

Biennial Report  
2009-2012

**Wildlife and Forestry  
Research Program**

Bureau of Science Services



Edited by Jessica Kitchell and Karl Martin  
July 2012



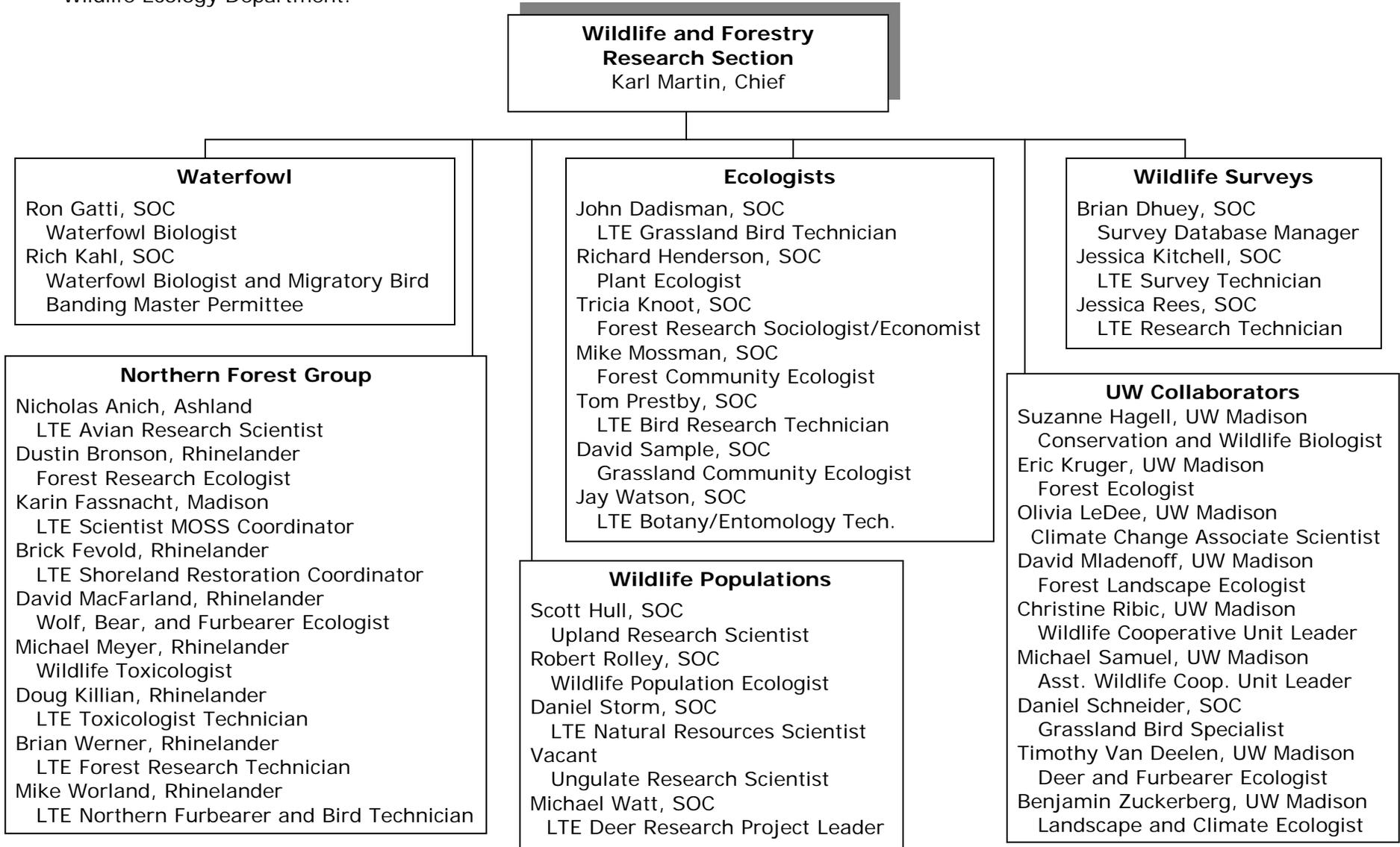
## Wildlife and Forestry Research Section

The Wildlife and Forestry Research Section provides the science foundation for programs within the WDNR's Bureaus of Wildlife Management, Endangered Resources, Watershed Management, Fisheries Management, Air Management, the Division of Forestry, and the Office of the Great Lakes. Section staff members accomplish this by conducting, sponsoring, and coordinating research on natural resource issues to solve important management problems; identifying and testing new and better ways of managing natural resources; providing scientific expertise to technical committees making management decisions, and to legislative staff; providing scientific expertise for agency policy development; providing training for forest management, waterfowl identification, deer aging, deer harvest management, furbearer management, and other topics for wildlife management, forestry, and law enforcement personnel; serving as department representatives to interagency teams; providing short-term problem solving and data analysis to address critical short-term problems; and providing scientific information to other agencies and the public. In 2012 the section added expertise to address policy and management decisions in the areas of forest social science and economics. This section also coordinates and manages the statewide wildlife surveys program and collaborates closely with the University of Wisconsin-Madison's U.S. Geological Survey Cooperative Wildlife Unit and the University of Wisconsin-Madison DNR sponsored Landscape Ecologist. Scientists also collaborate with researchers from academic institutions across the Great Lakes Region. The wildlife and forestry research section provides a balance of research on landscape-scale ecosystem projects *and* on socially and economically important species (e.g., deer, waterfowl, grouse, turkeys) and species and habitats that are rare, threatened, or endangered (e.g., eagles, wolves, American martens, old-growth forests, barrens, prairie, grasslands). A critical role of section staff is to investigate emerging issues such as climate change, deer habitat assessment, biomass, toxicology, and restoration to assist and cooperate with the management programs to address issues as they develop. Wildlife and Forestry Research Section Scientists secure significant state, federal and nongovernmental grant funding to implement and complete priority research activities and transfer information to managers, policymakers and administrators.

Section Organizational Chart .....	2
Science Consultation Services .....	3
Ecosystem, Landscape-Scale, and Forest Management Tech. Support .....	3
Wildlife Management and Biology Technical Support .....	5
Internal and External Consulting and Support .....	7
Current Research Projects .....	8
Ecosystem, Landscape-Scale, and Forest Management Research .....	8
Wildlife Management and Biology Research .....	20
2009-2012 Publications .....	34
2009-2012 Presentations .....	54
2009-2012 Publications and Presentations by UW Collaborators .....	73
Scientist and Technician Biographies .....	88

## Section Organizational Chart

The following organizational chart identifies the Wildlife and Forestry Research Section staff members located at three research stations: Science Operations Center-Madison (SOC), Northern Forest Research Unit (Rhineland), and UW-Madison Forest and Wildlife Ecology Department.



## **Science Consultation Services**

In addition to project-based research, individual staff members in the Wildlife and Forestry Research Section provide services that support programmatic functions related to routine management decisions and policy. This section highlights team participation, technical consultations, and policy development work efforts by these staff members during the past biennium. This is only a partial listing of the types of services section staff members have contributed, but provides an overview of the wide range of technical consultations provided.

### ***Ecosystem, Landscape-Scale, and Forest Management Technical Support***

- Provided scientific expertise, consultation, and data analysis for planning the reuse of the Badger Army Ammunition Plant
- Prepared scientific evaluations and white papers for specific management issues such as the impact of predators on white-tailed deer populations, baiting and feeding of deer and ecosystem management
- Led and participated, by providing the science base, on a host of department and interagency teams (over 50 teams) such as the Land Legacy project, the Ecosystem Management Planning Team, WBCI, CWCP, and Governor's Council on Forestry, Forest Research Task Force plus many others that develop policy and management actions
- Provided location and quality of remnant oak savanna and other natural areas to set priorities for the expenditure of DOT funds for the Highway 12 expansion and mitigation project
- Provided comments on forest-related portions of the National Fish, Wildlife, & Plants Climate Adaptation Strategy
- Provided technical expertise and training to UW scientists on methods to determine lens distortion calibration for use in canopy hemispherical photography
- Provided annual advice to individual field property managers on options for managing their properties based on the best available information
- Provided advice to property managers on the best way to evaluate the effectiveness of their management actions
- Provided advice to The Nature Conservancy's ecoregional planning effort, and preserve selection, design, and management
- Co-led team developing Southwestern Wisconsin Grassland Feasibility Study to develop a new land acquisition project
- Assisted in the development of plans for water level management of shallow lakes such as Beaver Dam Lake, Lake Koshkonong, Lake Puckaway, and the Winnebago Pool lakes, and provided consultation on shallow lake ecology to DNR, other agencies and private groups such as lake districts and associations
- Provided statewide assistance to the Bureau of Watershed Management in reviewing toxicological data and providing risk assessments associated with large scale aquatic herbicide treatments for invasive plant control
- Involved in reviewing pesticide residual data collected as part of several grant-funded AIS projects, and consulted with lakes and AIS staff statewide to help them understand and manage the risk associated with these projects
- Provided technical advice on the toxicity of 2,4-D treatment of the Eagle River Chain of lakes to the Eagle River Unified Lake's District and the Vilas County Land and Water Conservation Department
- Provided technical reviews of lake management applications submitted to Rhinelander Lake Management staff
- Coordinated and staffed interagency wolf monitoring team charged with developing options for a long-term monitoring plan for Wisconsin

