defend territories. For many social species, such as the zebra finch (*Taeniopygia guttata*), vocal communication plays a vital role in mate attraction, but less is known about the role of vocal signals in pair bond maintenance. If vocalizations play an important role in pair bond maintenance, then environmental white noise exposure may degrade established pair bonds. A repeated white noise disturbance treatment was applied on five established zebra finch pairs and a no noise treatment was applied on five other established zebra finch pairs at the University of Wisconsin-Stevens Point's Animal Care Facility. We then measured pair bond behaviors with the partner and with a novel opposite-sex individual (as a fidelity test). Mann Whitney U tests were used to determine if there are any significant differences in the means of specific pair bond behaviors with and without white noise exposure. My results did not show significance in pair bond degradation from white noise exposure. However, there is a trend with males that were exposed to white noise increasing the duration of clumping with their new partners. This experiment will ultimately give us a new perspective on how repeated white noise can affect song bird populations.

Poster and Oral
Advisor: Dr. Sarah Alger
Consider for Judging

Group Size and Vigilance Behavior of Wildlife at Anthropogenic Food Waste Sites

Nathaniel Rice
Major: Wildlife Ecology and Mangement

Marco Mascitti
Major: Wildlife Ecology and Management

Poster and Oral
Advisor: Dr. Cady Sartini
Consider for Judging

The group size effect suggests that individual animals are less vigilant as group size increases. However, in some instances group size has been positively correlated with vigilance suggesting that vigilance varies with species composition and group size. Vigilance behavior in animals can be affected by a variety of additional factors such as quantity and quality of forage, proximity to disturbance, and kleptoparatism. The extent to which species share vigilance behavior is largely unstudied. However, individual species could benefit from the vigilance of other species present. We used camera traps to collect images of wildlife foraging at two anthropogenic compost sites. We defined vigilant animals by their head position: if the animal's head was up it was scored vigilant, if the head was down it was scored non-vigilant. We expect to see a decrease in vigilance as conspecific group size increases. We also expect to find a decrease in vigilance as interspecies group size increases. This information is pertinent because of a lack of consensus in the existing research regarding group size and vigilance. Additionally, as urban interfaces expand, information regarding wildlife behavior in human-altered habitat is increasingly necessary.

Analysis of Microbeads Presence in Gastrointestinal Tract of Duck Species of Central Wisconsin

Trent Delehanty
Major: Wildlife Ecology

Brandon Johnson
Major: Wildlife Ecology

Not Pictured: **Connor Selvey and Matthew Parsons**
Majors: Resource Management Law Enforcement

Microbeads and micro plastics are small plastic debris polluting water systems around the world. The size of these plastics are five millimeters or less, and can elude traditional waste water treatment practices and be flushed into the environment. Our study focused on the presence of these plastics within duck species in the state of Wisconsin, specifically harvested within Portage and Winnebago counties. We categorized ducks based on species and feeding habitats; dabbling or top feeding ducks, and diving or predatory ducks. Our study focused on these feeding habits and if they would impact the presence of plastics within ducks gastrointestinal tracts (GI tract). Our sample included a total of 68 ducks: 49 of which were dabbling, and 19 were diving. These ducks were taken to the lab and the GI tract was examined to determine if plastics were present. Using a Chi-Square test for heterogeneity we determined that there was no statistical evidence supporting the feeding habits resulting in higher presence of plastics within our sample. If the results showed statistical evidence, management actions could have been applied to limit the accumulation and presence of these plastics within waterfowl species based upon feeding habits.

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

Analysis of Potential Brood Sources for Wisconsin Brook Trout Propagation

Bradley Erdman
Majors: Fisheries and Biology
Minors: Aquaculture and Water Resources

Poster and Oral
Advisors: Keith Turnquist and Brian L. Sloss
Consider for Judging

The Wisconsin Department of Natural Resources' (WDNR) Brook Trout propagation program seeks to increase Brook Trout abundance by means of stocking for both remediation and recreational purposes. Brook Trout propagation in Wisconsin has historically relied upon numerous sources and genetic strains; recently, Ash Creek has served as the primary brood source for statewide propagation needs. A decline in Brook Trout abundance in Ash Creek has prompted the WDNR to examine other potential brood sources consistent with stock-based management. From a genetic conservation perspective, two criteria are important to consider when exploring potential brood sources: 1) they should display levels of genetic diversity consistent with naturally-recruiting Brook Trout populations in the region/state, and 2) when genetic structure is detectable among watersheds/regions (consistent with genetic management units or stocks), the alternative source should be genetically consistent with Brook Trout populations in the management unit targeted for propagation. Our objectives were to develop a set of easily quantified and measurable genetic diversity metrics potential brood sources should meet to comply with stock-based management criteria, and determine if WDNR identified potential brood sources (Squaw Creek, South Fork of the LaCrosse River, Lowry Creek, Manley Creek, and Melanchthon Creek) were consistent with these criteria. We used a suite of 12 microsatellite loci to assess 42 populations of Brook Trout throughout Wisconsin and develop minimum threshold values (MTVs) for the mean number of alleles per locus, number of effective alleles per locus, expected heterozygosity, and observed heterozygosity. Bayesian admixture analysis (STRUCTURE) of the same 42 populations was also used to determine potential genetic units of Brook Trout throughout the state. By comparing the genetic diversity of the 5 potential brood sources to the MTVs and observed patterns of genetic structure among populations throughout the state, we were able to determine if potential brood sources met the aforementioned criteria and therefore, from a conservation genetics perspective, would be suitable candidates for the WDNR's Brook Trout propagation needs.

Exploring Aquaponics: Comparing Walleye (*Sander vitreus*) and Tilapia (*Oreochromis niloticus*) Production to Plant Growth and Nutrient Removal

Left to Right: **Taylor Remington** (Biology: Botany Emphasis), **Kayla Fuller** (Biology and Water Resources) and **Colton Branville** (Fisheries)

Aquaponic systems are recycled aquaculture systems consisting of hydroponic plants utilizing the nitrogen cycle. In aquaponics, water circulates between vegetable grow beds and fish tanks. Suspended and dissolved wastes generated by fish are converted to plant nutrients using mineralization and nitrifying bacteria. Aquaponics does not require soil; therefore, marginal land can be utilized to sustainably produce fish and vegetables. Plants require many micro- and macro- nutrients, which are supplied from fish waste. Following nutrient removal by plants, fish receive the plant-filtered water. To date, tilapia (*Oreochromis niloticus*) have been the only fish studied in aquaponic systems, so this project is examining walleye (*Sander vitreus*). We studied three replicate walleye and tilapia systems to compare water chemistry along with plant and fish growth. The water chemistry parameters measured were ammonia-N, nitrate-N, nitrite-N, ortho-phosphate, sulfate, iron, copper, nickel, potassium, molybdenum, alkalinity, hardness, and pH. Both repeated measures and two-factor tests were used to compare plant and fish growth differences, respectively. The walleye were fed a carnivorous diet with a high protein level derived from animal meal, and the tilapia were fed an omnivorous diet with a lower protein level derived from a mixture of animal and plant meal. Therefore, we anticipate that there will be differences in water chemistry based on nutrient composition that will differentially affect plant growth. Since modern aquaponics is a fairly new field of agricultural technology, there is still much to learn about the efficiency of different species and how we can maximize production.

Poster and Oral
Advisor: Chris Hartleb
Consider for Judging

Development and Validation of Leaf Area and Biomass Models for Urban Trees

Left: **Megan Eames** (Urban Forestry)
Right: **Jackson Beck** (Forest Managment)

Many studies use the i-Tree Eco/Urban Forest Effects (UFORE; hereafter i-Tree model) model developed by US Forest Service to estimate ecosystem services. In the past several studies have been conducted acting upon the assumption that relationships the i-Tree model uses are applicable to sites that vary in species, site, climate, and environmental conditions. Our goal is to test the accuracy of leaf area and biomass models in i- Tree, when used outside the region in which it was developed. To do this, we measured 74 urban trees (including five species) in Stevens Point, Wisconsin collecting data such as diameter at breast height (dbh), tree height, height to the base of live crown, and crown width, crown volume, leaf area ,and leaf dry weight biomass . Using the data we developed two models each to predict leaf area and biomass: 1) as a function dbh and shading factor 2) as a function of crown variables. Using ten independent samples, we compared our predictions with predictions from the models used in i-Tree. For both dbh model and crown model, i-tree models had much higher prediction error than local model – root mean square error of prediction for i-tree leaf area and biomass models (dbh model) was more than 200% higher than our locally developed models. The difference in prediction will ultimately affect ecosystem services estimation using i-Tree and future studies should acknowledge the difference.

