Jim and Katie Krause CNR Student Research Symposium Friday April 6, 2018

College of Natural Resources
University of Wisconsin - Stevens Point

College of Natural Resources
University of Wisconsin-Stevens Point

Student Research Symposium
April 6th, 2018

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

Booklet Layout and Editing: McKenna Hammons
COVER PHOTO: McKenna Hammons

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.

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University of Wisconsin
Stevens Point

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Phone: 715-346-2123 | Fax: 715-346-4841

April 6, 2018

Welcome to the 19th Annual College of Natural Resources Student Research Symposium! You are about to participate in a rich tradition at the University of Wisconsin-Stevens Point, one that is both an educational experience and an academic celebration.

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

Attendees and observers—I hope you will join me in applauding the drive and initiative of these students. They and their work are at the core of the university's new path toward creating *"thriving communities"* that are vibrant, healthy, prosperous and sustainable.

Whether you are here to make a presentation or to listen and observe, you will be participating in the celebration of these academic achievements. This is a special opportunity for students to share the results of their hard work participating in investigations, projects and research activities. This year's event features an outstanding turnout of participants representing projects from all the CNR majors, a fitting tribute to the level of faculty and student collaboration in and out of the classroom at the University of Wisconsin-Stevens Point.

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

Sincerely,

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 6, 2018

The UWSP College of Natural Resources is pleased to present the 19th annual CNR Student Research Symposium, featuring and celebrating the scholarly achievement of many of UWSP's finest natural resource students.

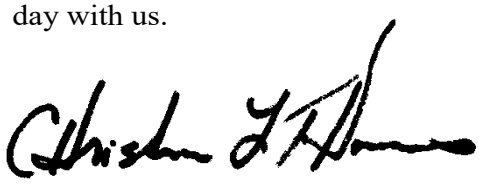
Congratulations to our student participants for taking the time and initiative to extend their learning beyond the traditional classroom by depicting their research contributions in these excellent poster and oral presentations. Through their participation in this event, these students are building on 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 another large turnout of participants: over 90 students presenting 53 projects (44 poster presentations and 15 oral 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 nearly 1,300.

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.

I want to extend special thanks to Dr. Jim Krause (BS-Biology, '74) and his wife, Kathleen "Katie" (BS-Mathematics, '75), who through their generous gift in 2017 created an endowment in the UWSP Foundation that will support the Symposium for the foreseeable future. We are grateful for this amazing gift, celebrating their belief in the value of higher education, undergraduate research, their alma mater, and the beautiful natural resources of their home state of Wisconsin.

Thank you for 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 19th Annual University of Wisconsin-Stevens Point Jim and Katie Krause CNR Student Research Symposium. This year's program features students who have invested considerable time conducting research in areas such as fisheries and water resources, forestry, human dimensions of natural resource management, paper science and engineering, soil and waste management, and wildlife ecology. 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. Dr. 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 Dr. James ('74) and Kathleen Krause ('75), all of our volunteer evaluators, faculty and staff members in the CNR and Biology department, CNR student organizations, Dean Christine Thomas, Chancellor Bernie Patterson, and the UW-Stevens Point administration.

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

Cheers,

Committee Chair: Abbie Lee

Secretary: Emily Weiler

Booklet Editor: McKenna Hammons

Web Weaver: Connor Ties

Judge Coordinator: Emily Weiler

Committee Members: Emmett Wiegel and Bailee Mathieu

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

Clive and Beverley David Memorial Research Scholarship Award

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

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

The 2018 recipient of the Clive A. David Memorial Research Scholarship is:

Janelle Taylor

Major: Wildlife Ecology Research and Management
Minors: Geographic Information Systems (GIS) and Biology

- Doug Stephens Boone & Crockett Club Wildlife Research Fellow (2017-18)
- Saw-whet Owl Project - Co-leader (2016-17 - The Wildlife Society - UWSP Chapter)
- Long-Tail Duck Project - Assisted Southern Illinois University graduate student with duck capture and processing
- Ruffed Grouse Project (UWSP TWS) - trapping, radio-collaring, radio telemetry, surveys
- Owl surveys, captures, banding - Wisconsin DNR
- European Summer Field Experience participant

"Janelle is the kind of student that faculty hope they get to work with some day, and most rarely get the chance. Her dedication to her research is truly remarkable and is an inspiration to those of us that strive to identify and mentor exceptional students. She's the kind of student that makes the CNR exceptional."

-Dr. Shawn Crimmins, Assistant Professor of Wildlife Ecology

Keynote Speaker

Dr. James E. Krause

Past Professor of Neurobiology,
Washington University School of Medicine in St Louis

Biotech Executive at Neurogen Corporation in CT,
and at ARMGO Pharma, New York

UWSP Graduate – BS-Biology, 1974

We welcome back to the College of Natural Resources Dr. James Krause as this year's keynote speaker for the Jim and Katie Krause CNR Student Research Symposium.

Dr. Krause (BS-Biology, '74) and his wife, Kathleen "Katie" (BS-Mathematics, '75), are natives of Wisconsin, graduates of UWSP, and recently retired to live in Madison, Wisconsin. Their path largely followed Jim's academic and business career in higher education and research, as well as several leadership positions in the biopharmaceutical industry.

Dr. Krause's career in biomedical research began when he was awarded an NSF Undergraduate Fellowship in Biochemistry under renowned University of Wisconsin biochemist, Dr. Hector DeLuca. After earning his PhD from UW-Madison in 1980 in Physiological Chemistry and Endocrinology-Reproductive Physiology, Jim worked as a Postdoctoral Fellow at the University of Pittsburgh ('80-'81), and Research Assistant Professor at SUNY - Stony Brook ('81-'83). He joined Washington University's School of Medicine in 1984, where he became a tenured Professor of Neurobiology in the Department of Anatomy and Neurobiology in 1987. His research efforts at Washington University School of Medicine resulted in 29 distinct license agreements with pharmaceutical and biotechnology companies in the U.S., Europe and Japan. Dr. Krause published extensively on the role of neuropeptides as neurotransmitters.

In 1997 he joined Neurogen Corporation, where he advanced to become Senior Vice President and Head of Biology. This work focused on the discovery of several drug candidates for neuropsychiatric and inflammatory disorders. Capping his career, Jim worked for the cardiology company ARMGO Pharma Inc. from 2008-2011, where he was Chief Scientific Officer, Executive Vice President and Head of Research and Development.

Among Dr. Krause's many accomplishments include eighteen U.S. and foreign patents, 185 peer-reviewed and invited publications and lectureships, and the training of five PhD student mentees during his time at Washington University. He was a recipient of a Pew Scholars Award and received the Vittorio Erspamer Medal for his work in peptide neurobiology.

In retirement, Jim serves on the Board of Directors for the Yahara Fishing Club and the Friends of Cherokee Marsh, the main watershed supplying the Madison area lakes, and also consults for a Biotech Hedge Fund.

The Krauses' generous gift in 2017 created an endowment in the UWSP Foundation fund to support the Symposium for the foreseeable future. The gift celebrates their belief in the value of higher education, undergraduate research, their alma mater, and the beautiful natural resources of their home state of Wisconsin.

Acknowledgements

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

Dean Christine Thomas

Chancellor Bernie Patterson

Jim and Katie Krause

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

Sharon Reichert/College of Natural Resources for Room Accommodations

University Relations and Communications Office - Publicity

CNR and Biology Faculty - Mentoring and Support

Biology Department - Room Accommodations

Volunteer Evaluators and Moderators

Tom Charlesworth - Photography

Symposium Support Volunteers

Jacob Dreves, Jessica Harter, Martin McCurtis, Dr. Andy Felt, and the Math 310 Operations Research Class - Developed Judge Sorting Algorithm

Schedule of Events

Registration
8:00AM
West Lobby

Oral Presentations
9:00 - 10:00
Rooms 120, 170 and 110F

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

Keynote Speaker
11:00
TNR 170

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

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

Oral Presentations
1:00 - 2:00
Rooms 120, 170 and 110F

CNR Celebration Evening Scholarship Banquet, SentryWorld Atrium
Donor Recipient Meet & Greet and Social Hour: 4:15
Awards Program: 5:30

Schedule of Oral Presentations: TNR Room 120

Time	Presenters	Title
9:00AM	Zachary Mohr	Comparison of Northern Pike Age Estimates and Reader Precision among Sequential Anal, Pelvic, and Pectoral Fin Rays
9:20AM	Alex Catalno	Preliminary Analysis of Lake Whitefish, Walleye, and Yellow Perch Diets in Green Bay
9:40AM	Benjamin Schleppenbach	Genetic Analysis of Sauger (Sander canadensis) Populations in the Mississippi River and Lake Michigan Drainages, WI
1:00PM	Janelle Taylor	Habitat Modeling for River Otters in Wisconsin
1:20PM	Madeline Abbatacola, Heather Foster	Comparisons of large carnivore spoor density in two regions of Botswana, 2016 to 2017
1:40PM	Benjamin Tjepkes	Comparing home ranges, habitat-use, and spatial patterns of raccoons (*Procyon lotor*) in Laramie, Wyoming

Schedule of Oral Presentations: TNR Room 170

Time	Presenters	Title
9:00AM	Ryan Eastman, Justin Kowalski, Abbie Lee	Fish communities and water quality in two Wind Pudding Lake basins following considerable water level fluctuations
9:20AM	Tymon Maurer	Fish Community Dynamics in a Species Diverse Illinois Pond
9:40AM	Nick Ritter, Kalya Wilcox, Ethan Robers	Developing a baseline assessment undergraduate study for effects of a fire regime on invasive wetland flora
1:00PM	Abbie Lee, John Brezinka	Macroinvertebrate abundance and distribution in restored wetlands in the Glacial Habitat Restoration Area of Wisconsin
1:20PM	Grant Gagliardi, Alex Coombs	Intestinal and Ceca Endoparasite Load Comparison Throughout Wisconsin's Fall Duck Migration

Schedule of Oral Presentations: TNR Room 110F

Time	Presenters	Title
9:00AM	Keifer Sroka	Relationships between submergent macrophyte morphology and aquatic
9:20AM	Macayla Greider	Abiotic and biotic factors relating to mermithid infection rates in larval midge (Chironomidae) specimens in northwestern Wisconsin streams
9:40AM	Sara Fischer	Teaching the North American Model of Wildlife Conservation: Do Students mirror professor attitudes?

