College of Natural Resources

Student Research Symposium

Friday, March 30, 2012

College of Natural Resources

Student Research Symposium
March 30, 2012
University of Wisconsin-Stevens Point

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

Booklet Layout and Editing: Alyssa Uhen
Cover Design and Photo: Alyssa Uhen

PHOTO: Highway 10, right outside of Stevens Point. Taken during the summer of 2010.

College of Natural Resources

MISSION

The College of Natural Resources provides education, research, and outreach in integrated natural resources management and environmental education, and in paper science. The College of Natural Resources:
1. Provides undergraduate and graduate instruction that combines theoretical concepts with practical experience, such as labratory and field oriented courses, summer camp, internships and special projects;
2. Promotes scholarly activities that enhance the creation or application of knowledge or contributes to the resolution of environmental and 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 College of Natural Resources embraces the philosophy of integrated natural resource management. All students in the College, regardless of major, need to understand and appreciate relations between natural resources and human needs. They need to understand the scientific method and its application to environmental problem solving. Critical thinking and problem solving strategies based on integrated resource management and education will be promoted through the College's teaching, scholarship, and outreach activities. The College is composed of faculty, staff, and students, each with their own expertise, strengths, attitudes, and values. This diversity contributes to the education offered by the College because of our integrated philosophy. Responsiblities and appointments, some have extension appointments, while others serve mainly in researh of 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
Office of the Chancellor

Stevens Point WI 54481-3897
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www.uwsp.edu

March 30, 2012

Welcome to the thirteenth annual College of Natural Resources Undergraduate 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.

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 UW-Stevens Point. You will have gained a greater understanding of the world around you, a deeper learning of the subject matter taught in your classes and a greater array of skills that will benefit you and your future employers.

Whether you are here to proudly present your research efforts 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 a diverse range of CNR facets, a fitting tribute to the level of faculty and student collaboration in and out of the classroom at UW-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 here and at conferences and symposia in the future.

Sincerely,

Bernie L. Patterson
Chancellor

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

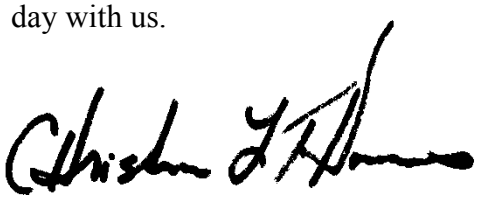
The UWSP College of Natural Resources is pleased to present the 13th annual CNR Student Research Symposium, featuring and celebrating the scholarly achievement of many of UWSP's finest natural resource students.

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 our ***largest turnout ever*** of participants: nearly 80 students and over 60 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 700.

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 recognize the outstanding faculty members who have mentored and motivated students to do their best. Finally, let me offer thanks to the late John and Anne Meyer, friends and benefactors of the College, whose establishment of the John R. Meyer Endowment Fund for CNR makes this event possible.

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



Christine L. Thomas
Dean and Professor of Natural Resource Management

From the College of Natural Resources Student Research Symposium Committee...

Welcome to the 13th Annual College of Natural Resources Student Research Symposium. This year's program features many students from a multitude of disciplines. Students have invested considerable time conducting research in fisheries, forestry, wildlife, biology, soils, waters, paper science, waste management, human dimensions of natural resources, resource management, and other areas. This event allows for the showcasing of students' questions which had been crafted into research projects. Students collected, explored, and analyzed data in an attempt to answer their questions. This symposium is the culmination of these activities where results are communicated in poster and oral presentations. Student mentors help guide students through the process in a truly 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. He was extremely influential in building and strengthening the undergraduate research program for the College of Natural Resources and was a true friend of both the students and the faculty. Dr. David, who passed away in November 2004, not only helped to create a venue for students to present their research, but also a positive atmosphere where students could learn how to conduct and present research. The hundreds of students who have benefited by the Symposium event over the past thirteen years can credit Dr. David for his pioneering efforts.

This year marks the highest year of student participation in this event, due largely to the students' initiative, faculty encouragement, and other sources of support, including the work of the Symposium Committee itself. 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.

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.

Finally, we would like to thank the late John and Anne Meyer and the John and Anne Meyer Fund for CNR, all of our volunteer evaluators, CNR and Biology Department faculty and staff members, CNR student organizations, Dean Christine Thomas, Chancellor Bernie Patterson, and the UWSP administration.

Cheers!

Brian Luedtke (Co-Chair)
Pat Otero (Co-Chair)
Alyssa Uhen (Booklet Editor)
Nigel Golden
Sara Wendt
Rebecca Kelble
Chris Ester

Faculty/Staff Advisors:
Dr. Rich Hauer (Faculty Chair)
Dr. Rob Michitsch
Dr. Gerry Ring
Dr. Kristin Floress
Dr. Ron Crunkilton
Mr. Steve Menzel
Dr. Kevin Russell
Ms. Bobbi Kubish

Clive A. David Memorial Research Scholarship Award

Dr. Clive A. David, retired professor of Forestry, was a driving force in establishing the CNR Student Research Symposium back 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. The College of Natural Resources proudly recognizes Joel Stokdyk in Dr. David's memory.

Joel is from Oostburg, Wisconsin and currently completing a major in Soil Science within the College of Natural Resources. Mr. Stokdyk has earned a remarkable 3.87 grade point average at the University of Wisconsin – Stevens Point. His academic excellence has been in conjunction with an active pursuit of research, service in student organizations, and support of urban agriculture through Growing Power. On top of that, he finds time to support community development during an annual trip to Nicaragua. Joel has conducted several research projects spanning soil, water, and microbiology. His work includes the effects of compost tea on the soil environment and the response on grasses, ash trees, and microbes. Joel also conducted research as an intern last summer and investigated effects of flooding on denitrifying bacteria. Most recently he has supported the long-term research efforts with the Soil and Water Conservation Horicon Marsh project. Joel has actively served student organizations including the Soil and Water Conservation Society and the Students for Wetland Awareness, Management, and Protection. He serves as a Mater Writing Consultant for the Tutoring and Learning Center. Joel also currently serves the University as a member of the Student Research Fund Committee. He plans to continue research after UWSP through graduate studies.

Joel Stokdyk

As with most years, several great applicants were considered for this award. Joel stood above the rest through his many accomplishments from academics, scholarship, and service. All which represent what Clive believed and what the Clive A. David Memorial Research Scholarship is all about. To Joel, we congratulate you!

Acknowledgements

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

Dean Christine Thomas

Chancellor Bernie Patterson

Kevin Lawton - Computer Assistance

Marshall Lee and UWSP Catering

Jerry Kummer, John Oestreich - Building/Support

Jeff Keuntjes and Tammy Naczek - Financial and Purchasing

UWSP College of Natural Resources - Room Accommodations

UWSP Biology Department - Room Accommodations

University Relations and Communications Office - Publicity

CNR and Biology Faculty - Mentoring and Support

Volunteer Evaluators and Moderators
(Angie Hauer, Eric Anderson, Amit Arora, Mary Bartkowiak, Kim Becken, Karyn Biasca, Kevin Burns, Jim Carr, Katherine Clancy, John Clare, James Cook, Ron Crunkilton, Joe Dittrich, Paul Doruska, Shelli Dubay, Kristin Floress, Tim Ginnett, Patrick Goggin, Don Guay, Justin Hall, Jim Hardin, Milo Harpstead, Ron Hensler, Kyle Herrman, Kori Hutchinson, Dan Isermann, Melissa Johnson, Valerie Johnson, Craig Kelling, Lowell Klessig, Waneta Kratz, Bobbi Kubish, Chris Kuntz, Steve Levine, Diane Lueck, Kathleen Mahoney, Kevin Masarik, Paul McGinley, Jen McNelly, Christine Mechenich, Rob Michitsch, Andrea Musch, Jessica Orlando, Holly Petrillo, Jessica Piispanen, Michael Reisner, AJ Repp, Jason Riddle, Jonathon Rivin, Ted Roeder, Carol Schulz, Anthony Sharp, Jess Sherman, Dan Sivek, Paul Skawinski, Earl Spangenberg, Stan Szczytko, Jessica Tomaszewski, Becky Vagts, Melinda Vokoun, Les Werner, Dennis Yockers)

Symposium Support Volunteers

Doug Moore - Photography

Schedule of Presentations

Refreshments/Registration
9:30 a.m.
TNR West Lobby

Dean's Welcome Address
10:00 a.m.
TNR 170

Oral Presentations
10:20 a.m.
TNR 120, TNR 122, and TNR 170

Poster Presentations
Lunch
12:00 - 1:15 p.m.
TNR North and South Hallways

Oral Presentations
1:30 p.m.
TNR 120 and TNR 170

Rendezvous
6:00 p.m.
Sentry Theater

Schedule of Oral Presentations: Room 120

Presenter(s)	Time	Title
Melissa Yarrington	**10:20**	Nonpoint source pollution impacts and recovery for Moses Creek in Stevens Point, Wisconsin.
Michael Waak	**10:45**	Gadolinium as a domestic wastewater marker.
Chris Rockey	**11:10**	Size Press Innovations.
David Lieble Kurt Oleszko Alex Stieve	**11:35**	Paper-A Hydrogen bond dominated solid foam material.
	LUNCH BREAK	
Ben Wegleitner	**1:30**	Comparison of growth models for estimating yellow perch total length using anal spines.
Lucas Nathan	**1:55**	Mixed stock analysis of Lake Michigan lake whitefish commercial harvests.
Derek Bahr	**2:20**	Use of dorsal spine growth increments as a nonlethal method to determine sex of Lake Erie walleyes (*Sander vitreus).*
Moua Yang	**2:45**	Minimal inhibitory concentration of bleach to the invasive aquatic pathogen Viral Hemorrhagic Septicemia Virus in the Great Lakes Region.

Schedule of Oral Presentations: Room 122

Presenter(s)	Time	Title
Ann McPherson	**10:20**	Mineralization and leaching rates of calcium and magnesium in weathered soils.
Brian Luedtke	**10:45**	Control of compost tea pH and electrical conductivity for use in deep water culture hydroponics.
Joel Stokdyk	**11:10**	Effects of soil properties on soil microbial communities across land uses.
Sara Wendt	**11:35**	Distinguishing *Peromyscus leucopus noveboracensis* and *P. maniculatus gracilis* using external field measurements in Wisconsin.

Schedule of Oral Presentations: Room 170

Presenter(s)	Time	Title
William Risse	**10:20**	The Green Index- An analysis of urban green spaces and the services they provide.
Krishun Karau	**10:45**	Effects of researcher experience and animal disposition on measurement variation in *Mus musculus.*
Leah McSherry	**11:10**	Foraging characteristics of yellow bellied marmots at varying elevations and its effects on average mass.
Robert Lisiecki	**11:35**	Prevalence of *Filaroides martis* in short-tailed weasels (*Mustela erminea*).
	LUNCH BREAK	
Paul Brandt	**1:30**	Landscape of the Chequamegon-Nicollet National Forest: Management Recommendations for Eastern Hemlock.
Hunter Gosda	**1:55**	Synonymous plant common names, their different perceptions, and their affect on marketability.
Christopher Frankulin	**2:20**	Micropropagation of Hazelnuts.
Marissa Vine	**2:45**	Assessment of vegetation response to restoration in the Moses Creek floodplain.

Poster Presentations: TNR South & North Hallways

Presenter(s)	Title
Zachary Beard	Evaluation of Dorsal Spines as a Nonlethal Alternative to Otoliths for Estimating Bluegill Ages.
Danielle Berger Nate Huck	Impact of Edge Effects on the Success of Artificial Northern Bobwhite (*Colinus virginianus*) Nests.
Sarah Bowman	Precipitation Changes in Wisconsin.
Rory Braun	Bringing Back a Species: Development of a Paper Birch Regeneration Alternative.
Alyssa DeRubeis	Assessment of frog abundance as influenced by pH, specific conductance, and temperature.
Lenora Dombro	Survey of Blood Parasites from Red-Tailed Hawks Admitted to a Rehabilitation Center in Illinois.
Jacob Farley Kenneth Fayas Scott Gewiss Jason Halambeck Casey Hallum Nathan Martin Lucas Moureau Wade Przekurat Trevor Snyder Mitchell Socha Anthony Stefka	Paper-A Hydrogen Bond Dominated Solid Foam Material.
Nicole Feiten Hayley Templar	Examining causes for cyanobacterial blooms in a minimally developed lake in Forest County, Wisconsin.
Christopher Frankulin	Micropropogation of Hazelnuts.
Andrew Gadow	Isolation of Compost Microorganisms for the Purpose Plastic Decomposition.