- Provided Northern Highland/American Legion staff with consultation on how to best manage lake shoreland buffers at properties such as North Turtle and Crystal Lake Campground, Vilas County
- Provided Vilas and Oneida County lake associations with detailed recommendations on shoreland restoration practices
- Provided consultation with Bureau of Watershed Management and the Natural Resources Board on shoreland restoration best management practices (BMPs)
- Worked with landowners and the Vilas County Land and Water Conservation Department and the DATCP to maximize the benefits of the Wisconsin County Conservation Cost-Share Program
- Provided expert consultation on the ecological risk of mercury in Wisconsin to Bureau of Air Management, the Natural Resources Board, and the Secretary's office
- Served as a member of the Wisconsin Initiative on Climate Change Impacts Wildlife Group and Forestry Group, developing climate change research and management strategies for Wisconsin
- Provided technical input in the development of Lake Protection Grant Proposals for the Turtle Flambeau Flowage Lake Association and the Moon/Alma Unified Lake District
- Served on technical review team evaluating the treatment of Little St. Germain Lake with alum to control excessive phosphorous and reduced water quality
- Routinely provided presentations on lakes and lake dependent wildlife to civic and government organizations, as well as lake associations, in the Northern Highlands
- Served as a member of the Great Lakes Mercury Monitoring Network
- Provided consultation to Division of Forestry on old forest management and policy, biomass harvesting, climate change, and management issues
- Served on the Statewide Forest Assessment Team
- Served on the Continuous Forest Inventory Team
- Served on the Department's Old-growth Management and Policy Team
- Coordinated with LoonWatch, a Citizen Science Project (Northwoods Loon Protection Program), which has recruited >500 volunteers to collect biological information on lakes in northern Wisconsin
- Worked with forest and wildlife managers in northern Wisconsin on the assessment and development of new silvicultural prescriptions
- Established and managed research contracts to obtain needed information for management bureaus (e.g., solve tree nursery problems, improve forest genetics)



*Large hollow trees are a key component of old-growth forests, providing wildlife habitat and unique structural characteristics.*

## ***Wildlife Management and Biology Technical Support***

Coordinated over 60 wildlife and hunter surveys to estimate size of wildlife populations and harvest. These data are used annually to set hunting and trapping regulations, track the trend of nongame species populations, and inform the public.

Answered media contacts for population levels, forecasts of upcoming hunting and trapping seasons, and harvest of wildlife species

Attended annual furbearer and bear committee meetings and provided data and consultation to set harvest quotas for fisher, bobcat, otter, and bear

Established web based surveys to collect public comments on the status of deer herd populations, and the review of a new statewide turkey management program

Ran models to estimate the size of white-tailed deer populations in deer management units and recommended antlerless harvest quotas and permit levels for the next hunting season

Evaluated hunter densities and deer kill on public and private land to make decisions on deer management unit boundaries and overwinter deer population goals

Refined existing models and added new technology to estimate amount of deer range in the state

Developed a Deer Management Workbook describing philosophy, laws, policies, procedures, and assumptions of our deer management system and provided training sessions for wildlife managers and law enforcement officers

Provided new science information, data analyses and interpretation, and recommendations for CWD management program and evaluated the effectiveness of the CWD management program

Assisted with preparation of the amendment to the elk management plan

Prepared the annual hunting rule package

Coordinated CWD research among all scientists in the state (34 studies) to insure collaboration and focus on important problems to the department

Maintained databases of CWD sampling results, harvest, and other information for decision-making and informing the public

Reviewed scientific information and co-authored environmental impact statement (EIS) on CWD and CWD management

Ran models to estimate size of populations for bear, bobcat, fisher and otter and recommended harvest quotas and permit levels for the next hunting and/or trapping season

Provided data analysis and recommendations to set turkey harvest quotas each year

Conducted minimum population viability analyses (e.g., wolves and Butler's garter snake) to set appropriate recovery goals for endangered and threatened species

Developed models and provided field work and expertise to locate the most suitable sites for reintroduction of elk, whooping crane, and American marten

Provided advice on how to avoid incidental take for species authorized under the Endangered Species Act to allow the department to get a blanket incidental take permit for grassland management

Provided technical advice on prescribed burning and barrens management for the Karner Blue Butterfly Habitat Conservation Plan

Provided consultation and data on deer population monitoring, management, and chronic wasting disease management for the White-tailed deer Trustee's review of deer management in Wisconsin

Provided assessments on species being considered for federal listing such as Canada lynx, Cerulean warbler, Golden-winged Warbler, Poweshiek Skipperling, and some plants

Managed the Master Bird Banding Permit that allows department staff to band and mark birds for research and management activities (e.g., band ducks and geese to assess movement and survival to set hunting seasons), including distribution of bird bands supplied by U.S. Geological Survey and maintenance of databases of the status of these bands (whether

used and if so by whom, when, where, and species and age/sex of bird), summary and analysis of databases of band recoveries for wildlife management, endangered resources, and science services personnel, and provision of summaries to wildlife managers for their own interest and dissemination to the public, especially to banding volunteers and sporting groups

Represented the department at the Mississippi Flyway Council Technical Section to establish management policy and hunting season regulations

Attended Wisconsin Waterfowl Partnership Workshop and provided data and consultation to set waterfowl season regulations

Assisted with development of Wisconsin's Chronic Wasting Disease Response Plan: 2010-2025

Completed short-term problem solving, such as survival analyses and derivation of birds in the harvest to set waterfowl hunting season strategies

Participated in writing the Wisconsin Prairie Chicken Plan

Conducted national genetics workshop to determine management options for Prairie Chicken in central Wisconsin

Took the lead in reintroduction efforts to move Prairie Chickens from Minnesota to Wisconsin to restore genetic diversity

Developed start of monitoring plan for Prairie Chicken management program

Consulted on development of the CWD communication plan and development of the KnowCWD.com web site

Provided consultation and advice on the federal farm programs such as CRP to insure they benefit Wisconsin wildlife; often represented the department at national CRP planning meetings

Provided scientific expertise for Lower Wisconsin State Riverway WDNR planning and management teams, regarding birds, small mammal and herptiles.

Formed research teams to answer specific management questions (e.g., determine ways to make agriculture more beneficial to wildlife) at the request of program bureaus

Gave presentations to other agencies and legislative committees (bear hunting, beaver populations) on important department activities, and prepared results for court cases (e.g., bobcat supreme court case, treaty court case)

Assessed project proposals for the expenditure of turkey, duck, and pheasant stamp dollars

Provided consultation on the impact of low water levels on the Manitowish Chain of Lakes to sensitive wildlife species

Served on the task force to develop the beaver management plan

Conducted literature review and formed research team to evaluate impact of Botulism E on migratory waterbirds in Wisconsin

Reviewed and prepared manuscripts jointly with the National Park Service to evaluate historic trends in bald eagle contaminant data collected on the Mississippi River, St. Croix River, and Lake Superior shoreline

Participated on the Loon Watch Advisory Council, Sigurd Olson Environmental Institute, Northland College, Ashland

Served on WBCI's Important Bird Areas technical committee, reviewing potential IBAs

Served on the National Wildlife Conference Program Committee

Served as Past President and current member of the State Chapter of The Wildlife Society Executive Board

Cooperated with the U.S. Forest Service, Great Lakes Indian Fish and Wildlife Commission, Bureau of Endangered Resources, and Bureau of Wildlife Management on the supplemental stocking and monitoring of American marten in northern Wisconsin

### ***Internal and External Consulting and Support***

Designed evaluation programs and surveys to test the effectiveness of management programs  
Assisted with scientific and historical evaluations for the Badger Army Ammunition Plant, evaluated NHI data, and helped plan and conduct a biological inventory for Rapid Ecological Assessment  
Provided expert assessment for birds, small mammals and herptiles, for WICCI Wildlife Working Group  
Served on the Animal Care and Use Committee reviewing management and research projects to ensure appropriate and safe human interactions with animals and animal handling, care, and disposition in these projects  
Participated in writing Species Management Plans; most significant workload right now is in WCR  
Served on DNR Master Planning team for the Sauk Prairie Recreation Area  
Provided hundreds of records of element occurrences for Natural Heritage Inventory  
Consulted on road and transmission line development projects as to their effects on spruce grouse habitat  
Assisted Bureau of Endangered Resources search for rare bee species  
Served as science and history consultant, and co-producer, of the video documentary "Rhythm of the River"  
Served as liaison to Universities and other agency science staff to acquire needed information or expertise to address department problems  
Assisted Bureau of Endangered Resources, The Nature Conservancy, Wisconsin Academy of Sciences, and other conservation groups in selecting projects to fund  
Reviewed the Spruce Grouse Species Guidance Document for WDNR Bureau of Endangered Resources  
Reviewed applications for Scientific Collector's permits  
Assisted the IBA coordinator collect and review bird records and draft a plan for the Lower Wisconsin River Important Bird Area  
Peer-reviewed several manuscripts for scientific journals and internal WDNR documents  
Consulted and served as advisors to graduate students and participated on graduate student committees to insure university research meets the needs of the department  
Reviewed WDNR species guidance documents and status assessments for birds and small mammals, and WBCI species and habitat reports  
Communicated research findings to state and local newspapers, radio, and television media  
Chaired the Department's Transition Team  
Served as science advisor for Wisconsin Frog and Toad Survey  
Co-advised graduate students and a post doctoral scientist at University of Wisconsin-Madison  
Served as adjunct professor in the Department of Forest and Wildlife Ecology at University of Wisconsin-Madison  
Served on WBCI's Southern Forest Working Group - assessing bird habitat needs, and writing and editing various summary and guidance documents  
Consulted with the U.S. Forest Service Chequamegon-Nicolet National Forest on forest management planning in relation to spruce grouse populations  
Served on the Wisconsin Chapter of The Nature Conservancy's Science Advisory Committee  
Serve on the Upper Midwest Great Lakes Landscape Conservation Cooperative Technical Team

## Current Research Projects

This section of our report highlights current research efforts by staff members working in the Wildlife and Forestry Research Section. Projects are listed in two categories: “Ecosystem and Landscape-Scale Management Research” and “Wildlife Management and Biology Research.” Brief project summaries describe each project and identify the lead scientist(s), collaborating scientists and agencies, and both internal (Wisconsin DNR) and external customer programs.