Poster
Advisor: Nilesh Timilsina
Consider for Judging

Variation in Fall Plant Species Diversity within and Bordering Ephemeral Ponds of Schmeeckle Reserve

Poster
Advisor: Dr. Michael Demchik
Consider for Judging

Kurt Bennett
Major: Forest Ecosystem Restoration and Management

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. Theses ponds are inundated with water in the spring, due to snowmelt and spring rain. The ponds will then dry out during the summer, and some will again become inundated during the fall. The difference in the moisture regime, compared to the rest of the forest, causes the formation of a unique habitat that supports a variety of vegetation not otherwise found on the forest floor. The Chilla Woodlot of Schmeeckle Reserve has many small ephemeral ponds. Currently there is no data that shows what species are growing in these ephemeral ponds nor is there data that shows how there biodiversity differs from that of the rest of the forest floor. The goal of my research was to determine the species and species diversity of fall vegetation growing in Schmeeckle's ephemeral ponds and compare to that of the vegetation growing past the edges of the same ponds. To conduct this experiment 20 ephemeral ponds in the Chilla woodlot were selected, and in the middle of the fall growing season the vegetation in and along the edge of the ponds were inventoried by random placement of 1 square meter plots. The findings were then combined and tabulated and the variation in plant species diversity of the two conditions were found.

Fire and Thinning Effects on Vegetation of the Great Lakes Region

Lauren Steinkamp
Major: Ecosystem Restoration and Management and Conservation Biology

John Foshag
Major: Wildland Fire Science

Poster
Advisor: Dr. Ron Masters
Consider for Judging

The purpose of this study was to examine patterns of species richness, relative abundance, and percent cover of the understory plant community in Red Pine and Mixed Pine-Hardwood stands of Northern Wisconsin. Baseline data was collected in the summer of 2013. Eight combinations of thinning and fire frequency were applied in a completely randomized design across 24 two-acre experimental units. Quadrat sampling was used in twelve plots within each of the twenty-four units. We calculated species density, frequency, percent cover, richness, diversity, evenness, and Bray-Curtis Similarity index for herbaceous species. We tested for treatment differences using the Kruskal-Wallis test with mean separation by Tukey's test. We also used regression techniques to examine the relationship of individual species with over story canopy cover, fire frequency and other environmental variables. We observed 212 species of herbaceous and woody plants on the study area. Because treatments have just been applied the plant community is still in a state of flux. We did find that average species richness per m^2 decreased significantly ($P<0.05$) in both the TNB and TF2 treatments. Percent cover of functional groups showed an increase in bare soil and grasses in treatments exposed to fire, along with a substantial decrease in cryptograms ($P<0.05$). Community similarities are starting to segregate between treatments without fire exposure and treatments with fire exposure. Currently, the thinning practices and stand dominants (mixed conifer-hardwood or red pine) have a greater impact on herbaceous understory communities than fire regimes.

Small Mammal Community Dynamics in Red Pine and Mixed Conifer Hardwood Stands

Lauren Steinkamp
Major: Ecosystem Restoration and Management and Conservation Biology

John Foshag
Major: Wildland Fire Science

Not Pictured: **Mike Jungen**
Major: Wildlife Ecology

We examined the initial influence of thinning, fire season and fire frequency on small mammal community dynamics. This study was composed of eight replicated treatments randomly assigned to 24 units. We used Sherman live traps to capture small mammals for 2,304 and 2,016 trap nights in 2014 and 2015 respectively. In 2014 we captured 12 species with a total of 337 captures. In 2015, we captured 484 small mammals representing 9 species. In 2014, the most abundant species captured was the red-backed vole (*Myodes gapperi*). The most abundant mammal caught in 2015 was the eastern chipmunk (*Tamias striatus*). Species richness varied from a low of two, to a high of six in an experimental unit. Our data suggests Over three years of burning, a significant increase in eastern chipmunk and red-backed vole has occurred in 2015. The results suggested a positive association between small mammal species richness and percent cover of coarse woody debris. Eastern chipmunk (*Tamias striatus*) presence was positively associated with plant species richness, while negatively associated with higher trees per acre. Our early results suggest that thinning and burning may increase mammal diversity.

Poster
Advisor: Dr. Ron Masters
Consider for Judging

A Comparison of Scent-post Stations and Camera Trap Surveys as Methods to Detect Canids and Other Species in Central Wisconsin

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

Poster
Advisor: Dr. Eric Anderson
Consider for Judging

The Canine Project of the Wildlife Society Student Chapter is exploring two methods - scent-post stations and camera trap surveys - for detecting the presence and relative abundance of various canids and other species. The canid species of interest include gray wolf (*Canis lupus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and gray fox (*Urocyon cinereoargenteus*). Data were collected in George W. Mead Wildlife Area in Milladore, WI from April 19 - May 1, 2015 and October 18 - 30, 2015. A transect of ten scent-post stations was constructed for each sampling period, with one scent-post station placed every 0.2 miles on alternating sides along a straight dirt road. Trail cameras were positioned at 5 scent-post stations in such a way that animals both using the scent station and simply passing by on the road would be detected. Trail cameras were only able to be placed at the 5 scent stations that had trees nearby to facilitate the installation of the cameras. One aspect we will focus on is comparing the detection capabilities of scent stations and camera trap surveys. We will analyze the trail camera and scent-post station data to determine if an event was captured solely with the trail camera or also detected at the scent-post station. The benefits and detriments of both methods for indexing canid population size in an area will be assessed.

Evaluation of the Moses Creek Restoration

Left to Right: **Solimar Garcia** (Forest Ecosystem Restoration and Management), **Isaiah Stone** (Forest Ecosystem Restoration and Management) and **Allison Earl** (Forest Ecosystem Restoration and Management)

The Wisconsin Department of Transportation restored Moses Creek in 2010/11 to mitigate a portion of the wetland loss due to the construction of U.S. Highway 10. Mitigation goals included the restoration of a diverse wet meadow, measured in part by the floristic quality index (FQI), which compares plant communities based on conservation values. Our objective was to determine if the wetland status of Moses Creek had improved since the first growing season after restoration.

To assess progress, we recorded percent cover by species within forty-three 1 x 0.5 meter plots systematically arranged in the wet meadow during September and October 2015. These plots were established and inventoried in fall 2011, and reassessed in 2012 and 2014. We analyzed our data to determine FQI, total vascular plant richness, percent of native species, percent of wetland species, and total cover. We compared data to previous inventories in order to determine the status of the community and its progression since 2011.

FQI was calculated at 21.1 in 2015, compared to 16.6 and 20.1 in 2011 and 2014, respectively. Richness decreased from 49 species in 2014 to 32 in 2015. Native species and obligate wetland species made up 94% and 96% of the community in 2015 and 95% and 36% in 2011. Average total cover was 55% in 2015 and 37% in 2011. The dominance of woolgrass (*Scirpus cyperinus*) and common rush (*Juncus effusus*) in 2015 may explain differences in richness and wetland cover.

Poster
Advisor: Dr. James Cook
Consider for Judging

Can Citizen Science be Used to Collect Data on Radio-marked Ruffed Grouse?

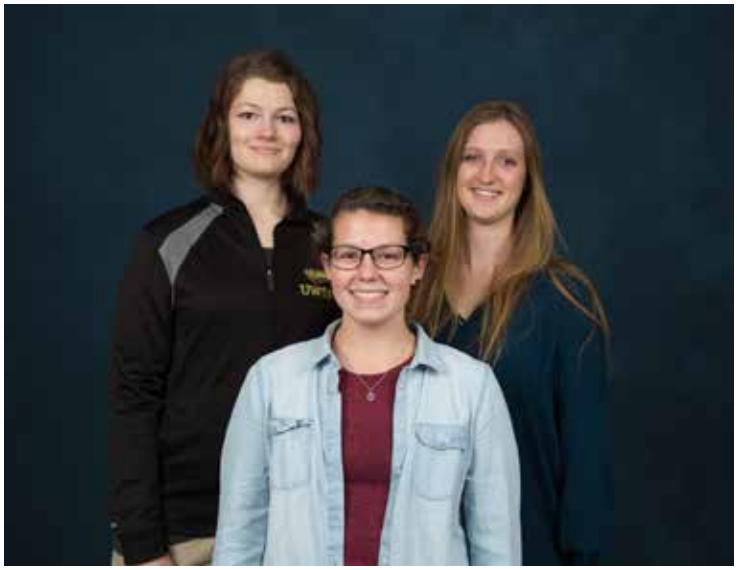
Holly North
Major: Wildlife Ecology and Biology

