

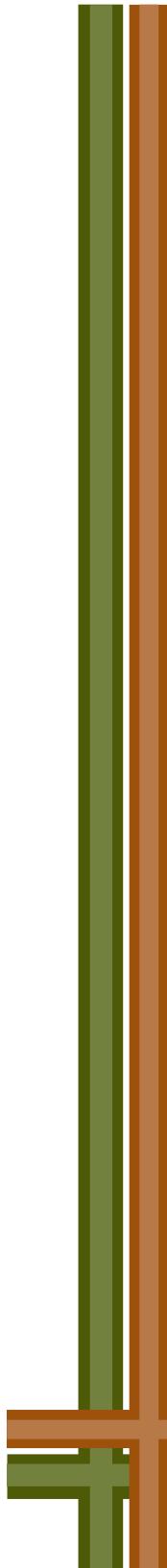
ONE HEALTH: The Wildlife - Human Connection



2014 Winter Meeting

March 11th - 13th, 2014

Stoney Creek Inn
Rothschild, Wisconsin



President's Welcome

On behalf of the Wisconsin Chapter of The Wildlife Society, I'd like to welcome you to the 2014 Winter Meeting. Once again through our collective ideas and collaborations we have put together an excellent program. This year's plenary theme is ***One Health: The Wildlife-Human Connection***, for which we have invited three highly accomplished individuals who are certain to enlighten as well as challenge us with thought-provoking considerations on our roles as wildlife professionals. New this year we have partnered with the Wisconsin Society for Ornithology to co-host a special symposium on Wednesday afternoon dedicated to the latest technology in avian research and monitoring. We are also pleased to continue to devote a session to student presentations per our dedication to professional development.

I would like to thank the WCTWS Executive Board for all of their hard work and dedication in bringing this meeting together. Special thanks to outgoing president Scott Hull for his leadership in planning and organizing great agendas for the general and student sessions, David Drake for his lead role on the WSO special symposium, Krista McGinley for once again compiling our program and running the garage sale and silent auction, and to the 2013 Arrangements Committee for The Wildlife Society Annual Conference co-chairs Jamie Nack and Karl Martin and incoming president Scott Craven, for their roles in planning the Tuesday evening welcome reception.

Enjoy the meeting!

*Tami Ryan
WCTWS President*

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Schedule At-a-Glance

Tuesday, March 11th, 2014

- | | |
|-------------------|-------------------|
| 6:30 - 7:30 p.m. | Registration |
| 7:00 - 10:00 p.m. | Welcome Reception |

Wednesday, March 12th, 2014

- | | |
|------------------------|--|
| 8:00 - 9:00 a.m. | Registration |
| 9:00 a.m. - 12:00 p.m. | Plenary Session |
| 12:00 - 1:00 p.m. | Lunch |
| 1:00 - 4:40 p.m. | Student Session
Special WSO/WCTWS Symposium |
| 4:30 - 6:00 p.m. | Chapter Business Meeting |
| 6:30 - 10:00 p.m. | Awards Banquet
Silent auction / garage sale |

Thursday, March 13th, 2014

- | | |
|------------------------|--|
| 8:20 a.m. - 12:00 p.m. | General Sessions A & B |
| 12:00 p.m. | Conclusion / Adjourn
<i>(lunch on your own)</i> |

Wednesday, March 12th, 2014

Registration
8:00 - 9:00 a.m.

Plenary Session:
“One Health: The Wildlife - Human Connection”
9:00 a.m. - 12:00 p.m.

Moderator: Tami Ryan

TITLE	SPEAKER
Welcome & Opening Remarks 9:00 - 9:15 a.m.	Tami Ryan
Perspectives on Wildlife Disease in a Changing World 9:15 - 10:00 a.m.	Milt Friend
Lyme Disease Management in Wisconsin 10:00 - 10:45 a.m.	Diep “Zip” Hoang Johnson
<i>BREAK: 10:45 - 11:15 a.m.</i>	
One Health, Anyone? 11:15 a.m. - 12:00 p.m.	Bryan Richards

Plenary Session - Speaker Abstracts/Bios

Milt Friend

Emeritus Scientist, USGS National Wildlife Health Center

Abstract: “Perspectives on Wildlife Disease in a Changing World”

The recent convergence of wildlife disease as a wildlife conservation issue has largely been driven by the ongoing global phenomenon of infectious disease emergence and reemergence. This enhancement of infectious disease became a focus for human concern during the last quarter of the 20th Century and about a decade earlier for wildlife interests. The resulting “double jeopardy” faced by wildlife as direct “victims” of mortality from disease and as perceived “villains” because of their role in disease transmission to other species is explored in the context of an increasing global focus on “One Health” approaches to address infectious disease. Such efforts are especially important within urban/suburban areas, the “third frontier” for wildlife conservation in America.

Milt entered the wildlife conservation field as an Assistant Waterfowl Biologist with the Vermont Fish and Game Department and retired from the USGS in 2004, where he is now an emeritus scientist. He is best known in the conservation field for his 23-year tenure as the first National Wildlife Health Center Director and for his ongoing role as an educator (UW adjunct Professor of Animal Health and Biomedical Sciences). He continues to bring the subject of wildlife disease into the context of several UW classes and to address this subject in other venues.

Plenary Session - Speaker Abstracts/Bios

**Diep "Zip" Hoang Johnson
Epidemiologist, Wisconsin Department of Health Services**

Abstract: “Lyme Disease Management in Wisconsin”

Lyme disease reported cases have increased dramatically over the past 20 years. In the last few years, Lyme disease was the third most reported illness in Wisconsin residents. The tick vector that is causing Lyme disease and other tickborne illnesses in Wisconsin is the *Ixodes scapularis*, commonly referred to as the blacklegged tick. Recent tick surveillance has demonstrated that the blacklegged ticks are spreading from western and central to eastern region. This presentation will provide a one health concept for the management of Lyme disease in Wisconsin. This will involve understanding the characteristics of Lyme disease, prevalence and distribution, tick vectors and hosts interaction, and available methods for prevention and control.

Diep "Zip" Hoang Johnson is an epidemiologist in the Wisconsin Department of Health Services, Bureau of Communicable Diseases and Emergency Response, Division of Public Health (DPH). She has served as the Vectorborne Coordinator at the Division of Public Health for the past 12 years. Before coming to DPH, she worked as a microbiologist at the Wisconsin State Laboratory of Hygiene for 13 years. She was certified at the Centers for Disease Control and Prevention and Rollins School of Public Health at Emory University in epidemiology and biostatistics in 2003. She graduated from UW-Madison with a Bachelor of Science, Bacteriology in 1988.

Plenary Session - Speaker Abstracts/Bios

Bryan Richards

Emerging Disease Coordinator, USGS National Wildlife Health Ctr.

Abstract: “One Health, Anyone?”

Historically, wildlife has been an afterthought in addressing human and domestic health issues. Certainly the field of wildlife health is integral to the “One Health” concept, but our role is less than clearly defined. What concerns continue to exist and how do we address them to earn wildlife and wildlife health a “seat at the table?” Does the reactionary means with which we have approached wildlife health play a role? How does our lack of infrastructure and capacity play in? What else are we missing? What have we accomplished and what remains to be done? In this presentation, we will explore these concepts, and how we might address them both today and into the future.

Bryan Richards is the Emerging Disease Coordinator at the US Geological Survey's National Wildlife Health Center (NWHC) in Madison, Wisconsin. A native of Monroe County, WI, Bryan completed his undergraduate work in Wildlife Ecology at UW-Madison, and graduate work at Southern Illinois University. After 11 years with Texas Parks and Wildlife Department, Bryan returned to Wisconsin in 2004 to assist with Chronic Wasting Disease efforts at NWHC. More recent activities include providing wildlife disease training to tribal wildlife managers, and biosurveillance and emergency management roles with the Departments of Interior and Homeland Security.