Poster Presentations from 10:00 to 11:00

Presenters	Title
Abigail Weigel	Trends in waterfowl abundance of the Lake Winnebago System
Leah Bell, Alex Coombs, Sean Mason, Abigail Weigel	Long Term Use Trends of Nesting Boxes by Waterfowl
Rachel Stepp, Cassidy Hamilton, Vanessa Komada, Ross Nett	North American Porcupine (Erethizon dorsatum) Giving Up Density
Sam Sauber	Comparing Rodents Consumed by Urban and Rural Coyotes (Canis latrans)
Jordan Meyer, Adelyn Hanchette, Monae Taylor	Cavity nesting bird communities sampled through passive auditory surveys as a predictor for bat roost locations
Logan Hennlich	The Effect of Urban and Rural Habitat Types of Waterfowl Behavior
Ian Beirke, Rebeca. Bravo, Joey Ehlers, Maddison Fell, Amanda Lang, Janelle Taylor	Microhabitat use of Saw-whet Owls
Zachary Mohr	Comparison of Northern Pike Age Estimates and Reader Precision among Sequential Anal, Pelvic, and Pectoral Fin Rays
Ryan Eastman, Justin Kowalski	A comparison of fish communities and habitats between two basins of a northern Wisconsin lake following sustained low water levels
Andrew Wieland	Evaluation of 2, 4-Dichlorophenoxyacetic acid on Bluegill and Yellow Perch in Nothern Wisconsin Lakes
Cadie Olson	Gill Lice Infection and Effects on Brook Trout in Streams on Fort McCoy, Wisconsin
Tymon Maurer	Fish Community Dynamics in a Species Diverse Illinois Pond

Poster Presentations from 10:00 to 11:00

Presenters	Title
Alexander Catalono	Preliminary Analysis of Lake Whitefish, Walleye, and Yellow Perch Diets in Green Bay
Nicholas Ritter, Kayla Wilcox, Eathan Robers	Developing a baseline assessment undergraduate study for effects of a fire regime on invasive wetland flora
Keifer Sroka	Relationships between submergent macrophyte morphology and aquatic macroinvertebrate community assemblages
Alyssa Mianecki	Determining the Occurrence of Pharmaceuticals and Personal Care Products by Polar Organic Integrative Sampling in an effluent impacted stream
Robert Burke	Persistence of Agricultural Pollutants in the Fever River Watershed
Emma Schmidt, Krista Bryan	Chroma color meter use for predicting soil organic matter from color for the Central Sands
Tate Klauck, Christian VanScoyk	Is Classroom Collected Data Accurate Enough For Scientific Research?
MarKatie Mealy, McKenzie Slack, Michael Nessman	The Effect of an Organic Residual Material High in Lignin on Soil Respiration of Three Puerto Rican Soils
Kelley Harkins, Cori Semler	Effects of Prescribed Fire on Plant Community Structure and Diversity in Berard Oaks of Schmeeckle Reserve
Joseph, Justin Okruzynski, Luke Mason, Farrah Scears	Two Headboxes are Better than One
Adam Socha, Evan Page, Victor Vang, Rudy Mogen, Nick Dercks, Jon Waterman, Casey Ausloos	Fiber Blending and Recovery Systems

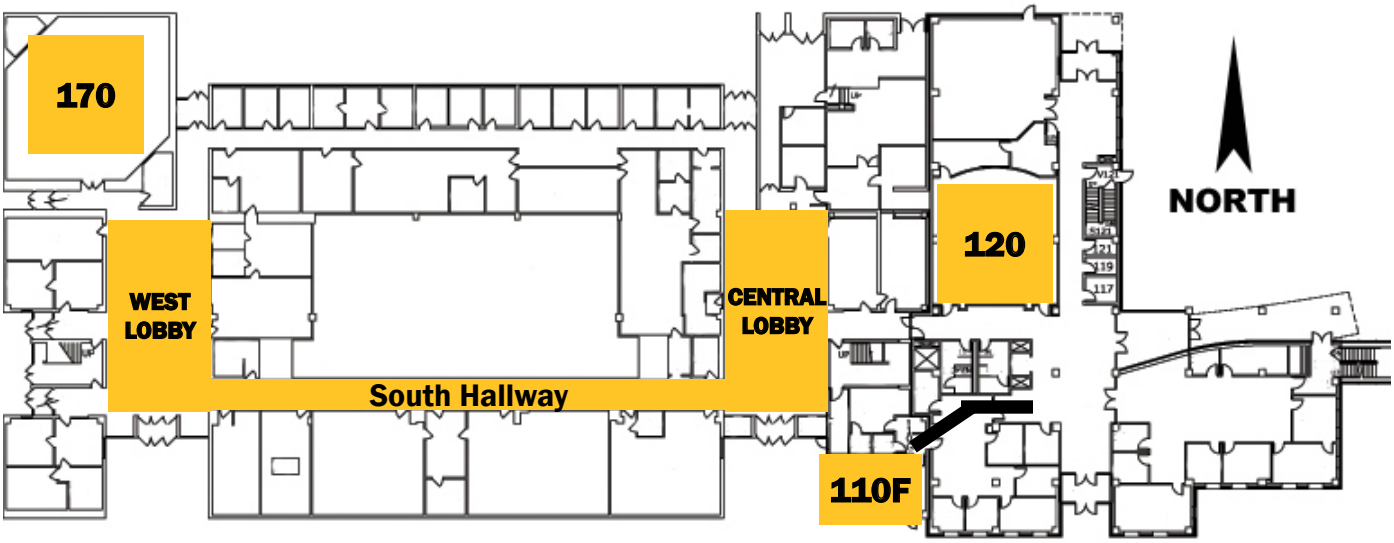
Poster Presentations from 12:00 to 1:00

Presenters	Title
Grant Gagliardi, Alex Coombs	Intestinal and Ceca Endoparasite Load Comparison Throughout Wisconsin's Fall Duck Migration
Mitchell Shallwani	Effects of Buckthorn Removal on Small Mammal Population Abundance
Madeline Abbatacola, Kara White	Comparisons of large carnivore spoor density in two regions of Botswana, 2016 to 2017
Cori Semler	The application of prescribed burns and food plots with white-tailed deer in Nothern Wisconsin
Janelle Taylor	Efficacy of Unmanned Aerial Vehicles of Hazing Elk from Wisconsin Agricultureal Areas
Katherine Rexroad, Sabrina Claeys, Hannah Schley	Comparing Parasite Species and Abundance in Rural and Urban Eastern Cottontail Rabbits
Garett Downing, Kelsie Hayes, Brown Kelsey	Home range comparison of urban white-tailed deer during the winters of 2014/15 through 2017/18
Jason Lins, Jennifer Krusiec	Analysis of Growth, Sex, and Neascus infestation (Black Spot Disease) in Wisconsin Johnny Darters (Etheostoma nigrum), a 60-year perspective
Justin Kowalski, Noah, Maxfield Jonas Kruger, Jeanne Thibodeau	Morphometric variation of Iowa Darters in lotic and lentic environment in Wisconsin
Thompson Hill	Population History and Netting Success of Lake Trout in the Flaming Gorge Reservoir of Green River, WY
Nathan Jaksha	Analysis of a Muskellunge Age and Growth Structure: Evaluating a Population from the Red Cedar River, WI

Poster Presentations from 12:00 to 1:00

Presenters	Title
Zachary Mohr, Benjamin Schleppenbach	Brook Trout Movements, Spawning, and Survival in the Little Plover River Prior to Watershed Restoration
Colton Branville, Taylor Feucht, Lucy Jones	Growth Differences in Walleye (Sander vitreus) and Saugeye (Sander vitreus X Sander canadensis) in Aquaponics Systems
Logan Ebert	The Impact of the Crop Type on Soil Temperature in the Central Sands
Chris Bocciardi	Using pharmaceuticals and artificial sweeteners in groundwater to trace septic system contamination in lakes
Robert Burke	Eutrophication Indicators in a Restored Trout Stream
Lindsey Laskowski, Jasmine Medukas	Analysis of Key Soil Nutrients and Physical Properties on a Managed Grazing Operation in Junction City, WI
Serena Kuczmarski, Bryce Mahoney	Effect of compost amendment on soil quality and corn yield in locally sourced sandy soil
Brooke Bembeneck, Lindsey Carlson	Effects of Vermicompost and Vermicompost Tea on Ginseng Production at Three Wisconsin Sites
Timothy Blazek, Jensen Derginer	Lost Creek Seed Bank Analysis
Joe Molle, Benjamin Demchik, Austin Dins, Jay Tienor	Size Press Unwind
Colin Koffarnus, Justin Dentici, Nathan Smith	Pilot Paper Machinze Size Press Improvement

Trainer Natural Resources Building Map



Symposium Presentations

Schedule of Oral Presentations in rooms 120, 170 and 110F on pages 10-12.

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

Teaching the North American Model of Wildlife Conservatoin: Do students mirror the professor attitudes?

Sara Fischer
Wildlife Ecology Major

The North American Model of Wildlife Conservation (NAMWC) is an important part of our history and wildlife management. The way instructors teach the NAMWC could influence the way students perceive the model, and could potentially influence the way they make future management decisions. We hypothesize that students who have particularly opinionated professors will adopt those same opinions and have similar views about the NAMWC. To assess this, observations and audio recordings of lectures at UW – Stevens Point, that taught the NAMWC, were conducted. A voluntary anonymous web survey was also sent out, via email, to both instructors and students at UW – Stevens Point in the classes where the NAMWC was taught. The study is on-going, and data are still being collected and analyzed. We hope to get a better understanding of how instructor opinions and teaching styles influence student perceptions of those topics.

Advisor: Cady Sartini
Oral Presenation
Consider for Judging

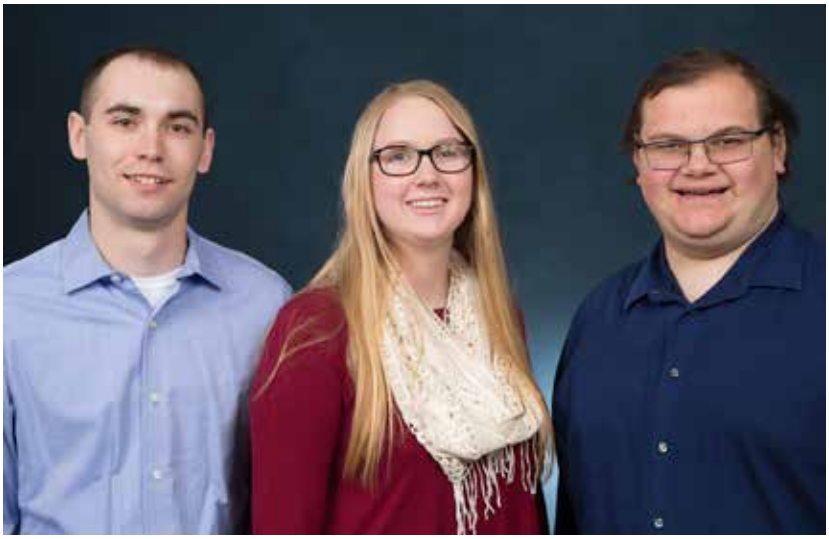
Habitat Modeling for River Otters in Wisconsin

Janelle Taylor
Wildlife Ecology Major

River otters (Lontra canadensis) are a widespread aquatic carnivore that are harvested for their value as a furbearer. Aside from their monetary value as a furbearer, river otters are also important components of aquatic communities as they often serve as top predators and have the capacity to alter trophic systems. However, monitoring otters is difficult due to their cryptic nature and the inaccessibility of the habitats that they often occupy. Identifying suitable habitat is a critical component for developing effective wildlife monitoring programs. Survey efforts often rely on accessibility of sampling locations rather than a targeted focus on areas of likely otter occurrence. Because of this, there have been a paucity of formal modeling efforts to quantify habitat selection by river otters compared to other harvested species. Using four years of aerial survey data (N > 2,000 sampling locations) from regular population monitoring conducted by Wisconsin DNR, we quantified habitat factors associated with river otter occurrence during the winter in both central and northern Wisconsin using a series of mixed-effects regression models. We explored the relationship between river otter occurrence and both natural and anthropogenic habitat factors such as various land cover metrics, fragmentation, water body characteristics, and human disturbance. The results from this study indicated substantial areas of wetland and forest cover types as priority sampling areas and will be considered for improving future monitoring programs and provide empirical insight into river otter ecology.

Advisor: Shawn Crimmins
Oral Presentation
Consider for Judging

Fish communities and water quality in two Wind Pudding Lake basins following considerable water level fluctuations



L to R: Ryan Eastman (Fisheries), Abbie Lee (Water Resources), Justin Kowalski (Fisheries)

Wind Pudding Lake in Oneida County, Wisconsin experienced a considerable water level drop (8-10ft) from 2002-2010. This drop nearly eliminated the fish community in the shallower western basin. The water level began to rise in 2010 and continued to rise through 2017. Fish were transported from the eastern basin to the western basin in 2014, but the success of transfer or natural movements has not been evaluated. Our objectives were to determine if the fish community in the western basin is recovering and if the water quality in both basins effects the fish communities. We used fyke nets and cloverleaf traps to evaluate species composition and abundance and monitored potential movements between basins. To monitor water quality we conducted vertical profiles with a multiparameter sensor and analyzed nitrogen & phosphorus concentrations. We sampled a variety of fish species (n=8) with some being relatively abundant in the western basin and fish movement between the two basins was documented, indicating successful recolonization of the western basin. Total nitrogen concentrations were significantly different (a=0.05) between the basins (d.f.= 5,5; W stat= 38; p= 0.037).
With total nitrogen being highest in the wester basin. Total phosphorus concentrations were not significantly different between the basins (d.f.= 8; t-stat= -0.0814; p= 0.468). The western basin experienced low dissolved oxygen levels (<5mg/L) in the lower half in January 2017. Overall, lake water levels may fluctuate naturally (e.g., droughts) or due to human actions (e.g., dams, water withdrawals), so understanding the influence of fluctuations on ecosystems and water quality is important.