Trenton Rohrer
Major: Wildlife Ecology
Minor: Biology and GIS

Poster
Advisors: Dr. Shelli Dubay and Dr. Jason Riddle
Consider for Judging

Telemetry has been used to aid management via identifying home range size and habitat selection. However, telemetry studies are labor intensive and costly. Citizen science has recently been used to increase data collected for wildlife studies. We aimed to identify if citizens with minimal training could effectively locate four radio-marked ruffed grouse (*Bonasa umbellus*). Grouse were located over the summer (May-August) of 2015 by two groups, trained teaching assistants for the summer field experience and students were trained in telemetry techniques, but had little experience. Teaching assistants had individual training with wildlife faculty and research projects. We hypothesized that teaching assistants would be better able to locate ruffed grouse, as determined by the size of an error ellipse, around the estimated location. Grouse were located using telemetry receivers, compasses, and GPS units. The Program Locate III program used GPS coordinates and azimuths to determine a location and error ellipse in km^2 for each located grouse. We compared the error ellipses for the four grouse using a Kruskal Wallis Test. Error ellipse sizes didn't vary by grouse ($H_{0.05,21,20,26,10}$=7.815 P > 0.05), so locations were pooled for further analysis for the grouse. We compared the size of the error ellipse generated from locations identified by teaching assistants to those generated by locations from students using a Corrected Mann Whitney test (Z_c=0.4286 P > 0.05). We found that the teaching assistants and student's error ellipses were not statistically different. We determined that citizen science could be a potential substitute for more experience.

Indentifying Spatial and Temporal Patterns of Anthropogenic Nitrogen Deposition and the Influence on Aquatic Community Change in Wisconsin Lakes



Left to Right: **Caitlin Shaw** (Biology), **Markie Rodgers** (Biology) and **Natalie Lirette** (Water Resources)

The health of aquatic primary producers, on which all species depend, is vital to the function and services provided by freshwater. Over time, increased nutrients elicit stark changes in primary producers, particularly diatom communities, and can indicate that these aquatic systems have reached an ecological threshold. This is apparent in regions where elevated levels of nitrogen are associated with ecological shifts. We examined sediment cores from Wisconsin Lakes along a nitrogen gradient to identify temporal shifts in diatom communities. We identified regions of high nitrogen concentrations to determine if the concentrations correlated with diatom community change. We present our preliminary findings from Crampton and Pike Lakes. These results have direct implications to the wise management of the water resources on which we depend and can lend suggestions to the establishment of critical nitrogen thresholds to diminish ecological change as a result of pollutants.

Poster
Advisor: Krista Slemmons

Crop Type and Soil Texture Effects on Nitrogen Leaching from Irrigated Agroecosystems in the Wisconsin Central Sands

Amy Sandel
Major: Water Resources and Soil Science

Nitrogen (N) leaching and its effect on groundwater quality is a prevailing concern in the Wisconsin Central Sands (WCS) because of the region's distinctly sandy soils, large N fertilizer inputs, humid climate, and relatively high water table. Estimating N leaching is vital for groundwater quality management in the WCS, however it is difficult to quantify deep drainage of N from agricultural fields. The variety of crop types grown in the WCS can leach differing amounts of N because of varied fertilizer inputs needed for growth, root depth disparities (deeper root systems filter N), and crop residue differences. Soil texture can play a prominent role in N leaching as well; fine-textured soils can inhibit N leaching, while coarse soils may promote higher N levels in groundwater.

We have been conducting an ongoing experiment to better understand the drivers of N leaching from irrigated agricultural fields in the WCS. In 2014 and 2015, we collected weekly deep drainage and N fluxes (N leached at 1.4 m depth) from 24 passive capillary wick lysimeters installed in 6 irrigated fields typical of a WCS rotation (sweet corn, field corn, peas-pearl millet, and potatoes). Sampling began the spring of 2014 and has continued throughout 2015.

After significant spatiotemporal variability was observed in drainage and N leaching during 2014, we determined that crop type could not be the only driver of N leaching from WCS irrigated cropping systems. Therefore, we quantified soil texture at 0-30 cm and 45-60 cm depths adjacent to each lysimeter in 2015. We will present results from 2014 and 2015 exploring the relationship between crop type, soil texture, and nitrate leaching.

Poster
Advisors: Dr. George Kraft, Mallika Nocco and Chris Kucharik
Consider for Judging

A Historical sSudy of the Mudd Minnow (*Umbra lima*) over a 40 Year Period in Wisconsin

Left: **Adam Garlie** (Fisheries and Water Resources)
Right: **Zach Mohr** (Fisheries)

There is very little known about one of the hardiest Wisconsin minnows, the mud minnow. Mud minnows are found throughout the state in a wide variety of habitats and are thought to spawn in the summer months. Gaining an understanding about the spawning and physical condition of mud minnows could be an important indicator of the overall health and diversity of Wisconsin's freshwater bodies. The goal of this research was to determine a length weight relationship along with a fecundity estimation. We also had a goal of determining relative spawning times. This historical data will give us an insight on a species that has been understudied.

Poster
Advisor: Justin Sipiorski
Consider for Judging

Relationships Between Home Range Size, Age and Habitat Quality for Ruffed Grouse in Wisconsin

Left to Right: **Samuel Lau** (Wildlife Ecology), **Jeffrey Williams** (Wildlife Ecology), **Benjamin Tjepkes** (Wildlife Ecology and Biology) and **Holly North** (Wildlife Ecology and Biology)

Poster
Advisor: Dr. Jason Riddle
Consider for Judging

The ruffed grouse (*Bonasa umbellus*) is a crucial game species in Wisconsin and over the last 3 years, co-leaders with the ruffed grouse project through the student chapter of The Wildlife Society have trapped and radio-marked male grouse at drumming sites. Male ruffed grouse drum in spring to attract mates, and defend territories with appropriate drumming sites. Juvenile males, that have not yet secured territories, have larger home ranges than adults. Radio-marked animals have been located to quantify home range size for male grouse on Treehaven property. We aim to compare home range size of adult male grouse to home range size of juvenile grouse to test the hypothesis that juvenile males have larger home ranges than adults. In addition, we hope to evaluate habitat quality of radio-marked grouse and compare home range size to habitat quality. To assess the home ranges of the grouse, we will trap additional grouse and radio-mark them with necklace collars. We will follow grouse from April through August to identify home range size. Grouse select habitats with young aspen, oak-hickory stands, and balsam fir. To analyze the habitat, we will look specifically at the drumming log, taking measurements of the log, density of the surrounding trees, and groundcover. We will establish a grid surrounding the log and record measurements of the tree and ground cover. We also will collect habitat data at random locations in the home range. We will identify relationships between home range size and habitat quality.

Impacts of Delineation Methods on Curve Number Runoff in Watersheds Containing Internal Drainage

Left: **Brandon Lee** (Water Resources)
Right: **Katherine Miller** (Hydrology)

Accurate watershed delineation is necessary in order to manage surface waters. For many landscapes a topographic model is appropriate, but landscapes with internal drainage (e.g. wetlands and many agricultural land uses) will not be well represented by topographic delineation methods. In this study, I will be evaluating three GIS delineation methods by comparing modeled runoff based on the delineation to the observed runoff from a USGS gage. The three delineations methods: Fill, Cut, and Potential Contributing Source Areas (PCSA) consider internal drainage differently. The Fill method is based on topography and does not consider internal drainage. The Cut method simply cuts out depressions in the topography assuming they represent internal drainage, and the PCSA method builds the watershed delineation outward from known stream locations. I will evaluate ten storms for ten watersheds with agricultural land use ranging from 25-85%. I hypothesize that as agricultural land use increases, the PCSA method will represent the observed runoff more accurately.

Poster
Advisor: Dr. Katherine Clancy
Consider for Judging

Parasite Presence of the South Dakota Nature Conservancy Free-roaming American Bison (*Bison bison*)

Lisa Zoromski
Major: Wildlife Ecology: Research & Management
Minor: Biology

The Samuel H. Ordway Jr. Memorial Preserve owned by The Nature Conservancy in Leola, South Dakota, manages a herd of approximately 300 bison. The Ordway bison have free-range to 3,030 acres of Leola prairie in the prairie pot-hole region. Ordway prairie had never conducted a parasite examination of the bison herd before. For the past 10 years, researchers coordinated through the Gustavus Adolphus College in Minnesota performed summer bison behavioral studies. This research accustomed the bison to a truck and allowed the unique ability to obtain fresh fecal samples of bison with known age, sex, and identification. From August 10-20th, 2015, forty-nine fecal samples were collected (9 adult bulls, 19 cows, 14 yearlings to three year olds, and 7 calves). Fecal floatation tests were performed to identify presence of parasite species. Results from this study will provide future management implications for controlling parasitism in the herd, and comparisons of parasite presence over different bison age classes.