Wednesday, March 12th, 2014

Student Session

Moderator: Chris Pollentier

Time	Title	Speaker
1:00	Tracking the footprint of climate change: snowshoe hares in Wisconsin	Sean Sultaire
1:20	A Bayesian approach to estimating white-tailed deer abundance using an integrated age-at-harvest model	Andrew Norton
1:40	Differential detection in greater sandhill cranes	Lindsey McKinney
2:00	Combining citizen science and genetics to evaluate the status of the American badger in Wisconsin	Elizabeth Kierepka
2:20	Observer discrepancies with environmental covariates: let's agree to disagree	Nate Francois
2:40	Altered population regulation for a northern-adapted mammal along the trailing edge of its distribution	John Pokallus
3:00	<i>BREAK</i>	
3:20	Effects of climate change and land cover on the subnivium, a refuge beneath the snow	Sonia Petty
3:40	Stable isotope analysis of black bear diet in northern Wisconsin	Becky Kirby
4:00	Proximate mechanisms of delayed recovery in reintroduced American martens	Phil Manlick
4:20	Could prey be limiting the recovery of American marten in Wisconsin?	Jenna Carlson
4:40	<i>CONCLUSION</i>	

Wednesday, March 12th, 2014
WSO Symposium at The Wisconsin Chapter of
The Wildlife Society Annual Meeting:
“The Latest Technology in Avian Research & Monitoring”

Moderators: Kim Kreitinger & David Drake

Time	Title	Speaker
1:00	Monitoring the individual foraging behavior of birds using RFID: new applications of an old technology	Chris Latimer
1:20	The evolution of video camera technology and its application to avian ecology research	John Dadisman
1:40	Turning on the lights to nocturnal migration: the power of Doppler radar for ornithological research	David La Puma
2:00	Introduction to eBird: how can one million Wisconsin bird observations per year help managers and scientists?	Thomas Prestby
2:20	Using automated telemetry to spy on the nightlife of warblers in the Midwest and the migratory pathway of thrushes crossing the Gulf of Mexico	Michael Ward
2:40	Use of archival geolocator tags to document movements and foraging patterns of common loons	Kevin Kenow
3:00	BREAK	
3:20	An important wintering population of golden eagles in southwestern Wisconsin and southeastern Minnesota	Mark Martell
3:40	Breakthroughs in wildlife tracking technology: Project SNOWstorm and the snowy owl irruption of 2013/2014	David La Puma
4:00	Closing remarks	Kim Kreitinger & David Drake

Thursday, March 13th, 2014
General Session A

Moderator: Jason Suckow

Time	Title	Speaker
8:20	Stopover habitat restoration: connecting migratory birds and people	Kim Grveles
8:40	Bird City Wisconsin: making our communities healthy for birds... and people	Carl Schwartz
9:00	Assessing the impact of mercury contamination on the Northern Highlands common loon (<i>Gavia immer</i>) population and simulating the potential benefits of emission reductions	Mike Meyer
9:20	American bison and Lepidopterans: a sizeable relationship in an oak savanna landscape	Robert Hess
9:40	Recovery of a contaminant-impacted Great Lakes bald eagle population	Sean Strom
10:00	BREAK	
10:20	Spatially explicit demographic modeling to assess the climate change vulnerability of ruffed grouse (<i>Bonasa umbellus</i>)	Lars Pomara
10:40	The effect of landscape variables on greater prairie-chicken lek persistence in central Wisconsin	Matt Broadway
11:00	Distribution and population viability of prairie grouse in Wisconsin, USA	Mike Hardy
11:20	Alternative scenarios of increased bioenergy production in southern Wisconsin implications for bird communities	Pete Blank
11:40	Wildlife hazard management to protect aviation safety in northern Wisconsin	Chad Alberg
12:00	CONCLUSION	

Thursday, March 13th, 2014
General Session B

Moderator: Nathan Roberts

Time	Title	Speaker
8:20	Assessment and spatial analysis of bobcat parasites in southern Illinois	Shelby Hiestand
8:40	Retirees helping recovery of the endangered black-footed ferrets	Mark Martin
9:00	Professionalism, praxis, and The Wildlife Society's Certification Program: why you should care	Tim Van Deelen
9:20	Survival of Wisconsin's gray wolves, 1979-2012	Jen Stanglein
9:40	Gray wolf hunter/trapper attitudes, efforts, and methods in Wisconsin	Brian Dhuey
10:00	<i>BREAK</i>	
10:20	Land cover mapping of the Glacial Habitat Restoration Area using satellite image classification	Jo Horton
10:40	A closer look at hunter numbers in Wisconsin and nationally. Did hunter numbers increase in 2011?	Mike Watt
11:00	Addressing disturbance and environmental change: perspectives from managers in the Upper Midwest	Christine Anhalt
11:20	Can we improve our ability to encourage active land stewardship on private lands in Wisconsin?	Tricia Knoot
11:40	<i>CONCLUSION</i>	

Abstracts - Student Session

(alphabetical by presenter's last name)

Carlson, Jenna₁, Jonathan Gilbert₂, John Pokallus₁, Phil Manlick₁, and Jonathan Pauli₁

₁University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

₂Great Lakes Indian Fish & Wildlife Commission

Could prey be limiting the recovery of American Marten in Wisconsin?

The American Marten (*Martes americana*) is the only endangered mammal in Wisconsin, and has undergone serial reintroductions to the state. Recovery has been slower than anticipated with the limiting factors still unknown. The lack of a basic knowledge surrounding regional marten foraging ecology led us to quantify the diet of martens inhabiting the Chequamegon-Nicolet National Forest (CNNF) in northern Wisconsin using a dual approach of scat and stable isotope analyses. Marten scat was collected at winter rest sites within the CNNF from 2000-2011. We recorded the occurrence of prey items within each scat via ocular assessments and calculated percent occurrence for each prey item. Marten hair was acquired from museum specimens and opportunistically sampled from carcasses within CNNF for isotopic analysis. Potential prey hair and feather samples were collected in CNNF during the spring, summer, and fall seasons of 2010-2012. Both analyses indicated that shrews and deer were most important to the diet of Wisconsin martens across seasons. This contrasts with other marten populations, where voles and mice are typically the principal diet items. Shrews are one of the least preferred prey items for martens, and are most common in populations limited by prey availability. Our findings suggest that nutritional limitation could be at least partially responsible for a delayed recovery of marten in Wisconsin.



Francois, Nate

University of Wisconsin-Stevens Point, Doug Stephens Boone & Crockett
Undergraduate Wildlife Research Fellow

Observer discrepancies with environmental covariates: let's agree to disagree

Abundance of avian populations is often estimated using point count surveys. Point counts can be used to estimate abundance of a single bird species or multiple bird species. A component of some point count surveys involves multiple observers collecting data on birds as well as on covariates such as sky condition, wind condition, and noise level. These covariates may affect the probability of detection and therefore abundance estimates. We hypothesized that observers would tend to agree on values of environmental covariates more strongly in single-species surveys than multi-species surveys. We used two data sets to test our hypothesis: 1) a single-species roadside survey for ring-necked pheasants in Wisconsin (2011 and 2012), and 2) Breeding Bird Survey (BBS) data from a detection probability project in North Carolina (2008). The pheasant study consisted of 2,939 point counts, each surveyed simultaneously by 2 of 9 different observers. The BBS study consisted of 1,800 point counts, each surveyed simultaneously by 2 of 6 different observers. We used a statistical method known as concordance correlation to calculate the strength of the correlation between observers in both studies. This procedure is traditionally used in a lab setting to test the correlation between measurements of two identical pieces of equipment or instruments. We tested our hypothesis by conducting one-tailed Z-tests for each covariate (sky condition, wind condition, and noise level). We rejected the null hypothesis in each instance. Our results suggest observers are more consistent in collecting environmental information when they also are sampling fewer bird species.



**University of Wisconsin
Stevens Point**

Kierepka, Elizabeth M. and Emily K. Latch

University of Wisconsin-Milwaukee

Combining citizen science and genetics to evaluate the status of the American badger in Wisconsin

Despite their iconic status in Wisconsin, little is known about the ecology of the American badger. Badgers are considered important species for grassland ecosystems, including prairies and natural savannas, habitats that have undergone severe degradation in Wisconsin. A lack of information on the distribution, abundance, and population trends for the badger throughout Wisconsin has made it difficult to designate appropriate strategies for conservation and management of the species. In 2009, a long-term project was initiated by UW-Milwaukee and the Wisconsin Department of Natural Resources to acquire basic data on the distribution and relative abundance of badgers, and to understand how the current landscape in Wisconsin affects the distribution and movement of badgers statewide. Public reports resulted in over 500 confirmed badger sightings from 2009-2013 in 66/72 counties, and samples were collected from 233 badgers. Genetic analyses revealed two features of the Wisconsin landscape that influence the distribution of badgers in the state. First, the Mississippi River separates badgers in Wisconsin from those in Minnesota, especially in southern Wisconsin. Second, genetic variation was correlated with agriculture, which suggests that population densities were the highest in agricultural southwestern Wisconsin compared to less suitable forested or urbanized habitats. Overall, Wisconsin appears to contain a genetically diverse population of badgers that is continuously distributed across the state in varying densities according to habitat suitability.