Poster Presentations: TNR South & North Hallways

Presenter(s)	Title
Lane Gibbons Melis Arik Rebecca Gregory Daniel Harrington	Fire effects monitoring: Tracking ecological change due to fire-caused disturbance.
Nigel Golden	Seroprevalence of Leptospira interrogans antibody in white-tailed deer from two sites in Wisconsin.
Hunter Gosda	Synonymous plant common names, their different perceptions, and their affect on marketability.
Hunter Gosda Anna Courtney	Litter decomposition rates in pine versus maple soils and fungal diversity associated with each soil type.
Jennifer Gruettner Melanie Hellrood Bryan Thomas	The Effectiveness of Manual and Chemical Control Techniques on Buckthorn (*Rhanmus fangula*) in Schmeeckle Reserve.
Katie Heath	Juneau County's United Way 2-1-1 Service Analysis.
Erik Hendrickson	The Relationship Between Soil Nutrients and Minerals and the Viability of *Myriophyllum spicatum L.* in 13 Wisconsin Lakes.
Laura Jaskiewicz Mike Havlik Matthew Buchholz	Diets of Weasels in the Midwestern United States.
Alyce Kacena Marcus Mueller	Intensity of Ectoparasites on White-tailed Deer (*Odocoileus virginianus*) in two sites in Wisconsin.
Krishun Karau Mari Shirley	Re-evaluation of the Arctic Shrew (*Sorex arcticus*) and Water Shrew (*Sorex palustris*) Distribution in Wisconsin.

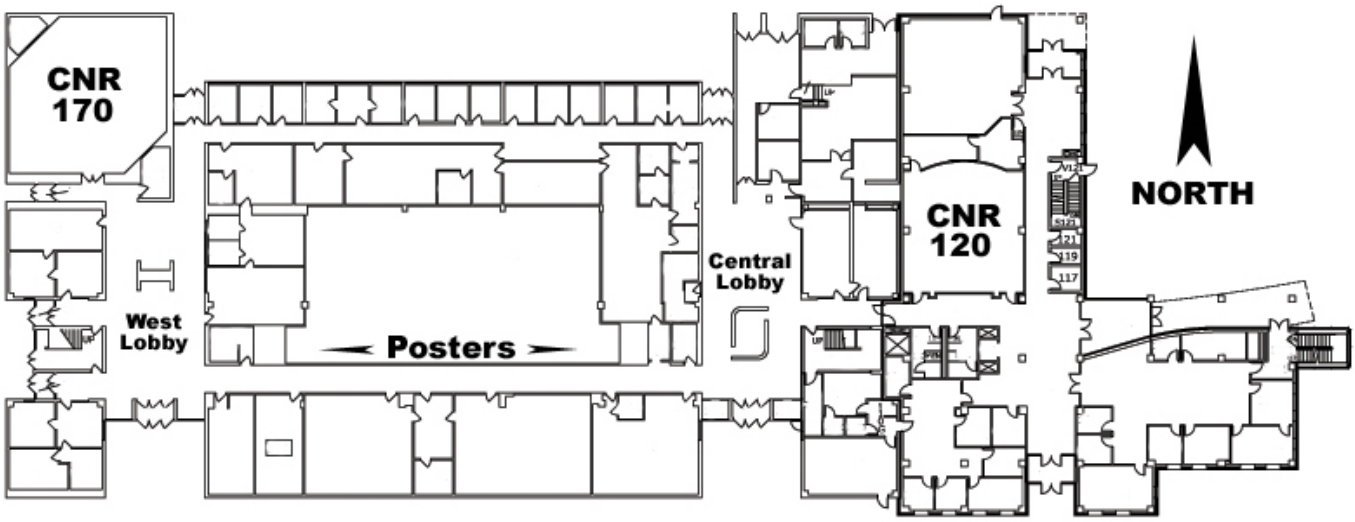
Poster Presentations: TNR South & North Hallways

Presenter(s)	Title
Sarah Kogler	Polylactic Acid Cups versus Paper Cups: A Composting Efficiency Comparison.
Kristine Kurszewski	Oak Regeneration in Central and Northern Wisconsin.
Robert Lisiecki	Prevalence of Filaroides martis in short-tailed weasels (*Mustela erminea*).
Aaron Marti	Comparison of National Water Management Policy Frameworks: United States and Germany (European Union).
Ann McPherson	Mineralization and Leaching Rates of Calcium and Magnesium in Weathered Soils.
Leah McSherry	Foraging characteristics of yellow bellied marmots at varying elevations and its effects on average mass.
Ross Mielke Marcus Mueller	Habitat analysis of white-tailed deer (*Odocoileus virginianus*) in an urban environment using home range analysis.
Katherine Moratz Kristina Borgstrom	Effects of Timber Harvest on Gray Squirrel Populations in Sandhill Wildlife Area.
Elizabeth O'Brien Molly Schleif Tammy Weiss	Determining habitat preferences of migrating Northern Saw-whet owls.
John Ohman Hilary Grybush James LaLuzerne Ho-Seong Meyeong	Wet End Optimization.
Mitchell Olds	Impacts of land use practices and increased precipitation on storm water runoff.
Isaac Palmer	DNA Extraction Methods For American Hazelnut (*Corylus americana*).

Poster Presentations: TNR South & North Hallways

Presenter(s)	Title
Rebecca Philipps	Analysis of Purina Aquamax and Purina Experimental Diet for Rainbow Trout based on Protein Content.
Anthony Recht	Thermic and Chemical Analysis of Three Micro-ecosystems of Spring Creek Lodi Wisconsin.
William Risse	The Green Index- An analysis of urban green spaces and the services they provide.
Nathan Stewart	Prevalence and Timing of Piscivory within of Age-0 Largemouth Bass Cohorts in Wisconsin Lakes.
Nathan Thomas	Estimating total egg count in lake whitefish from Lake Michigan.
John Tix	Effects of commercially available lighting on the culture of yellow perch (*Perca flavescens*).
Ian Torkelson	The Effect of Increasing Irrigation Demand on Local Groundwater Level in South Central Kenya.
Michael Waak	Gadolinium as a domestic wastewater marker.
Michael Waak	Nutrient export of residential yard waste.
Nathan Waid Kasey McCauley	Use of artificial nest boxes by wood ducks (*Aix sponsa*) and hooded mergansers (*Lophodytes cucullatus*) and compared to the distance to water and other artificial nest boxes in central Wisconsin: implications for management.
Sara Wendt	Distinguishing Peromyscus leucopus noveboracensis and P. maniculatus gracilis using external field measurements in Wisconsin.
Sara Wendt	Single and multiple sex incubation rates of Northern bobwhites (*Colinus virginianus*) in field borders on North Carolina farms.
Michael Zueger Donnie Peterson	Analysis of seed bank composition and density for a wetland restoration site.

College of Natural Resources Building Map



Symposium Presentations

Oral Presentations: Rooms 120, 122, and 170

Poster Presentations: South and North hallways
between central and west lobbies

Use of dorsal spine growth increments as a nonlethal method to determine sex of Lake Erie walleyes (*Sander vitreus*).

Advisor: Dr. Dan Isermann

ORAL

Derek Bahr

Majors:
Fisheries, Biology.

Abstract: Fisheries biologists use sex ratios in many ways, including estimation of spawning stock biomass and to assess sex-selective harvest. During certain times of the year biologists must sacrifice fish to determine sex. We will determine if growth increments recorded in dorsal spines can be used as a nonlethal method for determining the sex of Lake Erie walleyes. We will evaluate whether we can accurately determine walleye sex using back-calculated length-at-age 5 and the coefficient of variation in the first 5 growth increments. We are using these two metrics because male walleyes grow slower and mature earlier in life than females; therefore males should have smaller back-calculated lengths at age 5 and exhibit greater variation in their first 5 growth increments than females.

Consider for judging.

Evaluation of Dorsal Spines as a Nonlethal Alternative to Otoliths for Estimating Bluegill Ages.

Advisor: Dr. Dan Isermann

POSTER

Zachary Beard

Major: Fisheries.

Abstract: Otoliths are considered the most accurate structure for obtaining estimates of fish age for a variety of fish species, including bluegill (*Lepomis macrochirus*). However, removal of otoliths requires fish sacrifice. Scales offer a nonlethal method to age fish, but scale-based age estimates are often inaccurate and imprecise. Dorsal spines may offer a better nonlethal alternative to otoliths for estimating the age of bluegills, but a previous study indicated that dorsal spines provided consistently lower ages than otoliths for black crappies (*Pomoxis nigromaculatus*) in Minnesota. Our objective was to determine if ages estimated from dorsal spines and otoliths are similar for bluegills in Wisconsin lakes. Ages from dorsal spines were on the average lower then the ages from sectioned otoliths, indicating that they might not be a good nonlethal alternative to otoiliths.

Consider for judging.

Impact of Edge Effects on the Success of Artificial Northern Bobwhite (*Colinus virginianus*) Nests.

Advisors: Dr. Jason Riddle and Jessica Piispanen

POSTER

Danielle Berger

Majors: Wildlife Ecology and Biology.

Nate Huck

Major:Wildlife Ecology.

Abstract: Northern bobwhite (*Colinus viginianus*) populations have declined over much of the species' range due to loss of habitat and landscape fragmentation. Field borders provide supplemental early successional habitat critical for nesting. However, field border placement within the landscape may have a significant effect on the likelihood of nest success via negative edge effects. For example, predator search efficiency and travel may be magnified near edges, thereby resulting in an increased risk of nest depredation. The primary objective of our study is to determine if northern bobwhite nest success increases with increasing distance to field border edge and woody edge, and decreasing edge:area ratio. We make use of an artificial nest experiment conducted on 12 farms in the Coastal Plain of North Carolina in 2005 and 2006. Each year six nest sites were established on each farm and monitored once a week for two weeks for evidence of depredation. The coordinate locations of nests were recorded with a GPS receiver and distance to edge data as well as edge:area ratios were obtained through GIS analysis. We used a one-tailed T-test with unequal variance to assess the impacts of these features on nest success. Distance to field border edge and small edge:area ratio did not reduce nest success. However, nest success increased with increasing distance to woody edge ($t_{111} = -1.9287$, $P = 0.0281$). We suspect this relationship is the result of an increased concentration of nest predators near woody edges and may help to explain the conspicuous absence of natural nest construction within field borders in close proximity to woody edge in a parallel study. Landowners seeking to implement field borders to enhance the quality of quail nesting habitat on their property should consider field border placement within the landscape matrix, especially distance to woody edge, to avoid creating habitat that will act as a population sink.

Consider for judging.

Precipitation Changes in Wisconsin.

Advisor: Dr. Katherine Clancy
POSTER

Sarah Bowman

Major: Water Resources. Minors: Conservation Biology and Soil Science.

Abstract: The Wisconsin Initiative on Climate Change has documented that annual precipitation has increased 3.1 inches from 1950 to 2006. Research for the eastern US has documented that the increase occurs around 1970. The objective of this research is to determine if Wisconsin annual precipitation follows the same increase found in the eastern United States. Wisconsin annual precipitation data consisted of 29 NOAA rain gauge sites distributed throughout the state with periods of record from 1940–2010. To determine if the data showed a difference after 1970, one-tailed upper t-tests were used.

Consider for judging.

Landscape of the Chequamegon-Nicollet National Forest: Management Recommendations for Eastern Hemlock.

Advisor: Dr. James Cook

ORAL

Paul Brandt

Photo Unavailable

Major: Forest Management.
Minor: GIS.