### *Ecosystem and Landscape-Scale Management Research*

#### **Carbon sequestration**

**Project description:** The objective of this study is to quantify, compare, and track carbon pools in various components of forest stands during stand development under traditional and alternative management techniques. Results of this study will provide data that can inform policy development on the use of woody biomass for energy production, where carbon gains and losses are important. Results could also potentially inform carbon policies for cap and trade systems and provide information for use in developing state-level policies for forest management that would help mitigate climate change.

**Lead scientists:** Karin Fassnacht and Dustin Bronson.

**Collaborators:** Eunice Padley (formerly DNR), Deahn DonnerWright and Ron Zalesney, USFS

**Customer programs:** WDNR Division of Forestry; Forest managers (public and private) in other Lake States, northeastern US, and parts of Canada that support northern hardwood forests.

**Project timeline:** 2010 – ongoing

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#### **Evaluation of landscape management in the Stewardship Fund’s Habitat Restoration Area Program**

**Project description:** We are evaluating the wildlife response to restoration of wetlands and grasslands within the 840-mi<sup>2</sup> Glacial Habitat Restoration Area (GHRA) in southeastern Wisconsin. We annually survey three groups of wildlife species (dabbling ducks, ring-necked pheasants, and non-game grassland birds) on and off the GHRA to quantify the benefit of their management. Study is ongoing as management proceeds towards the restoration goals.

**Lead scientist:** Ron Gatti.

**Collaborators:** Christine Ribic, Wisconsin Cooperative Wildlife Research Unit, University of Wisconsin.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources.

**Project timeline:** 1990 - ongoing

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#### **Ecology and control of purple loosestrife**

**Project description:** This study will develop and evaluate management strategies (including biological control) to control purple loosestrife. Findings from this study will document the negative effects of purple loosestrife on native vegetation and may diminish the threat purple loosestrife currently poses to the health and productivity of Wisconsin wetlands. Research

conducted on the ecology and control of purple loosestrife resulted in legislation declaring loosestrife a noxious weed, changed emphasis of purple loosestrife management from mechanical and chemical control to biological control, was instrumental in establishing the department's biological control program for purple loosestrife, and raised the consciousness of citizens regarding the threats of invasive species.

**Lead scientist:** Rich Henderson.

**Collaborators:** Brock Woods, University of Wisconsin-Extension.

**Customer programs:** WDNR Bureaus of Watershed Management and Endangered Resources.

**Project timeline:** 1986 - 2013

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### **Oak ecosystem management**

**Project description:** This study seeks to quantify and compare the results of various oak regeneration techniques to develop ecologically sound and consistently reliable recommendations for oak management in Wisconsin. The results of this study should yield practical techniques for regenerating oak trees and maintaining the oak ecosystem as a whole. We are investigating oak regeneration, understory plants, and birds at this point.

**Lead scientist:** Rich Henderson.

**Collaborators:** Dave Sample and Mike Mossman, WDNR.

**Customer programs:** WDNR Bureau of Endangered Resources and Division of Forestry.

**Project timeline:** 1996 - ongoing



*Olson Oak Woods SNA response to prescribed fire. The right half has been burned 4 times over 11 years, while the left half has remained unburned.*

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### **Analysis and implementation of population surveys and strategies for ring-necked pheasants at multiple scales in Wisconsin**

**Project description:** The six-year WDNR fish, wildlife and habitat management plan (WDNR 2007) calls for continuing to perform auditory and visual surveys of wildlife to support knowledge of wildlife trends, knowledge of wildlife responses to weather and land use changes, and models to predict population levels and set harvest quotas and permit levels. The upland wildlife program and the DNR pheasant committee have identified a number of issues with the current road-side pheasant survey. These issues merit a complete review and redesign of the statewide pheasant survey. The primary goal of this study is to initiate the development and

implementation of field methodologies that will produce statistically valid population trend estimates for ring-necked pheasants that are robust to variation in detection rates associated with changing habitat conditions and observers at multiple spatial and temporal scales.

**Lead scientist:** Scott Hull.

**Collaborators:** Dr. Jason Riddle, UW-Stevens Point.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Project timeline:** 2011 - ongoing

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**Evaluating the impact of disease, habitat management treatments, dispersal barriers and genetic diversity and inbreeding on Sharp-tailed grouse populations in the Northwest Sands Ecological Landscape**

**Project description:** The overall goal of this project is to investigate the decline in sharp-tailed grouse lek counts by evaluating the impacts of disease, ring-necked pheasant interference, habitat management, habitat connectivity and genetic diversity on local reproductive success and survival at two managed properties in the Northwest Sands Ecological Landscape.

**Lead scientists:** Scott Hull; Dr. Scott Lutz and Dr. Matthew Reetz, UW-Madison Department of Forest and Wildlife Ecology.

**Collaborators:** Dr. Brad Swanson, Central Michigan University; WDNR Northern Region Field Staff; U.S Forest Service; Friends of Crex Meadows; Friends of Namekagon Barrens; Wisconsin Sharp-tailed Grouse Society.

**Customer programs:** WDNR Bureau of Wildlife Management and Division of Forestry; Wisconsin County Forest Association

**Project timeline:** 2010 – ongoing



*Sharp-tailed Grouse with radio-collar.*

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## Wisconsin sustainable planting and harvesting guidelines for nonforest biomass

**Project description:** The development of science-based guidelines in advance of widespread biomass planting and harvesting in Wisconsin is intended to help ensure sustainability of and, whenever possible, benefit the natural resources of the state. These voluntary guidelines may be used in making policy, land management, research and natural resources decisions and will help make informed decisions for bioenergy production on both public and private lands throughout Wisconsin. The Guidelines provide general guidance for site and crop selection and more specific management guidelines for biomass projects within the categories: perennial grasslands, non-forest tree and shrub, wetlands, and crop residue. The guidelines focus on perennial and/or diverse plantings that promote environmental benefits. The guidelines were written using current scientific knowledge and have gone through scientific review and public comment.

**Lead scientist:** Scott Hull.

**Collaborators:** Julianna Arntzen, Cathy Bleser, Alan Crossley, Eric Lobner, Dave Sample and Julie Widholm (WDNR); Dr. Randy Jackson, Gary Radloff, Dr. Steve Ventura and Dr. Carol Williams (UW-Madison); Laura Paine, Jim Vandenbrook, and Sara Walling (WDATEP); Dr. Christine Ribic (USGS and UW-Madison).

**Customer programs:** WDNR Land, Water, and Forestry Division's; Wisconsin legislators; Wisconsin farmers/producers; Wisconsin extension educators; Wisconsin land managers; Wisconsin energy producers/users; U.S. Departments of Agriculture and Forestry; Wisconsin Bioenergy Council.

**Project timeline:** 2009 – 2011



*Types of nonforest biomass.*

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## Oak regeneration and policy: a multi-state investigation of the Driftless Area

**Project description:** We are evaluating regional variations in forest change, and specifically the dominance of oak species, across the Driftless Area of Midwest and relative importance of various ecological, social, and economic factors on oak regeneration. Our integrated research approach includes a quantitative evaluation of long-term forest inventory data, identification and spatial analysis of limiting factors of oak regeneration through social surveys with regional land managers and foresters, and qualitative assessment of policy design and administration in the context of oak management and regeneration success. Findings from this project will help identify key opportunities for building upon existing policies and programs to encourage successful oak regeneration across the region.

**Lead scientists:** Tricia Knoot.

**Collaborators:** John Tyndall and Lisa Schulte Moore, Iowa State University; Lynne Westphal, Mark Nelson, Charles Perry, and Brian Palik, US Forest Service; Eli Sagor, University of Minnesota.

**Customer programs:** WDNR Division of Forestry

**Project timeline:** 2010-ongoing

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### **An assessment of the vulnerability and adaptation strategies of Wisconsin's wildlife to climate change**

**Project description:** The goal of this project is to develop risk assessments and white papers for the impact of global climate change on Wisconsin's wildlife resources as part of the Wisconsin Initiative on Climate Change Impacts (WICCI). WICCI is a collaboration between scientists at the University of Wisconsin campuses and the Wisconsin DNR to prepare for the impacts of climate change in Wisconsin. The goal of the WICCI Wildlife Working Group is to collaboratively synthesize existing climate research as it pertains to Wisconsin, set priorities for research, and generate management strategies to address future climate change impacts utilizing applied research, modeling, and adaptive management. The initial project of the WICCI Wildlife Working Group will be to synthesize information on the direct and indirect impacts of climate change on Wisconsin's wildlife resources that are likely to occur over the next 1, 5, 10, 20, 50, 100, and 200 years.