Kirby, Rebecca₁, David M. MacFarland₂, and Jonathan N. Pauli₁

₁University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

₂Wisconsin Department of Natural Resources, Bureau of Science Services

Stable isotope analysis of black bear diet in northern Wisconsin

As long-lived opportunistic omnivores, American black bears (*Ursus americanus*) exhibit great plasticity in diet and habitat selection, and can become habituated to human resources. To quantify the relative importance of distinct diet groups to black bears, we are using stable isotope analyses of tissues collected from hunter-harvested bears. Diet reconstruction with stable isotopes avoids biases of digestibility that can complicate traditional diet analyses, and sampling tissues with different metabolic rates allows for higher resolution of temporal patterns of resource use. Specifically, carbon ($\delta^{13}\text{C}$) values can indicate consumption of corn-dominated human foods (waste, agriculture, bait), and nitrogen ($\delta^{15}\text{N}$) values can indicate animal content and trophic position. We collected hair and blood from harvested bears at registration stations in north-central Wisconsin (n=12 in 2011, n=137 in 2012, and n=40 in 2013), and sampled representative diet items in the area. Using isotopic mixing models parameterized with the potential diet items, we estimated proportional contributions of three dietary groups: native vegetation, animal matter, and human-derived foods. Preliminary analyses show individual, as well as temporal variation in diet. To better understand resource use, we are exploring how these isotopic signatures relate to individual characteristics; for example, males on average are enriched in both $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$, indicating likely higher consumption of both human foods and animal matter. Further understanding of patterns of age and sex class resource use may have important implications for long-term management.



**Manlick, Philip J.₁, James E. Woodford₂, Jonathan H. Gilbert₃, Daniel Eklund₄,
Jonathan N. Pauli₁**

¹University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

²Wisconsin Department of Natural Resources, Bureau of Natural Heritage
Conservation

³Great Lakes Indian Fish & Wildlife Commission

⁴U.S. Forest Service, Chequamegon-Nicolet National Forest

Proximate mechanisms of delayed recovery in reintroduced American martens

Species reintroductions are increasingly important tools in wildlife management. The American marten (*Martes americana*) is Wisconsin's only endangered mammal and has been subject to multiple reintroduction attempts, the most recent of which occurred in the Chequamegon-Nicolet National Forest (CNNF) between 2008 and 2010. Marten recovery statewide, but especially in the CNNF, has seen significant delays, yet the exact mechanisms limiting recovery remain unknown. To evaluate the success of this reintroduction and explore potential limitations to recovery, we are utilizing marten hair captured using 200 randomly distributed hair snares in the CNNF to estimate marten abundance (\hat{N}), survivorship (\hat{S}), and density via genetic mark-recapture analyses. In addition, we will assess the influence of juvenile recruitment on population growth by quantifying the number of juveniles per female via genetic parentage assignment using a suite of 14 microsatellite markers. Concurrently, we are mapping marten distribution in the state by coupling hair snare detections with snow-track surveys to characterize marten occupancy relative to interspecific competitors and habitat features using dynamic occupancy models. To date, we have collected 72 genetic samples (29 in 2011-12 and 53 in 2012-13) with preliminary results indicating conditional capture probability for hair snares was 0.12. Similarly, replicated snow-track surveys ($k=3$) yielded 27 marten tracks and preliminary results revealed a detection probability of 0.48. Ultimately these analyses will help elucidate the proximate mechanisms limiting marten recovery and help guide management by providing crucial information on reintroduction biology for a state endangered furbearer.



©Mataley Tano

McKinney, Lindsey₁, Jason Riddle₁, Jeb Barzen₂, Tim Ginnett₁, Andy Gossens₂, and Shelli Dubay₁

₁University of Wisconsin-Stevens Point, College of Natural Resources

₂International Crane Foundation, Field Ecology Program

Differential detection in greater sandhill cranes

Abundance estimates allow wildlife managers to make informed management decisions, but differential detectability can lead to biased estimators. Sandhill cranes (*Grus canadensis*) are large-bodied and long-lived, rendering them ideal for mark-recapture estimates, but territorial birds have limited movement when compared to non-territorial birds, violating the assumption of equal detectability. Our objective was to quantify differential detectability for non-territorial and territorial sandhill cranes on a summer range, and to use this information to calculate population estimates for each group. We hypothesized that territorial sandhill cranes would be detected more often than non-territorial cranes. In 2009, the International Crane Foundation surveyed three routes in Briggsville, WI, two days per week with six passes per day. Bird locations were recorded on an aerial photograph. We created capture histories for territorial (n=52) and non-territorial cranes (n=23), and used the Huggins closed capture model in program MARK to calculate detection probability for each group. We identified *a priori* models that would explain crane detection using distance from road, territoriality, sampling event (first or subsequent sighting), and time of season as variables. We used Akaike's Information Criterion to rank models. The best approximating model included territoriality and sampling event (AIC_c weight= 0.92, 4 parameters). Probability of detection was higher for territorial ($\hat{p} = 0.11$, CI=0.08-0.14) than for non-territorial ($\hat{p} = 0.03$, CI= 0.01-0.07) cranes. In subsequent sampling events, detection probability almost doubled to 0.18 (CI= 0.17-0.20) for territorial cranes, and almost tripled to 0.11 (CI= 0.09-0.14) for non-territorial cranes. We will discuss potential reasons for differential detection, including habitat use by the birds and ability of observers to detect birds.



Norton, Andrew₁, Tim Van Deelen₁, Mike Watt₂, Ryan Walrath₂, Dan Storm₂, and Dennis Heisey₃

¹University of Wisconsin-Madison

²Wisconsin Department of Natural Resources

³USGS Survey National Wildlife Health Center

A Bayesian approach to estimating white-tailed deer abundance using an integrated age-at-harvest model

Population estimates for game species provide valuable information for making objective harvest recommendations. For many species, it can be difficult to make sufficiently precise population estimates. However, through in-person white-tailed deer (*Odocoileus virginianus*) harvest registration, the Wisconsin DNR has enhanced their ability to provide reliable population estimates. In addition, aged subsamples from registered deer provide age-at-harvest data, which is the foundation for most harvest-based population estimators. Age-specific harvest data through 10 years of age can also enhance the performance of flexible, integrated age-at-harvest population models. Integrated population models have been increasing in popularity in recent years, particularly due to increased exposure via workshops and published literature and computational advancements that make Monte Carlo Markov Chain iterations more tractable. These models have been applied to white-tailed deer, mule deer (*Odocoileus hemionus*), and black bear (*Ursus americanus*) populations; however, to our knowledge no models have incorporated informative prior information. Because such a vast amount of information is known about white-tailed deer, we were able to incorporate objective, biologically-supported prior information used to augment parameter optimization, which is a principal advantage of Bayesian methods.

In addition we used survival estimates from >400 radio-collared deer to

evaluate model performance. We compared our Bayesian integrated age-at-harvest population model with informative priors against current methods used to estimate abundance in Wisconsin.



Petty, Sonia, Jonathan Pauli, and Benjamin Zuckerberg

University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

Effects of climate change and land cover on the subnivium, a seasonal refuge beneath the snow

Winter is a season of energetic deficits and nutritional limitation. Many organisms endure the winter season by using the subnivium, a below-snow thermally stable seasonal refugium. The subnivium forms when a snowpack traps heat that is released from the soil. As warm air moves up through the snow layers it carries water vapor, which condenses as the air cools, resulting in a base layer of snow that is loose and granular. Because the insulation of snow is dependent on snow depth and density, the stability of the subnivium varies with land cover type. Increasing temperatures across the Northern Hemisphere and especially in the winter months have led to important changes in precipitation patterns and snow characteristics. Notably, in many northern regions snow extent, depth and duration are generally decreasing while snow density is increasing. These changes are likely to have important consequences on the thermal profile of the subnivium, although they have not yet been quantified, nor has the influence of land cover types been explored. To quantify the effects of climate change on the subnivium, we are using a micro-greenhouse (2.5 x 2.5 x 2 m) that maintains a temperature of 5° C warmer than outdoor ambient temperatures, and automatically opens during precipitation events. Prior to the first snowfall in winter 2013-2014, we secured temperature data loggers to the ground, both inside and outside the greenhouse, to measure the subnivium temperature throughout the winter. In addition, we have placed temperature data loggers in three different land cover types; prairie, deciduous forest, and coniferous forest. At each of these sites, we are measuring the variation in snow characteristics (depth and density) to better understand the importance of land cover in promoting and maintaining the subnivium. The results of our study will inform future efforts in climate change adaptation, especially for those winter-adapted organisms that depend on the subnivium for survival.