Advisors: Joshua Rabbe, Kyle Herman, Bill Fisher
Oral Presentation
Consider for Judging

Comparisons of large carnivore spoor density in two regions of Botswana, 2016 to 2017

Pictured: Madeline Abbatacola (Wildlife Ecology and History)
Not Pictured: Heather Foster (Wildlife Ecology) and Kara White (Graduate Student)

For effective conservation management the population densities of large carnivores are needed. Along with this, a baseline monitoring system needs to be in place as a reference to compare fluctuations in a population. Large carnivore densities are extremely important for understanding the interspecies relationships in specific habitat areas. Not only are the other species living on the landscape affected by the presence of large carnivores but the human populations as well. Living in areas occupied by large carnivores presents unique challenges, which local people can benefit from the knowledge of which species and their densities are present. The continuous need for large carnivore management leads us to use the noninvasive techniques of distance sampling and spoor counts, to acquire the population density estimates. We chose to use noninvasive spoor counts because it was inexpensive and capable of repetition. In the Ngamiland and Mababe regions of northern Botswana, two transects were run each day with a professional, local tracker as well as two wildlife biologists. The spoor found were examined to determine the species, sex, age, and number of individuals present and recorded using the data management application, Cyber Tracker. This was downloaded into ArcGIS and Excel for analysis. From this population densities were calculated. While we only have two years of previous data, this study will serve as an integral step in creating a baseline monitoring system for large carnivore densities in the northern region of Botswana as well as establish suitable habitat areas.

Advisor: Scott Hyngstrom
Oral Presentation
Consider for Judging

Comparing home ranges, habitat-use, and spatial patterns of raccoons (Procyon lotor) in Laramie, Wyoming

Benjamin Tjepkes
Wildlife Ecology Major

North American raccoons (Procyon lotor) are known to be solitary carnivores. However, individuals may still be using similar resources within the same spatial extent as other individuals. My study aims to investigate conspecific space-use and home range overlap to determine whether spatial patterns exist for a raccoon population in Laramie, Wyoming. Thirteen (6 male, 7 female) radio-collared adult raccoons were monitored between August 2015 and February 2017 using VHF radio telemetry. Home range size and overlap, habitat covariates, and spatial patterns are being compared between male and female raccoons. Several hypotheses can be made based on previous studies: 1) Females will have smaller home ranges than males, 2) There will be more home range overlap between individuals of the same sex than those of opposite sex, and 3) Habitat-use of males and females will be different. The spatial patterns observed in this study may be attributed to the sociality of these animals, however, the opportunistic collection of locations limit our inference to this specific population. Further research is needed to identify the spatial-temporal movements and interactions of these raccoons.

Advisors: Rachel Fanelli and Sarah Benson-Amram
Oral Presentation
Consider for Judging

Abiotic and biotic factors relating to mermithid infection rates in larval midge (Chironomidae) specimens in northwestern Wisconsin streams

Macayla Greider
Wildlife Ecology Major

Mermithid nematodes are generally considered as biological control agents for pest species like mosquitoes, but also may influence Trout (Salmonidae) food sources because they cause reproductive failure and mortality in both midge (Chironomidae) larvae and mayfly (Ephemeroptera) nymphs. However, much remains unknown about the mermithid life cycle and factors affecting their distribution. Our objectives were to determine if the prevalence of mermithid infections differed (1) between hosts with different feeding strategies, (2) streams with different macroinvertebrate and fish communities, and (3) with stream flow rates. We hypothesized that (1) filter feeding midges would have higher prevalence because filter-feeders passively ingest eggs whereas other midges seek out specific prey, (2) Trout-streams would have fewer mermithids, and (3) stream flow would not be related to mermithid prevalence. Mermithid prevalence was assessed in samples collected from 48 streams during 2010-2014 from four northwestern Wisconsin counties. Infection was determined by observation of mermithids within midge bodies. Significantly lower proportions of mermithids were present in Trout streams than non-Trout streams, but no significant differences were present between mermithid presence and either HBI score or stream velocities. Midges are currently being identified to species to determine feeding behavior and distinguish non-filter feeders from filter feeders. We will then use a chi square to compare prevalence of mermithids in filter feeders to non-filter feeders. This research will provide insight into some aspects of mermithid life cycles and host selection.

Advisors: Jeff Dimick, Justin VanDeHey, and Shelli Dubay
Oral Presentation
Consider for Judging

Macroinvertebrate abundance and distribution in restored wetlands in the Glacial Habitat Restoration Area of Wisconsin

John Brezinka
Wildlife Ecology Major

Abbie Lee
Water Resources Major

The Glacial Habitat Restoration Area (GHRA) covers 558,879 acres in Columbia, Dodge, Fond du Lac, and Winnebago counties in east-central Wisconsin. The main land use throughout the GHRA landscape consists of agricultural with a mix of dairy farms, forage and row crops, small woodlots, wetlands, shallow lakes, and residential development. The wetlands are managed by multiple agencies and occur on public and private lands. In the summer of 2017, field work was conducted to evaluate the biological function of restored wetlands. This project focused specifically on macroinvertebrate communities within the wetlands. Macroinvertebrates are an important food source for waterfowl during the growing season and can be an indication of water quality. Sampled wetlands were categorized into three groups based on hydrologic modifications and included waterfowl production areas (WPA) as reference sites. The wetlands were categorized as scrape only (least modification), scrape + ditch modification and scrape + water control structure (most modification). Properties (n=37) and wetlands (n=94) were randomly selected, however, 40 wetlands were selected for this project. We summarized aquatic macroinvertebrate community total abundance, taxonomic richness, the Shannon diversity index, and community composition for each wetland and made comparisons among wetland categories. Water quality was collected using a multiparameter sensor. Preliminary results showed that a scrape + ditch modification had the highest taxonomic richness and Shannon diversity index (n= 30, d= 2.37).

Advisors: Jacob Straub and Rachel Schultz
Oral Presentation
Consider for Judging

Genetic Analysis of Sauger (*Sander canadensis*) Populations in the Mississippi River and Lake Michigan Drainages, WI

Benjamin Schleppenbach
Fisheries Major

Sauger are a native fish species located in two distinct geographical areas in Wisconsin, the Mississippi River drainage and the Lake Michigan drainage. They are commonly found in the tributaries of the Mississippi River drainage, including the St. Croix, Black, Chippewa, Wisconsin Rivers and are relatively rare within the tributaries of the Lake Michigan drainage, including Green Bay, Lake Winnebago, and the Fox, and Wolf Rivers. Sauger have supported an important but variable recreational fishery in Lake Winnebago since the 1920s. As interest in stocking has increased, the need for defining the genetic structure of the two major populations within the state has become a priority. Sauger are naturally a more riverine species compared to their close relative, Walleye (*Sander vitreus*), which are native to more lacustrine systems. Fin clips from Sauger from Lake Winnebago and Sauger from the Lower Wisconsin River were collected for genetic analysis. These samples were genotyped with a standard suite of ten microsatellite loci. Genetic data from the two Sauger populations were analyzed using the programs GenAlEx and STRUCTURE. Walleye populations from two similar locations were then referenced and F_{ST} values were compared. Genetic differentiation calculated using pairwise F_{ST} values was 0.045 between populations, indicating higher differences than the Walleye populations from similar locations (F_{ST} =0.018) recognized as different genetic Walleye assemblages. The STRUCTURE results confirmed the two distinct genetic groups of Sauger. Our results demonstrate that significant genetic structure exists between Sauger populations in the Mississippi River and Lake Michigan drainages.

Advisors: Keith Turnquiest and Wes Larson
Oral Presentation
Consider for Judging

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

Alex Catalano
Fisheries

Lake Whitefish, Walleyes, and Yellow Perch support some of the most important fisheries in Green Bay, but managers have limited information on how these three species interact in terms of predation and diet overlap. In 2016, we initiated a collaborative effort to gain more information on diets and potential interactions among these three species. To this point, we have examined diets from 298 walleye, 205 lake whitefish, and 189 yellow perch collected in Wisconsin DNR gill nets placed in 3 locations during the spring and from a few Wisconsin DNR electrofishing runs conducted in the fall. In 2016 samples, round gobies represented the most important common prey item observed in walleye and yellow perch diets, while benthic invertebrates dominated lake whitefish diets. Initial assessment of 2017 samples suggests that round gobies are less prevalent in walleye diets and gizzard shad are more prevalent. Additional prey items in walleye have included rainbow smelt, yellow perch, and lake whitefish. Yellow perch also prey on benthic invertebrates and round gobies have been observed in lake whitefish diets. Our initial analyses have been limited in time and space and additional sampling is needed to understand food web interactions among these three species.

Advisor: Dan Isermann
Oral and Poster Presentations
Consider for judging

Developing a baseline assessment undergraduate study for effects of a fire regime on invasive wetland flora

L to R: Nicholas Ritter (Ecosystem Restoration and Management Major), Kayla Wilcox (Soil Science Major)
Not Pictured: Ethan Robers (Ecosystem Restoration and Management Major)

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 UW – Stevens Point 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 2018.

Advisor: Kyle Herrman
Oral and Poster Presentations
Consider for Judging

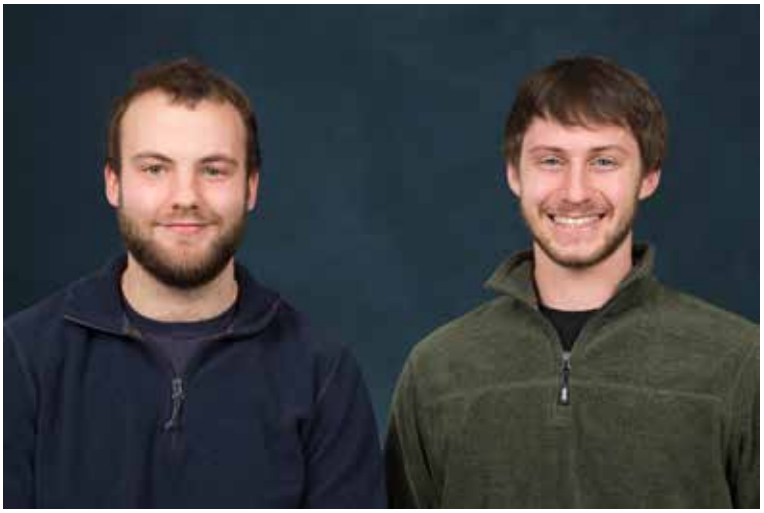
Relationships between submergent macrophyte morphology and aquatic macroinvertebrate community assemblages

Keifer Sroka
Biology Major
Water Resources Major

Just as trees on the landscape shape the terrestrial environment, aquatic vegetation acts in a similar manner. By providing shelter and food to a swath of organisms, the role of aquatic vegetation is vital to ecosystems beneath the surface. All plants are not created equally in regards to how rigid they are and the complexity of their branching. This in turn will create different types of habitats for macroinvertebrates to reside in. The objective of this study was to determine if the morphology of aquatic macrophytes affected aquatic macroinvertebrate assemblages in the Pine River, Waushara County, Wisconsin. Aquatic macroinvertebrates were collected from aquatic macrophyte beds comprised primarily of either Vallisneria Americana or Veronica anagallis-aquatica. Invertebrates were sorted and identified to order or family level. Two-tailed T tests were used to analyze the density, species richness, and species evenness between the two plant species. Density was insignificant, but the richness and the evenness was significant at a=0.05. The morphological complexity of Veronica hosted a richer community of invertebrates compared to the unstable environment provided by Vallisneria .