Abstract: The advent of GIS technology has allowed land managers to view landscapes in ways that were not possible previously. A landscape analysis of part of the Chequamegon Nicolet National Forest (CNNF) was conducted to assess the status of old-growth patches and the likely effects of the Emerald Ash Borer. Pockets of remnant, old-growth trees were located by an overlay of species composition and year of stand establishment. Although there are several types of old-growth, the focus was stands with Eastern Hemlock (*Tsuga canadensis*) as the dominant or co-dominant specie, as management for hemlock is a specific goal of the CNNF efforts to restore to a pre-European settlement condition. Characteristics (such as size, shape, edge and stocking) of hemlock patches were determined; this information and literature on the threat of Hemlock Woolly Adelgid were used to derive management recommendations.

Consider for judging.

Bringing Back a Species: Development of a Paper Birch Regeneration Alternative.

Advisor: Kevin Burns
POSTER

Rory Braun

Major: Forest Recreation.
Minor: Environmental Law Enforcement.

Abstract: The successful regeneration of paper birch in northern Wisconsin has been a difficult one since the virtual removal of wildfires from the ecology of the landscape. Several silvicultural techniques are suggested for regenerating paper birch, but with a large proportion of the paper birch of northern Wisconsin originating from widespread fires of the 1930's, questions are raised as to whether the suggested silvicultural treatments are and will be viable options with a population that is at or reaching over maturing. The development of an alternative method that looked at regeneration under high animal herbivory and varying residual basal area conditions was explored in this research to see if there was possibly a better method than those currently used.
Do not consider for judging.

Assessment of frog abundance as influenced by pH, specific conductance, and temperature.

Advisor: Dr. Todd Huspeni
POSTER

Alyssa DeRubeis

Majors: Wildlife Ecology Research and Management, Biology. Minor: Spanish.

Abstract: Anurans are known worldwide as biological indicators due to their sensitivity to changes in water quality and habitat. Additionally, frogs and other anurans are experiencing population declines across the globe. One common and easy method used to estimate frog abundance is to conduct a frog call survey. We adopted the Wisconsin Department of Natural Resources' (WI DNR) Frog and Toad Survey protocol to detect abundance of three frog species at 18 haphazardly chosen sites located in the Stevens Point, Wisconsin area. The three targeted frog species were spring peepers (*Pseudacris crucifer*), wood frogs (*Rana sylvatica*), and western chorus frogs (*Pseudacris triseriata*). We also monitored the water for temperature, pH, and specific conductance to determine if there was a correlation between these attributes and the frogs' abundances. We used simple linear regression to analyze these data. Four surveys were conducted from 11 April 2011 through 27 April 2011. Water temperature ranged from 41.7 F to 53.8 F (5.39 C to 12.1 C), pH varied from 7.1 to 9.0, and specific conductance varied from 2 µs to 1995 µs. *Pseudacris triseriata* were not detected at any of the sites. We observed that *R. sylvatica* calls were never recorded when measured water temperatures were below 50 F. However, *P. crucifer* were found vocalizing in temperatures as low as 41.7 F. We observed a possible negative correlation between frog abundance and increasing water pH. We did not detect any significant relationship between specific conductance and frog abundance. Due to significantly cooler 2011 spring air temperatures, only three sites met the WI DNR protocol's minimum water temperature requirement. Because of this small sample size, we are currently unable to make strong inferences regarding the effects of the measured variables on frog abundance. We will, however, sample these sites in the spring of 2012 to continue to assess the effects of these variables on frog abundance.

Consider for judging.

Survey of Blood Parasites from Red-Tailed Hawks Admitted to a Rehabilitation Center in Illinois.

Advisors: Dr. Shelli Dubay and Dr. Todd Huspeni
POSTER

Lenora Dombro

Senior,
Majors: Wildlife Ecology Research and Management, Biology.

Abstract: As top predators, raptors impact the dynamics of ecosystems and can affect prey abundance and maintain overall health of a community. Many rehabilitation programs accept injured birds and address their maladies in the hope that the birds will recover and can be released. However, the immunocompromised status of injured birds often predisposes them to parasitic infections. A large number of parasites can affect overall health and significantly slow recovery. Additionally, birds may not be as fit to survive post-release. We collected blood samples from red-tailed hawks (*Buteo jamaicensis*) admitted to Willowbrook Wildlife Center in Illinois to evaluate blood parasite loads of raptors admitted to the facility. We expect that red-tailed hawks will have a high frequency of infection given their immunocompromised status. We will compare our results to those reported in the literature for free-ranging red-tailed hawks.

Consider for judging.

Paper-A Hydrogen Bond Dominated Solid Foam Material.

Advisor: Dr. Gerry Ring
POSTER

Major: Paper Science and Engineering.

Jacob Farley

Abstract: The purpose of this project is to calculate the number of effective hydrogen bonds in a sheet of paper as a function of formation. With the assistance of PS&E seniors enrolled in Advanced Paper Machine Operations, five formation levels were produced on the department's paper machine. Samples were tested for formation, brightness, tensile stiffness index, and tensile strength. Nissan's innovative hydrogen-bond dominated theory was used to calculate the effective number of hydrogen bonds. These results demonstrate that the pore structure of paper is more significant than individual fiber properties.

Consider for judging.

Kenneth Fayas

Scott Gewiss

Jason Halambeck

Casey Hallum

Nathan Martin

Lucas Moureau

Wade Przekurat

Trevor Snyder

Mitchell Socha

Anthony Stefka

Examining causes for cyanobacterial blooms in a minimally developed lake in Forest County, Wisconsin.

Advisors: Nancy Turyk
POSTER

Nicole Feiten

Majors: Water Resources and Geology
Minor: Soil Science.

Hayley Templar

Major: Water Resources
Minors: GIS and Spatial Analysis.

Abstract: Bear Lake is a 68-acre drainage lake located within the Nicolet National Forest in east central Forest County. The lake attracts recreational users for activities such as fishing, boating, and camping. About seven private homes exist along the southern and eastern shore and a 27-site Forest Service campground exists along the western shore.

In recent years, health advisories were posted for Bear Lake by the USFS for cyanobacteria (blue-green algae), which exceeded the World Health Organization's health standards. The lake is located in a relatively undeveloped watershed; therefore, the causes of the cyanobacterial growth were initially unclear.

During a two-year study beginning in 2010, biological, physical, and chemical properties were evaluated in the groundwater, inflow/outflow streams, and the lake. In 2010, the algal community in Bear Lake consisted of 35% cyanobacteria. During the study, the inflow stream contributed a median of 29,000 kilograms of phosphorus, groundwater contributed 4,700 kg and the outflow was measured to be discharging 49,000 kg. The difference was 15,000 kg of phosphorus, suggesting that near shore runoff and internal loading are also contributing phosphorus to the lake. Another possible source of available phosphorus may be due to minimal aquatic macrophyte biomass, which has resulted from harvesting by a large population of *Orconectes rusticus* (rusty crayfish), an aquatic invasive species.

Groundwater was measured around the lake; sites that measured phosphorus concentrations higher than 45 µg/l also had elevated chloride concentrations. These sites were located down gradient of the Bear Lake campground privies. Road salt and household septic systems have also contributed to elevated chloride levels measured in the groundwater.

This study explores the potential sources and contributing factors of the elevated phosphorus levels, and discusses possible solutions to the cyanobacteria problems in Bear Lake.

Consider for judging.

Micropropagation of Hazelnuts.

Advisor: Dr. Michael Demchik
BOTH

Christopher Frankulin

Majors: Urban Forestry and Forest Recreation.

Abstract: While European hazelnut has a significant world market for both nuts and edible oils, American hazelnut has never been the subject of significant breeding work. As part of this project, micropropagation of hazelnuts is being developed as a method to propagate the new selections of this plant. This project is to determine successful techniques to micro-propagate American hazelnuts (*Corylus Americana*) from two different clone cultivars. With success at micropropagation, high productivity selections of wild hazelnuts can be used as the backbone of an Upper Midwest hazelnut industry. The problem that has been arising with micro-propagating hazelnuts occurs once the culture clones have grown roots. There is no progress once the plant has been placed into a soil bed. Further research must be done to determine a procedure that can proceed successfully from the growth chambers to the planting beds.

Consider for judging.

Isolation of Compost Microorganisms for the Purpose Plastic Decomposition.

Advisor: Dr. Rob Michitsch

POSTER

Andrew Gadow

Major: Natural Resource Management.
Minor: Soil & Land Planning.

Abstract: The goal of this research is to isolate individual microorganisms from known compost with the end goal of finding a species which can break down a specific type of plastic polymer. Stemming from composting experiments taken place last semester, the organisms in the compost were able to decompose a plastic which was thought not to be biodegradable. Microorganisms from the initial compost were put onto agar in petri dishes and sub-cultured until colonies containing a single species were present. These organisms will then be transferred into nutrient broth and exposed to the plastic polymer. After incubating and re-culturing in the broth solution, measurements can be taken to quantify if the organism is able to decompose the polymer. Once isolated and identified, further steps can be taken to map the genome of the organism and determine any economic value.

Do not consider for judging.

Fire effects monitoring: Tracking ecological change due to fire-caused disturbance.

Advisor: Dr. James Cook

POSTER

Abstract: The University of Wisconsin-Stevens Point Fire Crew has a long tradition of providing prescribed fire services to local landowners who may benefit from a structured fire effects monitoring program. Accordingly, the Fire Crew has begun testing methods of data collection and analysis critical to the measurement of variables associated with fire-caused disturbance. Prior to burning, a 1.3 acre mesic prairie was measured for the vertical structure and frequency of vegetation as well as fuel composition and loading. Pre-burn vegetation data show that, in decreasing order of importance, *Schizachyrium scoparium*, *Solidago canadensis*, and *Andropogon gerardii* are three dominant species. The structure of this site differs from other mesic prairies in its dominance of a weedy species, i.e. *S. canadensis*, over a major prairie grass such as *A. gerardii*. Fire-caused disturbance may aid in a shift of dominance back to this native prairie grass—a structure considered more desirable by most landowners. One year from its treatment date, the site will be measured for the same vegetative and fuel attributes. Analysis and comparison of the pre- and post-burn vegetative data will indicate any changes in vegetative characteristics that occur, such as a shift in dominance. All other variables, such as treatment weather conditions, fuel composition and loading, and burn severity, will be used to predict fire behavior which could help explain any observed changes. Statistical analysis of site variability will be used to evaluate our sample size and will allow for adjustments to monitoring efforts. Here we present a synthesis of all data, hypothesize possible associations between variables, and provide examples of the practical uses of a fire monitoring program.

Consider for judging.

Lane Gibbons

Senior.
Major: Biology.

Melis Arik

Sophomore.
Major: Resource Management.

Rebecca Gregory

Junior.
Major: Ecosystem Restoration & Management.

Daniel Harrington

Senior.
Major: Wildlife Ecology Research & Management.

Seroprevalence of Leptospira interrogans antibody in white-tailed deer from two sites in Wisconsin.

Advisor: Dr. Shelli Dubay

POSTER

Nigel Golden

Majors: Biology and Wildlife Ecology Research and Management.

Abstract: White-tailed deer (*Odocoileus virginianus*) are the most economically and culturally important game species in Wisconsin. The Wisconsin Department of Natural Resources initiated a $2 million research endeavor in January – February 2011 to determine causes of mortality in fawn and adult male deer. To fit deer with radio-collars for mortality investigations, DNR biologists captured deer in box and Clover traps and via helicopter net – gun near Winter and Shiocton, WI. We collected blood samples from captured deer to evaluate exposure to numerous pathogens that affect deer and livestock. I will discuss exposure of deer to leptospirosis, a disease that can cause abortion in deer. Leptospirosis is a bacterial disease that infects primarily the kidneys of affected hosts. Bacteria are shed in urine that then contaminates the environment, including surface water. We tested blood serum for antibodies against Leptospira interrogans using microscopic agglutination. We used Fisher's exact tests to identify differences in seroprevalence by site and by gender. No male deer (0/44) were exposed to *Leptospira pomona* but 22.3% (21/91) of females were exposed (P = 0.003). Additionally, more females in Winter (16/49 = 32.6%) were exposed to *Leptospira pomona* than females in Shiocton (5/45 = 11.1%) but the Fisher's exact test was not significant (P = 0.053). At this time, we do not know how exposure to leptospirosis affects deer and we hope to evaluate exposure in relation to pregnancy, site, etc. in a multivariate analysis at the conclusion of this study.