Pokallus, John₁, Richard P. Thiel₂, and Jonathan Pauli₁

₁University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

₂Wisconsin Department of Natural Resources, Bureau of Wildlife Management (retired)

Altered population regulation for a northern-adapted mammal along the trailing edge of their distribution

Community structure and interspecific interactions are particularly vulnerable to rapidly changing climatic regimes. Recent changes in both climate and vertebrate community assemblages have created a unique opportunity to examine the impacts of two dynamic forces on population regulation. We examined the effects of warming winter conditions and the reestablishment of a previously extirpated predator, the fisher (*Martes pennanti*), on regulatory mechanisms in a northern-adapted mammal, the porcupine (*Erethizon dorsatum*), along their southern range boundary. Using a long-term (17-year) capture-recapture dataset, we: 1) quantified the impacts of climate change and increased fisher predation on the survival of adult porcupines at their southern distribution; 2) assessed recruitment (via both adult fecundity and juvenile survival) of porcupines; and 3) modeled the relative importance of predation and winter conditions on the demography and population growth rate (λ). Severe winters and abundant predators interacted synergistically to reduce adult survivorship by as much as 44%, while expanding predator populations led to near reproductive failure among porcupines. Increasing predatory pressure, disruptions in community structure, and more frequent extreme winter weather events yielded an inviable population within 25 years, whereas in the absence of predators, the population was stable but declining. Our results provide a mechanistic understanding behind distributional shifts resulting from climate change and may be broadly relevant for predicting future distributional shifts in other northern-adapted mammalian species.



Sultaire, Sean, Benjamin Zuckerberg, and Jonathan Pauli

University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

Tracking the footprint of climate change: snowshoe hares in Wisconsin

Climate change is altering species distributions, especially along range limits. Such range shifts are, however, difficult to document due to lack of historic data and confounding effects such as land use change. Snowshoe hares exist at their southern geographic limit along the vegetative tension zone in central Wisconsin. In the late 1970s a statewide winter survey was conducted in Wisconsin to document the range boundary of hares and qualitatively compared to observations compiled by Leopold in the 1940s. As snowshoe hares are specially adapted to deep and persistent snow cover, it is likely that they will be strongly affected by warming winter conditions. We are currently revisiting over 100 historic hare locations throughout central Wisconsin and using snow tracking surveys to determine their current southern range limit, and to quantify how this range boundary has shifted over the past 70 years. To date, we have detected hares at <25% of historic presences, suggesting a significant retraction in their southern range boundary. Preliminary analyses suggest that hares are more likely to occupy heavily forested landscapes and that the characteristics of these landscapes will be important for future population persistence. In the near future we will correlate range boundary dynamics with changing climate and land cover variables to identify which climate variables snowshoe hares are most sensitive to and potential synergies with land cover. In addition to identifying areas and habitats where snowshoe hares are most likely to persist, this research will shed light on issues that snowshoe hare will face throughout Wisconsin and their entire distribution as the climate continues to warm.



Symposium Speaker Abstracts

(alphabetical by speaker's last name)

Dadisman, John

Wisconsin Department of Natural Resources, Wildlife & Forestry Research Section

The evolution of video camera technology and its application to avian ecology research

The evolution of commercially available video surveillance cameras and portable videocassette recorders (VCR) in the early 1990s was such that researchers could begin to adapt these systems to remote wildlife monitoring scenarios. Since that time rapid advances in digital video technologies have led to smaller, cheaper, and more energy-efficient video monitoring systems. I provide a brief overview of these advances and how they've led to a substantial increase in the use of miniature video cameras in avian productivity research. I present some specific examples of information collected using nest video cameras in the study of grassland bird nesting success such as: insights into the composition of the nest predator community and how it relates to habitat and nest location; parental behavior at the nest including feeding, nest defense, and response to weather; and how videos can reveal how unreliable visual interpretation of post-depredation nest condition may sometimes be in the determination of nest fate and predator identification.



**Kenow, Kevin₁, Michael W. Meyer₂, Steven C. Houdek₁, Luke J. Fara₁, and
Timothy J. Fox₁**

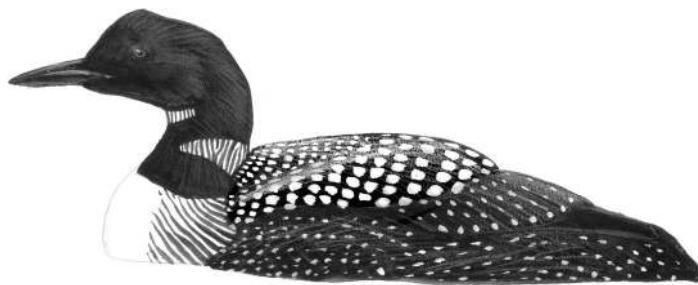
¹U.S. Geological Survey, Upper Midwest Environmental Sciences Center

²Wisconsin Department of Natural Resources

**Use of archival geolocator tags to document movements and foraging
patterns of common loons**

Common loons (*Gavia immer*) breeding in the Upper Midwest were equipped with archival geolocator tags during summers 2009–2012 to provide information on migration, wintering ground affiliations, and foraging patterns. The project was part of an effort to study the movements and foraging patterns of loons while migrating through the Great Lakes in association with a USGS study on avian botulism. Geolocator tags (Model 2500, Lotek Wireless Inc.) were attached via leg bands to 176 loons and programmed to record a light-based daily location estimate, temperature, and pressure (to provide information on dive depths). Because the data stored on geolocator tags is not transmitted, the marked loon must be recaptured to recover the tag and data. We have recaptured 99 (57%) of the geotagged loons thus far, yielding 68 tags that provided data through at least one fall migration.

Template-fit error estimates were used to filter aberrant geolocation estimates. Sea surface temperature (NASA MODIS imagery) across inland lakes, Atlantic coastal waters, and the Gulf of Mexico, coupled with diving depth information, were used to improve or obtain location estimates and timing of migration movements when geolocation estimates were unreliable. Recorded dive depths of marked loons, together with fine-resolution satellite telemetry location data, suggest that much of loon foraging activity on the Great Lakes and wintering areas occurred along the bottom at depths of up to 45 m and usually well offshore. Movement and foraging results contribute to understanding potential routes of exposure to botulism toxin in the Great Lakes and contaminants while on wintering grounds.



La Puma, David

Leica Sport Optics, Birding & Nature Markets Product Specialist

Turning on the lights to nocturnal migration: the power of Doppler radar for ornithological research

Each year billions of birds migrate over the U.S. between their breeding grounds to the north, and wintering grounds to the south. Studying bird migration poses many obstacles to wildlife researchers due to its ephemeral nature, dependence on uncertain atmospheric conditions, spatial heterogeneity, and occurrence primarily under the cover of darkness. These factors tend to limit our ability to sample migration with enough spatial and temporal replication to understand the phenomena at the scale which it occurs. With the proper corrections, though, freely available Doppler radar can be used to answer questions of migrant stopover habitat usage and migration behavior. This presentation will cover recent developments in radar data processing for biological research, and demonstrate how radar technology can "turn on the lights" during nocturnal migration and provide researchers with information to quantify stopover habitat and to predict bird movements based on weather conditions.



David Brinker¹, La Puma, David², Michael Lanzone³, and Scott Weidensaul⁴

¹Maryland Department of Natural Resources

²Leica Sport Optics, Birding & Nature Markets Product Specialist

³Cellular Tracking Technologies

⁴Ned Smith Center for Nature and Art

Breakthroughs in wildlife tracking technology: Project SNOWstorm and the snowy owl irruption of 2013/2014

Wildlife ecologists frequently attempt to answer questions about animal behavior using proxies for behavioral actions. Home ranges and foraging locations are estimated using points collected either through direct observation or some form of remote data collection (telemetry, satellite tags, etc.). All of these methods are limited, either logistically or technologically, resulting in high-resolution data at small spatial scales, or low-resolution data at broad scales. These limitations impact our ability to generalize findings within a species, or to make inferences across large landscapes and similar species. In recent years, advances in GSM/GPS transmitters have made it possible to deduce more than just presence/absence information from tracking data. In fact, the high spatial and temporal resolution of these transmitters, along with the addition of biometric sensors, allows researchers to directly test hypotheses of animal behavior in near-real-time from anywhere on earth.

In this presentation David La Puma will provide an overview of these new Cellular Tracking devices and demonstrate their use in Project SNOWstorm, a research project aimed to take advantage of the Snowy Owl irruption of 2013/2014. This project asks several questions about Snowy Owl behavior such as: What level of migration activity are these birds exhibiting during winter months? Are these birds more typically nocturnal or diurnal hunters? How do these birds use available food resources in a region atypical of their winter range? David will present some of the preliminary results of this ongoing research to illustrate how this emerging technology is changing our ability to answer important questions about wildlife behavior.