Advisor Jefferey Dimick
Oral and Poster Presentations

Endoparasite Load Comparison Throughout Wisconsin's Fall Duck Migration



L to R: Alex Coombs (Wildlife Ecology Major) and Grant Gagliardi (Wildlife Ecology Major)

Migratory birds, such as waterfowl, are potentially susceptible to accumulating parasites as they travel to and from geographically distinct locations. When migratory species are concentrated in social foraging areas, they are likely to encounter parasites brought by hosts from different geographic areas. Endoparasites commonly infecting waterfowl include flatworms (trematodes) and tapeworms (cestodes) found within the host body and feed on host tissue or compete with the host for digested food. These parasites are introduced into the environment through feces and develop and reproduce asexually in intermediate hosts and then are trophically transmitted (infection through consumption) to other species such as waterfowl. Based on migratory behavior and diet, we predicted that migratory waterfowl in the state of Wisconsin will show higher abundance of endoparasites and higher species richness later in the migration season. In this study, we examined the intestine and ceca of mallards (*Anas platyrhynchos*), green-winged teal (*Anas carolinensis*), blue-winged teal (*Anas discors*) and wood duck (*Aix sponsa*) for endoparasites. We necropsied 45 birds harvested from September 23, 2017 through November 11, 2017. We conducted linear regression in R statistical programming language and found abundance of parasites from early to late migration was a non-significant increase (p-value = 0.0694). Diversity of parasites showed a positive correlation from early to late season (p-value = 0.0419). This information could give wildlife managers a better understanding of endoparasite prevalence and geographic distribution within waterfowl during their migration through Wisconsin.

Advisor: Sarah Orlofske
Oral and Poster Presentations
Consider for Judging

Comparison of Northern Pike Age Estimates and Reader Precision among Sequential Anal, Pelvic, and Pectoral Fin Rays

Zach Mohr
Fisheries Major

Northern pike support popular fisheries across much of their range and estimation of pike population characteristics, including age structure and growth, is an integral component of northern pike management. Fin rays are frequently used by fisheries biologists to estimate the age of northern pike, but not all biologists use fin rays from the same location. We compared ages and between-reader precision estimated from anal, pectoral, and pelvic rays of northern pike collected from three Wisconsin lakes. Fin rays were embedded in epoxy, sectioned using a slow speed saw, photographed under magnification, and assigned ages by two readers. Age bias plots are being used to examine differences in age estimates between fin rays and coefficients of variation are being used to assess between-reader precision.

Advisor: Daniel Isermann
Oral and Poster Presentations
Consider for Judging

Fish Community Dynamics in a Species Diverse Illinois Pond

Tymon Maurer
Fisheries Major

Pond fish culture is important for subsistence, aquaculture, agriculture, and recreation. While traditional pond management attempts developing balanced fisheries from several species to produce sustainable harvest and recreation opportunities, it may not represent natural environments. Managing for species diversity can enhance resource utilization, function in conservation, and may increase recreation and harvest potential. The goal of this study was to determine if the fish community in a one acre central Illinois pond was healthy and balanced after over 30 local species were stocked. The fish community was surveyed with electrofishing and fyke nets, and evaluated by assessing abundance, community balance, mortality, condition, growth, and size structure. Forage to Carnivore (F/C) (index of community balance) and Consumable Prey to Carnivore (Y/C) ratios were 1.76 and 0.34 respectively, indicating "temporary balance" due to slight predator overabundance, placing the fish community closer to imbalance and inefficiency. Individual species analyses suggested balanced populations, with minor signs of excess competition and predation. Bluegill *Lepomis macrochirus* size structure, and condition of some predators were low, likely due to minimal harvest. Overall, the study pond appeared to support a balanced and mostly healthy fish community, with adequate resources for predators and prey. Pond owners desiring a diverse fishery should sustainably harvest naturally reproducing and regularly stocked predator species, in addition to prey species to maintain balance in diverse fish communities. Future studies should employ more exhaustive surveys of pond fish communities (boat electrofishing setups, piscicides, or pond drainages) for complete community assessment.

Advisors: Joshua Raabe and Justin VanDeHey
Oral and Poster Presentations
Consider for judging

Effects of Buckthorn Removal on Small Mammal Population Abundance

Mitchel Shallwani
Wildlife Ecology Major
Biology Major

Small mammal populations such as Southern flying squirrel (Glaucomys volans) are influenced by the composition of the plant community. Invasion of glossy buckthorn (Frangula alnus) has necessitated their removal; this removal disrupts the local plant community and the wildlife inhabiting these communities. We used the Schnabel estimator to estimate small mammal population abundances with sites obtaining values of 54, 16.57, 6, 2.54, and 45.33. Pre and post-removal sites showed a decrease in abundance but these differences were tested to be not statistically different in a one-way ANOVA. Buckthorn removal shows biological significance and there is most likely other environmental factors affecting abundance and considering all of them is important for future invasive removal plans.

Shelli Dubay
Poster Presentation
Consider for Judging

Fiber Blending and Recovery Systems

L to R: Casey Ausloos, Nick Dercks, Rudy Mogden, Jon Waterman, Evan Page, Adam Socha, Victor Vang
Chemical Engineering and Paper Science Engineering Double Majors

The purpose of this project is to convert the fiber recovery system on the UW – Stevens Point pilot paper machine from a fractionation saveall to a sidehill screen. This installment will improve fiber blending capabilities and reduce plugging issues at the current saveall by limiting its use. If successful this project will allow for the use of synthetic fibers on the machine, the ability to control fiber length distributions, and the ability to utilize broke more effectively. By piping around the stock preparation section of the machine, recovered fiber from the couch tank may be sent back to the mix chest, with the filtered whitewater being recycled back to the seal tank. The fiber recovery systems will be able to run as an either/or, with hand valves controlling which piece of equipment the couch tank flows to. Consistency meters and flowmeters will be calibrated to ensure 100% accuracy. This will allow for weight percentage of each fiber type and the length weighted average length of the blend to be easily calculated. This design will keep the fiber blend consistent throughout the machine during a run.

Advisor: Malek Alkasrawi
Poster Presentation

Lost Creek Seed Bank Analysis

Timothy Blazek (Ecosystem Restoration Major)
Not Pictured: Jensen Derginer (Resource Management Major)

The soil seed bank is a dynamic component of ecosystems that represents a site's former state due to selective events. The seed bank contains a pool of genetic and phenotypic diversity capable of providing valuable insight for the study of species composition, richness, and abundance. The restoration of Lost Creek produced an upland ridge seeded with prairie plant species as well as a lowland with species of wet meadow and shallow marsh origin. In this study, species composition, richness and abundance in the seed bank were determined. A total of eighty-two soil seed bank samples were collected from three different plots located on the northern portion of Lost Creek. Sample sites were geo-referenced prior to sampling. Samples were extracted using a mud auger. Thirty-four samples were taken from plot A, and twenty-four samples were taken at both plot B and plot D. Each sample was sown in plant trays in a greenhouse to determine composition. It was hypothesized that there would be a shift in seed bank composition toward invasive species since previous research performed on the site in 2013; however, the site overall would favor wetland species over prairie. Based on observations made during sample collection, the variation was expected in the values of species composition among the three different plots. The composition of each plot will be determined and compared to data collected in 2013.

Advisor: James Cook
Poster Presentation
Consider for Judging

Determining the Occurence of Pharmaceuticals and Personal Care Products by Polar Organic Chemical Integrative Sampling in an effluent impacted stream

Alyssa Mianecki
Water Resources

Wastewater treatment plants continually release treated human waste into the natural environment. Typically, the wastewater is only treated to remove bacteria and excess nutrients. Compounds such as pharmaceuticals and personal care products are able to bypass the treatment process due to their complex chemical nature and expense of removal. Pharmaceuticals and personal care products (PPCPs) are used to improve the quality of life for humans through means of medication, cosmetics, or food enhancement. In this study, PPCPs were collected from a small stream that is impacted by the Marshfield wastewater treatment plant. Samples were collected using polar organic chemical integrative samplers (POCIS). Grab samples of the water were also collected and analyzed to help verify detections found using the POCIS devices. Other matrices analyzed for the presence of PPCPs were stream sediment, periphyton, and aquatic invertebrates. PPCPs were only detected using the POCIS devices and in the water grab samples. In the laboratory, POCIS samples were extracted using methanol and analyzed on a HPLC/MS/MS system. The water grab samples were extracted via solid phase extraction (spe) and analyzed on the same HPLC/MS/MS system. Results showed that PPCPs were entering the stream from the wastewater treatment plant and can be found at the part-per-trillion level. As the water and contaminants flow downstream, there is a reduction in concentration of contaminants. The pattern of PPCP contaiminent reduction follows the same pattern of phosphorus reduction that has been observed in this stream during past studies.

Advisors: Amy Nitka and Bill DeVita
Poster Presentation
Consider for Judging

Trends in waterfowl abundance of the Lake Winnebago System

Abigail Weigel
Wildlife Ecology Major

Waterfowl breeding and habitat surveys have been conducted across North America annually for over 50 years through a cooperative effort among private, state and federal agencies. These surveys provide data for making management decisions and designing framework for hunting seasons. In 1970, the Wisconsin Department of Natural Resources began conducting aerial waterfowl surveys over the Lake Winnebago System, which includes Poygan, Winneconne, Winnebago, Butte des Morts, Winnebago and Rush Lakes. The species sighted and the number of individuals of each species were counted and recorded each year during both fall and spring. The primary duck species observed were Mallards (*Anas platyrhynchos*), Canvasbacks (*Aythya valisineria*) and Scaup (*Aythya spp.*) but the numerical and spatial distributions have varied greatly over time. Recently, Ducks Unlimited begun working on developing a habitat restoration project on Lake Poygan intended to increase the foraging capacity for Canvasbacks. My project is intended to summarize historic canvasback use of Lake Poygan (and other lakes) to provide baseline monitoring by which to compare pre- and post-restoration work. Preliminary results indicate canvasback numbers from 2017 were substantially lower than a few decades ago.

Advisor: Jacob Straub
Poster Presentation
Consider for Judging

North American Porcupine (Erethizon dorsatum) Giving Up Density

L to R: Vanessa Komada (Ecosystem Restoration Major), Cassidy Hamilton (Wildlife Ecology Major), Ross Nett (Wildlife Ecology Major), and Rachel Stepp (Wildlife Ecology Major)

Foraging opportunities for North American porcupines (Erethizon dorsatum) may be reduced by the increased risk of predation within their home ranges. The goal of the Porcupine Project at the University of Wisconsin - Stevens Point is to determine where porcupines are more likely to forage within an established area at Treehaven UWSP in Tomahawk, WI using model based on Giving Up Densities (GUD). A GUD refers to the amount of food left uneaten at a food patch. A high GUD can indicate that foraging in a location is too costly in terms of energy use or risk of predation. The purpose of the first phase of this project is to determine which type of bait and foraging height is preferred by porcupines so we can later study their GUDs over a larger area. We tested brined pine timber, pine bark mulch, and aspen shavings to determine the selected bait for porcupines. Height preference was tested using two different types of stations: five 8ft tall platforms and five on the ground. Bait types were rotated through different stations over six days of data collection. Baits were dried and weighed each day to find GUDs. Trail cameras were used to confirm that the loss of bait was due to porcupines feeding at the stations. Cameras were also used to indicate how long porcupines stayed at each station. We expect to find that the ground stations baited with brined pine timber will be preferred by porcupines. Using these results, we will be able to conduct a GUD study in winter 2018-2019 using the best bait and station to determine where porcupines feel most comfortable foraging.

Advisor: Cady Sartini
Poster Presentation
Consider for Judging

A comparison of fish communities and habitats between two basins of a northern Wisconsin lake following sustained low water levels

L to R: Ryan Eastman (Fisheries Major) and Justin Kowalski (Fisheries Major)

Wind Pudding Lake in Oneida County, Wisconsin experienced a considerable water level drop between 2002 and 2012. Likely due to changing available habitat and water quality associated with this drop, the fish population in the shallower western basin was almost completely eliminated. Water levels began to rise in 2012 and continued through 2017 and fish were transferred from the eastern to western basin in 2014. Our objectives were to determine if (1) species composition, body size, and condition of fishes differed and (2) if habitat and water quality differed between the eastern and western basins of Wind Pudding Lake. Fyke nets were used to evaluate fish species composition in the spring and fall of 2017. Six fish species occurred in the eastern basin and five occurred in the western basin. Fish captured in the eastern basin were significantly larger ($t=10.22$, d.f.$=958$, $p<0.05$, but no difference was observed in relative weight (i.e., body condition) between the basins. The eastern basin had more diverse habitat, in terms of number of types of habitat and distribution, than the western basin, while there was no difference in water quality between basins. We concluded the increased habitat diversity in the eastern basin was able to support higher fish species diversity. Conversely, homogenous vegetated habitat in the western basin may provide refuge for smaller fish. Based on our findings, fisheries managers should consider that when habitat differs in lake basins the fish communities in those basins may also differ.