**Lead scientists:** Karl J. Martin, Mike W. Meyer, and David W. Sample.

**Collaborators:** Dr. Christine Ribic, Wisconsin Cooperative Wildlife Research Unit; Drs. William Karasov and Tim Van Deelen University of Wisconsin U.S. Geological Survey and U.S. Fish and Wildlife Service.

**Customer programs:** WDNR Bureaus of Endangered Resources and Wildlife Management.

**Project timeline:** 2010 - ongoing

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### **An environmental and economic assessment of forest biomass harvesting in Wisconsin**

**Project description:** We will assess the amount of available woody debris from an economic and environmental aspect as well as assess the ecological role of woody debris in forested ecosystems that have recently been harvested. The goal of this research is to provide policymakers, resource managers, energy companies, and the forest industry valuable information about ecological and economic factors associated with forest biomass harvesting. We will provide a volume estimate of woody debris and assess the role of coarse woody debris in our forested ecosystems.

**Lead scientist:** Karl Martin.

**Collaborators:** Drs. Baishali Bakshi, University of Minnesota; Tracy Rittenhouse, University of Connecticut; David MacFarland, WDNR; Timothy Van Deelen, University of Wisconsin-Madison.

**Customer program:** WDNR Division of Forestry.

**Project timeline:** 2009 - 2012

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## Managed old-growth silvicultural study (MOSS)

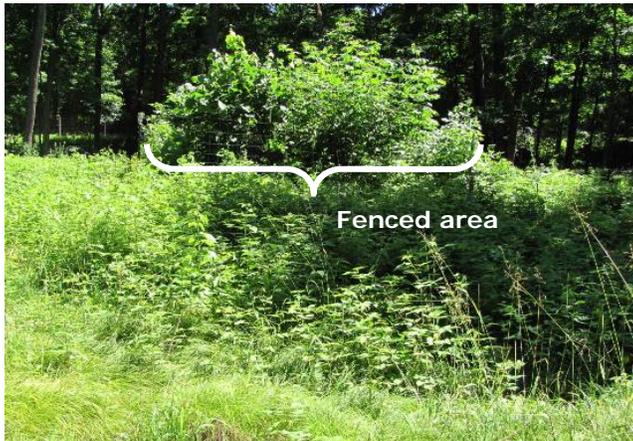
**Project description:** The objective of the Managed Old-growth Silvicultural Study is to investigate the use of novel silvicultural prescriptions to accelerate the development of old-growth characteristics in second-growth northern hardwood forests while still allowing for some timber extraction. Research associated with MOSS is being conducted in multiple focus areas including silviculture, wildlife, and economics. Results from this research will provide managers with sound quantitative information on these new silvicultural prescriptions. If they produce the desired results (i.e., characteristics associated with old-growth habitat, some timber extraction), these prescriptions will be an important management option for land managers in northern Wisconsin.

**Lead scientists:** Karl Martin, Karin Fassnacht, and Dustin Bronson.

**Collaborators:** Tricia Knoot, WDNR; Tom Steele and Craig Lorimer, University of Wisconsin; Brian Palik and Eunice Padley, US Forest Service; Tony D'Amato, University of Minnesota.

**Customer programs:** WDNR Division of Forestry.

**Project timeline:** 2001 - 2057



*Regeneration in a deer enclosure within a scarified 80-ft gap, Northern Highland-American Legion State Forest.*

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## Managing for old-growth attributes: Harvesting productivity and costs associated with restorative silvicultural practices

**Project description:** As part of the Managed Old-growth Silvicultural Study (MOSS), we are investigating the harvesting productivity and costs that are associated with restorative silvicultural practices as compared to more conventional practices in northern hardwood forests. We will also determine the potential impact of using the innovative restorative silvicultural practices on regional timber supply and stumpage revenues. Findings from the forest economics/forest operations research component of the MOSS project will contribute to broader understanding of impact of these alternative silvicultural practices on ecosystem services and trade-offs.

**Lead scientists:** Karl Martin, Karin Fassnacht, Tricia Knoot, and Dustin Bronson.

**Collaborators:** Tom Steele and Craig Lorimer, University of Wisconsin; Brian Palik and Eunice Padley, US Forest Service; Tony D'Amato, University of Minnesota.

**Customer programs:** WDNR Division of Forestry.

**Project timeline:** 2001 - ongoing

## **Ashland/Chequamegon Bay Shoreland Restoration Project 2010-2012**

**Project description:** WDNR Science Services received a \$223K grant from the USEPA Great Lakes Research Initiative in 2010 to conduct a 4100' shoreland restoration project on Chequamegon Bay in the City of Ashland. Projects are ongoing in Memorial and Bayview Parks where invasive species have been removed and native trees, shrubs, and groundcover has been planted. Restoration work is scheduled for completion December 2012 and biotic surveys to measure habitat quality and wildlife response to the restorations will continue through 2022. This project will provide guidance to efforts to restore degraded shorelines on the southern shore of Lake Superior.

**Lead scientists:** Michael W. Meyer and Brick M. Fevold.

**Collaborators:** City of Ashland; Ashland County; Northland College; and UW-Extension.

**Customer programs:** WDNR Bureaus of Watershed Management, Wildlife Management, Endangered Resources, and WDNR Office of the Great Lakes.

**Project timeline:** 2010 – 2020

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## **Assessing the potential population effects of Botulism E toxin and Gulf oil exposure on migrating Wisconsin waterbirds**

**Project description:** WDNR Science Services received \$25K grant from the Great Lakes Fish and Wildlife Recovery Initiative to co-investigate (WDNR WM and Science Services) the impact of Type E botulism (BotE) on migrating waterbirds in Wisconsin. Funds are used to survey for dead birds along the Lake Michigan shoreline in the autumn as well as to document the annual return rates of color-banded common loons which are at risk to the toxicity. WDNR collaborated with USGS UMESC La Crosse to place 13 satellite transmitters and 78 geolocators on adult loons breeding in Wisconsin. The goal is to identify migration routes, foraging patterns in the Great Lakes, and wintering areas in the Gulf of Mexico and Atlantic Coasts. This data will be used to evaluate the proportion of WI loons using regions of Lake Michigan impacted by Botulism E as well as Gulf of Mexico coastal areas impacted by the 2010 BP oil spill.

**Lead scientists:** Michael W. Meyer and Sean Strom.

**Collaborators:** Kevin Kenow, USGS UMESC, La Crosse.

**Customer programs:** WDNR Bureaus of Fisheries Management, Watershed Management, Wildlife Management, Endangered Resources, and WDNR Office of the Great Lakes.

**Project timeline:** 2007 – 2014



*Satellite transmitters allow WDNR and USGS researchers to track loons during migration and on the wintering grounds.*

### **Develop Wisconsin Wildlife Mercury monitoring plan and promote Wisconsin as a National Mercury Monitoring site**

**Project description:** Federal legislation has been proposed to develop a national mercury monitoring network (MERCNet). In this project we develop a long-term mercury monitoring plan for wildlife in Wisconsin by synthesizing existing data (1990 – 2012) with new data generated by analysis of archived loon and eagle tissues. We are working with scientists from other agencies to promote Wisconsin as a potential long-term mercury monitoring site under pending federal legislation to create a national mercury monitoring network.

**Lead scientist:** Michael W. Meyer.

**Collaborators:** Bill Route, NPS Ashland; James Wiener, UW La Crosse; Kevin P. Kenow, USGS La Crosse; David Evers, Biodiversity Research Institute, Gorham, ME.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Project timeline:** 1992 - ongoing

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### **Evaluate the impact of legacy polychlorinated bioaccumulating toxic substances (PCBs, DDE, PBDE, PFOS, PFOA) on Wisconsin's Great Lakes bald eagle population - Wisconsin Bald Eagle Biosentinel Project**

**Project description:** WDNR Science Services initiated the Wisconsin Bald Eagle Biosentinel Program in 1990, and has since tracked the dramatic increase in abundance and productivity of Wisconsin's Great Lakes population, as well as the concurrent decline in exposure to toxic substances such as PCBs and DDT. This eagle population was seriously impacted by contaminant exposure in the 1960's and 1970's when the Wisconsin Great Lakes population declined to fewer than 10 breeding pair. The number now exceeds 50 breeding pair, and contaminant exposure levels, primarily PCBs and DDE, have declined dramatically.

**Lead scientist:** Michael W. Meyer.

**Collaborators:** Sean Strom and Steve Easterly, WDNR; Matthew Stuber, USFWS East Lansing; Bill Route, NPS Ashland.

**Customer programs:** WDNR Bureaus of Watershed Management, Wildlife Management, Endangered Resources, and WDNR Office of the Great Lakes.