Latimer, C.E. and B. Zuckerberg

University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

Monitoring the individual foraging behavior of birds using RFID: new applications of an old technology

Cold-adapted birds of the northern hemisphere must carefully balance their needs for energy while foraging in risky environments during a time of year when energy demands are high and resources are limited. A number of studies have focused on biotic and abiotic factors that influence foraging behaviors and survival of birds in winter; however, a major limitation of these studies is the inability to monitor the individual behavior of wild birds within and across winter seasons. Because selective pressures act upon individuals, understanding the mechanisms that motivate differences in individual behaviors is especially important for understanding how organisms and populations will respond to environmental change. Here, we present a novel application of Radio-Frequency Identification (RFID) to monitor the foraging behavior of individual wintering birds inhabiting a diversity of forest patches.



Martell, Mark₁, Scott Mehus₂, and Kristin Hall₁

₁Audubon Minnesota

₂National Eagle Center

An important wintering population of Golden Eagles in southwestern Wisconsin and southeastern Minnesota

Golden Eagles do not breed in the upper Midwest but are known to winter in the region. We are studying a wintering population of Golden Eagles that extends from southwestern Wisconsin and southeastern Minnesota into Illinois and Iowa. Annual, single-day surveys have been conducted in mid-January for the past nine years and indicate that this population regularly exceeds 100 individuals. In all years of the survey adults outnumbered immature birds and more birds were counted in Wisconsin than in other states. We are using satellite telemetry to track individual Golden Eagles wintering in this area to determine the birds' winter habitat use, home range, breeding origins and migratory routes. Five transmitters have been deployed; two on rehabilitated and released Golden Eagles, and three on wild trapped birds. Tracking results indicate that this Midwestern wintering population originates from the eastern Canadian breeding population and their summer ranges extend from the eastern Northwest Territories to the Labrador Sea. Our tracking also shows a fidelity to wintering as well as summer areas. As we understand more about the habitat use and migration patterns of this bird we are coming to realize the vital role that Minnesota and Wisconsin play in the life cycle of the eastern population of the Golden Eagle. In the same way that we rely upon, and expect, effective conservation of the neo-tropical migrants that winter in Latin America, so too are we expected to understand, conserve and protect wintering habitat for these eagles that breed to our north.



Prestby, Thomas B.₁ and Nicholas Anich₂

₁University of Wisconsin-Green Bay, Department of Natural & Applied Sciences

₂Wisconsin Department of Natural Resources, Bureau of Science Services

Introduction to eBird: how can one million Wisconsin bird observations per year help managers and scientists?

In 2013, over 1 million bird observations were reported to Wisconsin eBird, a free online bird database. Birdwatchers submit their bird observations to the website (www.ebird.org) and are able to use the online tools for record-keeping and visualization while contributing to an increasingly massive pooled database. This database holds great potential for use by managers and scientists. We introduce eBird to those not familiar with it, and discuss potential applications for resource professionals such as identifying bird species present on a property, learning about typical dates of occurrence, and gathering observations of species of concern. We explain how bar charts, maps, graphs, and other online tools can be used to view the data, and provide examples of analyses from downloaded datasets. Due to a very active user-base in Wisconsin, wildlife professionals should be aware of the many possible applications of this data.

eBird

Ward, Michael

Illinois Department of Natural Resources and Environmental Sciences
University of Illinois at Urbana-Champaign, Illinois Natural History Survey

Using automated telemetry to spy on the nightlife of warblers in the Midwest and the migratory pathways of thrushes crossing the Gulf of Mexico

Although birds are well-studied taxa, there remain many unanswered questions that require novel research approaches. We are using automated radio telemetry systems (ARTS) to monitor many different species of birds for several different questions. One study, which was initially investigating the home range use of Yellow-breasted Chats, changed its focus once the ARTS detected both male and female chats moving at night. We found that females tended to leave their mates' territories at night, but only when fertile. Male chats tended to be active at night, and only leave their territory when their female was not fertile. We suggest that the nightlife of chats is associated with extra-pair copulations. Using the exact same system but moving it from Illinois to the Yucatan Peninsula of Mexico, we radio-tagged several species of Neotropical migrants in Alabama and tracked them as they left Alabama to determine if they migrate through the Yucatan. Over the course of four years we have detected between 0% and 40% of individuals using the Yucatan in any given year. The data we are collecting will greatly enhance our understanding of how birds migrate across large geographic features. Using the same system in Illinois, we tracked the movement of pheasants and pheasant hunters in early winter. With these tracking data, we are investigating if pheasants and pheasant hunters change their behavior through the hunting season, and whether male and female pheasants differ in their behavior given the different threat hunting poses to each sex.



Abstracts - General Sessions

(alphabetical by presenter's last name)

Alberg, Chad Q. and James A. Tharman

USDA Wildlife Services

Wildlife hazard management to protect aviation safety in northern Wisconsin

Aircraft collisions with wildlife have long been a serious concern of Federal, state, and local aviation managers. However, the well-publicized “miracle on the Hudson,” the emergency landing of US Airways Flight 1549 on the Hudson River in 2009 after complete engine failure caused by ingestion of Canada geese, brought wildlife hazard concerns to the forefront. Aircraft-wildlife collisions (strikes) have been increasing in the United States in part due to steadily increasing populations of potentially hazardous species such as resident Canada geese, turkey vultures, bald eagles, double-crested cormorants, sandhill cranes, some species of gulls, and white-tailed deer. At the same time air traffic also has been increasing. In 2012, 10,726 wildlife strikes were reported to the National Wildlife Strike Database (NWSD). According to the NWSD, 675 wildlife strikes, as well as \$445,665 worth of damage to aircraft caused by strikes, were reported from Wisconsin from 2008-2013. Wildlife strikes in Wisconsin occur at both certificated airports (those that have commercial passenger service) as well as smaller general aviation airports. Airports in northern Wisconsin are often located in areas where wildlife habitat and populations are abundant. The mitigation of wildlife hazards can be particularly challenging for airport managers in the north. The United States Department of Agriculture-Wildlife Services (USDA-WS) program works closely with northern Wisconsin airports to assess wildlife hazards present at an airport and to develop risk mitigation plans. This is an overview of wildlife hazard management projects conducted by USDA-WS at certificated and general aviation airports in northern Wisconsin.



Anhalt, Christine₁, Tricia Knoot₁, Karl Martin₁, A. Rissman₂, and A. Sharp₁

₁Wisconsin Department of Natural Resources, Wildlife & Forestry Research Section

₂University of Wisconsin-Madison

Addressing disturbance and environmental change: perspectives from managers in the Upper Midwest

Traditional approaches to managing ecological systems assume an underlying natural equilibrium state. However, changes in environmental conditions, coupled with human disturbance, necessitate a need to manage natural resources for change, rather than for stationarity. We utilized a mixed-methods approach to better understand the capacity of land managers to address environmental disturbance and change and to identify opportunities that exist to remove barriers and support managers in addressing emerging issues. We delivered a survey to 348 federal, state, and tribal land managers in the Upper Midwest, with an adjusted response rate of 68.8%, and completed interviews with 29 state agency managers. We found that most managers have already noticed an increased spread of invasive plants or trees, an increased spread of tree pests and diseases, and more frequent or severe drought, and also noted a high likelihood for further impacts in the next 25 years. Managers anticipate devoting greater effort to managing the spread of invasive species and tree pests and diseases, compared to managing for other expected disturbances. Respondents also noted that other work responsibilities, in addition to availability of resources (e.g. staff time, funds, equipment), are considered to be most limiting in addressing these emerging issues.



**Blank, Peter J.₁, Carol L. Williams₂, David W. Sample₃, Timothy D. Meehan₄,
and Monica G. Turner₁**

¹University of Wisconsin-Madison, Department of Zoology

²University of Wisconsin-Madison, Department of Agronomy

³Wisconsin Department of Natural Resources

⁴University of Wisconsin-Madison, Department of Entomology

Alternative scenarios of increased bioenergy production in southern Wisconsin and implications for bird communities

Demand for bioenergy is increasing in the United States, and increased allocation of agricultural lands to bioenergy crops would alter current landscape patterns. Understanding the consequences of alternative land-use patterns would provide guidance for optimizing multiple benefits, and scenarios offer a means to explore such alternatives. We developed spatially-explicit scenarios of increased bioenergy production in an 80-km radius landscape centered on a potential biomass processing plant in southern Wisconsin, and evaluated the consequences of each scenario for bird communities. We varied the percent of land cover type conversion (10%, 20%, or 30%), grassland bioenergy crop types (grass monocultures, grass-dominated fields, or forb-dominated fields), and the spatial aggregation of bioenergy crop fields (random, clustered near similar field types, or closest to the processing plant), yielding 36 scenarios. Effects on bird species richness, total bird density, and the density of Species of Greatest Conservation Need [SGCN] were evaluated using empirical relationships. Bird population metrics consistently increased with the amount of bioenergy grasslands in the landscape. Spatial aggregation was important; clustering bioenergy crops closer to similar field types resulted in greater increases in bird metrics. Certain bioenergy landscape designs had greater positive influences on the bird community. For example, a 30% conversion of current rowcrops to grass-dominated bioenergy crop fields clustered near other grasslands increased SGCN density in the study landscape by 137%. This study indicates that increasing bioenergy grasslands would benefit grassland bird populations, and that bioenergy landscapes can be designed strategically to maximize biodiversity benefits while meeting targets for biomass production.