Poster
Advisor: Dr. Todd Huspeni
Consider for Judging

Comparison of the Vegetation in a Burned and Unburned Wet Meadow

Poster
Advisor: Dr. James Cook
Consider for Judging

Caitlin Alba
Major: Ecosystem Restoration and Soils

Kelsey Forrest
Major: Ecosystem Restoration and Wildlife

This study compares the effects of a late season burn on the vegetative composition of a wet meadow community in the Mead Wildlife Area. Careful monitoring of the changes in vegetative composition pre- and post-burn can help determine whether the results of the current fire regime align with the management objectives. Data was collected from two plots, one burned and one unburned. This data was compared to data collected the year prior to the burn from different plots within the same areas. Data was collected at each site by randomly selecting a starting point and running three parallel transects spaced 100 ft. apart, each with 10 sample points spaced 100 ft. apart. Vegetation was sampled by estimating the percent cover in a 1-meter x 0.5-meter quadrat. The burned site had 61.6% invasive cover, a 13.3% decrease from the previous year. In contrast, the unburned site had only 9.9% invasive cover, a decrease of 6.6% from the previous year. A Bray-Curtis similarity test revealed that the overall structure of the two sites remained equal.

A Survey of Common Parasites in Greater Prairie Chickens (*Tympanuchus cupido*) of Central Wisconsin

Left: **Shanell Budleski** (Wildlife Ecology and Management and Biology)
Right: **Emily Weiler** (Fisheries)

The Greater Prairie Chicken (*Tympanuchus cupido*) is a state threatened species. Overharvest from hunting and poaching caused significant declines in prairie chicken populations in Wisconsin. In 2013, a graduate project was initiated to identify nest and brood survival rates for prairie chickens in central Wisconsin. Female chickens were radio-marked and chicken carcasses were collected after death. Prairie chickens can be affected by gapeworm (Syngamus trachea), a gastrointestinal parasite, but how parasites affect prairie chickens in central Wisconsin is unknown. We aimed to identify ectoparasites and endoparasites of greater prairie chickens to identify any management concerns for the species in Wisconsin. We hypothesized that parasites would be common in prairie chickens. We necropsied 13 prairie chickens and parasites or fly larvae were identified in 7 (54%) of the birds. Gapeworm was present in 3 (23%), gizzard worms of unknown species were found in 2 chickens (15%). Two chickens (15%) had larvae of a Dipteran species of fly inside the GI tract, and a single chicken had a chewing louse located in the lung (8%). Gapeworm infection may affect survival of individual prairie chickens, but additional research is needed to determine if these parasites affect chicken populations.

Poster
Advisor: Dr. Shelli Dubay
and Dr. Jason Riddle
Consider for Judging

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

Poster
Advisors: Dr. Robert Michitsch, Dr. Jacob Prater and Dr. Bryant Scharenbroch
Consider for Judging

Left to Right: **Erik Halverson** (Soil and Land Management), **Derek Potratz** (Soil and Land Mangement) and **Zach Leitner** (Soil Science)

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 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. Fields were broken up into five acre parcels and grid points were allotted to each parcel. 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 results will be presented at CNR research symposium in 2017.

Impacts of Gypsum Applications on Phosphorus Availability in Soil

Aaron Pershern
Major: Soil and Land Management

Alec Dix
Major: Soil Science

Gypsum applications to farm lands have been useful because they can improve soil physical properties by strengthening soil structure and increasing water holding capacity. Gypsum can also help increase calcium and sulfur availability without affecting soil pH (acidity). This is unique because other applications that increase calcium and sulfur affect soil pH. Gypsum has many good qualities; however few tests have been done to determine the negative effects of gypsum applications. Jason Zilisch, a farmer in Amherst WI, has begun using gypsum applications and noticed yield loss and some signs of phosphorus deficiency in his crops. He believes the yield loss is related to the lack of phosphorus in his plants even though his soil tests indicate there is plenty of phosphorus. Our goal in this research project is to determine the relationship between gypsum application rates and phosphorus availability in soils testing at optimum levels for phosphorus. This is a greenhouse based experiment intended to replicate standard corn production. Through soil and plant chemical tests we hope to find some significant results that will better our understanding of gypsum and potentially its limitations in agriculture.

Poster
Advisor: Dr. Jacob Prater
Consider for Judging

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

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

Poster
Advisor: Dr. Ron Masters, Dr. James Cook and Dr. Mike Demchik
Consider for Judging

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 stand of jack pine (*Pinus banksiana*) on the perimeter and completely open in the center to represent the basal area of a pine barren. SER will be seeding a mixture of wild lupine, combined with other nectar producing flowers and native forbs. The study area is composed of five equal size plots that will receive different prescribed fire treatments to prevent encroaching woody vegetation. Pre and post vegetation sampling will be conducted to monitor the abundance of desired plant species in each plot. The butterfly population will and be completed during the two flights of its life cycle using transects.

Invertebrate Abundance Sampling on Different Management Types Found at Buena Vista Grasslands

Eric Canania
Major: Wildlife Ecology: Research & Management
Minor: Biology

Not Pictured: **Brittany Henderson**
Major: Wildlife Ecology: Research & Management

Poster
Advisor: Dr. Eric Anderson
Consider for Judging

The greater prairie chicken (*Tympanuchus cupido pinnatus*) was once found from the Great Plains to the east coast, but due to overexploitation of grassland habitat, this species has disappeared from much of its native range and is currently threatened in Wisconsin. Buena Vista Grasslands, located in Portage County, Wisconsin, is home to the last stronghold of prairie chickens in the state. These birds exhibit a high percentage of nest/brood mortality due to predation, but it has also been speculated that early brood mortality could be due to lack of food resources in the form of invertebrate abundance. Our objective was to determine if various management techniques could express a difference in invertebrate abundance at the Buena Vista Wildlife Area. Swoop netting was used to gather invertebrates on 5 management types (rotationally and continuously grazed, Rx burned, and commercial Ag fields, and fields with no active management for 5+ years). A significant difference in the average number of invertebrates found between each management type was determined using a one way ANOVA (alpha = 0.05, 4 df, F =136.068), while a Student-Newman-Keuls (SNK) post hoc test was used to categorize each management type from highest average number of invertebrates sampled to the lowest. The rotational grazed field^{A} exhibited the greatest number of average invertebrates, while the Rx burned^{B}, continuous^{B}, and no management fields^{B} tied for second, with the agricultural field^{C} coming in last. Future research might consider examining differences in invertebrate biomass between such management types as game bird brood survival tends to increase with mass gain.

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

Poster
Advisor: Dr. Bryant Scharenbroch
Consider for Judging

Simon Stevenoski
Major: Waste Management and Soils

Greenroofs are gardens containing various plants on top of a structure that help to improve energy use efficiency and provide additional space for ecosystems to develop in urban areas. Due to structural limitations for weight, natural soils cannot be used on roofs. Instead lightweight aggregate soils are used, which have a limited ability to retain water and nutrients, however improvements may be attainable with amendments like biochar. Biochar is a charcoal-like substance that has been created through the process of pyrolysis. Some studies have found biochar to improve nutrient and water retention, but none have examined biochar in a greenroof system. Waste biosolids from wastewater treatment were the chosen organic material to be pyrolysized. Using biosolids for this purpose helps to divert them from landfills while potentially improving greenroof conditions.

For this experiment six greenroof mesocosms were constructed and each fitted with a greenroof drainage system. Each mesocosm contains clean greenroof substrate (control) and three amendments, biosolids at 5%, biochar at 5% and biochar at 20% by volume. Each of the 24 units has its own collection system to collect leachates that percolate through the media. Leachate quantity and quality (pH, electrical conductivity, nitrate and phosphate) is also being measured. Sunflowers (*Helianthus annuus*) were chosen as the test plant due to their fast growth and potential to phytoremediate. Quantitative and qualitative measurements of sunflower growth and health are being collected. At the experiment end each soil treatment will be analyzed for physical and chemical characteristics, such as pH, moisture retention, conductivity and nutrient levels.