Consider for judging.

Synonymous plant common names, their different perceptions, and their affect on marketability.

Advisor: Dr. Richard Hauer

BOTH

Hunter Gosda

Major: Urban Forestry.
Minors: Soil Science and German.

Abstract: Many woody landscape plants have multiple common names that people may have different perceptions of according to their level of experience with plants. Certain names may be beneficial in conveying a favorable trait and therefore could be used to enhance the appeal of the plant. Other names may induce negative perceptions and certainly could affect the appeal of a plant as well. This study is aimed at different common names of woody landscape plants and the affect peoples inherent perception differences have on their marketability. We would determine if people would be more apt to purchase certain plants according to their different common names or their level of knowledge of that plant at that time.

Consider for judging.

Litter decomposition rates in pine versus maple soils and fungal diversity associated with each soil type.

Advisors: Dr. Rob Michitsch and Dr. Les Werner

POSTER

Hunter Gosda

Major: Urban Forestry. Minors: Soil Science and German.

Anna Courtney

Majors: Soil Land Management & Geology Earth Materials.

Abstract: Soil fungal samples were aseptically obtained from pine and maple soil that was collected for a greenhouse-based experiment, which analyzed decomposition rates of pine and maple litter in alternating soil-litter combinations. The microbial samples were used to examine similarities and differences in microbial community diversity. The goal of this experiment is to identify which predominant fungal species exist across each litter and soil type and identify differences between the variant abiotic conditions of each. Furthermore, this study will determine whether any of the dominant microbial species will colonize the foreign litter type with any degree of success. This is important in that decomposition of organic matter provides the forest with much of the nutrients required for vitality. A better understanding of litter-specific microbial decomposition could be useful in soil health improvement in regards to forest health monitoring. Preliminary results of this research will be presented.

Consider for judging.

Wet End Optimization.

Advisor: Don Guay and Karen Biasca

POSTER

Abstract: The goal of this project is to improve to quality and runnability of the wet end of the paper machine. Most of the research and trial work is currently revolving around edge curling and table roll replacement. The edge curling portion of the project has assessed the feasibility of replacing deckle straps and deckle rulers with a fabric curling device. The table roll replacement is two pronged. First, there is a fixed cost associated with the table rolls. Bearings are painstakingly maintained under the current system. In addition, the pressure pulse profile of the table roll disturbs the sheet greatly. Currently, most of the energy has been focused on assessing a replacement of the rolls with table foils.

Consider for judging.

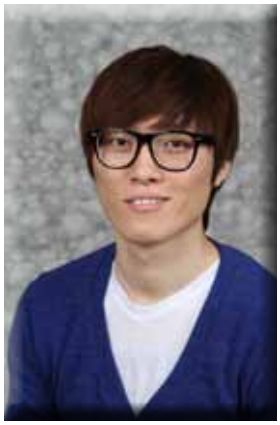
Hilary Grybush

Major: Paper Science and Engineering.

James LaLuzerne

Major: Paper Science and Engineering.

Myeong Ho-Seong



Major: Paper Science and Engineering.

John Ohman

Major: Paper Science and Engineering.

The Effectiveness of Manual and Chemical Control Techniques on Buckthorn (*Rhanmus fangula*) in Schmeeckle Reserve.

Advisor: Dr. Jason Riddle

POSTER

Abstract: Glossy buckthorn (*Rhamnus frangula*) is an exotic invasive tree-sized shrub which is found readily within Schmeeckle Reserve on the University of Wisconsin Stevens Point campus. The staff of the reserve has begun an aggressive effort to control buckthorn utilizing manual hand pulling and cutting, as well as application of herbicides. The purpose of our pilot study was to determine the effectiveness of these control efforts. We established two transects within Schmeeckle, one served as a control, and the other was in a site that had been manually and chemically treated a year earlier. We located five randomly selected one by one meter plots within each transect, and counted the number of buckthorn plants within each plot. Our initial data showed that the treated transect had an average stem density of 4.8 stems/m2 (SE=0.26); and the untreated plot had an average stem density of 19 stems/m2 (SE=2.90). We determined that there was a statistical difference between treated and untreated plots by performing an independent two-sample t-test. (t=5.34, df=8, P=0.00035). Further research is needed to substantiate the findings of this pilot study.

Consider for judging.

Jennifer Gruettner

Major: Wildlife Ecology.

Bryan Thomas

Majors: Forest Management, Urban Forestry.

Melanie Hellrood

Major: Wildlife Ecology.
Minor: Captive Wildlife.

Juneau County's United Way 2-1-1 Service Analysis.

Advisor: Doug Miskowiak

POSTER

Katie Heath

Majors: Resource Management, Land Use Planning.

Abstract: The Juneau County's United Way 2-1-1 program is a telephone-based service that provides individuals with information about community services that assist with human health, job assistance, and volunteer opportunities. By dialing this phone number (211), the caller lists their needs and a United Way representative assesses these needs and directs them to the proper resources. Data provided by United Way was in an excel format. The data was used to calculate the needed information for the creation of the maps. This included how many calls were made from a particular city within Juneau County, what they called about, and where callers were directed to for the closest facility to meet their needs. In order to illustrate the importance of this program, two maps were created using the analyzed data. Depicting this importance will be of great value as the 2-1-1 program seeks future funding.

Consider for judging.

The Relationship Between Soil Nutrients and Minerals and the Viability of *Myriophyllum spicatum L.* in 13 Wisconsin Lakes.

Advisor: Dr. Ron Crunkilton

POSTER

Erik Hendrickson

Majors: Water Resources.
Minor: Soils.

Abstract: Since the late 1800s, when Eurasian water milfoil (*Myriophyllum spicatum L.*) (EWM) first arrived in the U.S, EWM has become an invasive species across the nation, including Wisconsin. EWM can tolerate a variety of water chemistry conditions, can reproduce from stem fragments, and out-compete many native aquatic plants by absorbing nutrients quickly and withstanding harsh conditions that are detrimental to native aquatic plants. This invasive is present at problem densities in many Wisconsin lakes. This study is part of a larger graduate student project that is assessing the importance of physical, chemical and biological characteristics of lakes, including the importance of a native herbivorous weevil that feeds exclusively on milfoil and a parasitic fungus, on the abundance of EWM in study lakes. The smaller project reported here focuses on the correlations between EWM and sediment nutrients and minerals. Thirteen unmanaged lakes across Wisconsin, ranging from Walworth County in the southeast to Burnett County in the Northwest were sampled to estimate EWM density. Soil sediments were gathered via a hand-operated dredge. Soil sediments were analyzed by the Marshfield Soil and Forage Analysis Laboratory for 17 soil nutrient, mineral and sediment characteristics. Pearson Correlations between the measured variables and EWM density ranged from -0.3 for NH4-N to 0.19 for total P. Most measured variables were uncorrelated with EWM density. The lack of strong correlations between sediment nutrients and EWM density suggests that traditional watershed management strategies focused on reducing nutrient movement into lakes may be ineffective in reducing problem EWM densities in lakes. Other lake characteristics including the presence of the native milfoil weevil or the parasitic fungus may be more important than these variables in controlling the distribution of EWM in study lakes. The importance of these two biological variables and other lake characteristics on controlling EWM density is the subject of an ongoing graduate student project at UWSP that is focusing on identifying sustainable management strategies that may be employed to control EWM throughout Wisconsin.

Consider for judging.

Diets of Weasels in the Midwestern United States.

Advisor: Dr. Shelli Dubay

POSTER

Abstract: Weasels (*Mustela spp.*) that live in the Midwestern United States primarily eat shrews, squirrels, voles, mice, rabbits and mollusks. Diet varies with gender because male weasels are larger than females and are therefore able to take larger prey than females. Adult weasels consume larger prey than juveniles as well. For the last 4 years, we have been working with furbearer trappers to acquire carcasses for parasite investigations. Since 2010, we have investigated stomach contents of weasels trapped in Wisconsin and identified prey species based upon hairs found inside the stomachs. We hypothesized that 1) a higher proportion of male weasels will have mammals in their stomachs because males are larger in size, and 2) that a higher proportion of adult weasels will eat shrews than juveniles. We evaluated stomach contents of approximately 40 weasels for presence of hairs using dissecting microscopes. Hairs were identified to genus or species using a hair identification key. Hairs were placed on a slide with xylene in order to see the unique characteristics of the medulla (central portion) of the hair. From these characteristics, we were able to identify mammalian prey items in weasel stomachs. Prey species included shrews, chipmunks, squirrels, opossums and rabbits. Shrews were the most common prey item identified in weasel stomachs.

Consider for judging.

Laura Jaskiewicz

Junior.
Major:Wildlife Ecology Research and Management.

Mike Havlik

Photo Unavailable

Junior.
Major: Wildlife Ecology Research and Management.

Matthew Buchholz

Sophomore.
Major: Wildlife Ecology Research and Management.

Intensity of Ectoparasites on White-tailed Deer (*Odocoileus virginianus*) in two sites in Wisconsin.

Advisors: Dr. Shelli Dubay

POSTER

Alyce Kacena

Senior.
Major: Biology.
Minor: Captive Wildlife.

Marcus Mueller

Senior.
Majors: Biology and Wildlife.

Abstract: White-tailed deer (*Odocoileus virginianus*) are the most economically and culturally important game species in Wisconsin. The Wisconsin Department of Natural Resources is conducting research to determine causes of mortality in fawn and adult male deer from 2011-2014. To fit deer with radio-collars for mortality investigations, DNR biologists captured deer in box and Clover traps and drop-nets near Winter and Shiocton, WI. We collected ectoparasites to: 1) determine if non-native lice (*Damalinia sp.*) that cause hair-loss syndrome in black-tailed deer (*O. hemionus columbianus*) and mule deer (*O. hemionus*) occur on deer in Wisconsin and 2) determine if the number of ticks and lice on deer differ by gender, study area or field season. We combed the ears of deer with flea combs and parasite specimens were placed in vials containing 70% alcohol until identification. We sampled 110 deer in 2010-2011 and, we have collected parasites from 51deer so far this year. We have identified Mallophaga sp. lice and/or deer ticks (*Ixodes scapularis*) on numerous deer. *Damalinia sp*. have not been found. Last year, parasite loads did not differ by study area or gender. Analyses are ongoing, but we hypothesize that the 2011-2012 field season will exhibit greater parasite intensity on white-tailed deer compared to the 2010-2011 field season because this winter has been warmer than last year. Our results will contribute to the overall study because some parasites transmit diseases to deer and could affect overall body condition in deer.

Consider for judging.

Effects of Researcher Experience and Animal Disposition on Measurement Variation in *Mus musculus*.

Advisors: Ryan Stephens and Chris Yahnke

ORAL

Krishun Karau

Photo Unavailable

Majors: Biology & Wildlife Ecology Research & Management.

Abstract: Morphological measurements are used to distinguish between cryptic species, assess the health of an animal, differentiate between sexes, and even monitor growth changes over time, both small scale and evolutionarily. However, it is generally reputed that measurements may vary depending on the experience of the researcher and the physical state of the animal, alive or post mortem. Yet there have been few studies to address this issue. We obtained a sample of 80 domestic mice, *Mus musculus*, and took external standard museum measurements among four researchers of varying experience. Metrics included total length, tail length, hind foot length, ear length, and weight and were performed when the mouse was alive, directly post mortem, 4 hours post mortem, and after it had been frozen and thawed. We compared replicated measurements for the different physical states of the same mice and inter-researcher measurement variation of all five measurements using one-way repeated measures analysis of variance. While analyses are ongoing, we expect to find statistical differences between the quantitative measurements of the mice during each measurement scenario i.e.; alive, post mortem, and frozen/thawed. We also expect that there will be statistically significant variation among the quantitative measurements of all four researchers of varying experience. This study is valuable to the scientific community because it will encourage researchers to consider potential bias of measurements more critically and ways to minimize these biases by choosing the "best" measurements to take and compare. This could also call into question past investigations of animal morphology research that incorporates different body states and multiple researchers.