**Project timeline:** 1990 - ongoing



*USFWS Raptor Biologist Matt Stuber "collecting" a bald eagle nestling for contaminant sampling.*

### **Evaluating the risk to native fisheries of the use of liquid herbicides (2,4-D) to control Eurasian Watermilfoil in Wisconsin lakes**

**Project description:** WDNR Science Services assisted in the development of a \$100K Wisconsin Aquatic Invasive Species grant to evaluate the impact of liquid herbicides to control Eurasian Watermilfoil in Wisconsin lakes. WDNR Science Services serves as science liaison between WDNR and UW as the grant is implemented. Dosing experiments are being conducted at UW Water Sciences by Ph.D candidate Zachery DeQuatro, under the guidance of Dr. William Karasov, UW-Forestry and Wildlife Ecology, to evaluate the impact of ecologically relevant concentrations of liquid 2,4-D herbicide on fathead minnow reproduction, a native forage fish found throughout Wisconsin. Results will help guide permit criteria for the application of these herbicides in Wisconsin lakes.

**Lead scientist:** Michael W. Meyer.

**Collaborators:** Zachary deQuatro and William Karasov, Department of Forestry and Wildlife Ecology, UW-Madison; Tim Asplund and Kevin Gauthier, WDNR.

**Customer programs:** WDNR Bureaus of Fisheries Management and Watershed Management.

**Project timeline:** 2011 - 2013

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### **Potential effects of climate change on inland glacial lakes and implications for lake-dependent biota in Wisconsin**

**Project description:** WDNR Science Services received a \$100K grant from the Focus on Energy EERD program to assess the potential impacts of climate change on lakes and lake-dependent wildlife in northern Wisconsin. The common loon (*Gavia immer*) was chosen to serve as a sentinel lake-dependent piscivorous species to be used in the development of a template for linking primary lake-dependent biota endpoints (e.g., decline in productivity and/or breeding range contraction) to important lake quality indicators. In the current project, we evaluate how changes in freshwater habitat quality (specifically lake clarity) may impact common loon lake occupancy in Wisconsin. The methods employed here provide a template for studies where integration of physical and biotic models is used to project future conditions under various climate change scenarios.

**Lead scientists:** Michael W. Meyer, Paul Rasmussen, and Paul Garrison.

**Collaborators:** John Walker and Randy Hunt, USGS Water Center, Madison; Kevin Kenow, USGS UMESC La Crosse; Paul Hanson, Center of Limnology, UW-Madison.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Project timeline:** 2008 - 2012

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### **Measure the value of wildlife habitat restoration on northern Wisconsin Lakes: The Wisconsin Shoreland Restoration Project**

**Project description:** This study quantifies the ecological benefits of shoreland habitat conservation and restoration by measuring aquatic ecosystem health (via biotic surveys) before, during, and after conservation and restoration activities on five developed lakes in northcentral Wisconsin. Projects restore and conserve native vegetation within the shoreland riparian buffer and littoral zone of private and public properties participating in the project, and biologists quantify the benefits of restoration activities by conducting habitat and plant and

animal species surveys at reference, control, and treatment lakes before restoration occurs and in subsequent years. Findings will support revisions to NR115 Shoreland Management Rules.

**Lead scientist:** Michael W. Meyer.

**Collaborators:** Dan Haskell, Dave Flaspohler, Christopher Webster, MTU Houghton; Carolyn Scholl and Marquita Sheehan, Vilas County Land and Water Conservation Department, Eagle River; Stacy Dehne, DATCP Park Falls.

**Customer programs:** WDNR Bureaus of Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources; Northern Highlands/American Legion State Forests.

**Project timeline:** 2007 – 2017



*Shoreland restoration sign at Moon Beach.*

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## Comparison of old-growth and managed forest communities

**Project description:** The goal of this project is to refine forest management strategies to maintain the biodiversity of Wisconsin's forests. I was involved in the first of two phases, which assessed if old-growth (unmanaged) forests differ from managed forests in species composition or ecological processes. This phase is completed and among other findings identified a key difference in the amount of woody debris and hemlock between harvested forests and old growth (unharvested) forests. Avian habitat relationships are being compared between different stand types (managed, unmanaged, and old-growth).

**Lead scientist:** Michael Mossman.

**Collaborators:** Robert Howe, University of Wisconsin-Green Bay; and U.S. Forest Service.

**Customer programs:** WDNR Division of Forestry and Bureau of Endangered Resources.

**Project timeline:** 1993 - 2013

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## Effects of houses and roads on abundance and productivity of breeding forest birds in the Baraboo Hills

**Project description:** The Baraboo Hills supports one of the most significant communities of forest-interior breeding birds in the Midwest. Increasing development pressures apparently threaten this community yet little information exists for guiding development to minimize its effects. This study measures changes in bird populations and development since 1980 and documents the current relationships between bird abundance, breeding success, habitat composition, landscape pattern, and the density of and proximity to houses and roads. Results

from this study will be provided to local and regional land use planning agencies and boards, landowners, land trusts and conservation agencies to help identify and minimize the effects of exurban development here and in other forested Midwestern landscapes.

**Lead scientist:** Mike Mossman.

**Collaborators:** Volker Radeloff and Anna Pidgeon, University of Wisconsin; and The Nature Conservancy.

**Customer programs:** WDNR Division of Forestry and Bureau of Endangered Resources.

**Project timeline:** 2005 - 2013

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### **Impacts of non-forest biomass production on wildlife in Wisconsin**

**Project description:** This study will a) Foster and implement interdisciplinary research on the relationships between biomass and other alternative energy production systems and agricultural and grassland ecosystems – including ecologic, economic, and sociological parameters – in Wisconsin through the Agricultural Ecosystems Research Group; b) Compare grassland bird density and nesting productivity between potential biomass energy crops, including monotypic switchgrass, low-diversity mixes of several native warm season grasses, and diverse plantings of multiple native grasses and prairie forb species; and c) Model future landscape scenarios illustrating potential biomass markets, as well as the impacts of future land use/land cover changes on wildlife Species of Greatest Conservation Need, and identify landscape configurations that may simultaneously offer opportunities for economic development and wildlife enhancement.

**Lead scientist:** David Sample

**Collaborators:** Dr. Carol Williams and Dr. Randy Jackson (UW–Agronomy); Dr. Christine Ribic, USGS Wisconsin Cooperative Wildlife Research Unit, University of Wisconsin; Dr. Monica Turner (UW-Zoology).

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, and Office of Energy.

**Project timeline:** 2009 – ongoing



*Camera over a Horned Lark nest to determine nest success and identify any predators.*

## **A multi-scale approach to managing prairie and grassland resources in southwest Wisconsin agricultural landscapes**

**Project description:** This study is in the publication phase of looking at the effects of removing wooded fencerows bisecting cool-season Conservation Reserve Program grasslands on nesting grassland birds and their predators. This research project will result in recommendations for the management of linear woody cover in grasslands that will benefit nesting grassland birds. Grassland birds are of high conservation concern at both the state and continental levels, due to population declines that exceed those of any other group of birds (e.g., forest, wetland, urban).

**Lead scientist:** David W. Sample.

**Collaborators:** Dr. Christine Ribic, USGS Wisconsin Cooperative Wildlife Research Unit, University of Wisconsin

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources; U.S. Geological Survey; U.S. Fish and Wildlife Service; U.S. Department of Agriculture, Farm Service Agency and Natural Resources Conservation Service; and Pheasants Forever.

**Project timeline:** 2004 - 2012

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## **Evaluation of the Wisconsin grassland bird conservation area concept**

**Project description:** Current research shows that landscape context plays an important role in determining the abundance and productivity of nesting grassland birds. Traditional grassland habitat management and conservation delivery has not recognized the importance of landscape context, nor has it occurred with specific population and habitat goals that allow for periodic evaluation and adaptive management.

The Wisconsin Bird Conservation Initiative (WBCI) created the Strategic Grassland Implementation plan to address these issues. Specifically, it includes the Grassland Bird Conservation Area (GBCA) concept to step down the regional USFWS Joint Venture bird population and habitat goals. GBCA's consist of a large (>2,000 acres) core of permanent grassland surrounded by a matrix of long-term grassland patches embedded in an open, relatively treeless agricultural landscape at least 10,000 acres in size.

The objective of this project is to evaluate the WBCI Strategic Grassland Implementation Plan, specifically the concept of, and assumptions behind, GBCA's. These assumptions include the size and shape of the core grassland area, as well as the amount and configuration of grassland patches in the agricultural matrix surrounding the core. We are interested in the relationships between grassland bird density and productivity and these landscape-scale factors. We are conducting the evaluation in three focal grassland landscapes: the Southwest Wisconsin Grassland and Stream Conservation Area, the Western Prairie Habitat Restoration Area, and the Central Wisconsin Grassland Conservation Area. Each of these focal landscapes includes at least 3 GBCA's.

**Lead scientist:** David Sample

**Collaborators:** Andy Paulios, WDNR; Dr. Christine Ribic and Michael Guttery, UW – Madison department of Forest and Wildlife Ecology; Chris Trosen (U.S. Fish and Wildlife Service)

**Customer programs:** WDNR Bureaus of Wildlife Management, Bureau of Endangered Resources; US Fish and Wildlife Service; Wisconsin chapter of The Nature Conservancy; The Prairie Enthusiasts; Driftless Area Land Conservancy.

**Project timeline:** 2012 - 2015

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## **Responses of avian communities to management for old-growth characteristics**

**Project description:** We are currently studying different silvicultural treatments to determine how best to manage for old-growth characteristics in the northern hardwoods forest of Wisconsin. Our goal is to determine how these silvicultural treatments affect bird communities. Three treatments plus a control were applied to four 120 ac. stands in each of three replicates in winter, 2008. We conducted breeding season point-count and spot-mapping surveys from 2004-2012 in the twelve stands, so we have 4 years of pre-treatment data and 5 years of post-treatment data. We plan to continue surveying intermittently through at least 2058.