Areas of Potential Phosphorus Loading in the Pecatonica River Watershed

Left to Right: **Chase Bayer** (Geoscience: Environmental Analysis, GIS and Geology), **Kirsten James** (Hydrology, Business and GIS) and **Katherine Miller** (Hydrology and Soil Science)

Poster
Advisor: Tim Kennedy
Consider for Judging

Phosphorus is exported from the landscape due to its tendency to bind to soil particles that can be transported in overland flow (Winchell et al. 2015). This runoff can carry excess nutrients and fertilizers into surface waters. Phosphorus is often the limiting nutrient in fresh water ecosystems. Excess phosphorus loading can lead to numerous health and environmental problems including liver failure, fish kills, increased turbidity, loss of arable soil, eutrophication and algal blooms (Bennett et. al. 2015) (Jochimsen, et. al. 1998).

In response to growing concerns surrounding water quality in the town of Darlington, Wisconsin, we determined what areas in Lafayette County are at risk to erosion by overland flow in the Pecatonica River watershed upstream from Darlington. The purpose of this study was to locate and quantify the square meters and percentage of the watershed that are at high, medium-high, medium and low susceptibility to erosion. Land use, row crop orientation, slope, and K_w factor (the susceptibility of a soil to particle detachment and transport by overland flow) were used as inputs for an ArcGIS based weighted overly analysis.

Our analysis determined that the majority of the study area is at significant risk for erosion by overland flow. These results can help the WiDNR, local government, land owners and conservation groups better design and implement best management practices to reduce sediment erosion.

Creating Methods for Testing Germination in the Presence of Ash

Not Pictured: **Jacob Livingston**
Major: Forest Ecosystem Restoration and Wildland Fire Science

The Karner Blue Butterfly is one of Wisconsin's species that is in peril due to loss of habitat. One of the key habitats for the species is sandy, Jack Pine openings that support lupine and a mix of dry prairie species. Key to the restoration and maintenance of these areas is frequent fire. Studies have been done on how heat effects the germination of prairie plants but little research has been done to test for the effects of ash on germination. Consequently, there is not a standardized set of methods to carry out this type of research. The methods we choose depend on the questions we need to answer which include: Does ash increase germination? Does ash increase the germination of native species, especially those key to the Karner Blue Butterfly? And, are there species that will only germinate with ash present? In this study we demonstrate possible solutions for seed bank sampling, species counting and identification, suitable greenhouse conditions, and determining the amount of ash to add to samples. We present possible pros and cons of each step in the process, ways we may go about overcoming the barriers, and a demonstration of these methods. We present our reasons for using specific methods and how we could improve them. We hope this study leads to research in this field and aids students in deciding methods for sampling.

Poster
Advisor: Dr. James Cook
Consider for Judging

Change in Condition of Bluegill in Man-Made Pond in Central Wisconsin

Jacob Rocke
Major: Fisheries

Poster
Advisor: Dr. Joshua Raabe

Sampling a body of water to find out the body condition of fish and what species inhabit that body of water is crucial for the management of that water body. A fyke net study was conducted on Lake Joanis located in Schmeeckle Reserve, Portage County, Wisconsin in October of 2015 to asses the body condition of bluegill (*Lepomis macrochirus*). Using the same nets and trap locations, this study was a replication of another study conducted in the spring and fall of 1993-1994. Various sites throughout the lake were sampled using six fyke nets. There were 191 bluegills caught in 2015 compared to 409 bluegills caught in the previous study. A length frequency histogram shows that the majority of fish caught in 1993-94 were between 90- 130mm while the 2015 bluegill were mainly between 60-90mm. A von Bertalanffy equation also shows that fish from 2015 grew faster than those caught in the previous study. This equation shows that the 2015 bluegill grow more rotund because the growth parameter is above 3. A value of 3 is used to show fish in three dimensions: length, width, height. A proportional stock density was also performed on the data to assess the density of bluegill in Lake Joanis. The PSD value for 1993-94 was 2, while the PSD value for 2015 was 16. This means there are proportionally more large fish in Lake Joanis in 2015 than in 1993-94. Overall, less bluegill were caught in 2015, but those bluegill were larger, fatter and grew faster than those caught in 1993-94.

Lead Distribution is Correlated with Urbanization in the Chicagoland Area

Poster
Advisor: Dr. Bryant Scharenbroch
Consider for Judging

Wednesday Jordan
Major: Soil and Land Management and Water Resources

Lead is a serious problem especially in urban and residential areas because it a major health concern for children. As a growing number of people move to more urbanized environments, knowing lead distribution is extremely important to keep the public safe. The city of Chicago is one such city where urbanization has reached as far as seven counties forming what is known as Chicagoland. Soil samples were taken from 190 randomly located sites, stratified by land use across the Chicagoland area. Statistical analysis with R were used to examine lead concentrations and urban factors including: land use, distance to a road, distance to a highway, distance to a building, distance from Nay Pier, and litter cover of the sample site. We found significant correlations between lead concentrations and urban factors. Our analyses showed that industrial, commercial, and other highly urban land uses had the highest concentrations of lead while more natural areas like forests and parks, had the lowest concentrations. There was a negative log relationship between concentrations of lead and the sample distance from a road, highway, and building. Industrial areas, roads, and highways have been known to have high levels of lead contamination due to pollution. Lead is relatively immobile in soil, so the initial contamination may have occurred many years ago. Further research is needed to explore potential sources of lead.

Population Demographics of White-tailed Deer in Schmeeckle Reserve: Overabundance and Potential Impacts on Native Plant Communities

Left to Right: **Dana Jarosinski** (Biology), **Eric Canania** (Wildlife Ecology:Research & Management), **Dylan Wenker** (General Resource Mangement), **Anne Vierling** (Wildlife Ecology: Research & Managment) and **Garett Downing** (Wildlife Ecology: Research & Managment)

Poster
Advisor: Dr. Scott Hygnstrom
Consider for Judging

The population of white-tailed deer (*Odocoileus virginianus*) in North America is on the rise, with over 30 million individuals currently inhabiting the landscape. This increase in population is causing major economic and environmental problems, especially in urban nature preserves where application of management techniques is limited. Overpopulation of white-tailed deer can profoundly alter native plant and animal communities through the effects of over-browsing. Our objective was to estimate population demographics of white-tailed deer in the 103.6 ha Schmeeckle Reserve located in Stevens Point, Wisconsin. To obtain these demographics, we conducted a trail camera survey for 3, 14-day periods in late summer[A] and fall[B] of 2015 and winter[C] of 2016. We established a grid of 6 trail cameras with a density of 1 camera/ 17.3 ha. All three surveys combined produced 7,950 pictures of white-tailed deer. The summer[A], fall[B], and winter[C] surveys resulted in a population estimate of 65[A], 198[B], and 59[C] individuals, respectively. We calculated a population density estimate of 63[A], 192[B], and 57[C] deer/km^2. According to the Wisconsin Department of Natural Resources, as of 2010, the population density goal for Central Wisconsin was 10-12 deer/ km^2. Our data suggests that the estimated deer density in Schmeeckle Reserve up to 17 times greater than the state's goal. A deer population of this magnitude can negatively impact hardwood regeneration and soil development, reduce productivity and nutrient cycling, and potentially extirpate vulnerabe plant species. To prevent long-term damage, management of white-tailed deer should be considered.

Characterizations of Aquatic Macroinvertebrate Communities in Four Central Wisconsin Wetlands

Poster
Advisor: Dr. Bill Fisher
Consider for Judging

Kaira Kamke
Major: Water Resources, Soil Sciences and Wetland Certificate

Macroinvertebrates are widely accepted as quality indicators of aquatic environments and are utilized in many studies to evaluate effects on ecosystem health. While they have been used as indicators in stream riffle habitats, no macroinvertebrate metric has been established for use as an indicator across all wetland types. A study was conducted on four different wetlands around the Stevens Point community to compare environmental quality to sampled invertebrate species. Two sites consisted of recently restored depressional wetlands, one site was a natural unrestored depressional wetland, and one site was a natural floodplain wetland of the Wisconsin River. Samples were taken at each site by sweeping a box net through shallow vegetated locations. The specimens were field picked and then identified taxonomically to the lowest possible level. The sites for each sampling effort were assessed for quality using the wetland habitat rating established by the Wisconsin Department of Natural Resources in their development of biological index and classification of wetlands. A variety of comparative metrics were used to assess and compare each wetland site. These findings, in combination with other preliminary research, can begin to establish an overall index to be used on multiple wetland types.