Consider for judging.

Re-evaluation of the Arctic Shrew (*Sorex arcticus*) and Water Shrew (*Sorex palustris*) Distribution in Wisconsin.

Advisors: Ryan Stephens

POSTER

Krishun Karau

Photo Unavailable

Majors: Biology & Wildlife Ecology Research & Management.

Mari Shirley

Photo Unavailable

Majors: Biology & Wildlife Ecology Research and Management.
Minors: Conservation Biology, Adventure Education, Museum Methods.

Abstract: Shrews are members of the order Insectivora and are among the smallest mammals in the world. Typical morphological characteristics include velvet like pelage, reduced eyes, and an elongated snout. *Sorex arcticus* typically occur in swamps and wetlands and *S. palustris* prefer habitat near open water sources such as streams, marshes, and lakes. In Wisconsin, *S. arcticus* was recently delisted as a Species of Special Concern while *S. palustris* remains a Species of Greatest Conservation Need. Based on museum records, historically *S. arcticus* has been documented throughout northern Wisconsin and as far south as Dane County. *Sorex palustris* has been documented in northern Wisconsin and as far south as Portage County. Neither *S. arcticus* or *S. palustris* has ever been documented in the western part of the state, known as the Driftless Area. However, recent sampling suggests that the distributional range of both species is greater than was previously thought. The objective of our project is to determine the current distribution of *S. arcticus* and *S. palustris*. Using a Geographic Information System (GIS) we created new distributional maps for *S. arcticus* and *S. palustris* using georeferenced data from recent small mammal surveys and historical museum records. These data extend the range of *S. arcticus* further into the southeastern part of the state (Walworth County) and within the Driftless area (Trempealeau and Buffalo Counties). The distributional range of *S. palustris* has been extended approximately 80 km south (Marquette County) and westward within the Driftless area (Trempealeau County). Based on the expanded state distribution and a plethora of collected specimens, we concur with the WDNR's decision to delist *S. arcticus*; however, further survey work is needed to determine their range boundary within the state. Although we extended the distributional range of S. palustris, records remain sparse and additional survey work is needed to consider a revision of its current status.
Consider for judging.

Polylactic Acid Cups versus Paper Cups: A Composting Efficiency Comparison.

Advisor: Dr. Robert Michitsch

POSTER

Sarah Kogler

Majors: Soil Science, Biology.

Abstract: As green practices become more common, products are developed to facilitate sustainability, including compostable products. University Dining Services (UDS) at the University of Wisconsin-Stevens Point (UWSP) purchases biobased plastic ware to replace Styrofoam food service dinnerware containers. These containers, made of polylactic acid (PLA), are considered sustainable because they are compostable. However, PLA is compostable only under industrial composting conditions, and there is not an active, large-scale composting program on campus. The efficiency of composting PLA was studied to determine if a large-scale composting program would benefit UWSP. This study was designed to analyze the decomposition of PLA against a paper alternative. Preliminary results will be presented.

Consider for judging.

Oak Regeneration in Central and Northern Wisconsin.

Advisor: Dr. Michael Demchik

POSTER

Kristine Kurszewski

Majors: Urban Forestry and Forest Recreation.

Abstract: Oak regenerated very well after the logging era of the late 1800's/early 1900's, and many current oak stands in central and northern Wisconsin have their origins from that timeframe. While these stands regenerated with minimal help from foresters during that timeframe, today many foresters are struggling to regenerate oak after harvest on lands managed throughout Wisconsin. This project was conducted by surveying foresters in 49 of Wisconsin's 72 counties, in central and northern Wisconsin. The surveys collected data defining oak regeneration problems such as specific site qualities that present problems, activities that are currently being done to promote oak regeneration, as well as successful sequence patterns for oak harvesting. Foresters also shared many common ideas of oak regeneration activities they would like to try but some sort of barrier is holding them back. Further research and data analysis is needed to conclude the result of this survey to help point foresters to common, successful regeneration practices.

Consider for judging.

Paper-A Hydrogen Bond Dominated Solid Foam Material.

Advisor: Dr. Gerry Ring

ORAL

Abstract: The purpose of this project is to calculate the number of effective hydrogen bonds in a sheet of paper as a function of formation. With the assistance of PS&E seniors enrolled in Advanced Paper Machine Operations, five formation levels were produced on the department's paper machine. Samples were tested for formation, brightness, tensile stiffness index, and tensile strength. Nissan's innovative hydrogen-bond dominated theory was used to calculate the effective number of hydrogen bonds. These results demonstrate that the pore structure of paper is more significant than individual fiber properties.

Consider for judging.

David Lieble

Major: Paper Science and Engineering.

Kurt Oleszko

Majors: Paper Science and Engineering.

Alex Stieve

Major:Paper Science and Engineering.

Prevalence of Filaroides martis in short-tailed weasels (*Mustela erminea*).

Advisor: Dr. Shelli Dubay and Dr. Todd Huspeni

ORAL

Robert Lisiecki

Senior.
Major: Wildlife Ecology Research and Management.
Minor: Captive Wildlife.

Abstract: Short-tailed weasels (*Mustela erminea*) are trapped as legal furbearers but are not actively managed by the Wisconsin Department of Natural Resources. Trappers tend to trap from late November to late January, providing a unique opportunity to acquire carcasses from trappers after furs have been removed. We have been necropsying weasels and looking for internal parasites for 5 years (251 total necropsies with 38 more in process), so we are beginning a long-term health assessment of the weasels in Wisconsin to better understand the ecology of free-ranging weasels and to provide weasel trappers with health updates on the animals they trap. In the past, we have identified Filaroides martis, a parasitic nematode of the respiratory tract, in approximately 35 % of the weasels we necropsy. *Filaroides martis* is transmitted to weasels when they consume an infected adult gastropod or small mammal. This year, our goals were to: 1) identify differences in prevalence and intensity by year, and 2) identify differences in parasite prevalence and intensity by gender, and 3) investigate if infection affects body condition of weasels. Parasites were collected and identified using reference specimens in the Steven Taft Parasitological Collection. After running a Fishers Exact test for a comparison of prevalence of *Filaroides martis* in males and females, we found that males have a higher prevalence (P=0.00, df=1). A Mann-Whitney U-Test showed no difference in intensity of Filaroides martis in males and females (P=0.055, df=1). We used a chi-square test to identify relationships in prevalence by year, and found that more weasels were infected in 2010-2011 (P = 0.005, df = 3). Using ANCOVA, we found that infected males had higher body condition scores than uninfected males (P=0.007, df = 1), but we found no difference in body condition score in females (P=0.479, df=1). To date this year 13 weasels have been necropsied with 5 of 12 (40%) of them being infected with *F. martis*. We will update statistical analyses to include data from this year and discuss implications of our findings.

Consider for judging.

Control of compost tea pH and electrical conductivity for use in deep water culture hydroponics.

Advisor: Dr. Robert Michitsch

ORAL

Brian Luedtke

Major: Urban Forestry.
Minor: Soil Science.

Abstract: Compost teas (CT), an aqueous extract of compost in water, have been recognized as having potential for use as a hydroponic nutrient source. Research into the use and maintenance of CT as a hydroponic nutrient source must build a firm foundation for commercial growers to utilize and expand upon. Hydroponic solutions are traditionally maintained using pH and electrical conductivity (EC) as indicators of nutrient availability and concentration in solution. CT's were brewed aerobically in triplicate in 4.5 gallon tubs, each with five spinach (*Spinachia oleracea*) plants. A CT with no amendments was used as a check. A treatment of phosphoric acid was used to maintain a target pH near 6.5. Another treatment amended the CT with ammonium sulfate to maintain a target pH of 6.5 and an electrical conductivity of 0.85-1.0 dS•m-1. Solutions were adjusted to target levels slowly to avoid any shocking effect on the plants or microbes. Plants were grown for five weeks indoors at room temperature. Control solutions consistently returned pH and EC values of 8.2 and 0.51 dS•m-1, respectively. The phosphoric acid amended CT had a mean pH of 6.9 and EC of 0.54 dS•m-1 and had long lasting pH modification effects from each application. The ammonium sulfate amended solution had a mean pH of 7.2 and EC of 0.78 dS•m-1. Spinach plants grew best in the ammonium sulfate amended solution, likely due to the additional nitrogen from the ammonium sulfate. Both amendments took about one week to have an effect. Results will be compared and contrasted with data collected from several other compost tea brewing and hydroponic experiments.

Consider for judging.

A Comparison of National Water Management Policy Frameworks: United States and Germany (European Union).

Advisor: Dr. Richard Ruppel

POSTER

Aaron Marti

Majors: Water Resources, German. Minors: Soil Science, International Resource Management.

Abstract: This project is part of research completed through two weeks of participation in the Transatlantic Program: Youth Technology Leaders- Water Management (TAP-YTL) coordinated by the German-American Chamber of Commerce during Fall 2011. This program brought together twelve young scientists and professionals from across the United States to meet with leading experts in water management throughout Germany. This study sought to compare the fundamental national policies of the United States and Germany related to water management. Water policy is important in guiding the management actions of field professionals in managing lakes, rivers, and streams around the world. These policies are often determined by political structures and define the goals and desired outcomes of management. The European Water Framework Directive (EWFD) functions as the fundamental basis of German water management policy, whereas United States water management is guided through the provisions of the Clean Water Act. Both systems were compared through a literature review for this study, as well as discussions held during TAP-YTL . EWFD standards placed emphasis on the ecological integrity of aquatic ecosystems based on biotic, physical, and chemical factors. These standards differ from water quality standards in the United States which focused on an anthropocentric-based designated use for the water body, with namely chemical and physical water quality criteria needed to be met for the use. These and other comparisons presented in this study will allow water managers as well as political leaders from both nations to consider strengths and weaknesses of their current approaches and apply this knowledge to improve their own ecological management and protection of this important natural resource.

Consider for judging.

Mineralization and Leaching Rates of Calcium and Magnesium in Weathered Soils.

Advisor: Jess Sherman

BOTH

Ann McPherson

Major: Soil Science.
Minor: Chemistry.

Abstract: Weathered soils, such as Oxisols and Ultisols, are classified as having low fertility and fast rates of nutrient mineralization due to high leaching potential, low pH, low organic matter (OM) content, low cation exchange capacity (CEC) and low buffering capacity. Despite these characteristics of Oxisols and Ultisols, which are the most common soil classes in tropical regions, they are used in agricultural activities with the potential for crop production with visible nutrient deficiencies. Weathered soils that are used in agricultural activities are typically amended with fertilizers, chemical or organic, and lime to minimize issues arising from low fertility and low pH. One of the amendments commonly used is dolomitic limestone. This product provides calcium (Ca2+) and magnesium (Mg2+), essential elements often seen as deficient in these soils, as well as increases pH levels potentially reducing other essential element losses. Although dolomitic limestone adds Ca2+ and Mg2+, many crops grown with this amendment still exhibit deficiency symptoms. The objective of this experiment is to determine mineralization and leaching rates of Ca2+and Mg2+ in a weathered soil. E horizons of Alfisols, a locally available weathered soil, were used in this experiment. These soils have similar characteristics to Ultisols and Oxisols. E horizons with sand, loamy sand, and silt loam soil textures were packed into columns of the same bulk density and amended with dolomitic limestone. The pH, OM content, and initial Ca2+ and Mg2+ content were determined. These columns were then leached with additions of deionized water (DI) and the leachate was collected and analyzed over a period of several weeks. This analysis, in addition to a post leaching measurement of soil CEC, was used to determine the mineralization rates of Ca2+ and Mg2+ from the amendment, adsorption of these ions to soil particles, and leaching rates through the column.