Broadway, Matthew S.₁, Jason Riddle₁, Scott Hull₂, Jacob Hernandez₁, and Aaron Thompson₁

₁University of Wisconsin-Stevens Point, College of Natural Resources

₂Wisconsin Department of Natural Resources

The effect of landscape variables on Greater Prairie-chicken lek persistence in central Wisconsin

Greater Prairie-Chickens (*Tympanuchus cupido p.*) are grassland obligate, ground displaying prairie grouse endemic to the Great Plains. Greater Prairie-Chicken breeding behaviors are fundamental to their reproductive biology and subsequent research that provides population-level inferences. For example, booming displays result in high detectability of males at breeding grounds (i.e. leks) for population size estimates. Similarly, lek locations are routinely used to build predictive habitat models as well as identify relationships between geospatial information and prairie-chicken occupancy. However, no research considers divergent trends in male lek attendance, or persistence, when examining relationships between landcover variables and lek locations. We propose that differences in landscape variables at site-relevant extents explain variations in lek persistence. Furthermore, we suggest that leks not be treated as 'equal' when analyzing relationships between geospatial information and lek occurrence. The resulting information may prove valuable in developing a strategic conservation planning model for Greater Prairie-Chickens in the state of Wisconsin.

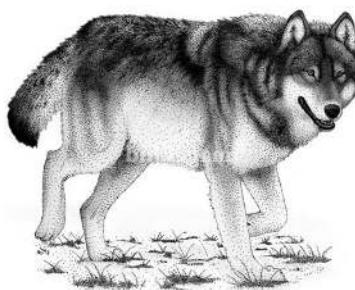


Dhuey, Brian

Wisconsin Department of Natural Resources, Forestry & Wildlife Research
Section, Wildlife Surveys & Database Manager

Gray wolf hunter/trapper attitudes, efforts, and methods in Wisconsin

Wisconsin's first modern day wolf (*Canis lupus*) harvest season occurred in 2012. A post hunt questionnaire was mailed to all adult (18 years and older) wolf license holders. Completed questionnaires were received from 80% of those contacted. One third of all those authorized to pursue wolves did not actively hunt or trap wolves. The most stated reason for not pursuing wolves was "the zone I wanted to hunt/trap closed before I could hunt/trap". Most wolf license holders (64.6%) intended to "Hunt only" when they were informed that they could pursue wolves. Those pursuing wolves by hunting only outnumbered those that trapped only by over 4:1; those that hunted only had a lower success rate than those that trapped only, 9.0% vs. 50.0% respectively. Two thirds of all active wolf pursuers "selected an area to hunt or trap because of known wolf predation on livestock, dogs, or Game". Wolf depredation was the "Primary (only) reason" or "Very important" in the decision of wolf pursuers selection of the area they hunted (68.4%). One third of active wolf pursuers hunted or trapped an area at the request of a landowner. There was no difference in the amount of interference other wolf hunters/trappers may have had on the wolf pursuers based on harvest method. Those that trapped only rated the quality of their wolf harvest season higher than those that hunted only ($p<.0001$). There was no difference ($p=.59$) between wolf harvesters and non-harvester in the likelihood to apply for another wolf license in 2013-14.



Grveles, Kim₁, Bill Mueller₂, and Sumner Matteson₁

₁Wisconsin Department of Natural Resources, Bureau of Natural Heritage Conservation

₂Western Great Lakes Bird and Bat Conservancy

Stopover habitat restoration: connecting migratory birds and people

The Wisconsin Stopover Initiative (WISI) is a partnership of many agencies and organizations working together to protect, conserve, and enhance the habitats used by birds migrating through Wisconsin's Great Lakes basins. These habitats, called "stopover" habitats, offer vital cover and food at a time in a bird's life when risk of mortality may be highest. WISI has developed education programs to promote replacing manicured lawns and ornamental shrubs with a diversity of native plants. In addition to providing stopover habitat for migratory birds, native plants sustain a diversity of wildlife and reduce or eliminate the need for chemical fertilizers and pesticides in landscaping. To illustrate the concept of stopover habitat restoration and its benefits, we will tell the story of how a golf course was transformed into the innovative Forest Beach Migratory Preserve. Discussion will also include how the recipients of our education programs –both private landowners and professional land managers -- have implemented stopover habitat restoration on their properties and in their communities.



Hardy, Michael A.₁, Scott D. Hull₂, and Benjamin Zuckerberg₁

₁University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

₂Wisconsin Department of Natural Resources, Bureau of Science Services

Distribution and population viability of prairie grouse in Wisconsin, USA

Sharp-tailed Grouse and Greater Prairie-Chickens have a long history of cultural and economic significance in the Great Lakes region. However, both species have exhibited significant long-term population declines in Wisconsin, raising concerns about the future of the state's prairie grouse. In Wisconsin, Greater Prairie-Chickens are listed as Threatened and are currently restricted to a few breeding sites in the central part of the state; Sharp-tailed Grouse are both a harvested species and a state species of Special Concern and are found chiefly in northwestern Wisconsin. Both species are open-habitat specialists that inhabit highly fragmented landscapes where patch connectivity and gene flow are thought to be limited. In 2013, researchers from the Wisconsin Department of Natural Resources and the University of Wisconsin-Madison initiated a multi-year study to assess the distribution and long-term population viability of prairie grouse under various land management and climate change scenarios. Focusing primarily on Sharp-tailed Grouse, we provide a brief overview of the objectives of the study, describe proposed methods for conducting population viability analyses, and describe our methodology for conducting occupancy surveys in the Northwest Sands Ecoregion beginning in April 2014. Results of this study will provide researchers and managers with a better understanding of the factors that influence the distribution and persistence of prairie grouse populations in Wisconsin and ultimately facilitate more effective conservation and management of the focal species.



Hess, Robert J.², Anna N. Hess¹, Beverly S. Paulan³, and Joy L.M. Hess⁴

¹Wisconsin Department of Natural Resources, Bureau of Natural Heritage Conservation

²Wisconsin Department of Natural Resources, Karner Blue Butterfly Recovery Program Coordinator

³Wisconsin Department of Natural Resources, Division of Forestry

⁴Independent Researcher, Central Sands Region

American bison and Lepidopterans: a sizable relationship in an oak savanna landscape

The native grassland communities of Central Wisconsin provide a pristine opportunity to observe Lepidopterans within nearly extinct habitat. We observed butterfly and moth populations in the Sandhill Wildlife Area bison pasture and documented significant relationships between bison disturbance and the federally endangered Karner blue butterfly. This pasture (~200 acres), where ~15 bison help to maintain the oak savanna landscape, produces the largest reported population of Karner blues in the state of Wisconsin.

Lepidopteran populations were observed in mid-Summer, 2013, and related to groundcover variables and disturbance features generated by American bison (trails, wallows, areas of mineral-soil exposure). Observed Lepidopteran populations included: the Karner blue butterfly (*Lycaeides melissa samuelis*), small white members of the Ennominae subfamily, Eastern Tailed Blue (*Cupido comyntas*), sulfurs (*Pieridae spp.*), satyrs (*Satyrinae spp.*), fritillaries (*Heliconiinae spp.*), and American Coppers (*Lycaena phlaeas*). General results indicate that wild blue lupine (the Karner blue host plant) was most likely to occur around bison wallows, or in areas of aged disturbance. Regression analyses explained variation in Lepidopteran populations (27%), Lepidopteran populations excluding Karner blues (22%), and Karner blue populations (22%), based on combinations of increasing nectar, lupine, and forb cover. Karner blue females and males were separately explained by increasing bison wallow size and number of bison chips (which were considered indicative of the recent presence of bison). Karner blue females were more likely to be present around bison wallows than other cover areas. Lupine variation was particularly well explained (77.4%) by bison wallow size, forb, grass, nectar and especially canopy cover.