Advisors: Joshua Raabe, Kyle Herrman, and Bill Fisher
Poster Presentation
Consider for Judging

Using citizen science technology to monitor giraffe populations in Botswana

Madeline Abbatacola (Wildlife Ecology and History Major)
Not Pictured: Kara White (Graduate Student), Christian Winterbach, Tau Consultants

Citizen science is a unique tool in conservation efforts that can assist in the collection of data. I used the data collection and management application, Cyber Tracker, to obtain photographs and GPS coordinates of giraffes in northern Botswana. This is a free program offered to the public. The application is programmed to record information in the field using a tablet or smartphone that is then downloaded to a computer. My application records a photograph of the individual which is later run through a spot recognition program as well as herd demographics. Currently, the program is being used by a group of researchers in Botswana to gain a better understanding into individual movement patterns and group demographics. The goal once a database of giraffe individuals is established is to use this information to estimate populations using noninvasive measures. This is where citizen science will help hasten along this process. If tourists are already taking photographs of giraffes on their safaris, they can add these and their GPS location to the pool of data being collected. Interactive guest programs in national parks could be started by offering tablets to check out and be used in the data collection process and then be connected to the computer to download the data after each use. My hope for the future is that the combination of citizen science and technology can connect the public sphere and the scientific community which would ultimately cultivate an interest in conservation science and show the importance of collaboration.

Advisor: Scott Hyngstrom
Poster Presentation
Consider for Judging

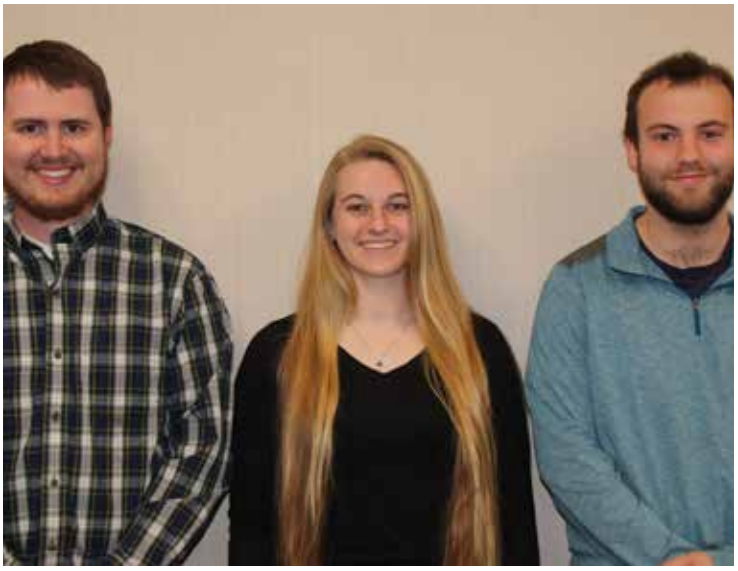
Comparing Rodents Consumed by Urban and Rural Coyotes (Canis latrans)

Sam Sauber
Wildlife Ecology Major

Coyotes (Canis latrans) are generalist predators, whose diet consists of anything that's in abundance in their environment. Urban and rural environments have an abundance of prey species for coyotes to consume. In this project, I compare the percent occurrence of rodent species remains found in coyote scats between rural and urban areas. This research is a continuation of a previous study, where another researcher found a difference in the number of rodents, deer, and vegetation eaten by coyotes in urban and rural areas. I am continuing this work by determining exactly what species of rodents coyotes are eating by reexamining hairs found in scat sampled in the initial project. As a part of the initial project, scats were collected along roadways in urban (Stevens Point, n=20; Wisconsin Rapids n=21) and rural (George W. Mead, n=21; and Buena Vista Prairie Chicken Meadow, n=23) areas. Hair samples from coyote scat were identified to species under a microscope using published guides and known reference specimens. Research is still being conducted through February 2018, and I hypothesize that there will be a difference between urban and rural coyotes in the percentages of each rodent species consumed. Preliminary observations seem to indicate a difference exists, though in-depth statistical analyses have yet to be conducted. This research will help biologist better understand the difference between urban and rural coyote's diets.

Advisor: Cady Sartini
Poster Presentation
Consider for Judging

Long Term Use Trends of Nesting Boxes by Waterfowl



L to R: Sean Mason, Leah Bell, and Alex Coombs
Wildlife Ecology Majors

Abigail Weigel
Wildlife Ecology Major

Cavity nesting birds rely on nest boxes in areas where natural cavities are not available. In Wisconsin, specifically the Mead Wildlife Area in Marathon County, *Lophodytes cucullatus* (Hooded merganser) and *Aix sponsa* (Wood ducks) use nesting cavities or boxes for their eggs; however, the use rate and number of young produced may be declining. To evaluate this potential decline, we examined the numbers of waterfowl eggs laid relative to the number of ducklings hatched from 2008 to 2017. The data has been collected since 2008 by the University of Wisconsin-Stevens Point Wildlife Society. We check nearly 130 boxes in January and February by opening the boxes, removing, and examining the contents, and recording any type of use. Our preliminary results demonstrate *Lophodytes cucullatus* have a higher use of the nesting boxes than *Axis sponsa* but the overall recruitment of waterfowl (i.e. ducklings hatched) has remained consistent over time

Advisor: Jacob Straub
Poster Presentation
Consider for Judging

Persistence of Agricultural Pollutants in the Fever River Watershed

Robert Burke
Water Resources Major

Water infiltrating from agriculturally-dominated watersheds commonly carry with them compounds that degrade the quality of surface water and groundwater. Depending on factors such as soil infiltration rates and the volume of an aquifer, groundwater degradation can continue long after fertilizer and pesticide application are reduced. A 2007 study ascertained that an impacted aquifer in southwestern Wisconsin was not yet fully permeated with nitrates and pesticides, and the water quality should continue to degrade. Samples were drawn from the Fever River, a low-order gaining stream, on three separate dates from two locations near the sampling locations used for the 2007 study. Detections of pesticide metabolites were low, with the most significant being metolachlor ESA. The concentrations were significantly lower in these samples than in the 2007 study. Inorganic nutrients commonly associated with agriculture were higher in every case, with organic nitrogen (TKN) and total phosphorous mean concentrations 80% higher in this study than the 2007 mean values. The inorganic nutrient load in the stream suggests that the water quality has continued to worsen over the last decade in this watershed, and that the aquifer has not reached equilibrium with the surrounding land use.

Poster Presentation
Consider for Judging

The Impact of the Crop Type on Soil Temperature in the Central Sands

Logan Ebert
Hydrology Major

This research project was conducted in order to understand the impact of crop type on the soil temperature with similar soil conditions. Soil temperature data was collected for the 2015 agricultural growing season at the Isherwood Farm research project. This sub study focuses on two lysimeter stations, one in each of the two neighboring fields with contrasting crops. One field was planted into potatoes and the other in field corn. The stations record soil temperature and moisture data at 10, 20, 40, and 80 cm depth. Maximum daily soil temperatures were used to investigate differences between crop types. In particular, I hoped to understand whether crop canopy differences between potato and corn will affect the rate at which soil temperature warms during the growing season. The difference of time between the max temperatures is the main focus because the average minimum temp can be skewed by the irrigator spraying the cold ground water. Field measurements of leaf area index (LAI) as well as data from a meteorological station and soil temperature data were used to investigate differences between crop types. Understanding the relationship between LAI and soil temperature could be useful in managing seed banks, particularly for cover crops, as we understand the influence of temperature on germination.

Advisor: Kevin Masarik
Poster Presentation
Consider for Judging

Analysis of Growth, Sex, and *Neascus* infestation (Black Spot Disease) in Wisconsin Johnny Darters (*Etheostoma nigrum*), a 60-year perspective

Jason Lins (Fisheries Major)
Not Pictured: Jennifer Krusiec (Biology Major)

We are analyzing potential similarities and differences among age, growth and ectoparasitism patterns across historical Johnny Darter (*Etheostoma nigrum*) populations in Wisconsin. This study is based on a dataset that is currently being formed from the analyses of Johnny Darter (*Etheostoma nigrum*) specimens housed in the Becker Memorial Ichthyology Collection (University of Wisconsin-Stevens Point Museum of Natural History). The current dataset for this project consists of over 300 specimens, collected over the past 60 years from lentic and lotic waters throughout Wisconsin. Data collection will continue until all of the specimens available are measured—approximately 1000 individuals. For each specimen we are measuring total length (mm), preserved mass (g), sex, gonadal weight and number of encysted Neascus parasites. All specimen locality information is georeferenced. Regression analyses will be conducted from the dataset to evaluate potential spatiotemporal relationships among number of infestations, length, weight, gonadal somatic index (GSI) and body condition. Johnny Darters can occur in nearly any aquatic habitat in Wisconsin—cool to warm water, lentic or lotic, polluted or unpolluted, heavily developed or pristine. We are curious about potential growth, body condition, and ectoparasitism rate variation across Wisconsin aquatic ecosystems over the past 60 years.

Advisor: Justin Sipiorski
Poster Presentation

Morphometric variation of Iowa Darters in lotic and lentic environment in Wisconsin

L to R: Maxfield JonasKrueger (Fisheries Major), Noah Daun (Biology Major), Justin Kowalski (Fisheries and Biology Majors), Jeanne Thibodeau (Biology Major)

The Iowa Darter (*Etheostoma exile*) is a member of the perch family and make up an important part of the benthic community in many lakes and streams, and is native to the state of Wisconsin. Iowa Darters are also an important indicator species of good water quality and have a high index of biotic integrity (IBI) value. They are notable because they are one of the only darter species that are found in both lotic and lentic environments. Even though Iowa Darters are fairly common and widely distributed throughout the northcentral United States and most of central Canada, little research has been done concerning this species. Our past research showed that Iowa Darters have length based growth. We wanted to continue this research to determine if growth differs between lotic and lentic populations. We used truss measurements to determine if morphologies differed between the populations. We also calculated gonadal-somatic index (GSI) for each population. We then compared the GIS's of the lotic and lentic populations to determine if there was a difference in reproductive investment between populations. Understanding differences in growth between Iowa Darter populations in lotic and lentic environments would help us to further understand this important indicator species and help future managers understand what makes this species a potentially important species in aquatic food webs.

Advisor: Justin Sipiorski
Poster Presentation
Consider for Judging

Using pharmaceuticals and artificial sweeteners in groundwater to trace septic system contamination in lakes

Chris Bocciardi
Soil and Waste Management

With one fourth of U.S homes relying on septic systems, more than 4 billion gallons of wastewater is pumped into the grounds surface per day. As the reliance on septic systems continue to increase, no greater threat is created than phosphorus loading into surface waters. Once in the environment, phosphorus can have substantial impacts on ecosystem health, water quality and property values. In the Midwest, it is often difficult to distinguish sources of phosphorus due to the many contributing land use practices within a watershed. This study seeks to use human waste tracers as a way to determine if septic systems are contributing phosphorus to groundwater and how it enters surface waters. We collected groundwater samples directly entering Lake Camelot in Adams County, Wi, and analyzed it for nutrients and indicators of potential septic system contamination. Groundwater samples were collected from the lake adjacent to several parcels on Lake Camelot using mini-piezometers. In the laboratory, samples were analyzed for nutrients including reactive phosphorus, total phosphorus, nitrate/nitrite nitrogen, total kjeldahl nitrogen and chloride. Septic system tracers analyzed included acesulfame, sucralose, saccharin, cotinine and caffeine. Preliminary results indicate that Lake Camelot has some evidence of septic system contamination, with one sample having measurable amounts of acesulfame and sucralose. While present, acesulfame and sucralose concentrations are low, constituting only 1% of what previous research has shown to be common in septic system tracer samples. This dilution is most likely due to the large volume of groundwater contribution in the sampling location. Continuing efforts will involve modifying sampling locations to access lateral groundwater movements onshore to obtain undiluted samples.