**Lead scientists:** Mike Worland and Karl J. Martin.

**Collaborators:** Tom Prestby, Karin Fassnacht, and Michael Mossman, WDNR.

**Customer programs:** WDNR Division of Forestry; U.S. Forest Service; WDNR Bureaus of Wildlife Management and Endangered Resources; Wisconsin Bird Conservation Initiative; Wisconsin Council on Forestry.

**Project timeline:** 2004 - ongoing

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## ***Wildlife Management and Biology Research***

### **Boreal bird surveys in northern Wisconsin**

**Project description:** We are using targeted bird surveys to develop occupancy estimates and population estimates for spruce grouse, black-backed woodpecker, boreal chickadee, and gray jay in Wisconsin. These are all fairly rare, secretive species tied to boreal habitats, and we know little about their abundance or distribution. There is an important need for baseline data on these species, particularly because their favored conifer habitats will likely be affected by climate change.

**Lead scientist:** Nicholas Anich.

**Collaborators:** Mike Worland and Karl Martin, WDNR; U.S. Forest Service.

**Customer programs:** WDNR Bureaus of Endangered Resources, Wildlife Management, and Division of Forestry; U.S. Forest Service; County Foresters; Wisconsin Bird Conservation Initiative; Wisconsin Initiative on Climate Change Impacts.

**Project timeline:** 2011 - ongoing



*Boreal chickadee,  
Iron County Forest.*

### **Spruce grouse habitat use in Wisconsin**

**Project description:** Little was known about spruce grouse in Wisconsin until recent DNR work. We are examining fine-scale habitat use of radiocollared spruce grouse in Chequamegon-Nicolet National Forest and on Vilas County Forest. We are also examining nest-site characteristics and landscape-scale factors that may influence occupancy of sites. These findings will be used to guide forest management and will shed light on potential impacts due to climate change.

**Lead scientist:** Nicholas Anich, Mike Worland, and Karl Martin

**Collaborators:** Wisconsin Bird Conservation Initiative; U.S. Forest Service.

**Customer programs:** WDNR Bureaus of Endangered Resources, Wildlife Management, and Division of Forestry; U.S. Forest Service; County Foresters; Wisconsin Initiative on Climate Change Impacts.

**Project timeline:** 2006 – 2012, writing and analysis will continue into 2013



*Capturing a female Spruce Grouse, Chequamegon National Forest.*

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### **Wildlife surveys and databases**

**Project description:** Through this effort, we examine registered harvest, estimate population levels, set hunter permit levels and season lengths, and disseminate harvest and population information for most hunted and trapped species in Wisconsin. We also investigate Wisconsin hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitor hunter participation trends. Finally, we establish protocol, data standards, and review data dissemination systems for most wildlife survey and harvest information to the public and other wildlife agencies.

**Lead scientist:** Brian Dhuey.

**Collaborators:** University of Wisconsin; U.S. Fish and Wildlife Service; U.S. Forest Service; and Great Lakes Indian Fish and Wildlife Commission.

**Customer program:** WDNR Bureau of Wildlife Management.

**Project timeline:** 1930 - ongoing

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### **Evaluating factors limiting Blue-winged Teal production and survival in the Great Lakes region**

**Project description:** Blue-winged Teal were the most abundant breeding duck species in Wisconsin, but have declined 60% in the past 30 years for unknown reasons. We are using radio telemetry to estimate vital rates of survival and production to determine why the species is declining and discover ways to reverse the trend with habitat management.

**Lead scientist:** Ron Gatti.

**Collaborators:** Greg Souilliere, Upper Mississippi River and Great Lakes Region Joint Venture, U.S. Fish & Wildlife Service.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Project timeline:** 2006 - 2012

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### **Distribution and status in WI of *Silphium* gall-wasps and associated insects**

**Project description:** The goal of this project is to provide enough distribution, status, and host information to allow for determination of what, if any, of 9 species of *Antistrophus* gall wasp species, or their associated parasitic wasps and beetles, warrant being listed as Species of Greatest Conservation Need or Endangered/Threatened in WI. The genus *Antistrophus* (Cynipidae:Hymenoptera) is a little known group of gall-forming wasps. They are prairie-specialist insects that require plants of the genus *Silphium*. A community of nearly a dozen species of parasitic wasps are associated with these gall-wasps, one (*Eurytoma lutea*) is a probable specialist on *Antistrophus* spp., and many of the others are poorly known. In addition, the larvae of a rarely collected species of Mordellid beetle (*Mordellistena aethiops*) and a Clerid beetle are also associated with the galls. This study will document the occurrence, distribution, and status of these species.

**Lead scientist:** Richard A. Henderson.

**Collaborators:** Dr. Dan Young and Steve Krauth, University of Wisconsin-Madison; Dr. Zhiwei Liu, Eastern Illinois University; and Dr. John Tooker, Pennsylvania State University.

**Customer programs:** WDNR Bureau of Endangered Resources.

**Project timeline:** 2010 - 2013

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### **Management impacts on and species composition of prairie invertebrate communities**

**Project description:** Which species constitute prairie invertebrate communities is mostly unknown, as are their habitat requirements, and the effects of common management practices such as fire. This is information that is needed to make sound preserve selection and management decisions. A five state (WI, MN, IA, IL, OH) cooperative composed of state, federal, and private partnerships is conducting this study. This study will develop species lists of potential Wisconsin prairie specialist macro invertebrates; develop lists of species or taxonomic groups that have a high degree of probability of being remnant-restricted specialists; determine which of the species are truly remnant-restricted and how they are affected by remnant size, isolation, and management. This information is critical to making land acquisition and management decisions that could maintain the invertebrate portion of an endangered ecosystem.

**Lead scientist:** Rich Henderson.

**Collaborators:** A dozen cooperators for various state agencies and universities, including the University of Wisconsin-Madison Department of Entomology.

**Customer programs:** WDNR Bureaus of Endangered Resources and Wildlife Management.

**Project timeline:** 1995 - ongoing

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### **An evaluation of the translocation of greater prairie-chickens from Minnesota to Central Wisconsin**

**Project description:** The overall goal of this project is to increase the genetic diversity of Wisconsin's Prairie-chicken population by conducting, between 2006 and 2010, summer translocations of up to 250 greater prairie-chicken hens from northwest Minnesota to the Buena Vista Grassland Management Area in central Wisconsin. The study is a cooperative effort between WI DNR, University of Wisconsin – Madison, University of Wisconsin – Milwaukee, University of North Dakota – Fargo, and the Minnesota Department of Natural Resources. The project will specifically address the habitat use, reproductive success, and survival of the translocated birds, resident Wisconsin birds, and their offspring.

**Lead scientist:** Scott Hull.

**Collaborators:** David W. Sample, WDNR; Dr. Peter Dunn, UW-Milwaukee; Dr. Dan Svedarsky, University of Minnesota-Crookston; Dr. Scott Walter, WDNR; MN Department of Natural Resources.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources; Central Wisconsin Grassland Conservation Area Partnership.

**Project timeline:** 2006 – ongoing



*Capturing Greater Prairie Chickens for DNA sampling.*

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### **Coordination of Wisconsin DNR bird banding program**

**Project description:** We coordinate the department's migratory bird banding program in cooperation with U.S. Geological Survey involving: 1) ordering from U.S.G.S. the appropriate number and sizes of bands for DNR banders and cooperators, then distributing these to the banders; 2) compiling data and maintaining databases for the bandings; 3) submitting these data to U.S. Geological Survey for a Canadian-U.S. cooperative database; 4) summarizing DNR's banding efforts for wildlife, endangered resources, and research staff and managers;

and 5) analyzing and summarizing band recovery data provided by U.S. Geological Survey for wildlife and endangered resources staff and other researchers. In 2011, DNR banders and cooperators banded 4,034 geese, 6,031 ducks, 810 mourning doves, and 63 woodcock in addition to loons, trumpeter swans, bald eagles and other birds of prey, common terns, Henslow's sparrows and several other species. Banding data for waterfowl, doves, and woodcock are used by U.S. Fish and Wildlife Service, the Mississippi Flyway Council, and the department to manage these species and set hunting regulations.

**Lead scientist:** Rich Kahl.

**Collaborators:** U.S. Geological Survey; U.S. Fish and Wildlife Service; Iowa State University.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources.

**Project timeline:** 1947 - ongoing

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### **Black bear foraging ecology and telomeric aging**

**Project description:** Little information is available on black bear foraging ecology in Wisconsin. The composition of black bear diets likely varies dependent on local ecosystem characteristics, seasonal changes in food availability, and availability of human sourced food. Our research will take advantage of recent advances in stable isotope analysis to evaluate the composition of bear diets within a study area in North Central Wisconsin. Various bear tissue samples will be collected at registration stations and analyzed against known isotopic signatures of potential bear foods. The different tissues give an indication of diet over different periods allowing for analysis of changes in diet through time. This information will provide a better understanding of the ecology of bears in Wisconsin. A second component of this project aims to develop a technique for aging bears through DNA. Telomeres are a component of DNA which degrades as an animal ages. We will use known age tissue samples to quantify the rate of telomeric decay in black bears. This will provide a non-invasive bear aging tool.