Detection of Fisher (*Martes pennanti*) in Association with Stand Characteristics in Central Wisconsin

Katie Youngberg
Major: Wildlife Ecology: Research & Managment
Minor: Captive Wildlife & Biology

Sara Pederson
Major: Wildlife Ecology: Information & Education
Minor: Captive Wildlife

Poster
Advisor: Dr. Cady Sartini and Kevin Burns
Consider for Judging

Fisher (*Martes pennanti*) have been found in a variety of different habitats in central Wisconsin. Because of their broad habitat preferences, we wondered if there were key characteristics that cause fisher to choose one habitat over another. We utilized hair snares to detect fisher presence to see if there were any correlations between key stand characteristics and habitat selection. Testing occurred in three broad habitat types: spruce-fir, hemlock, and mixed pine stands. For each of these general habitat types there were numerous individual tree stands. We created six hair snares specifically to detect fisher in association with three key stand characteristics: primary cover type, average DBH range of primary cover, and stand size. Snare locations were randomly generated on the UWSP - Treehaven property within the three specified habitat types. We deployed snares for one month intervals. After each deployment, all hairs were collected and we relocated the snares to new sites for a total of thirty-six snare deployments. We analyzed hair samples collected to confirm the samples were from fisher by identifying internal and external characteristic of the hairs. Detection and non-detection of fisher was then compared to the specific stand's characteristics. If fisher are associated with large blocks of habitat and old growth stands, then we expect higher rates of fisher presence in larger stands that have higher primary cover DBH ranges. By determining key characteristics that fisher are selecting for, we can better understand habitat requirements and manage for specific stand attributes to improve fisher habitat.

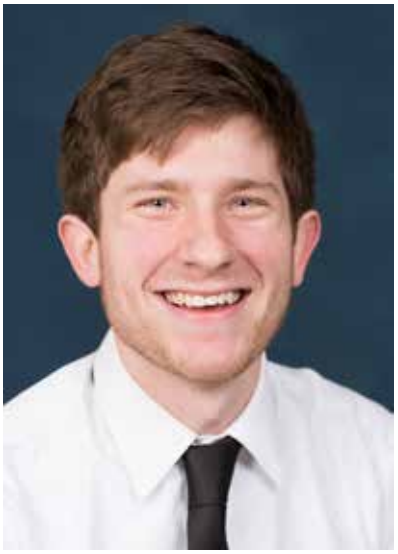
Home Range Comparison of Urban White-tailed Deer During the Winters of 2014/15 and 2015/16

Poster
Advisor: Dr. Scott Hygnstrom
Consider for Judging

Left to Right: **Dana Jarosinski** (Biology), **Eric Canania** (Wildlife Ecology:Research & Management), **Dylan Wenker** (General Resource Mangement), **Anne Vierling** (Wildlife Ecology: Research & Managment) and **Garett Downing** (Wildlife Ecology: Research & Managment)
Not Pictured: **Kurt Stetzer** (Wildland Fire Science)

White-tailed deer (*Odocoileus virginianus*) in urban environments present a unique challenge to wildlife managers. Movement patterns and home ranges vary depending on habitat availability throughout specific times of the year. This study compares home ranges of white-tailed deer during the winters of 2014/15 and 2015/16 in Schmeeckle Reserve, a forested habitat located adjacent to an urban interface. Deer were trapped using modified Stephenson box traps baited with corn. Selected deer were outfitted with VHF radio collars and ear tagged for identification. The average home range size of collared deer for 2014/15 was 54.34 ha. At this time, we are collecting data from 2 of the 3 deer from last winter and are in the process of collaring additional deer for this study. Home range analysis for each deer will be constructed using the Kernel home range estimator. A t-test will be used to compare the average home range size between the 2 winters. Data collection is ongoing and will continue until April 1, 2016. This analysis will provide insight to movement patterns of urban deer over the course of multiple wintering seasons.

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



Cole Walli
Major: Biology

Not Pictured: **Madison Hodge** (Biology and Wildlife Ecology: Research and Management), **Michelle Sauers** (Wildlife Ecology:Research and Management) and **Michelle Willis** (Wildlife Ecology Research & Management)

River otters (*Lontra canadensis*) are a keystone predator in North American aquatic ecosystems, and understanding their diet is crucial to understanding their enormous, season-to-season impact in the surrounding community members. River otter scat was collected approximately once per month in 2014 and 2015 from Sandhill Wildlife Area in southern Wood County in central Wisconsin. The scat was then processed and analyzed to determine seasonal variance in fish consumption of river otter diet. We extracted fish cleithra (the major bone in the pectoral girdle of fish) from otter feces. We used a recently published guide on fish cleithra published by the Michigan Department of Natural Resources to identify fish remains to species. No extensive statistical analysis has been completed yet, but the substantial presence of brown trout (*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 that the otters make from one taxonomic group of fish prey to another. Perhaps there are dietary ramifications to shifting from one group of fishes to others.

Poster
Advisor: Justin T. Sipiorski
Consider for Judging

Effects of Compostable Food Service Packaging on Second Generation Growth of Wisconsin Fast Plants

Poster
Advisor: Dr. Rob Michitsch
Consider for Judging

Kelly Adlington
Major: Waste Management, Soil Science & International Resource Management

Our world demands disposable products, and often times these products are landfilled once their purpose is served. However, in recent years plastics and papers derived from naturally occurring materials (such as corn starch) have been making an impact on industries that utilize disposables by providing a product that can be composted rather than landfilled. Perfluoropolyether (PFPE)-coated paper is a product that is used in food service for preparation and packaging due to its ability to withstand grease, moisture, and heat. While ASTM standards call for testing on first generation plants to germination only, this project tested the impact of compost that contained PFPE paper on the second generation of Wisconsin Fast Plants through an eco-toxicity test carried out under the standards of ASTM D6868.

Greenhouse Gas Emissions in Two Restored and One Natural Wetland

Alissa Johnson
Major: Forest Ecosystem Restoration and Management, Spanish and Wildlife

Poster
Advisor: Dr. Kyle Herrman
Consider for Judging

Carbon dioxide and methane are two greenhouse gases emitted from wetlands mainly due to microbial activity, making it critical to quantify their emissions flux as they may contribute to or attenuate against the overall greenhouse effect. Gas emissions were measured using one-inch PVC capped pipes installed in the floodplain and scours of two restored wetlands (Moses and Lost Creek) and in a reference wetland floodplain near Stevens Point, Wisconsin in the fall of 2015. Gas samples were analyzed using an SRI Gas Chromatograph equipped with a 10" x 1/8" SS Porapack Q column and an FID. Sulfate, which is known to inhibit methanogenesis, was also monitored by site. Soil samples were tested for water-extractable sulfate concentrations using a Metrohm Compact IC Plus Ion Chromatograph and also tested for organic matter using a standard loss on ignition method. Statistics revealed higher organic matter contents in the reference and Lost Creek wetlands ($F_{2,21} = 13.3$; $p < 0.001$). Unexpectedly, there were no statistical differences in carbon dioxide and methane flux among the sites. Extractable sulfate also had no apparent control on methanogenesis. Although not significant, the results suggest the scours experienced higher methane flux than the floodplains of the restored sites (Lost Creek: $F_{1,10} = 2.1$; $p = 0.183$ and Moses Creek: $F_{1,10} = 1.5$; $p = 0.250$) likely due to the forced anaerobic conditions from constant standing water. While still preliminary, these results suggest that restored wetlands in central Wisconsin can release methane fluxes at rates similar to established natural wetlands.

Biochar and Biosolids as Potential Urban Soil Amendments

Poster
Advisor: Dr. Bryant Scharenbroch
Consider for Judging

Jacob Cerminar
Major: Forestry Ecosystem Restoration and Management

Soils under pavements must support infrastructure and provide ecosystem services like supporting plants and retaining stormwater. Most soils under pavements are engineered and contain high amounts of sand and/or coarse fragments. These coarse materials are excellent for supporting infrastructure, but are poor at other ecosystems services. Organic amendments have been found to improve soil quality in these engineered mixes. For instance biosolids have been found to increase nutrient availability and tree growth, but concerns exist about nutrient losses. Biochar is an organic amendment with a very high absorption capacity, therefore might be useful in retaining nutrients applied in biosolids. The objective of this study was to assess the effect of three organic amendments: biochar, biosolid, and a combination of biochar and biosolid on three different soils. The three soils were: 1) an engineered sand-based urban soil, 2) a native loam soil and 3) an intergraded soil that is minimally processed and includes less sand. Results showed that treatments of biosolids had increased nitrate and phosphate in leachates and also increased loss of carbon measured as soil respiration. We did not find significant increases in nutrient leaching or soil respiration with biochar alone and the 50/50 mix of biochar and biosolids only partially reduced leaching and respirations. Preliminary data suggest that biochar might limit nutrient loss from these soils while improving soil quality and tree health and growth. On-going data collection on soil quality and tree response is being collected to assess the efficacy of these amendments in urban soils.