Consider for judging.

Foraging characteristics of yellow bellied marmots at varying elevations and its effects on average mass.

Advisor: Dr. Brett Woods - UW of Whitewater

ORAL

Leah McSherry

Major: Wildlife Ecology Research and Management.

Abstract: We observed foraging and growth in populations of yellow-bellied marmots (*Marmota flaviventris*). Data were collected through observations and live trapping among colonies at varying elevations. One colony was found in a subalpine environment at approximately 3,200 meters. The other two colonies were located in the alpine, one at about 3,500 meters and the other colony at about 3,616 meters. Marmots were observed and various behaviors, such as foraging, locomotion, alertness, lying/sitting, etc. were recorded. From these data, we calculated the percent of day the marmots spent foraging and compared this to the amount of time they allocated towards other behaviors. Trapping allowed us to compare average masses between the study sites. At higher elevations, there is a shorter growing season, and therefore, marmots at higher elevations may have slower growth rates compared to lower elevations. Furthermore, environmental temperatures at higher elevations are cooler compared to lower elevations and marmots may be able to spend more time of the day foraging. Through our observations and trapping, we discovered that the yellow bellied marmot colonies observed at the high elevation sites spent a greater time foraging and continued to be active throughout the day when compared to the lower elevation site; however, the marmots at the high elevation sites had an overall lower average body mass than the colonies found at the lower elevation site. Although higher elevations may have a shorter growing season, our study suggests that marmots can spend more time foraging during the day and may have a similar total foraging time as lower elevation populations. The critical issue for marmot populations at higher elevations may be the length of hibernation as a result of longer winters at higher elevations.

Consider for judging.

Habitat analysis of white-tailed deer (*Odocoileus virginianus*) in an urban environment using home range analysis.

Advisors: Advisor: Dr. Tim Ginnett

POSTER

Ross Mielke

Senior.
Majors:Wildlife Ecology Research and Management, Biology.

Marcus Mueller

Senior.
Majors: Wildlife Ecology Research and Management, Biology.

Abstract: White-tailed deer (*Odocoileus virginianus*) in urban environments present a unique challenge to wildlife managers. Movement patterns and home ranges vary depending on the habitat available to the animals and the time of year. This study investigated the use of different habitat types by deer in Schmeeckle Reserve, a forested habitat located adjacent to an urban environment, during the winter of 2011-2012. Deer were trapped using modified Stephenson Box Traps (Anderson and Nielson 2002) and adult deer were radio-collared and ear tagged for identification. Data collection is still in progress. To date, we have four adult deer wearing VHF radio collars and whose locations are triangulated three times per day using radio telemetry. We will construct Kernel home range estimates for each animal and use GIS to quantify habitat types that fall within each individual's home range. Data analysis is ongoing and will continue as more data are collected. A two way Chi-squared test will be used to compare the habitat use by each deer to habitat availability within their respective home range. This analysis will provide insight into managing on an ever expanding urban landscape.

Consider for judging.

Effects of Timber Harvest on Gray Squirrel Populations in Sandhill Wildlife Area.

Advisors: Dr. Shelli Dubay and Dr. Jason Riddle

POSTER

Katherine Moratz

Junior.
Major: Wildlife Ecology Research and Management.
Minor: Conservation Biology.

Kristina Borgstrom

Junior.
Major: Wildlife Ecology Research and Management.
Minor: Captive Wildlife.

Abstract: Small mammals can be used as indicators of ecosystem health, and to assess effects of timber harvest on population dynamics. The effects of timber harvest on Eastern gray squirrel (*Sciurus carolinensis*) populations have not been well documented in the Midwest and information in Wisconsin is lacking. We are studying how timber harvest affects capture rates of gray squirrels in Sandhill Wildlife Area, Babcock, Wisconsin, where logging has occurred periodically over the last few decades. We gathered information on gray squirrel habitat use in mature (70+ years), intermediate (10-20 years) and young (< 5 years old) stands to determine density in response to timber harvest. The stands were maple and oak deciduous forests mixed with white pine. From January 28 through March 4, 2012, gray squirrels were trapped using Tomahawk and Have-a-Heart live traps baited with peanut butter and oats. Each stand contained 20 traps that were checked Saturdays and Sundays every three hours starting at 6 am and ending at 3 pm. Squirrels were removed from traps using a handling cone and were aged, sexed, weighed, ear tagged for future identification, and then released. To date, 34 gray squirrels have been caught and 16 were recaptures. We captured 89% of the squirrels (95% of the recaptures) in the old growth stand, 11% (5% of the recaptures) in the regeneration stand, and none in the clear cut. After trapping is complete, we will use linear regression to determine if capture rate varies with stand age.

Consider for judging.

Mixed stock analysis of Lake Michigan lake whitefish commercial harvests.

Advisor: Dr. Brian Sloss

ORAL

Lucas Nathan

Majors: Fisheries.

Abstract: Lake whitefish Coregonus clupeaformis are the dominant species of the Lake Michigan commercial fishing industry. Contemporary fisheries management principles prescribe the use of stock-based management to maximize the probability of sustainable populations and harvest. Previously, six geneticbased stocks were identified in Lake Michigan. A recent analysis of the lake whitefish commercial harvest throughout the majority of Lake Michigan has shown the fishery consists of mixtures of fish from different stocks and therefore it is critical to determine what degree each stock is harvested. Some harvest locations are in whitefish management zones that are not directly synonymous with spawning stocks. The objective of this study was to determine the proportional stock contribution to harvest in management zones without known spawning stocks. Sample harvests from two whitefish management zones (WFM-00 and WI-03) were analyzed using mixed stock analysis on microsatellite DNA diversity. It was determined that the Green Bay stocks (North and Moonlight Bay and Big Bay de Noc) and the Northern stocks contribute a large proportion of the fish catches (>97%). A key finding of these results is the stocks with little contribution to the commercial harvests (Southeastern stock and Elk Rapids) may have lower population sizes and thus may need to be regulated so that overfishing of the stocks does not occur.

Consider for judging.

Determining habitat preferences of migrating Northern Saw-whet owls.

Advisor: Dr. Jason Riddle
POSTER

Abstract: Northern Saw-whet owls (NSWO) are the smallest owls occurring in North America and they are migratory (Johnsgard 2002). It has been reported from banding stations along the shore of Lake Michigan's Green Bay that NSWO arrivals from farther north traveled through mostly contiguous forested habitat (Erdman et. al 1997). Conversely, NSWOs captured and recaptured at stations farther south and southwest traveled through mostly fragmented habitats. We are interested in determining autumn migrations of NSWOs through Sandhill Wildlife Area in Babcock, Wisconsin, especially because it is a large contiguous forest area surrounded by agricultural regions and broken forested areas. We are continuing an ongoing study investigating whether NSWOs exhibit selective tendencies toward certain micro-habitats as they migrate. The main objectives of our study are to: (1) capture and mark migrating owls with bands issued from the U.S. Fish and Wildlife Service to determine age-sex ratios, numbers of owls migrating through Sandhill, year-to-year population trends and capture rates, (2) Determine whether micro-habitat selection preferences exist and (3) ascertain migratory pathways of NSWOs banded at Sandhill or elsewhere and recaptured at Sandhill and share recapture data with other banders.
Consider for judging.

Elizabeth O'Brien

Major: Wildlife Ecology Research and Management. Minor: Captive Wildlife.

Molly Schleif

Majors: Wildlife Ecology Research and Management. Minor: Captive Wildlife.

Tammy Weiss

Major: Wildlife Ecology Research and Management.

Impacts of land use practices and increased precipitation on storm water runoff.

Advisor: Dr. Katherine Clancy
POSTER

Mitchell Olds

Major: Watershed Management.
Minor: Geology.

Abstract: Following the 1930's Dust Bowl, farmers were encouraged to introduce land practice changes. In regions with high agricultural land use (>50%), such as southwest Wisconsin's Driftless Area, increases in baseflow and decreases in runoff are correlated with this shift in land practice. Complicating this trend has been a step increase in precipitation detected throughout much of Wisconsin since 1970. In the Driftless Area, I found that watersheds with higher amounts of agricultural land use showed a higher increase in baseflow over time than watersheds with lower amounts of agricultural land use. To determine how much of this baseflow increase is associated with land use practice changes compared to precipitation increases, I examined watersheds with similar land use and precipitation increases. My hypothesis is that the land use changes are the dominant factors in increasing baseflow.

Consider for judging.

DNA Extraction Methods For American Hazelnut (*Corylus americana*).

Advisor: Dr. Les Werner and Dr. Michael Demchik

POSTER

Isaac Palmer

Photo Unavailable

Major:Urban Forestry.
Minor: Conservation Biology.

Abstract: The extraction of DNA from plant tissues is the first step in preparing a polymerase chain reaction and subsequently analyzing the genome of an individual plant or population of plants. Numerous studies have dealt with the genetic sequencing of European hazelnut (*Corylus avellana L.*) but few have examined the sequences of American hazelnut (*Corylus ameicana*). Conversely, little literature is available regarding the best protocol for specifically extracting DNA from American hazelnut tissues. General DNA extraction protocols are readily available for other plants but many are species specific. The goal of my research was to determine the extraction method that resulted in the highest DNA yields for American hazelnut. Four variables were compared: size of bead used for bead beating, tissue preparation (frozen or dehydrated), duration tissue had been stored, portion of leaf (tip or base) tissue was taken from, and all possible combinations.

Consider for judging.

Analysis of Purina Aquamax and Purina Experimental Diet for Rainbow Trout based on Protein Content.

Advisor: Dr. Chris Hartleb

POSTER

Rebecca Philipps

Major:Water Resources. Minors: Aquaculture, Biology, International Resource Mngmt, & Anthropology.

Abstract: Two Purina diets were tested on Rainbow Trout fingerlings: Purina Aquamax Grower 500 (41% crude protein, 4% crude fiber) and Purina Experimental feed (56.5% crude protein, 2.5% crude fiber, 4.0% starch). The two feeds were distributed twice daily at 1.2% total body weight, adjusted weekly. After the five week growth study, the growths were compared using percent gain in weight and length, food conversion ratios, and condition factors in order to determine whether the higher protein content affected the growth of Rainbow Trout fingerlings. According to the t-test the weights between weeks 2-3 and 3-4 were found to be statistically different. The feed that garnered the greater percent gain differed between the weeks 2-3 and 3-4, Aquamax having the greater percent gain in the former, and Experimental in the latter. There was not a significant difference between lengths throughout the study; food conversion ratios and condition factors were comparable. As protein content was the primary difference between the two feeds it was concluded that over a short term the Experimental feed was not efficient at eliciting the enhanced growth of Rainbow Trout as compared to Purina Aquamax. This may indicate that the limit to which Rainbow Trout can metabolize protein has already been reached, and was maximized in Purina Aquamax Grower 500.

Consider for judging.

Thermic and Chemical Analysis of Three Micro-ecosystems of Spring Creek Lodi Wisconsin.

Advisor: Nancy Turyk

POSTER

Anthony Recht

Major:Water Resource.
Minor: Soil Science.

Abstract: Spring Creek is valuable to the city of Lodi due to aesthetic values and the trout fishery it supports; it is classified as a class II trout stream. City Officials are interested in minimizing agricultural and urban impacts to Spring Creek and have requested this evaluation of water quality and storm response. Downstream of Lodi, Spring Creek drains into Lake Wisconsin.

There are five sampling sites strategically placed along the 12 miles of Spring Creek and two of its tributaries to encompass the complexity of the Spring Creek watershed and pin-point problematic reaches. Three sample sites were placed in the main stream of Spring Creek (LSO2, LSO4, and LSO5); two were placed on Spring Creek tributaries (LSO1 and LSO2). The first site LSO2 was placed downstream of the Lodi Marsh State Wildlife Area which provides a reference site. Two sample sites on Spring Creek tributaries representing rural influence (LSO3 and LSO1). Finally, LSO5 represents urban influences in the main creek and LSO4 located downstream of the municipal wastewater treatment plant.