**Lead scientist:** David MacFarland.

**Collaborators:** Jon Pauli and Becky Kirby, UW-Madison; Matt Alldredge, Colorado Division of Wildlife.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Project timeline:** 2011-2016

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### **Black bear population estimate**

**Project description:** Our goal is state-wide and bear management unit specific black bear population estimates. We are using a biomarker based capture-recapture estimator. Tetracycline is a common antibiotic which leaves a detectable mark in bone tissue. In the spring of 2011 DNR staff and over 600 volunteers from around the state set and checked 3,361 tetracycline laced baits in 33 counties. A total of 957 were taken by bears. Successful bear hunters in 2011 and 2013 are required to submit both a rib and a tooth sample. Ribs are analyzed for tetracycline exposure and teeth are used to determine the year of exposure. These data are incorporated into capture-recapture models to estimate bear population size. An initial estimate will be available late fall 2012 with final results available in 2013. Results will be used to evaluate recent changes in DNR black bear management including higher harvest rates since the release of the last tetracycline-based population estimate in 2008.

**Lead scientist:** David MacFarland.

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Field research continues through 2012 with final results in 2013. The information developed through this research will help inform Central Wisconsin bobcat management decisions.

**Lead scientist:** David MacFarland.

**Collaborators:** Eric Anderson and John Clare, UW-Stevens Point.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Project timeline:** 2011 - 2014

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### **The influence of policy change on illegal take of wolves**

**Project description:** Wisconsin's authority to use lethal controls in management of wolf conflicts has varied throughout the period of wolf recovery. There has also been variation in the rate of illegal wolf take. Our research explores the influence of policy change of illegal take through 2 analyses. The first relies upon in-depth analysis of attitudes towards wolves and how those attitudes respond to policy change. Focus groups consisting of hound hunters, livestock producers and deer hunters were convened prior to wolf delisting during a period when lethal control was not authorized. Their attitudes toward wolves and propensity to kill wolves illegally were measured. In January 2012 wolves were removed from the endangered species list granting Wisconsin management authority which includes lethal control and a harvest season. Focus group participants will be reconvened to evaluate how these policy changes have influenced their views toward the species. In the second phase of this research, records of illegal kill will be analyzed against wolf policy change to determine if illegal kill rates were influenced by changes in wolf policy. Results of this research will provide useful information on how policy influences the attitudes of people in areas of large carnivore population recovery.

**Lead scientist:** David MacFarland.

**Collaborators:** Adrian Treves, Christine Browne-Nunez, Tim Van Deelen, UW-Madison; TJ Miller, US Fish and Wildlife Service; Adrian Wydeven, WDNR.

**Customer programs:** WDNR Bureaus of Endangered Resources and Wildlife Management.

**Project timeline:** 2010 - 2013

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### **An ecological assessment of varying deer densities and forest habitat**

**Project description:** This study was designed to evaluate the impact of varying densities of deer on forest ecosystems. Results from this research will be used to provide information on the ecological carrying capacity of deer in Wisconsin's forest. Information gathered from this project will be used to help managers and policymakers institute management actions that increase, decrease, or maintain current deer densities.

Starting in 2012 scientists from WDNR and UW-Madison have been evaluating potential sites on which to build deer enclosures in hardwood forested systems in northern Wisconsin. Pretreatment data collection is planned for 2013 with enclosures being implemented in 2014.

**Lead scientist:** Karl Martin and Dustin Bronson

**Collaborators:** Dr. Eric Kruger, UW-Madison; Dr. Alex Royo, US Forest Service Northern Research Station; Dr. Susan Paskewitz, UW-Madison.

**Customer programs:** WDNR Bureau of Wildlife Management, WDNR Division of Forestry

**Project timeline:** 2011 - 2020

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### **Habitat selection of flying squirrels in managed old-growth forests**

**Project description:** We are evaluating the response of flying squirrels to experimentally manipulated and nonmanipulated hardwood forests in northern Wisconsin. Key habitat features include tree size, gap opening size, and down wood levels. Results will be used to develop old-growth management guidelines for the Great Lakes Region.

**Lead scientist:** Karl Martin

**Collaborators:** Dr. Timothy Van Deelen, University of Wisconsin-Madison; U.S. Forest Service; University of Wisconsin-Extension; and Notre Dame University.

**Customer programs:** WDNR Division of Forestry, Bureaus of Endangered Resources, and Wildlife Management.

**Project timeline:** 2009 - 2012

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### **Interspecific habitat selection of Golden-winged Warblers and Blue-winged Warblers in northern and central Wisconsin**

**Project description:** Golden-winged Warblers are a candidate species for federal listing under the Endangered Species Act and over 70% of the world's population of Golden-winged Warblers breed in northern Wisconsin and Minnesota. We are assessing habitat requirements for Golden-winged Warblers and developing a multi-state management plan to conserve this declining species and prevent listing under the ESA.

**Lead scientist:** Karl Martin.

**Collaborators:** Dr. Scott Lutz, University of Wisconsin; U.S. Fish and Wildlife Service; Cornell Ornithology Laboratory; and Ruffed Grouse Society.

**Customer programs:** WDNR Bureau of Endangered Resources.

**Project timeline:** 2008 - 2012

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### **Assess the impact of mercury exposure on Wisconsin's Common Loon population**

**Project description:** This project evaluates the cost of mercury exposure to the common loon population in Wisconsin, as well as estimates the benefits new mercury reduction rules will provide. Field and laboratory studies were conducted to identify the threshold of exposure associated with negative population consequences. Population modeling will be used to quantify the population-level benefits to be anticipated from the new mercury emission rules in Wisconsin.

**Lead scientist:** Michael W. Meyer.

**Collaborators:** Kevin Kenow, USGS UMESC La Crosse; William Karasov, Department of Wildlife and Forestry Ecology, UW-Madison.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Project timeline:** 1998 - 2014

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## **Assessing the population effects of lead fishing tackle on fish-eating wildlife in Wisconsin**

**Project description:** Cooperating with the WDNR Wildlife Management health team to quantify the population level effects of lead fishing tackle ingestion on common loons breeding in Wisconsin. Wildlife Management is necropsying all loons found dead in Wisconsin and Minnesota to quantify the proportion succumbing to lead toxicity; WDNR Science Services will evaluate the potential population level effects via simulations of the Wisconsin Loon Population Model, published in the Journal of Wildlife Management September 2009.

**Lead scientist:** Michael W. Meyer.

**Collaborators:** Sean Strom, WDNR; WDNR Wildlife Health Team.

**Customer programs:** WDNR Bureaus of Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Project timeline:** 2006 – 2014



*Necropsy work shows approximately 20% of Wisconsin's loon mortality is due to lead toxicity associated with ingestion of fishing tackle.*

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## **The Wisconsin Lakes and Wildlife Citizen Science Project**

**Project description:** This project will further develop the existing Wisconsin Loon Citizen Science Network (75 participants in 2012) to monitor long-term abundance of lake-dependent wildlife in the Northern Highland ecological landscape. Specific objectives include conducting workshops and training volunteers for the Wisconsin Loon Citizen Science Network, producing project reports, informational packets for Citizen Scientists, annual newsletter, and developing additional citizen science monitoring activities on Northern Highland lakes to monitor impacts of land-use and climate change on lake-dependent wildlife.

**Lead scientist:** Michael W. Meyer.

**Collaborators:** LoonWatch - Sigurd Olson Environmental Institute; WDNR Citizen Based Monitoring Network; WDNR Citizen-based Lake Monitoring Network; and WDNR Bureau of Watershed Management.

**Customer programs:** WDNR Bureaus of Watershed Management, Wildlife Management, and Endangered Resources.

**Project timeline:** 2007 - 2014

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## **Developing a system for adaptive management on the Leopold-Pine Island Important Bird Area**

**Project description:** Important Bird Areas (IBAs) include some of the most important sites for maintaining biodiversity in Wisconsin. Individual IBAs often incorporate multiple ownerships with diverse management goals. This project integrates bird inventory and monitoring, habitat analysis, and partnership-building on one 15,000-acre IBA. Standardized techniques allow comparisons with other IBAs and the southern Wisconsin landscape, and between properties within the IBA; and incorporate citizen science projects and a pioneering adaptation of the eBird program. The partnership identifies focal species and habitats, and develops and evaluates management goals and plans at the IBA and individual property scales so that biodiversity and bird populations benefit at both property and IBA (landscape) scales. The results are applicable to other landscape-scale conservation areas.

**Lead scientist:** Mike Mossman.

**Collaborators:** Steve Swenson, Aldo Leopold Foundation; Yoyi Steele, WDNR; USFWS; NRCS; private landowners.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources and Division of Forestry.

**Project timeline:** 2006 - ongoing

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## **Developing and piloting a long-term monitoring protocol for breeding forest and barrens birds on the Lower Wisconsin State Riverway, Wisconsin**

**Project description:** The 90-mile-long Lower Wisconsin State Riverway (LWSR) and more inclusive Lower Wisconsin River Important Bird Area (LWR IBA) support a high diversity and density of breeding birds, including many Species of Greatest Conservation Need (SGCN)--the most significant of which are those of upland and floodplain forests and sand barrens. The LWSR incorporates both public and private properties and is managed for a variety of goals including agriculture and forest products, forest health, natural area quality, wilderness, recreation, fish and wildlife resources. This project develops a system for inventorying and monitoring breeding-bird populations (using point-counts and transects) and their forest and barrens habitats (using augmented forest recon) to gauge the effects of various management options. The ultimate goal is to model these effects and provide guidance for integrated management decisions that will maintain or increase biodiversity in this large landscape, especially for species and communities for which the LWSR is crucial.