Advisor: Paul McGinley
Poster Presentation
Consider for Judging

The application of prescribed burns and food plots with white-tailed deer in Northern Wisconsin

Cori Semler
Wildlife Ecology Major
Wildland Fire Science Major

The dietary needs of white-tailed deer vary by the region of the country, and also the season of year. Nutrients, such as crude protein, factor into growth, development and maintenance of white-tailed deer. Prescribed fire has been shown to enhance nutrient cycling, and increase plant diversity and productivity. Food plots are used to provide a consistent high-quality food source, pattern mature males, and keep white-tailed deer on properties for harvest goals. The purpose of the study was to compare white-tailed deer use of food plots versus burned and unburned native habitat. I hypothesized that there would be no difference in the number of deer captured, the sex-ratio and crude protein between the prescribed burns, food plots, and unburned areas along with the variation by month.

This was a study in the summers of 2016 and 2017 in Fence, WI. Two prescribed burns of equal size were conducted and compared to two food plots. The first food plot contained a mixture of perennial clovers, and food plot two contains a mixture of annual forbs. A camera was placed on each during June, July and August, making observations for 30 trap hours. Each observation recorded the number of deer and sex by way of percentage. The maximum number of deer was recorded for each hour. Three vegetation samples were collected in each month in food plots, burn plots, and unburned plots during 2017 to measure crude protein. Three statistical Z tests and four one-way ANOVAs were used to compare the observations.

Advisor: Ron Masters
Poster Presentation
Consider for Judging

Chroma color meter use for predicting soil organic matter from color for the Central Sands

L to R: Krista Bryan (Soil and Land Management Major) and Emma Schmidt (Water Resources Major)

Soil organic matter (SOM) is a key component of soil quality, and is therefore important to determine as soil quality is a soil's capacity to function, sustain biotic productivity, and maintain and enhance water and air quality. There is currently no accurate field-based method to measure SOM in Wisconsin, and laboratory analyses are expensive and time-consuming. As other studies have found, soil color correlates strongly with SOM and might be used to predict SOM in the field. The accuracy of this prediction is dependent on the soil management practices as well as soil properties, meaning that different models need to be created for different regions to preserve accuracy. Our objective is to develop a relationship between soil color and SOM in the Central Sands region of Wisconsin. To accomplish this, we have taken soil samples to 50cm in forested, pastured, and row cropped areas throughout the Central Sands Region. Color will be assessed by Munsell color chart, a Konica Minolta CR-400 chroma meter, and two smartphone based applications, all of which have the ability to be used easily in the field. Organic matter content will then be determined using the loss on ignition method and any possible relationships will then be determined. This relationship could be a very practical soil quality assessment tool that is accessible to practitioners which also lays down a basis for continued work throughout other regions. We will be presenting preliminary data as our study has just begun.

Advisor: Bryant Scharenbroch
Poster Presentation
Consider for Judging

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

Kelley Harkins
Wildland Fire Science Major
Forest Ecosystem Restoration and Mangement Major

Cori Semler
Wildland Fire Science Major
Wildlife Ecology Major

Globally, oak savanna ecosystems are at risk of extinction. These ecosystems are characterized by open areas with scattered trees dominated by an understory of grasses and forbs creating forage and cover for wildlife. Plant community structure and composition are dependent upon frequent disturbance, such as fire. The objective of this study compares changes over time in plant community composition, diversity, and structure under various fire frequencies and seasons. We hypothesize that a fire frequency of three to seven years is a major contributor to maintaining plant diversity and preventing woody encroachment in oak savannas. We explored the effects of variable prescribed fire frequency and seasonality on plant community responses. This data is then used to determine the appropriate treatment to maintain ecosystem function.

In fall 2014, UWSP Fire Crew established six permanent 1m² sample plots in the two savanna units in Berard Oaks. Berard Oaks is located in Schmeeckle Reserve, Stevens Point, Wisconsin. At each plot, we sampled the number of stems and the percent cover by species and functional group. Plant surveys are conducted each semester, and twice throughout the growing season. Prescribed fire has been applied twice to the units in the last ten years. Prescribed fire will be applied to both units in the spring of 2018. Comparisons are made about the effects of time since fire on community richness and diversity using the Shannon Diversity Index. From our vegetation surveys we have found species richness has increased post fire and continued to increase through time.

Advisor: Ron Masters
Poster Presentation
Consider for Judging

Is Classroom Collected Data Accurate Enough For Scientific Research?

Tate Klauck
Soil Science Major

Christian VanScoyk
Biochemistry Major

Involving students in research and data collection can facilitate enhanced learning, professional development, and potentially contribute to scientific knowledge. However, classroom data may not be accurate. Students from a UWSP Soil Science course were taught two labile carbon (labile C) methods to assess the soil quality of three different landscapes. Labile C is a portion of the soil organic matter pool that is easily decomposed by microbes. Labile C was measured by using two laboratory procedures: potassium oxidizable carbon (POX-C), and potentially mineralizable carbon (PMC). To assess the quality of classroom data, "experts" also measured labile C using the same methods with the same soil samples. The "experts" followed more rigorous protocols including uniform incubation time, hydrating vessels, and accurate measuring instruments to ensure accuracy. Students in the classroom were also instructed on the methods, but questions remain as to whether they are able to follow these procedures to produce accurate data. Accuracy of expert and classroom data were also evaluated by assessing labile C with gas chromatography, which would give information without human measurement errors of both groups. Linear regression analyses were used to evaluate the accuracy of student collected data. The hypothesis is that if a significant relationship ($P \leq 0.05$ and high R2) exists between the classroom and expert data, then classroom data might be accurate and possibly considered reliable.Having information on the quality of classroom data can improve its utility and facilitate further research.

Advisor: Bryant Scharenbroch
Poster Presentation

Efficacy of Unmanned Aerial Vehicles for Hazing Elk from Wisconsin Agricultural Areas (in progress)

Janelle Taylor
Wildlife Ecology Major

Elk (*Cervus canadensis*), a large and exceptionally popular game species, were reintroduced to north-central Wisconsin in 1995. Since then, the population has been growing at an average rate of 13 percent annually. In 2015 Wisconsin DNR began the process of establishing a second elk herd in Black River State Forest. The increasing populations have co-occurred with increased elk use and resultant damage of agricultural areas including corn fields and cranberry bogs. Agricultural damage can result in financial stress for farmers; additionally, farmers enrolled in the Wildlife Damage Abatement and Claims Program (WDACP) are eligible for financial compensation provided by the Wisconsin DNR. Abatement methods for nuisance animals have traditionally included shooting permits, noise, scent, and strobe light deterrents. The current population is not considered a game species and shooting permits are not issued, meaning that alternative approaches to damage abatement should be considered. One such approach is the use of unmanned aerial vehicles (UAV) as hazing tools. UAVs have become an increasingly popular phenomena and potentially provide a wide variety of natural resources applications, including hazing. In cooperation with Wisconsin DNR, elk occurring on privately owned agricultural properties near Black River Falls State Forest will be hazed using a DJI Inspire flown by an FAA certified remote pilot. Behavioral responses will be recorded both in situ and will be further monitored using GPS collared individuals to evaluate level of acclimation of elk to UAV hazing. We will evaluate the effects of hazing on one hour and five day net displacement distances using a mixed-effects regression model. Based on the deterrent efficacy, cost of equipment, time, and feasibility, we will estimate the cost-effectiveness of the use of UAVs as a hazing tool.

Advisors: Scott Hyngstrom and Shawn Crimmins
Poster Presentation
Consider for Judging

Brook Trout Movements, Spawning, and Survival in the Little Plover River Prior to Watershed Restoration

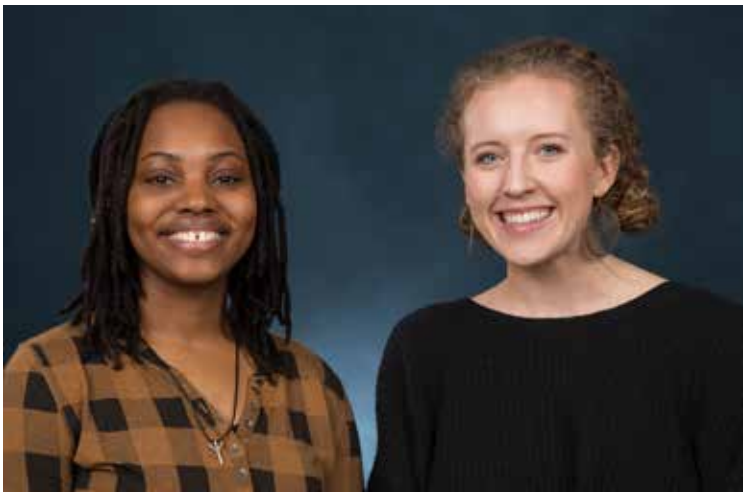
Zachary Mohr
Fisheries Major

Benjamin Schleppenbach
Fisheries Major

The Little Plover River is a self-sustaining brook trout *Salvelinus fontinalis* stream and a focal study system for groundwater issues in central Wisconsin. The stream has experienced reduced water levels in recent years including dry reaches in 2005 through 2009, potentially due to a combination of drought conditions and groundwater pumping. The Village of Plover has begun facilitating watershed restoration efforts to increase stream flows. Our study sought to learn about the brook trout population and to provide baseline data prior to restoration efforts. Since Autumn 2015 a subset of brook trout (> 120 mm) were implanted with a passive integrated transponder (PIT). Beginning in Spring 2016, PIT antennas at four locations throughout the river were used to detect tagged brook trout, evaluate movements and migrations, and estimate survival rates. Weekly redd surveys were conducted in late 2017 to locate important spawning habitat. Preliminary results indicate daily movements shifted from nocturnal to diurnal during the spawning period (late Autumn to early Winter) when river-wide migrations also occurred. Redds were located throughout the river, with concentrations in certain areas. Monthly survival estimates were variable with a mean around 0.9. This information will expand knowledge on brook trout from a unique system and provide baseline data to analyze potential effects of watershed restoration efforts.

Advisor: Joshua Raabe
Poster Presentaiton
Consider for Judging

Cavity nesting bird communities sampled through passive auditory surveys as a predictor for bat roost locations



L to R: Monae Taylor (Wildlife Ecology Major) and Adelyn Hanchette (Wildlife Ecology Major)

We seek to investigate the relationship between cavity nesting bird communities and maternal bat roost locations. Ultimately, our objective is to use cavity nesting nesting bird communities (which can be sampled through passive auditory surveys) as a predictor for bat roost locations. We will determine the influence of species, habitat, and observer on detection probabilities for cavity nesting bird species at Sandhill Wildlife Area. We will then calculate species-specific bird abundance at point count locations and investigate patterns in abundance as they relate to proximity to bat roosts.

Advisor: Jason Riddle and Jordan Meyer
Poster Presentation
Consider for Judging

Evaluation of 2,4-Dichlorophenoxyacetic acid on Bluegill and Yellow Perch in Northern Wisconsin Lakes

Andrew Wieland
Fisheries Major

Eurasian Watermilfoil Myriophyllum spicatum (EWM) is an invasive aquatic macrophyte that creates dense vegetative mats and often outcompetes native plant species. The most common herbicide used to treat and control EWM is 2, 4-Dichlorophenoxyacetic acid (2, 4-D). However, the effects of 2, 4-D on fish communities are not well known, especially outside of laboratory settings. Our objective was to determine if (1) survival of juvenile Bluegill and Yellow Perch and (2) catch per unit effort (CPUE) of young of the year (YOY) Yellow Perch differed between lakes treated and not treated with 2, 4-D. We studied six lakes in northern Wisconsin, all with EWM present, using a before-after-control-impact design. Pre-treatment data were collected from all lakes in 2015. In 2016, three lakes were treated with 2, 4-D (treatment) while three lakes served as reference systems. All lakes were surveyed in 2017 (post-treatment). Yellow Perch YOY mean CPUE from seine hauls was different between treatment (2.74±7.30) and reference (0.68±1.70) lakes ($P < 0.01$), but no differences were present between treatment and reference years within individual treatment lakes ($P > 0.05$ for all lakes). Juvenile Bluegill and Yellow Perch survival in net pens was not significantly different between treatment and reference trials (PBLUEGILL = 0.91; PPERCH = 0.16). Overall, it did not appear that the application of 2, 4-D herbicides caused population-level declines (mortality) in Yellow Perch or Bluegill. Based on these results it appears that 2, 4-D application may be a reasonable method for treating EWM.