During the sampling seasons of 2010 and 2011 chemical and physical data were collected to evaluate impacts. Sampling site LSO3 consistently revealed high concentrations of phosphorus with a median of 127µg/L TP, NO2+NO3-N with a median concentration of 6.2 mg/L, and Cl with a median of 30 mg/L in contrast samples collected from LSO2 had median TP concentrations of 61µg/L, median NO2+NO3-N concentrations of 1.8 mg/L, and median Cl concentrations of 9.2 mg/L. Continuously recorded temperature data were collected throughout the summer; sites downstream of Lodi had average temperatures higher than sites upstream of Lodi.

This study explores what impacts the city of Lodi have chemically, nutritionally, and physically on Spring Creek within the city as compared to the reaches of Spring Creek buffered by Lodi Marsh State Wildlife Area.

Consider for judging.

The Green Index- An analysis of urban green spaces and the services they provide.

Advisor: Dr. Aaron Thompson

BOTH

William Risse

Major: Natural Resource Management- Land Use Planning
Minor: GIS and Spatial Analysis

Abstract: The open spaces surrounding us, known to many communities as green infrastructure, provide an essential support system on which our cities and communities rely. Green infrastructure provides services including storm water retention, ecological systems, recreational opportunities, and improved community aesthetics. This study classifies these valuable systems as "green services," and each one of these services plays a pivotal role in the continued health and prosperity of our communities. This study makes use of the city of Stevens Point, Wisconsin, and also the village of Plover, Wisconsin. Through GIS analysis techniques, an index of "green services" is created to identify how well these individual communities are served by their current open spaces. Upon completion of this index, a simple equation is applied to equalize for differences in area between municipalities and provide a final value for comparison. It is hoped that this technique can be applied to other communities in the future to better understand differences in the "green services" provided.

Consider for judging.

Size Press Innovations.

Advisor: Dr. Biasca

ORAL

Chris Rockey

Major: Paper Science and Engineering.
Minor: Chemistry.

Abstract: The UWSP pilot paper machine has a horizontal size press starch coating application, and this application has several flaws with its operations. The flaws of the process create several distinguishable complications for an inefficient production of sized paper. Analyzing this process to create a better operation can give the university the ability to open an entire product line from light weight coated to a heavier coating depending on the customer's desires. Correcting the process even further will give the pilot paper machine the ability to regulate weight of coat, improve sheet properties and quality, reduce waste by preventing retrogradation, and increase capacity.

Do not consider for judging.

Prevalence and Timing of Piscivory within of Age-0 Largemouth Bass Cohorts in Wisconsin Lakes .

Advisor: Dr. Dan Isermann

POSTER

Nathan Stewart

Major: Fisheries.

Abstract: The availability and quality of food available to age-0 fish affects their survival and growth. Largemouth bass *Micropterus salmoides* advance through a series of dietary shifts during early life, eventually switching to piscivory. The onset of piscivory is important to the survival and growth of age-0 largemouth bass and affects the number of fish that will eventually recruit to the fishery. Recent increases in largemouth bass abundance in Wisconsin lakes have prompted renewed interest in the factors regulating largemouth bass recruitment. The onset of piscivory has been poorly studied in largemouth bass populations at the northern edge of their native range. A better understanding of the prevalence and onset of piscivory in Wisconsin largemouth bass populations would allow fishery managers to better understand increases in largemouth bass population dynamics. The objectives of our study were to 1) determine if piscivory was evident in age-0 largemouth bass collected from four Wisconsin Lakes and 2) determine if the extent of piscivory was related to bass length or the geographic location of the populations. Currently, we have observed little evidence of piscivory in any of the four lakes; bass diets have largely consisted of invertebrates of various orders including: Amphipoda, Cladocera, Copepoda, and Hemiptera.

Consider for judging.

Effects of Soil Properties on Soil Microbial Communities Across Land Uses.

Advisor: Dr. Kyle Herrman

ORAL

Joel Stokdyk

Major: Soil and Land Management.
Minor: Geographic Information Systems and Spatial Analysis.

Abstract: Soil microorganisms play crucial roles in mediating many environmental processes such as carbon and nitrogen cycling. The objective of this study was to investigate the relationships between land use and soil microbial communities using the ratio of microbial biomass carbon (C) to nitrogen (N). Microbial biomass and soil physical/chemical properties were measured in 4 land use types (wetland, forest, agriculture, urban street cut-outs). Microbial biomass was determined using the chloroform fumigation - direct extraction method, and soil physical and chemical parameters were determined using standard methods. Results showed that microbial biomass C and N for all land uses ranged from 243-1625 μg C g soil-1 and 8-43 μg N g soil-1. Although no statistical significance was observed, the data suggested that the agricultural sites had lower microbial biomass C (409 ± 174 μg C g soil-1; all data hereafter are mean ± 1 standard deviation) than the forested sites (794 ± 289 μg C g soil-1), wetland sites (842 ± 297 μg C g soil-1), and urban sites (876 ± 710 μg C g soil-1). Microbial biomass C:N ratios were statistically higher (ANOVA; $F_{3,11} = 21.9$; $p < 0.001$) in the wetland sites (140:1) compared to the upland sites (25:1) suggesting that denitrification in the wetland sites may have been limiting available N. No statistical difference was observed in microbial biomass C:N ratios between upland sites. In regards to soil physical/chemical properties, few parameters explained the variance observed in microbial biomass C. However, after removing one outlier from the data set, soil organic matter content had the best ability to predict microbial biomass C ($r^2 = 0.77$). This preliminary study revealed that the abundance of microbial biomass was not influenced directly by land use but likely by the amount of soil organic matter. Further research is needed to determine if these results are observed on a larger and more robust scale.

Consider for judging.

Estimating total egg count in lake whitefish from Lake Michigan.

Advisor: Dr. Dan Isermann

POSTER

Nathan Thomas

Major: Fisheries

Abstract: Lake Whitefish are an important species in the Lake Michigan ecosystem and are part of an economically valuable fishery. Monitoring lake whitefish fecundity is a key process in managing this fishery. Estimating the amount of egg production in a fish population is an essential part in determining fecundity. Estimates of egg production are usually obtained by counting the amount of eggs in a sub-sample that has a known weight and using these counts to get an average number of eggs per unit of weight. Number of eggs per unit of weight is then extrapolated to the whole egg mass and the total amount of eggs within the fish can be estimated. The first objective of this study was to determine the minimal number of sub-samples that are needed in order to obtain an accurate estimate of the number of eggs per gram. The second objective was to determine the accuracy of using a computer to count the number of eggs within a sub-sample. Sub-samples from a whole egg mass were weighed in grams and the total amount of eggs within each sample was manually counted. A picture was taken of each sub-sample spread out in a petri dish. The number of eggs in each sub-sample was used to train the computer to count the eggs in a sub-sample from the picture taken. Results from this study will be used in future studies focusing on lake whitefish fecundity and egg production.

Consider for judging.

Effects of commercially available lighting on the culture of yellow perch (*Perca flavescens*).

Advisor: Dr. Chris Hartleb

POSTER

John Tix

Majors: Fisheries and Biology.
Minor: Aquaculture

Abstract: Many different factors can contribute to growth and survival when raising yellow perch (*Perca flavescens*). Handling, netting, even walking by the tank, but also lighting can be a factor. This study compares the growth and survival of yellow perch with three different kinds of common and commercially available lights. The different kinds of lighting used were LED, incandescent and fluorescent. Three separate groups of perch will be subjected to one type of lighting over a period of time. The three groups will have constant lighting intensity, photoperiods, feed, temperature and other water chemistry. All fish will be measured biweekly for wet weight, length and survival. The predicted result due to few previous studies and to the different spectrums each emits is that fish will grow and survive more efficiently in the lighting the emits a red spectrum.
Consider for judging.

The Effect of Increasing Irrigation Demand on Local Groundwater Level in South Central Kenya.

Advisor: Dr. Ron Crunkilton

POSTER

Ian Torkelson

Major: Water Resource. Minors: Soil science and Chemistry.

Abstract: Life in sub-Saharan Africa, particularly in rural Kenyan communities, teeters on the brink of sustainability. Residents widely believe that deforestation has altered seasonal rain patterns, which has increased the severity of what may be a naturally cyclic pattern of drought. Localized attempts to reforest tracts of land are gaining popularity and success rates are on the rise as better permaculture techniques like drip line irrigation are implemented. The objective of this project was to determine how the groundwater level in an extremely arid environment changes over time due to increased irrigation.

A method was devised to measure the depth of water and then calculate the volume of several hand-dug wells used primarily for wood lot irrigation. These wells were drawn on during daylight hours via solar pumps and therefore recharged every night. Pre-dawn measurements, before pumping began, were taken to provide a baseline to track changes in water volume over a three-month period. A well's location, its water volume, and its recharge rate limit the amount of available water on a per well basis. It was found that these combined factors caused some wells to run dry on a daily basis while others showed no measureable decrease in volume over the same timeframe.

Despite a drier that usual year and no measurable precipitation during the course of this project a declining trend in well water volume was not observed. This may be due to taking measurements when the groundwater was at its lowest seasonal elevation. Long term data collection and analysis will be necessary to gain a more accurate understanding of how local groundwater levels fluctuate and how they will be affected by increased crop irrigation.

Consider for judging.

Assessment of vegetation response to restoration in the Moses Creek floodplain.

Advisor: Dr. James Cook

ORAL

Marissa Vine

Major: Forest Ecosystem Restoration and Management.
Minors: Conservation Biology and Wetland Science.

Abstract: In ecological restoration, initial biotic response often determines future adaptive management actions (Clewell & Aronson, 2007). This study examined vegetation response of the Moses Creek floodplain within the first year after it was restored. Twenty-three transects were established 30 meters apart throughout the floodplain. Transects contained two to six, 1 m x 0.5 m plots spaced 20 meters apart. Vegetative cover by species and amount of bare mineral soil was estimated for each plot. Average number of species per plot was 7.2. Average percent vegetative cover was 37.0. On average, wetland obligates made up 36.1 percent of total plant cover per plot. Richness and abundance per plot were significantly higher ($p < 0.01$) for non-sown species than sown species. The floristic quality index (FQI) value was 16.6, indicating moderate quality of the native plant community. Overall, the results are consistent with other recently restored wetlands.

Special Note: UWSP's Society for Ecological Restoration took part in some of the field data collection for this project.

Consider for judging.

Gadolinium as a domestic wastewater marker.

Advisor: Dr. Paul McGinley

BOTH

Michael Waak

Major: Water Resources.
Minor: Chemistry.

Abstract: Recent research has suggested gadolinium, atomic number 64, might be a persistent chemical marker of domestic wastewater in aqueous systems. Gadolinium is a rare-earth metal used intravenously during medical applications of magnetic resonance imaging. This study investigated the occurrence and transport of gadolinium in the headwaters of Mill Creek in Wood County, Wisconsin, which receives effluent from the City of Marshfield wastewater treatment facility (WWTF). Influent, effluent, activated sludge, and biosolid samples were collected from the Marshfield facility to determine the occurrence and removal efficiency of gadolinium during the treatment process. Samples were also collected from Mill Creek to determine presence of gadolinium in surface water upstream and downstream of effluent discharge. Gadolinium was found at all WWTF and stream sites. The WWTF influent and effluent gadolinium concentrations were 764 ng/L and 496 ng/L, respectively. Activated sludge and biosolid concentrations were 4.63 µg/L and 1.76 µg/kg, respectively. Although there appeared to be some removal of gadolinium in the WWTF, the concentration in the effluent was still much higher than the water upstream of the WWTF. Water upstream had a concentration of 86 ng/L, while downstream concentrations ranged from 415 to 495 ng/L. Thus, this study suggests gadolinium is a persistent marker of domestic wastewater in aqueous environments.

Consider for judging.

Nutrient export of residential yard waste.

Advisor: Dr. Kyle Herrman

POSTER

Michael Waak

Major: Water Resources.
Minor: Chemistry.