We suggest that American bison activities on the landscape may reduce woody growth and improve habitat for nectar plants and especially lupine abundance, encouraging Lepidopteran population persistence. Improved management techniques could consider mimicking the steady mineral-soil disturbance that maintains low canopy and shrub cover and encourages growth of native nectar plants. This study is part of an on-going research project to help land managers focus efforts on geographic areas and underlying mechanisms to most effectively isolate habitat characteristics influential to species success.

Hiestand, Shelby J._{1,2,3}, F. Agustín Jiménez₂, and Clayton K. Nielsen₁

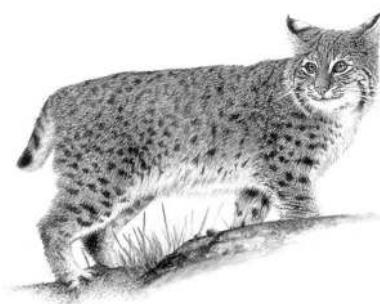
₁Southern Illinois University Cooperative Wildlife Research Laboratory

₂Southern Illinois University Department of Zoology

₃Wisconsin Department of Natural Resources

Assessment and spatial analysis of bobcat parasites in southern Illinois

Bobcats (*Lynx rufus*) are the most abundant and widely-distributed wild felid species in North America. Although many parasites found in bobcats also infect other wild and domestic animals, knowledge of bobcat parasites and potential impacts on other species has received relatively little study. Our objectives were to determine endoparasite species presence in Illinois bobcats and spatially predict potential parasite presence in southern Illinois using the program MAXENT. Necropsies were performed on 67 road-killed or trapped bobcats collected during 2003-12. We found infections of cestodes, nematodes, and trematodes including *Taenia rileyi* (70%), *Toxocara cati* (25%), and *Alaria marcianae* (42%). The highest mean abundance was found for *Alaria marcianae* (81) followed by *Taenia rileyi* (4) and *Toxocara cati* (3). *Alaria marcianae* had the highest intensity (193) with a range of 1-2872. Parasite presence data were then used with environmental data layers of water, soil, land cover, human density, and climate variables in MAXENT to create maps of potential presence of 3 parasite species in a 46,436-km² portion of southern Illinois. Precipitation of seasonality and average precipitation were the highest contributing variables used by MAXENT when creating probability maps of *Taenia rileyi* (55.1%) and *Alaria marcianae* (58.4%). For *Toxocara cati* land cover (40.6%) and soil (27.6%) were the highest contributing variables. Larger percentage areas of potential presence were found for generalist parasites such as *Taenia rileyi* (85%) while a more selective potential presence was indicated for parasites with complex life cycles such as *Alaria marcianae* (73%). My study provides information to wildlife biologists and health officials regarding the potential impacts of growing bobcat populations in combination with complex and changing environmental factors.



Horton, Jo

Wisconsin Department of Natural Resources, Bureau of Science Services

Land cover mapping of the Glacial Habitat Restoration Area using satellite image classification

Remote sensing allows for large areas to be mapped for land cover accurately and efficiently, which is a need in the Glacial Habitat Restoration Area (GHRA), a program which covers 558,902 acres (2,262-km²) in east-central Wisconsin. The land cover of 1,570,626 acres (6,356 km²) in and around the GHRA was classified using data from Landsat 7 ETM+ images for 6 dates between April and September, 2012. The classification used a 60-band multi-temporal stacked image and a total of 2,543 reference sites to create a consolidated 8-class land cover map. This map was then compared to a 1990 land cover map of the area to evaluate landscape composition of target habitat types as well as landscape-scale changes in vegetation composition. Understanding the landscape-scale shifts in vegetation across this area as well as trends in conservation program land cover can help guide grassland conservation throughout the region in the future.



Knoot, Tricia₁, J. Nuñez₂, M. Rickenbach₂, A. Koshollek₃, J. Greenberg₄, C. Nielsen₁, J. Simoni₂, H. Schnitzler₅, and S. Swenson₂

¹Wisconsin Department of Natural Resources

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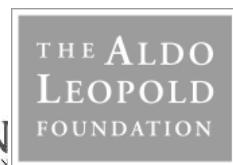
³Aldo Leopold Foundation

⁴American Forest Foundation

⁵Arington Tree Farm

Can we improve our ability to encourage active land stewardship on private lands in Wisconsin?

Of the roughly 17 million acres of forestland in Wisconsin, over half are owned by private woodland owners. These privately held forests provide numerous benefits to woodland owners and to the citizens of Wisconsin, such as watershed services and wildlife habitat. Consequently, sustainability of these forests relies on the land management decisions made by private woodland owners. However, natural resource agencies and organizations continually face questions about how to first reach these landowners, and more importantly how to encourage active land stewardship activities on their lands. A project in Southwestern Wisconsin, the Driftless Forest Network (DFN) project, is taking strides to directly address these challenges. In 2010, the project was initiated through collaboration from over 15 state and federal agencies and non-profit groups, including the Wisconsin DNR. The project is based in Southwestern Wisconsin ("Driftless" region), an area that is home to nearly 32,000 woodland owners. The overall goal of the project is to develop and test targeted social marketing approaches and offers that increase woodland owner engagement over time in the region. Early findings suggest that we are taking a significant step in the right direction. Through implementation of several direct mail campaigns over 11,000 woodland owners have been targeted, with roughly 1,750 woodland owners responding. The 13.6% average response rate across campaigns and offers outperforms typical direct mail campaigns that average 1-4% depending on the promotion. Additional project findings highlight the importance of targeted messaging and the importance of "knowing your audience", i.e., understanding the specific characteristics of landowners that can help determine who to reach and what types of messages may resonate with specific groups.



Martin, Mark₁, Susan Foote-Martin₁, and Dick Nikolai₂

₁Madison Audubon Society

₂Wisconsin Department of Natural Resources (retired)

Retirees helping recovery of the endangered black-footed ferrets

The winter 2013 issue of *The Wildlife Professional* contained a section “Ever Forward – How retirees Work for Wildlife” and provided examples of projects that retired wildlife biologists were involved with. Prairie Wildlife Research, a Colorado-based non-profit, coordinates an annual, intensive live-trapping program of endangered black-footed ferrets in the Conata Basin/Badlands near Wall, South Dakota. Trapped ferrets are marked and vaccinated against sylvatic plague. Mark and Sue volunteered to spotlighted ferrets in October of 2012. In October 2013, Mark and Dick spent four nights spot lighting about 600 acres of a prairie dog colony. In 2013 we recorded 20+ ferret sightings with two captures. Additionally, we also saw a variety of prairie wildlife including badgers, burrowing owls, coyotes, and swift foxes. This presentation will provide information on black-footed ferret recovery efforts, our experiences, concerns, efforts and on how others can volunteer in 2014 to trap ferrets with us. Retired wildlife biologists can be ideal volunteers as they are well-trained, experienced and typically have flexibility to commit time. For retirees present, we ask that you consider ways that you can still make a positive impact on wildlife management. For the wildlife managers present, we suggest that you make your needs known and consider retirees as potential volunteers in meeting your management objectives.



Meyer, Michael W.₁ and Kevin P. Kenow₂

₁Wisconsin Department of Natural Resources

₂U.S. Geological Survey, Upper Midwest Environmental Sciences Center

Assessing the impact of mercury contamination on the Northern Highlands common loon (*Gavia immer*) population and simulating the potential benefits of emission reductions

The ecological risk of mercury (Hg) in a Wisconsin aquatic system was assessed by quantifying common loon (*Gavia immer*) population dynamics and Hg exposure in the Northern Highlands Ecological Landscape.

Approximately 10% of the population exhibit Hg exposure associated with toxicity in the laboratory and field. The impacts are most likely to affect chick survival and nest success via reduced egg hatchability. Temporal trends in blood Hg concentrations indicate that Wisconsin loon Hg exposure declined over the period 1992-2000, and increased 2002-2010, but not to the level observed in the early 1990s. This bi-phasic pattern is similar to trends observed for concentrations of methylmercury and SO₄ in lake water of an intensely studied seepage lake within our study area. A cause-effect relationship between these independent trends is hypothesized. Wisconsin and neighboring states recently implemented Hg emission reduction rules, targeting large coal-burning power plants. We simulate how this reduction may impact loon population performance.