Advisors: Justin VanDeHey, Nick Rydell, and Daniel Isermann
Poster Presentation
Consider for Judging

Population History and Netting Successs of Lake Trout in the Flaming Gorge Reservoir of Green River, WY

Thompson Hill
Fisheries and Aquatic Sciences

Lake Trout *Salvelinus namaycush* are an important fishery in the Flaming Gorge Reservoir. Lake Trout were introduced into the reservoir via downstream movements from adjacent waters in the Wind River Range. Lake Trout population in the reservoir are now renowned for their large size structure and high density. Flaming Gorge is co-managed by the Wyoming Game and Fish Department and the Utah Division of Wildlife Resources. Annual spring gill net surveys have been conducted since 1990. Our objective was to determine if relative abundance and size structure of Lake Trout (1) has changed over time and (2) differed between net-types. Two types of gill nets, experimental (ER) and exploratory (EX), were set in fixed locations throughout the lake (n = 18 sites/net type). Experimental nets have eight randomized mesh panels varying from 3/4 inch to 2 1/2 inches and were soaked for four hours. EX nets have two in^2 mesh throughout and are only set for one hour to minimize mortality. Mean fish/hr in ER nets was 0.55 (SD = 0.55). The mean catch rate per hour increased significantly by 0.015 fish per year (P = 0.0003). Mean fish/hr in EX nets was 0.37 (SD = 2.88). Catch rates in EX did not change over the study but EX nets caught more Lake Trout > 28" (minimum length limit). This project is a first step at analyzing a ~30 year dataset for changes in abundance and size structure of Lake Trout in the reservoir due to increased angler convern over the fishery.

Advisors: Justin VanDeHey and John Walrath
Poster Presentation
Consider for Judging

Comparing parasite species and abundance in rural and urban Eastern cottontail rabbits

L to R: Hannah Schley, Sabrina Claeys, and Katherine Rexroad
Wildlife Ecology Majors

The Eastern cottontail rabbit (*Sylvilagus floridanus*) is an abundant species throughout the Midwestern United States. Cottontail rabbits serve as a prey base for many of the predators and as hosts to several endo- and ecto-parasites; however, parasites in cottontails are rarely observed and documented. Observations of Eastern cottontail rabbit parasites have not been published in Wisconsin since the 1950's. Since then, many areas in Wisconsin have urbanized due to an increase in population. Our objective is to observe the endo- and ecto-parasites of Eastern cottontail rabbits in Stevens Point, Wisconsin in order to compare the diversity and abundance of parasite species between hosts in rural and urban areas. We hypothesize rabbits in urban areas will host a greater number and variety of endo- and ecto-parasite species. We set 10 Tomahawk traps on personal properties in the Stevens Point neighborhood and 10 Tomahawk traps on the Izaak Walton League property. Traps were set in the evenings from February – March and were baited with sweet feed. Captured cottontail rabbis received an ear tag and were combed for ectoparasites, and fecal samples were collected for endo-parasites. Parasites were analyzed by conducing fecal floats and microscopic observations for identification.

Advisors: Robert Lonsinger
Poster Presentation
Consider for Judging

Gill Lice Infection and Effects on Brook Trout in Streams on Fort McCoy, Wisconsin

Cadie Olson
Fisheries Major

Brook Trout *Salvelinus fontinalis* populations have declined throughout their native range likely due to environmental changes and introduced species, but possibly other factors including parasitic Gill Lice *Salmincola edwardsii*. My objectives were to determine if relationships existed between Gill Lice prevalence and Brook Trout densities, lengths, and water quality characteristics (e.g. flow, water temperature), and if Gill Lice severity negatively influenced Brook Trout body conditions. Brook Trout were electrofished at nine sites on the La Crosse River and Silver Creek from 2014-2017. All Trout were qualitatively inspected for Gill Lice (0 = none, 3 = severe), measured for total length (mm) and weight (g), and enumerated for density estimates (Trout per mile). Potential relationships between Gill Lice severity and factors were evaluated with multiple logistic regressions. Brook Trout density was poorly related with Gill Lice prevalence and fish length was the best predictor (lowest AIC) of Gill Lice prevalence; larger fish had higher probabilities of hosting more Gill Lice. Higher stream flows reduced the probability of severe Gill Lice indices while dissolved oxygen and temperature models suggested that lower temperatures and higher dissolved oxygen concentrations were favorable to Gill Lice. Brook Trout body condition was average (mean relative weight 90-100) and was similar among all Gill Lice prevalence levels (P=0.63). However, managers concerned with Brook Trout conservation should consider how changing environmental conditions may alter the distribution and prevalence of Gill Lice, and how these factors relate to Brook Trout population dynamics.

Advisors: Joshua Raabe and Jeffrey Dimick
Poster Presentation
Consider for Judging

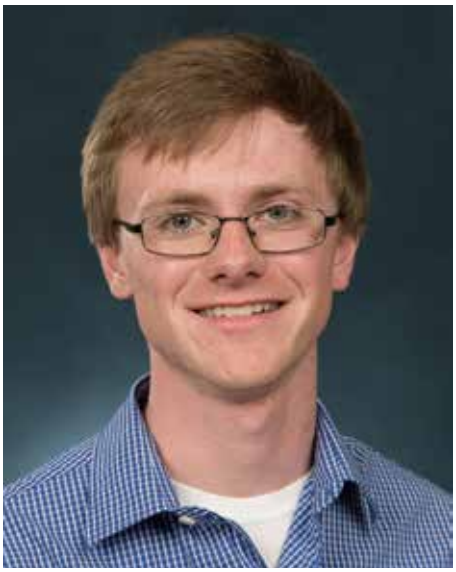
Growth Differences in Walleye (Sander vitreus) and Saugeye (Sander vitreus X Sander canadensis) in Aquaponics Systems

L to R: Taylor Feucht (Biology Major), Colton Branville (Resource Management Major), and Lucy Jones (Sustainable Food and Nutrition Major)

Aquaponics is the combination of hydroponic growing techniques and recirculating aquaculture systems. Aquaponics allows for the elimination of soil. This eradicates the possibility for soil-borne diseases and can increase yields. There is a small range in the variety of fish that can successfully be raised in an aquaponics system. Tilapia are the most common fish raised in aquaponics because of their hardiness and tropical origin, making them perfect in a greenhouse setting. Walleye and/or saugeye (a cross between walleye (Sander vitreus) and sauger (Sander canadensis)) are being raised to create a more lucrative market for farmers when it comes to selling their fish. Over the past two years saugeye and walleye have been raised in the University of Wisconsin- Stevens Point's Aquaponics Innovation Center. There are six replicate aquaponic systems consisting of three different densities of fish per tank 50, 100, and 150 per 200 gallons of water. The fish were measured (length in millimeters, and weight in grams) once per month to track growth. The research ran for 12 months for each density of fish. $Nitrate^{-n}$, $nitrite^{-n}$, and $ammonia^{-n}$ tests were tested every week during the 12 months of the research to understand the role of water quality during fish production. Saugeye and walleye were fed the same diet, which removed the influence of feed on growth performance. The hypothesis was that saugeye will grow faster in a six-month period than walleye, due to heterosis (hybrid vigor). Hybrid vigor is the selection of traits such as growth rate, size, and yield stemming from two different species of pure-bred parents.

Advisor: Chris Hartleb
Poster Presentation
Consider for Judging

Analysis of a Muskellunge Age and Growth Structure: Evaluating a Population from the Red Cedar River, WI



Nathan
Fisheries Major

Muskellunge *Esox masquinongy* are an ecologically and economically important sportfish in Wisconsin. To better understand population dynamics in the > 700 fishable Muskellunge populations in Wisconsin, fisheries managers utilize age and growth data to determine what management actions (e.g., regulations or stocking) should be implemented. Because Muskellunge are managed as a trophy species, understanding growth rates and potential is critical. In this study, Muskellunge from the Red Cedar River (40" Minimum Length Limit (MLL)) were compared to a nearby population in Rice Lake (50" MLL), both located in Barron County, WI. The objective of this project was to determine if growth rates and age structure of Muskellunge differed between the Red Cedar River and Rice Lake populations. Muskellunge were collected from the Red Cedar River via electrofishing in August of 2015 and 2016, and from Rice Lake via fyke netting during the spring of 2014 and 2015. Length, weight, and sex were recorded for all fish and anal fin rays were removed for aging structures. The bases of the rays were sawed flat using a dremel tool, then fin rays were viewed under a microscope, and annuli were counted to estimate age. We compared age distributions and sex-specific von Bertallanfy growth parameters between populations. Average age was lower and growth of males was slower, but $L\infty$ was higher for females in Red Cedar River. Results suggest the Red Cedar River could support a higher MLL to promote a trophy fishery.

Advisor: Justin VanDeHey and Aaron Cole
Poster Presentation
Consider for Judging

The Effect of Urban and Rural Habitat Types on Waterfowl Behavior

Logan Hennlich
Wildlife Ecology Major

Waterfowl are a prevalent family of Aves and provide important ecological functions in Wisconsin and across large portions of the United States. Waterfowl are a family that rely on different behaviors to maximize the fitness of an individual and the setting, either rural or urban can vary those behaviors. This series of behaviors are key for dabbling ducks regardless of the setting. Performing all behaviors is important because if an individual animal is not able to perform the behavior normally, it would increase energy expenditures and decreases fitness, and increasing mortality rates. Many waterfowl species, such as mallards, have learned to adapt and perform behaviors in an urban setting just as effectively as their traditional rural habitats. I hypothesize that dabbling ducks in a rural setting will exhibit behaviors that differ drastically than will dabbling ducks in an urban setting. Observations of dabbling ducks were conducted in the municipal area of Stevens Point as well as from George Mead Wildlife Area. At each setting focal animal sampling was used when 10 minute periods and 20 second intervals between each record. The behaviors that were recorded included loafing, swimming, feeding, preening, flight, bathing and courtship. Preliminary results show that swimming was the most performed behavior in urban and rural waterfowl, and loafing or feeding was performed more in rural settings. Preening and the other behaviors varied between individuals and species. The behaviors that were recorded will help to examine the effects that a particular habitat with low or high human influence can have on waterfowl behavior.