Eastern Gray Squirrel Population Demographics in Different Aged Timber Stands

Left to Right: **Nathan Klopmeier** (Wildlife Ecology: Research and Management), **Addison Swenson** (Wildlife Education), **Shaylee Church** (Wildlife Ecology: Research and Management) and **Nathaniel Yost** (Wildlife Ecology, Applied Mathematics and Biology)

Poster
Advisor: Dr. Shelli Dubay and Dr. Jason Riddle
Consider for Judging

The eastern gray squirrel (*Sciurus carolinensis*) is an important game species in many states. In Wisconsin, the hunting season for eastern gray squirrels is open between mid-September and late January. Since 2012, long term research in Sandhill Wildlife Area, Babcock, Wisconsin, has been focused on collecting data pertaining to forest growth and the live capture of eastern gray squirrels. Three separate trapping grids were placed in timber stands harvested in different years: Mature (1932), Intermediate (1996), and Young (2011). Data have included individual squirrel information such as sex, age, weight, 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 determine the population demographics, the proportion of juveniles to adults and males to females, in each timber stand. An F-test will be used to determine variance between years in the demographics of the populations in each timber stand. Analysis is ongoing.

Macroinvertebrates on Utilized and Unutilized Walleye Spawning Substrates

Poster
Advisor: Jeffrey Dimick

Samuel Schaick
Major: Fisheries

Walleye Sander vitreus are an economically, ecologically, and culturally important fish species in the Midwestern United States. Walleye natural reproduction has declined in Wisconsin and Minnesota in recent decades. Consequently, many studies have investigated Walleye spawning and spawning habitat. In lakes, Walleye spawning is known to occur on near-shore, rocky substrates. While these habitats are often where Walleye eggs are deposited, there is also similar suitable habitat where Walleye do not spawn. The focus of this study was to determine if a difference in macroinvertebrate communities existed between Walleye egg deposition sites and similar suitable habitat sites where eggs were not deposited. Scapnetting was performed in spring 2015 on two central Minnesota lakes to locate egg deposition sites. In summer 2015, near-shore habitats were mapped at all egg sites as well as randomly selected non-egg sites. A minimum and maximum range was calculated for depth, distance from shore, and gravel + cobble percentage within the measured habitat where eggs were found. Four egg deposition sites and four similar sites meeting these criteria were randomly selected for study on each lake. D-netting was conducted for macroinvertebrate capture. Macroinvertebrate samples were sorted and overall macroinvertebrate densities were calculated for each site. Macroinvertebrates were identified to order. Total abundance, order abundance, and percent contribution of each order were calculated for each site. On Bella Lake, non-egg sites had significantly ($p<0.05$) more total macroinvertebrates than egg sites. No other significant differences ($p>0.05$) were found between egg deposition and similar sites for total abundance, order abundance, or percent contribution of any order.

Examining Total Nitrogen and Phosphorus Levels Found in Yellow Perch (*Perca flavescens*) Waste Water and Comparing the Effects of Tomato Seedling Growth Under Fish Waste Water Versus Various Commercial Fertilizer Treatments

Not Pictured: **Erik Halverson**
Major: Soil Science

Not Pictured: **Richard Mahoney**
Major: Fisheries

Poster
Advisor: Dr. Rob Michitsch
Consider for Judging

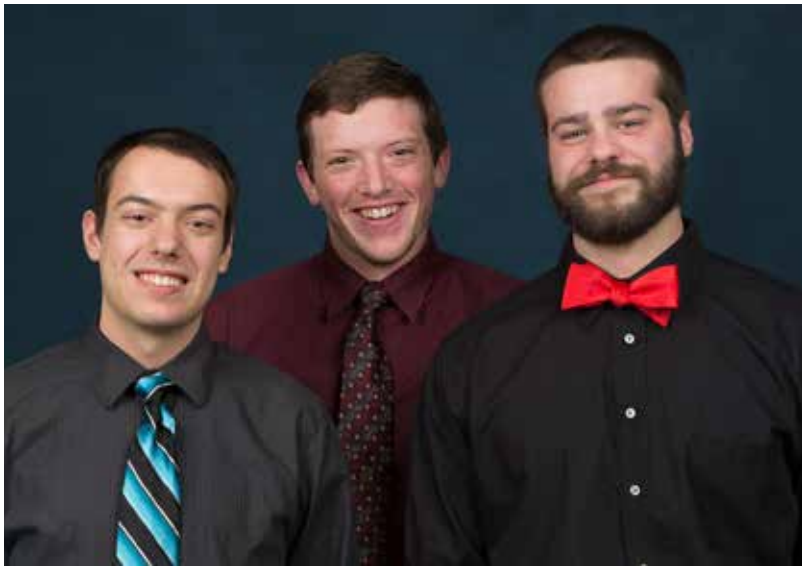
Due to nutrient levels in fish waste water such as nitrogen and phosphorus, it can be used as a potential soil amendment to fertilize plants. The effects of fish waste water on tomato (*Solanum lycopersicum*) growth was examined in an eight week experiment at the University of Wisconsin – Stevens Point. Yellow Perch (*Perca flavescens*) fish waste was siphoned from acetylene tanks in the UW-Stevens Point aquaculture lab and stored in a cool environment prior to the start of the experiment. Tomatoes were planted in pots and grouped into five different treatments with five pots per treatment: Group 1 (tap water), (group 2 fish waste water), and group 3 (20-20-20 NPK commercial fertilizer balanced for nitrogen), group 4 (20-20-20 NPK commercial fertilizer balanced for phosphorus), group 5 (20-20-20 NPK commercial fertilizer balanced for nitrogen and phosphorus). Upon harvesting the tomato plants, physical measurements (eg height, dry weight, yield, etc.) of each plant were conducted and were analyzed for N, P, and K contents for the dried tomato plant tissues as well as soil samples from each pot.

Historical Analysis of Black Spot Parasite Prevalence in Common Shiners (*Luxilus cornutus*) Throughout Wisconsin

Poster
Advisors: Dr. Justin Sipiorski, Dr. Todd Huspeni
Consider for Judging

Left to Right: **Richard Mahoney** (Fisheries), **Andrew Zabel** (Fisheries), **Johnathon Butku**s (Biology) and **Erik Halverson** (Soil and Land Management)

We are currently constructing a dataset comprising all specimens of the Becker Memorial Ichthyology Collection (University of Wisconsin- Stevens Point Museum of Natural History) for the Common Shiner (*Luxilus cornutus*). Specimens have been collected from throughout the state of Wisconsin over the past 60 years. Our accessioning and cataloging is ongoing, and to date we have currently gathered data from over 10,000 specimens. This represents approximately 30% of the total individuals in this collection. For each specimen cataloged, we recorded total length (mm), preserved mass (g), gonad mass (g) and estimated age. We also recorded the number of individual Black Spot parasites (metacercariae of Uvilifer ambloplites) on the left side of each specimen. Considering size classes of fish over 30 mm and sample sizes of at least 30 fish, prevalence (% individuals with at least one parasite) varied across populations from 25% to 100%. Considering similar size classes and sample sizes, average intensities (average number of parasites on the left side of infested individuals) varied from 0 to 213. Separate analyses were conducted for each sex for individuals ranging from 30 – 80 mm (ages I & II; Becker 1983). Multiple regression analyses were calculated to evaluate the relationships among parasite intensity, sex, location, season, latitude, and total length.