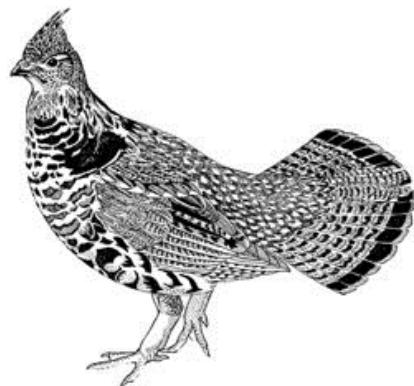
Pomara, Lars₁, Benjamin Zuckerberg₁, and Karl Martin₂

₁University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

₂Wisconsin Department of Natural Resources

Spatially explicit demographic modeling to assess the climate change vulnerability of ruffed grouse (*Bonasa umbellus*)

Adaptation to climate change requires understanding species vulnerability in terms of demographic sensitivities to climatic and other environmental factors, and exposure to variability in those factors, across full life cycles. This often takes place at broad spatial scales commensurate with the scales of climate change and the need to manage across administrative boundaries. We used spatially explicit demographic modeling to conduct an assessment of the vulnerability of Ruffed Grouse populations to climate change in the upper Midwest and Great Lakes region. Results from multiple survival and reproductive success studies were utilized to identify demographic sensitivities to several climatic and land use factors. We then used these relationships to develop demographic simulations with dynamic climate and land use from 1960 to 2012, and evaluated the resulting population dynamics by comparison to long-term monitoring datasets. Preliminary results suggest that important aspects of large-scale spatial variation in abundance, and of dynamics over time, are related to inter-annual variation in temperature and precipitation, particularly during winter. Further, models that use climate projections to forecast expected demographic change throughout the 21st century predict important changes in Ruffed Grouse distribution and dynamics. Spatially explicit demographic modeling allows us to better understand sensitivities specific to survival and fecundity, as well as spatial shifts in climatic suitability. Climate change vulnerability assessment provides a framework for linking demographic and distributional dynamics to environmental change, and can provide unique information for conservation planning.



Schwartz, Carl

Bird City Wisconsin

Bird City Wisconsin: making our communities healthy for birds... and people

The Bird City Wisconsin program is entering its fourth year and continues to demonstrate strong growth. It remains focused on *making communities healthier for birds... and people* and features a strong emphasis on community partnerships. It has recognized 76 communities, and the latest three demonstrate the program's breadth of appeal: Janesville, the state's 10th largest city; Prairie du Chien, population 5,911, and Ferryville, with 176 residents. Eight of the state's ten largest cities are now recognized by BCW, which presented awards to 16 new communities in 2013. The program draws major support from the Bird Protection Fund of the Natural Resources Foundation of Wisconsin. It also profits from a strong relationship with the DNR's Urban Forestry Division and Bureau of Wildlife Management. Representatives of all 76 communities are being invited to a special Bird City Summit that is the focus of the 2014 annual meeting of the Wisconsin Bird Conservation Initiative March 21-22 in Oshkosh. Participants will hear from experts and be invited to share best practices with each other as well as communities seeking future recognition. Kent Hall, a BCW steering committee member and vice president of the Bluebird Restoration Association, says: "The BCW initiative has done more to awaken municipal officials to the importance of bird conservation than any program I have been associated with in my 44 years in Wisconsin." This fresh presentation to WCTWS would focus on new healthy-community initiatives fostered by BCW and collaborative partnerships it has generated, resulting in:

- Improved habitat conditions for breeding and migrating birds.
- Sound management of urban forests.
- Reductions in bird fatalities caused by domestic cats allowed to roam outdoors, and by window strikes.
- Active and coordinated engagement in conservation activities.
- A strong sense of community pride in conservation accomplishments.



Stenglein, Jennifer₁, Tim Van Deelen₁, Dennis Heisey₂, and Adrian Wydeven₃

₁University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

₂U.S. Geological Survey, National Wildlife Health Institute

₃Wisconsin Department of Natural Resources

Survival of Wisconsin's gray wolves, 1979-2012

Since the 1970s, Wisconsin's gray wolf population has increased from a handful of individuals to more than 800 wolves. During this time, the population expanded their range, increased in density, and became a harvest population. Concurrently, WDNR has radio-collared and tracked > 450 wolves. We use this radio-collared wolf dataset and a hierarchical Bayesian modeling approach to understand patterns in wolf survival, as well as to estimate a rate of mortality-associated loss-to-follow-up in the dataset. We provide important baseline estimates of wolf survival in Wisconsin that vary through time and are informed by landscape variables. Our understanding of harvest mortality compensating for some amount of natural mortality requires a thorough understanding of mortality patterns prior to harvest.



Strom, Sean₁, Mike W. Meyer₂, and Steve P. Easterly₃

₁Wisconsin Department of Natural Resources, Appleton WI

₂Wisconsin Department of Natural Resources, Rhinelander WI

₃Wisconsin Department of Natural Resources, Oshkosh WI

Recovery of a contaminant-impacted Great Lakes bald eagle population

Bald eagle populations in Wisconsin were severely impaired for decades as a result of exposure to organochlorine chemicals. The decline in eagle numbers was especially apparent along the Lower Fox River and Green Bay/Lake Michigan shoreline where eagles were essentially extirpated by the 1970s. The purpose of this project was to document the recovery of bald eagle populations along the Lower Fox River and Green Bay/Lake Michigan study areas and examine the relationship between increased eagle productivity and decreased contaminant levels in eaglet plasma. The number of nesting pairs on the Wisconsin Green Bay/Lake Michigan shore increased to 4 in 1993, then 14 by 2002, and 20 in 2012. Reproduction improved from complete nest failure in 1993 to 27% nest success in 2002 and 65% nest success in 2012. Temporal trends in eagle plasma contaminant concentrations indicate the increase in the number of nesting bald eagles coincided with a decrease in PCBs and organochlorine pesticides, especially in the Lower Fox River population. The decrease in levels of contaminants in eaglets from the Lower Fox River is especially apparent along the areas of the river that have been remediated – indicating that bald eagles can be a useful and reliable indicator of environmental change. Improved reproductive performance of this population is most closely related to a reduction in DDE exposure over the past decade.

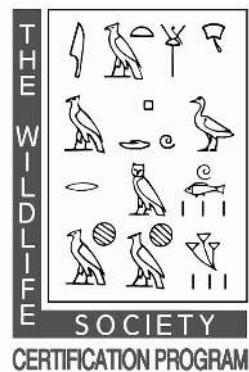


Van Deelen, Timothy R.

University of Wisconsin-Madison, Department of Forest & Wildlife Ecology

**Professionalism, praxis, and The Wildlife Society's Certification Program:
why you should care**

Wildlifers are custodians of a vitally important legacy of practical, ethical, and aesthetic competencies that are vital to the mission of wildlife conservation. Collectively, those competencies make up our profession and our professional society has organized its certification program to recognize, to a greater or lesser extent, thresholds for training and experience that serve as professional standards. Unfortunately, our profession is under siege and I will argue that we need to buttress our professionalism in order to keep the cause of wildlife conservation vital. I will make my argument in terms of the elements of The Wildlife Society's certification program, Leopold's Land Ethic, and the North American Model of Wildlife Conservation. My talk will include nuts and bolts advice on applying for certification and ivory-tower calls to arms of behalf of professional wildlife management.



Watt, Michael and Keith Warnke

Wisconsin Department of Natural Resources, Bureau of Law Enforcement

A closer look at hunter numbers in Wisconsin and nationally. Did hunter numbers increase in 2011?

Both the National Survey of Hunting, Fishing, and Wildlife-Associated Recreation (National Survey) and the Federal Aid certified paid license holders showed increases in the number of hunters in 2011. The National Survey reported that Wisconsin resident hunters increased 17% between 2006 and 2011. In contrast actual license buyers in Wisconsin, the people who provide real dollars for wildlife management, declined by about the one-half percent between 2006 and 2011. And, recent demographic work suggests that resident hunter numbers there will decline by more than 25% in the next 17 years. Since estimates from surveys can be affected by methodology, terminology, sample size, and response rates we believe the state data based on actual counts should be used for projections. The surprising increases in the National survey gained creditably because reports of individual license purchasers by states (Federal Aid data) showed a 2% increase nationally between 2006 and 2011 and a 4% increase in hunter numbers from 14.4 million to 15 million between 2010 and 2011. Our examination of the increase in 2011 shows that two thirds of it was due to increases in hunter numbers in just two states (Alabama and New York). In both cases these were caused by changes that increased the number of individuals required to purchase a license, *not* an increase in number of hunters. To be proactive, state conservation agencies must have an objective outlook of hunter numbers and realize that the annual hunter census (which most states do with license databases) may be more reliable than the national survey data.



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Contact Hours

Attendance at the 2014 WCTWS Winter Meeting can count toward TWS's Professional Development Certificate and/or the Certified Wildlife Biologist Renewal Program.

The following contact hours have been calculated and approved by TWS.

Wednesday:

Plenary session:	2.5 hours
General session or symposium:	3 hours
Business meeting:	1.5 hours

Thursday:

Session A or Session B:	3 hours
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Maximum total hours for both days: **10 hours**