Advisor: Cady Sartini
Poster Presentation
Consider for Judging

The Effect of an Organic Residual Material High in Lignin on Soil Respiration of Three Puerto Rican Soils

L to R: Mckenzie Slack (Soil and Land Management Major), Michael Nessman (Soil and Waste Resources Management Major), and MarKatie Mealy (Soil and Land Management Major)

Sustainable reuse of our waste is needed as human populations continue to rise. The waste materials from Puerto Rican fruit farms are currently being examined for energy production systems. Although these residuals are currently considered waste, they can be used to improve the health of relatively infertile Puerto Rican fruit farm soils. These residuals have relatively high ligin concentrations and the effects on soil quality are unknown. This study examines the decomposition of varying rates of lignin by measuring CO_2 evolution from respiring microorganisms. Lignin was applied to the soil at rates of 0%, 5%, and 10%. The preliminary results suggest that higher rates of lignin cause sharp increases in microbial respiration followed by a stunt in respiration over time. Lower rates show a gradual increase in respiration over time. A soil type effect was also observed and respiration appeared to be correlated with soil organic matter content. High respiration rates may indicate a more vigorous microbial pool which increases plant available nutrients and soil health. Future work will examine the effect of lignin-induced changes on plant growth and health on Puerto Rican fruit farms. These results are important for improving Puerto Rican soils and also finding sustainable ways to reuse agriculture byproduct in a sustainable way

Advisor: Bryant Scharenbroch
Poster Presentation

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

Lindsey Laskowski
Soil and Land Management Major

Jasmine Medukas
Soil and Land Management Major

Not Pictured: Erik Halverson, Zach Leitner, Derek Potratz

Rotational grazing is an agricultural practice which provides long-term ecological, environmental, and soil benefits. The goal of this project is to assess soil quality on a rotational grazing farm over time. This study is a long term-club research project through the UW - Stevens Point Soil and Water Conservation Society. The research crew analyzes the impact of rotational grazing on soil physical and chemical properties on a local managed grazing operation development. Soil Carbon:Nitrogen ratios in fall of 2017, Total Carbon, Nitrogen and Organic Matter spring of 2018, Phosphorus, Potassium, pH, and Electrical Conductivity will be measured in fall of 2019. Fields were broken up into five acre parcels and grid points were allotted to each parcel. A control field was sampled, which is not rotationally grazed, as well as a newly converted conventionally farmed field. Soil samples (6") were collected within a ten-meter radius around each point in fall 2015. Fields will be sampled four years from now in fall of 2019 and tested for the same soil properties as listed above. Samples are currently undergoing testing and will conclude in spring of 2019.

Advisors: Robert Michitsch, Bryant Scharenbroch, Jacob Prater, and Kyle Herrman
Poster Presentation

Home range comparison of urban white-tailed deer during the winters of 2014/15 through 2017/18

L to R: Kelsey Brown, Garret Downing, and Kelsie Hayes
Wildlife Ecology Majors

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, 2015/16, 2016/17 and 2017/18 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 2017 was 1.92 ha. At this time, we are collecting data from 3 deer. Two from 2016 and one from 2017. We 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 past 2 winters. Data collection is ongoing and will continue until April 1, 2018. This analysis will provide insight to movement patterns of urban deer over the course of multiple wintering seasons.

Advisor: Scott Hyngstrom
Poster Presentation
Consider for Judging

Eutrophication Indicators in Restored Trout Stream

Robert Burke
Water Resources

Freshwater systems rich in inorganic nutrients suffer a reduction in biodiversity as algal and macrophytic dominance leads to the reduction in the dissolved oxygen content, rendering the environment unsuitable for species sensitive to oxygen depletion. Water samples were analyzed from a restored wetland stream in a heavily agricultural area in Portage County, Wisconsin. This stream gains baseflow from agriculturally impacted groundwater studied extensively in 2004. This stream has been stocked with brook trout (*Salvelinus fontinalis*), an ecologically and recreationally desirable species requiring high (>5 mg L^{-1} O^2) dissolved oxygen. Three parameters examined were found to be of concern. Nitrate + nitrite (as N), and total phosphorous concentrations were compared against established eutrophication thresholds, the published groundwater data from the 2004 study, and a reference site. The concentrations of nitrate and total phosphorous in these samples were significantly greater than eutrophication thresholds. An autotrophic index (AI) value was derived from ash-free dry weight and chlorophyll-a analysis. This AI value was typical of an enriched stream. These data may raise questions about the long-term viability of a brook trout population in this stream.

Poster Presentation
Consider for Judging

Effect of compost amendment on soil quality and corn yield in locally sourced sandy soil

L to R: Bryce Mahoney and Serena Kuczmarski
Soil and Waste Resources Majors

Wisconsin's central sands region is a major producer of vegetables, adding billions of dollars and tens of thousands of jobs to our agricultural economy (Helsel, Bradbury, Fienen, 2013). Previous research has demonstrated benefits of compost amendment on soil quality and soil health. Our research, conducted on corn plants receiving compost application rates of 6, 9, 12, 15 or 18 tons per acre, will more precisely quantify the effects of compost amendments on a loamy sand (Plainfield B) soil sourced from this intensively farmed region in order to better recommend compost use locally. After 9 weeks of corn propagation we analyzed plant biomass and soil samples for various physical and chemical properties.

Advisor: Robert Michitsch
Poster Presentation
Consider for Judging

Effects of Vermicompost and Vermicompost Tea on Ginseng Production at Three Wisconsin Sites

L to R: Brooke Bembeneck (Soil and Waste Resources Major) and Lindsey (Soil and Waste Resources Major)

"Wisconsin-Grown Ginseng" is increasing in demand worldwide, but the current strategy for commercial production involves the excessive application of pesticides, which can have adverse impacts on human and environmental health. The purpose of this study is to evaluate the effects of vermicompost and vermicompost tea in commercial ginseng (Panax quinquefolius) production, with the idea that sustainable amendments such as these could offer solutions for reducing pesticide application and increase revenue for ginseng farmers. We hypothesized that the vermicompost and vermicompost tea would stimulate plant health by enhancing beneficial microorganisms. The beneficial microorganisms will inhibit soil-borne phytopathogens which will increase the ginseng yield. Furthermore, with the addition of organic material, nutrients will be made available for the plants and the beneficial microorganisms.

The experiment was conducted at three sites in Marathon County, Wisconsin. At each site, three rates of vermicompost were assigned using a randomized complete block design, along with a split block design for the presence or absence of vermicompost tea.

A significant increase in total root mass yield was found when vermicompost tea was applied, but no significant difference in root mass of individual plants was observed. Additionally, it was found that the average mass of berries produced decreased when vermicompost tea was applied. The composition of bacteria and fungi in ginseng rhizosphere samples is being determined by sequencing genetic fragments from the 16S rRNA and ITS, respectively. The microbial community composition is being assessed to attempt to explain the relationship between ginseng health and use of vermicompost-derived amendments.

Advisors: Jacob Prater, Daniel Keymer, Robert Michitsh
Poster Presentation
Consider for Judging

Microhabitat use of Saw-whet Owls

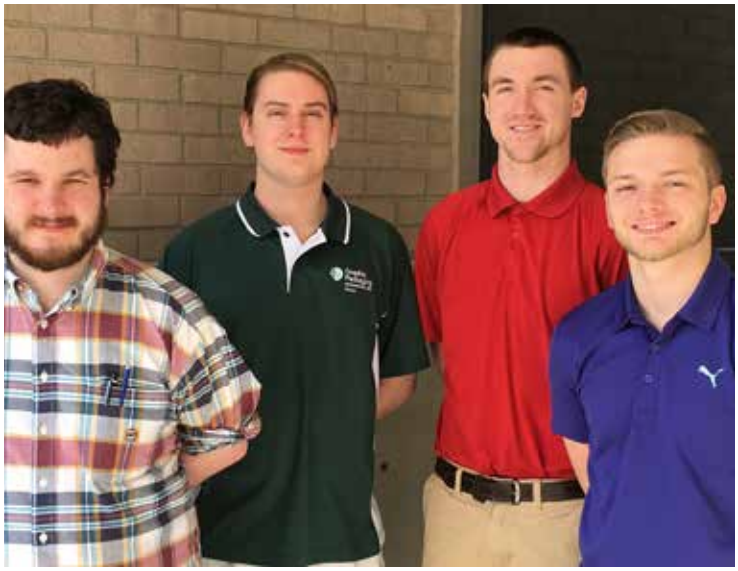
L to R: Madison Fell (Wildlife Ecology Major), Ian Bierke (Wildlife Ecology Major), Rebeca Bravo (Wildlife Ecology Major), Joseph Ehlers (Wildland Fire Science Major), Janelle Taylor (Wildlife Ecology Major)

Not Pictured: Amanda Lang (Wildlife Ecology Major)

The Northern saw-whet owl (*Aegolius acadicus*) (NSWO) is a mesopredator within upland ecosystems. NSWO's migrate in fall from September until December, peaking in around mid-October. During migration this species encounters a wide variety of habitat types. Little is known about fine-scale habitat use of migrating NSWO's within migration corridors. We utilized data from the University of Wisconsin - Stevens Point student chapter of The Wildlife Society's long-term saw-whet owl banding project at Sandhill Wildlife Area in Babcock, Wisconsin from fall 2007 to 2015. NSWO's were lured and captured using call playback devices and mist-nets and were banded using USGS aluminum leg bands. Trapping occurred in 7 microhabitat types: seral stage pine and oak mix, late successional big tooth aspen, old growth white pine, intermediate big tooth aspen, intermediate red maple and big tooth aspen, mature red oak, and oak savanna. We used regression to investigate trends as well as variation in use of each site over the duration of the study.

Advisor: Jason Riddle
Poster Presentation
Consider for Judging

Size Press Unwind



L to R: Benjamin Demchik, Joe Molle, Jay Tienor and Austen Dins
Paper Science and Enginnering and Chemical Engineering Majors

The University of Wisconsin Stevens Point (UWSP) paper machine, operated by the Wisconsin Institute of Sustainable Technology (WIST), can create paper and use an in-line size press to coat it with a desired chemical agent. There is a current interest by WIST customers to add coating to pre-made rolls of paper. This requires a new mounting system that would allow a roll of paper to be coated through the in-line size press.

The purpose of this project is to design an unwind stand that will allow rolls of external paper to be run through the size press on the UWSP paper machine. Our designs will satisfy the interest of WIST's customers. Three separate designs that each have varying processes and locations have been laid out to satisfy the problem.

The appropriate next steps are to audit these designs with electrical, mechanical, and structural engineers. This would prepare WIST and UWSP for the decision of a final design and eventually fabrication and installation. Then the equipment will be tested to work out any kinks. Operators will be trained on the loading and operating processes. After this is all completed, WIST will be able to utilize the new system to add coatings to pre-made rolls of paper.

Advisors: Malek Alkasrawi and Karyn Biasca
Poster Presentation
Consider for Judging

Two Headboxes are Better than One

L to R: Joseph Kinscher, Justin Okruzynski, Luke Mason, and Farrah Scears
Paper Science Engineering and Chemical Engineering Majors

The purpose of team Two Headboxes are Better than One (THABTO) senior capstone project is to design and implement a secondary headbox on the Mead-Wittier Pilot Fourdrinier Paper Machine located at the University of Wisconsin Stevens Point. This group consists of four senior Chemical and Paper Science Engineering students including: Joeseph Kinscher, Luke Mason, Farrah Scears, and Justin Okruszynski. The group project objective is to optimize a secondary headbox by examining the design, method, wet end process, and types of grades that can be created. This technology will be useful to the Wisconsin Institute for Sustainable Technology (WIST) to meet the demands of their customers. Implementing a secondary headbox that can produce a uniform two-layer sheet will allow WIST to manufacture new grades of paper, which adds additional technology and value to the current pilot paper machine. In addition, a secondary headbox will allow the paper machine to produce a wider range of basis weights to provide learning opportunities for the Paper Science and Engineering students on campus, as well as the hands-on courses WIST offers to companies in the paper industry.

Advisor: Malek Alkasrawi
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Pilor Paper Machine Size Press Improvement

L to R: Colin, Justin Dentici, and Nathan Smith
Paper Science and Engineering and Chemical Enginnering Majors

The pilot paper machine at UW-Stevens Point is a small scale Fourdrinier paper machine that is used for education and research purposes. A horizontal size press is used to apply surface sizing coatings to the base sheet. The size press currently has runnability issues that prevent it from being a reliable piece of equipment and is therefore used minimally on machine runs. The size press has safety issues that need to be addressed and a recycle system needs to be installed to allow the sizing materials to be re-used and not wasted. The side dams need to be improved, a system for two stream blending needs to be installed, starch supply pump reliability, and a standard operating procedure needs to be created for the size press. Research was done to see how conventional size presses operate, what variables to look at when dealing with coat weight control, how to cook and deliver starch, and what other types of sizing additives can be used, and what mixing technology can be used in the process. The goals for this project are to make the size press a safer piece of equipment, decrease the amount of lost sizing agent, or coating, during a machine run, and help introduce new grades to the WIST run schedule. The end date for accomplishing one or more of these goals is May 2018

Advisors: Malek Alkasrawi and Karyn Biasca
Poster Presentation

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