Abstract: Leaves, grass, and soil compost are common components of residential yard waste. Improper disposal or storage of such debris presents a potential source of nutrient pollution during rain events. This study examined four common yard waste materials —leaves, grass, combination of leaves and grass (leaves/grass), and composted soil—to assess their potential to release nitrogen, phosphorus, and dissolved organic carbon during storm events. The four yard waste materials were placed in 18 gallon containers that had drainage ports installed in the bottom to allow water to freely drain through the material. Three simulated storm events at days 0, 7, and 11 were used to generate runoff. Each event had a similar intensity (70 mm hr-1) and duration (~2 minutes). After each individual event, drainage water was collected, volume was estimated, and water samples were filtered and preserved until analysis took place in the laboratory. Results showed that the composted soil had the greatest potential to release nitrate/nitrite, with 360 mg N kg-1 export over all three rain events. Grass and leaves/grass produced the highest levels of ammonium and phosphorus export, at 233 and 207 mg N kg-1 and 54 and 59 mg P kg-1, respectively. In regards to dissolved organic carbon, grass and leaves/grass exported most at 2570 and 2520 mg C kg-1, respectively. This study demonstrated that when improperly stored, most common yard wastes are a potential source of nutrient pollution. Notably, it appears grass clippings can be a major source of phosphorus pollution, which is a major concern to freshwater systems in Wisconsin.

Consider for judging.

Use of artificial nest boxes by wood ducks (*Aix sponsa*) and hooded mergansers (*Lophodytes cucullatus*) compared to the distance to water and other artificial nest boxes in central Wisconsin: implications for management.

Advisor: Dr. Kevin Russell

POSTER

Nathan Waid

Senior.
Majors: Wildlife Ecology Research and Management and Biology.
Minor: GIS.

Kasey McCauley

Sophomore.
Major:Wildlife Ecology Research and Management.

Abstract: Wood ducks (*Aix sponsa*) and hooded mergansers (*Lophodytes cucullatus*) are two cavity-nesting species of waterfowl that are common in Wisconsin. Because of the long-term reduction in the availability of natural nest cavities, these and other species of cavity-nesting birds have increasingly relied on artificial nest boxes for reproduction. Previous research conducted at the Mead Wildlife Area (MWA) in Marathon County, Wisconsin has evaluated a suite of variables that influence nest box use by fledgling success of wood ducks and hooded mergansers. Although wildlife biologists have continually added new artificial nest boxes to the MWA, little is known about the specific reasons why some nest boxes are never used by waterfowl. We tried to identify if success of an artificial nest box could be determinable based on the distance from each nest box and the distance from water bodies. We combined historic data on nest box use by wood ducks and hooded mergansers collected from MWA between 2008 and 2011 with new data that we collected from 127 artificial nest boxes in February of 2012. We determined use of nest boxes by the presence of egg shells. We identified species of the presumed hatchlings by shell thickness and nest success was defined by the presence of intact membranes separated from shells. We will present results of our analyses evaluating the potential relationship between distance to water bodies and distance to other artificial nest boxes by wood ducks and hooded mergansers.

Consider for judging.

Comparison of Growth Models For Estimating Yellow Perch Total Length Using Anal Spines.

Advisor: Dr. Dan Isermann

ORAL

Ben Wegleitner

Major: Fisheries Science.

Abstract: Back calculation of fish total length from measurements on calcified structures is commonly used to describe growth patterns within fish populations. This technique has recently been used for anal spines collected from Green Bay yellow perch *Perca flavescens*, but it is unknown whether back calculation formulas derived for one population can be used for all yellow perch populations. The objective of this study was to determine if formulas for back calculating length of yellow perch from anal spines are significantly similar among perch populations in Green Bay, Lake Michigan, Lake Erie, and Lake Winnebago. The slopes of the predicted length versus observed length regressions from Lake Michigan and Lake Erie were significantly different than 1 ($F = 15.9$, $df = 1, 116$, $P = <0.0001$; $F = 9.12$, $df = 1, 23$, $P = <0.0001$). These data are non linear, meaning anal spine growth in comparison to total length is different among populations of fish. Therefore, it was determined that one back calculation model cannot be applied across water bodies.

Consider for judging.

Distinguishing *Peromyscus leucopus noveboracensis* and *P. maniculatus gracilis* using external field measurements in Wisconsin.

Advisor: Dr. Ryan Stephens and Dr. Eric Anderson

ORAL

Sara Wendt

Major: Wildlife Ecology Management and Research.
Minor: Biology.

Abstract: In Wisconsin, white-footed mice (*Peromyscus leucopus*) and woodland deer mice (*P. maniculatus gracilis*) are cryptic and sympatric species. Recently, warming trends from climate change have allowed encroachment of *P. leucopus* into the range occupied by *P. maniculatus,* causing further ambiguity in identifying species. Previous work has attempted to distinguish these species using cranial and external measurements, as well as salivary amylase and genetic testing. However, most morphological studies only used dead specimens for measurements, and molecular sampling can be cost prohibitive for large sample sizes. In addition, due to geographical variation, studies conducted outside of Wisconsin are not effective for distinguishing Wisconsin Peromyscus species. Thus, external morphological measurements need to be identified that effectively identify live individuals to species in the field. We live trapped Peromyscus species in central and northern Wisconsin during the summer of 2010. We measured ear, tail, hindfoot, and weight from live animals, in addition to collecting tissue samples for genetic testing to positively identify species. We collected a total of 84 *P. maniculatus* and 293 *P. leucopus* from 6 counties. We used discriminate function analysis (DFA) to identify measurements that best separated mice to species, and developed two functions. Using ear measurements alone, the function correctly classified 97.9% of mice, and with the addition of weight and tail, successfully classified 99.5% of mice. These equations can be used to identify live Peromyscus in northern Wisconsin with a high degree of accuracy. This is essential for field studies requiring identification of *P. leucopus* from *P. maniculatus gracilis* and for understanding current trends of *P. maniculatus* in Wisconsin.

Consider for judging.

Single and multiple sex incubation rates of Northern bobwhites (*Colinus virginianus*) in field borders on North Carolina farms.

Advisor: Dr. Jason Riddle, Jessica Piispanen

POSTER

Sara Wendt

Major: Wildlife Ecology Management and Research.
Minor: Biology.

Abstract: Traditionally, northern bobwhites (*Colinus virginianus*) were considered strictly monogamous. However, recent studies indicate that ambisexual polygamy and rapid multiclutch polygamy mating structures also are used and account for a significant portion of the total reproductive output. Additionally, these systems are used more often in good habitat and with an uneven sex ratio. Our objective was to determine the sex ratio of incubating bobwhites on nests in field borders on farms in North Carolina. We collected data as part of a larger study on nest success during the summers of 2010 and 2011. We systematically searched field borders to find nests, and each nest was monitored every three to four days until it either succeeded or failed. In addition, we used cameras to monitor about half the nests. Adults were identified as they flushed from the nest during a nest check or viewed using camera footage. Preliminary analysis suggests males are contributing to incubation and we will present the final estimates of single and multiple sex incubation rates. Our results may indicate if landowners' efforts to provide increased habitat with field borders are supporting mating systems which provide opportunities for increasing bobwhite population sizes.

Consider for judging.

Minimal inhibitory concentration of bleach to the invasive aquatic pathogen Viral Hemorrhagic Septicemia Virus in the Great Lakes Region.

Advisors: Richard Crowther, Robert Michitsch, Robert Schmitz, Brian Sloss

ORAL

Moua Yang

Major: Biology.
Minor: Chemistry.

Abstract: Viral Hemorrhagic Septicemia Virus (VHSV) type IVb is a bullet-shaped single stranded RNA virus from the Family Rhabdoviridae and the Genus *Novirhabdoviridae.* This invasive aquatic pathogen causes viral hemorrhagic septicemia disease in many of the freshwater fish species in the Great Lakes Region. The pathogen was first detected in Lake St. Claire, Michigan, in 2005. Regulations were implemented by the Wisconsin Department of Natural Resources and Wisconsin Department of Agriculture to prevent the spread of VHSV to uninfected bodies of water. However, these regulations do not require disinfection. A 10% bleach solution is the current standard for disinfection but the minimal inhibitory concentration (MIC) of bleach to VHSV is unknown. End-point dilution assays were performed on cultures of virally infected Fathead Minnow (*Pimephales promelas*) epithelial cells to determine the MIC of bleach to the virus. Results from these assays indicate that a bleach concentration of 0.3% is required to neutralize the virus. VHSV can be devastating to the sports and commercial fishing industry and it is unknown whether the pathogen will spread to other areas of uninfected water, so disinfection is essential. The results from this experiment lends support to the fact that VHSV is highly sensitive to bleach, and therefore it is critically important for the general public to consider bleach disinfection as a standard procedure to prevent the spread of this viral pathogen.

Consider for judging.

Nonpoint source pollution impacts and recovery for Moses Creek in Stevens Point, Wisconsin.

Advisor: Dr. Kyle Herrman
ORAL

Melissa Yarrington

Major: Water Resources.

Abstract: Excessive phosphorous loading to freshwater ecosystems can result in eutrophication. Eutrophic systems are characterized by wide fluctuations in dissolved oxygen, which can harm aquatic biota. Eutrophication in freshwater systems typically occurs with the addition of a limiting nutrient that consequently increases the number of primary producers. As a result, more oxygen is produced during the day (i.e., photosynthesis), but more oxygen is also consumed at night (i.e., respiration). The nightly consumption of oxygen in a eutrophic system is of concern, since lack of oxygen can harm or kill aquatic organisms. To date, little work has been done to quantify stream recovery temporally from non-point source pollution. This study examined diurnal fluctuations of percent saturation dissolved oxygen (DO) for Moses Creek in Stevens Point, Wisconsin, before, during, and after a small scale nutrient enrichment of phosphorus (PO43--P L-1). Minimum DO values were assessed over the study period to determine the time necessary for the stream to recover. Data collected three weeks prior to the nutrient addition indicated average minimum DO was 67.4%. Prior to the twenty-four hour injection period, minimum DO was below average but returned to pre-enrichment conditions one day after injection ceased. Minimum DO declined over days two through six, and reached an absolute minimum of 25.1 % on day six. On days seven through nine, daily minimum DO increased rapidly. Nine days after injection ceased, daily minimum DO reached an absolute maximum of 77.3%. Average minimum DO conditions returned on day ten, and were maintained through day twelve. Results of this experiment indicate that for a first order stream such as Moses Creek, it takes approximately a week and a half for a stream to recover after short term additions of phosphorus.

Do not consider for judging.

Analysis of seed bank composition and density for a wetland restoration site with reapplier topsoil.

Advisors: Dr. James Cook
POSTER

Michael Zueger

Major: Ecosystem Restoration and Management
Minors: Conservation Biology, Wetland Science.

Donnie Peterson

Major: Ecosystem Restoration and Management.

Abstract: We are currently examining the seed bank of the restored Moses Creek wetland in Schmeeckle Reserve. Ten inches of topsoil was saved prior to restoration and reapplied after the wetland construction was completed. The effectiveness and value of this technique has rarely been evaluated for wetland restorations. We are determining if saving the topsoil will be of importance to seed banks as it may harbor remnant wetland species in the seed bank. Comparison of the adjacent upland forest seed bank against the floodplain area and the density of the seed bank are also of interest. Soil cores were taken at multiple quadrats located on perpendicular transects spanning the entire restoration project area and into adjacent upland. Seed bank species composition was determined by greenhouse propagation. Preliminary investigations show that a minimum of two obligate (OBL) and one facultative (FACW) wetland species have survived and some are present that were not planted as part of the restoration, but were observed pre-treatment. Various weedy and generalist species have also moved in. Natural seed dispersal from upstream, animals, and wind may play an important role. Seed bank density varies greatly overall and significantly between upland and wetland areas. Upland and wetland seed banks averaged 2,921 and 1,300 seed germinants per meter squared respectively. Stratified samples are currently being examined and should provide another dimension to this study. This continuing research provides future insight to potential benefits of topsoil reapplication in regards to seed bank resiliency over a large span of time in an altered habitat.

Consider for judging.

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