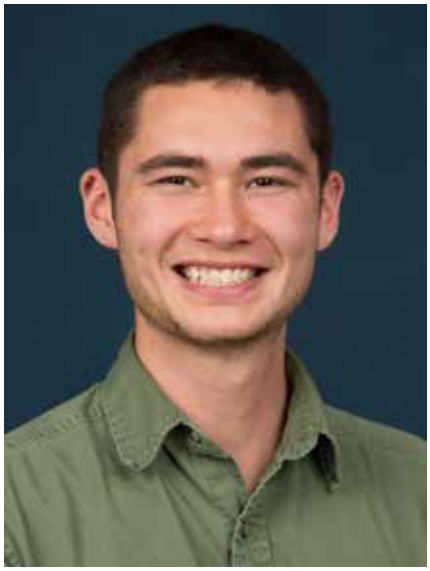
Waterfowl Project

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

Poster
Advisors: Dr. Kevin Russel and Dr. Jason Riddle
Consider for Judging

U.S. Fish and Wildlife Biologists Gil Gigstead and Milford Smith first utilized Wood Duck (*Aix sponsa*) nesting boxes at Chautauqua National Wildlife Refuge in 1937. These boxes sought to imitate the declining number of natural tree cavities in old growth forest that Wood Ducks and Common Mergansers (*Mergus merganser*) use for rearing their young. In the George Mead Wildlife Area there are 120-130 Wood Duck boxes, which are checked and cleaned out in the first couple months of each year. These boxes are permanent additions on the landscape and are only taken down if parts need to be replaced. We recorded which species nested in the box, as well as collected data on nest success, box height, distance from water, and box opening direction. We then used a linear regression to analyze whether there was a correlation in the data between the length of time a box has been on the landscape and the amount of use by waterfowl. Our hypothesis is that older nest boxes have a higher proportion of successful nests than those that have not been on the landscape as long. We will be presenting out findings at this symposium.

Differences in Ruffed Grouse (*Bonasa umbellus*) Home Range Sizes Between Summer and Spring Months.



Chase Gadbois
Major: Wildlife Ecology

Michelle Murawski
Major: Wildlife Ecology

James Hansen
Major: Wildlife Ecology

Ruffed grouse (*Bonasa umbellus*) are an umbrella species of great concern here in the Midwest. They are an important prey species for many animals and an important indicator for forest management. We sought to find a difference in their home range sizes between the summer months and their breeding period in the spring. To do this male grouse were collared off of drumming logs in the spring and equipped with a telemetry collar. These grouse were followed by the The Wildlife Society Ruffed Grouse Project through the springs of 2014 and 2015, and the same grouse were followed by the Wildlife 340 class during the summer Treehaven sessions of the same years. The birds' locations were determined by triangulating their positions using three survey points, and an error ellipse was created using program Locate to determine their coordinates. These coordinates were put into a GIS layer over the Treehaven property and were connected using a minimum convex polygon. The areas of the polygons were compared to look for significant differences ($p<.05$). By comparing their ranges in these two time periods we can see if mating practices change their movement behaviors and if we need to adjust our drumming surveys to account for this.

Poster
Advisor: Dr. Jason Riddle
Consider for Judging

Mapping Stream Alterations to Enhance Watershed Scale Water Quality Indicators

Brandon Lee
Major: Water Resources and Geographic Information Science
Minor: Geology

Not Pictured: **Mason Johnson**
Major: Hydrology

Poster
Advisor: Dr. Katherine Clancy
Consider for Judging

Nested hierarchy theory (NHT) espouses the idea that rivers have a fractal dimension where processes at the larger watershed scale (>10^2 m) control processes at the reach or mesoscale (10^1 m) and microscale (10^-1 m). This theory is supported by the strong correlation between watershed landuse and water quality at the outlet. The theory also is used to justify the downscaling of water quality data from the watershed scale to the microscale (or upscale from micro to watershed scale) with mixed success. Largely absent from this work is mesoscale and its link to the larger and smaller scales. The objective of this research is to provide a link from watershed to microscale. To do this, stream alterations were classified in one urban, two forested, and three agricultural watersheds using historic and current orthophotographs, landcover, and LiDAR derived terrain models. I paired EPA and DNR phosphorus point data with landuse characterized by watershed, subwatershed, and 100-meter buffers around the point data. I found that the watershed scale plays a role associated with average total phosphorus, and the landuse of 100-meter buffers are a better indicator of water quality for most points, which corroborates other studies. Adding the altered stream component explained anomalies such as water quality sampling points with low total phosphorus but high agricultural landuse. These points were found to be associated with unaltered stream channels.

A Comparison of Temporal and Spatial Small Mammal Community Stability in Schmeeckle Reserve, Stevens Point, WI

Poster
Advisor: Chris Yahnke
Consider for Judging

Left to Right: **Sarah Rothe** (Environmental Education and Interpretation), **Tara Buehler** (Wildlife Ecology Research & Mangement) and **Ava Boswell** (Wildlife Ecology Research & Management)

Since 2011, the Small Mammal Project as a part of The Wildlife Society has been monitoring small mammal populations within two areas in Schmeeckle: the eastern edge of Lake Joanis and the Chilla Woodlot. Long-term monitoring of small mammal populations in an area is important because changes in population sizes could correlate with many factors such as amount of ground cover, food availability, predator presence, and wildlife diseases. A 4x5 trapping grid was set on each site. Small mammals were marked and recaptured at each location over a four week period each fall since 2011. Morisita's Index of Similarity was used between each site and between years for each site to measure similarity between communities. We expected to find both habitats to be temporally and spatially stable. Schmeeckle Reserve is a heavily used area by University of Wisconsin - Stevens Point students for research as well as by the general public. This information could be used as a comparison tool for future studies in Schmeeckle Reserve, as well as to monitor habitat and wildlife health within the reserve.

Developing a Baseline Assessment Undergraduate Study for Effects of a Fire Regime on Invasive Wetland Flora

Left: **Ethan Robers** (Wildland Fire Science and Forest Ecosystem Restoration)
Right: **Kaira Kamke** (Water Resources)

Poster
Advisor: Dr. Kyle Herrman
Consider for Judging

Wisconsin has lost nearly half of its original wetland environments, primarily for development and agriculture. This has led to a revival in recent years to mitigate and restore wetlands to their pristine state. A wetland located west of Stevens Point, Wisconsin, was converted to an agriculture field nearly a century ago and has recently been restored to a wetland environment. The Students for Wetland Awareness, Management and Protection (SWAMP) organization from conducted a baseline assessment to evaluate the quality of the site and provide recommended actions that could improve the area. Parameters included a soil survey, hydrologic analysis, vegetation assessment, macroinvertebrate collection, and water chemistry analysis. Due to a high percentage of invasive wetland plants, the group determined that the best option of control is to implement a fire regime, which is anticipated to begin in spring of 2016.

Estimating the Time of Greater Prairie-Chicken Nest Failure

Oral
Advisors: Dr. Jason Riddle and Matthew Broadway
Consider for Judging

Rachel Konkle
Major: Wildlife Ecology: Research and Management and Communications: Media

Nest failure can be an important limiting factor for avian populations. As such, understanding the reasons for nest failure is critical. Predators are a common cause of nest failure, but identifying depredating species, or even taxa, may require expensive camera sets near nests to photograph or video depredation events. Recent research suggests that the timing of nest failure may be an indicator of the depredator. For example, birds often depredate nests during daylight hours, whereas mammals may depredate nests during crepuscular and nighttime hours. We used paired Thermochron iButtons® in greater prairie-chicken (*Tympanuchus cupido*) nest bowls and ambient locations to determine the time of nest failure for 32 nests in the Buena Vista and Paul Olson Wildlife Areas of Portage and Wood County, Wisconsin, in the summers of 2014 and 2015. We then used a uniform, circular statistical distribution to estimate basic descriptive statistics of the temporal ecology of these nests. Specifically, the average time of failure was 1:14 a.m. with a 95% CI of 10:52 p.m. - 3:32 a.m. Indeed, 62.5% of failures occurred during the crepuscular and nighttime hours. We will compare the nests' time of failure to their determined predation class from field observations to find the average mammalian, avian, reptilian, and other nest depredation time.

Relative Precision of Northern Pike Ages Estimated from Multiple Calcified Structures: Preliminary Results from an Ongoing Statewide Evaluation

Zachary Witzel
Major: Fisheries

Poster
Advisors: Dr. Dan Isermann and Tom Meronek
Consider for Judging

Ages of Northern Pike are estimated using a variety of calcified structures, including cleithra, scales, fin rays, and otoliths. Previous work has validated pike ages estimated from cleithra and suggested that differences in reader precision vary among structures. However, specific protocols for estimating the age of northern pike are lacking and most previous work including otoliths and fin rays has been conducted for fast-growing pike populations. We expect that reader precision will be lower for slower-growing (i. e., stunted) pike populations that are common in smaller inland lakes within the upper Midwest. Our objectives are to compare among-reader precision and northern pike age assignments among cleithra, scales, otoliths, and fin rays for pike populations located throughout the state. Wisconsin DNR personnel have collected more than 300 fish from 10 lakes throughout the state. We will report the preliminary results of this assessment which represents a collaborative effort between the Fisheries Analysis Center, the WDNR Fish Age Task Group, and the WDNR Northern Pike Team.

Index of Presenters

Index of Presenters

Index of Presenters