**Lead scientist:** Mike Mossman.

**Collaborators:** USFWS; Brad Hutnik, Rich Staffen, Yoyi Steele, WDNR; LWSR Wildlife Biologists.

**Customer programs:** WDNR Division of Forestry, and Bureaus of Wildlife Management, Endangered Resources, and Facilities and Lands.

**Project timeline:** 2009 – 2013



*Measuring songbird habitat along the Lower Wisconsin River.*

### **Characterizing Cerulean Warbler distribution and habitat in the Lower Wisconsin State Riverway**

**Project description:** The State-Threatened Cerulean Warbler is a species of conservation concern rangewide, and breeds in relatively high numbers in the Wisconsin Driftless Area, including the Lower Wisconsin State Riverway (LWSR). This study characterizes the local forest habitat, landscape patterns, and management histories of LWSR and nearby sites in which the species breeds, and tests models that have been proposed for its management. Results include a map of Cerulean Warbler distribution in the LWSR, a description of habitat and management factors that influence its occurrence, monitoring guidelines, and preliminary evaluations of existing management models.

**Lead scientist:** Mike Mossman.

**Collaborators:** USFWS; Brad Hutnik, Rich Staffen, Yoyi Steele, WDNR; LWSR Wildlife Biologists.

**Customer programs:** WDNR Division of Forestry, and Bureaus of Wildlife Management, Endangered Resources, and Facilities and Lands.

**Project timeline:** 2010 - 2013

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### **Estimating survival and cause-specific mortality of adult male white-tailed deer in Wisconsin**

**Project description:** This study was designed to provide rigorous estimates of the buck recovery rate or its components (buck survival and cause-specific mortality), and hence increased accuracy of SAK population estimates. Additionally, this study will enhance our understanding of the effects and magnitude of hunter bias on estimates of cause- and age-specific mortality rates on male deer, and a greater understanding of spatial and temporal effects on variation in mortality of male deer across Wisconsin.

During 2010, the Department initiated adult deer capture operations across northern and eastcentral Wisconsin. External partners played a critical role in assisting Department researchers with study design, equipment purchase/construction, deer trapping activities, and providing logistical support during winter 2011.

**Lead scientist:** Robert Rolley, Mike Watt, and Karl Martin.

**Collaborators:** Dr. Timothy Van Deelen, University of Wisconsin-Madison; Dr. Shelli Dubay, University of Wisconsin-Stevens Point; Jim Klatt, AFL-CIO/Union Sportsmen's Alliance; Whitetails Unlimited; William Moritz, Safari Club International; Mike Riggle, Wisconsin Conservation Congress.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Project timeline:** 2010 – 2015

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### **Evaluation of Wisconsin's deer population monitoring and management system**

**Project description:** The objective of this research is to quantify the accuracy of sex-age-kill (SAK) population estimates and harvest predictions including evaluating impacts by input variables and explore other population models to determine their effectiveness to estimate deer populations. This study is expected to increase the understanding of factors affecting the

harvest of white-tailed deer and rate of population increase which will lead to a better understanding of the accuracy and precision of the current deer population monitoring and harvest management system. This information is needed to increase the public's confidence in the Department's deer management program and willingness to harvest the number of antlerless deer required to maintain populations at goal levels.

**Lead scientists:** Robert Rolley and Daniel Storm.

**Collaborators:** Dr. Timothy Van Deelen, University of Wisconsin.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Project timeline:** 1995 - ongoing

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### **Impact of predation, winter weather, and habitat on white-tailed deer fawn recruitment in Wisconsin**

**Project description:** This study was designed to examine several possible causes for variable deer population goals in northern and eastern Wisconsin by focusing on deer fawn survival and recruitment as impacted by species-specific predation, winter weather, and habitat conditions. Additionally, estimates of black bear, coyote, and wolf predation on white-tailed deer fawns in the northern forest and eastern farmland deer management regions will be obtained. Understanding impacts of various predators on fawn survival is important for formulating appropriate harvest recommendations for deer populations throughout northern Wisconsin.

During May 2011, the Department initiated fawn deer capture operations across northern and eastcentral Wisconsin. External partners played a critical role in assisting Department researchers with coordinating/planning/ implementing daily fawn capture events, microhabitat data collection activities, data entry, and equipment purchase/construction.

**Lead scientist:** Robert Rolley, Mike Watt, and Karl Martin.

**Collaborators:** Dr. Timothy Van Deelen, UW-Madison; Dr. Shelli Dubay, UW-Stevens Point; Jim Klatt, AFL-CIO/Union Sportsmen's Alliance; Whitetails Unlimited; William Moritz, Safari Club International; Mike Riggle, Wisconsin Conservation Congress

**Customer programs:** WDNR Bureau of Wildlife Management.

**Project timeline:** 2011 - 2013



*White-tailed deer fawn with an expansion break-away radio-collar.*

### **Relationships of deer ecology, disease ecology, and hunter behavior to manage chronic wasting disease (CWD) in Wisconsin**

**Project description:** The objectives of this study is to provide the science needed to manage CWD in Wisconsin, use an adaptive management approach to evaluate the effectiveness of an aggressive CWD eradication program, and provide new scientific information upon which to base future decisions. This study will document deer movements and behavior in the CWD affected area of southwestern Wisconsin. It will determine the geographic distribution and prevalence of CWD, its transmission rates and its spread, relative to age, sex and genotype. Perceptions of human risk factors, attitudes of hunters, landowners, and the public and economic effects from CWD will be assessed. Size of the deer population in the CWD affected area will be determined and monitored.

**Lead scientists:** Robert Rolley and Jordan Petchenik.

**Collaborators:** Timothy R. Van Deelen, University of Wisconsin; and Michael Samuel, Cooperative Wildlife Research Unit.

**Customer program:** WDNR Bureau of Wildlife Management.

**Project timeline:** 2002 - ongoing

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### **American Badger genetics, population size, distribution, and ecology in Wisconsin**

**Project description:** There has never been a thorough study of the American badger in Wisconsin. Badgers are listed as a Species in Need of Information in the Wisconsin Wildlife Action Plan. The objective of this study is to determine the genetic structure, population size, and distribution of the American badger statewide, and to investigate badger ecology, including demographics, habitat use, movements, home range, and diet, in an intensive study area in southwest Wisconsin. This study will help determine if badgers should be considered a Species of Greatest Conservation Need in the state.

**Lead Scientist:** David W. Sample

**Collaborators:** Dr. Tim Van Deelen, UW-Madison; Dr. David MacFarland and John Olson, WDNR; and Dr. Emily Latch, UW-Milwaukee.

**Customer programs:** WDNR Bureaus of Endangered Resources and Wildlife Management.

**Project timeline:** 2011 – 2013



*Radio-tagged American badger being returned to its den site post-surgery.*

### **A comparison of the relative abundance of Eastern and Western Meadowlarks in southern Wisconsin in 1952-53 and 2003**

**Project description:** This project repeated a 108 x 12 mile transect of meadowlark survey points across southern Wisconsin, conducted by Wesley Lanyon in 1952-53. At each section corner along the transect, the number of eastern and western meadowlarks was counted, and habitat data were recorded. This unique study will demonstrate the relationship between land use changes and changes in meadowlark populations over a 50-year time span. These results will aid in guiding land use planning to benefit meadowlarks and other declining grassland bird species.

**Lead scientist:** David W. Sample.

**Collaborators:** Wesley Lanyon, American Museum of Natural History (retired); Dr. Christine Ribic, Wisconsin Cooperative Wildlife Research Unit, University of Wisconsin and U.S. Geological Survey.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources.

**Project timeline:** 2002 - present

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### **Grassland birds in Dane County, Wisconsin: 48 years of changes in rural land use and bird populations**

**Project description:** This study consists of 48 years of data from grassland bird counts and land use surveys along 5 roadside routes in Dane County. During this period, some routes have remained rural in character, while others have become urbanized; agricultural land uses have also changed. This project will provide useful information to land use planners on how development patterns and rural land use impact declining grassland birds.

**Lead scientist:** David W. Sample.

**Collaborators:** Paul Rasmussen, WDNR, Dr. Christine Ribic, Wisconsin Cooperative Wildlife Research Unit, University of Wisconsin; U.S. Geological Survey.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources.

**Project timeline:** 1985 - ongoing

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### **An evaluation of the usefulness of deer-vehicle collision data as indices to deer population abundance.**

**Project description:** Monitoring deer populations is crucial for harvest management. Recent research has suggested limitations to current monitoring techniques (i.e. audit of the SAK model), and they remain controversial with the public. Additional, independent sources of information on population trends of deer are desirable, and deer-vehicle collision data has been suggested as potentially useful for that purpose. This research project was intended to identify sources of deer-vehicle collision data, understand data collection procedures, and evaluate potential usefulness of such data for monitoring deer populations.

**Lead scientists:** Daniel Storm and Robert Rolley.

**Collaborators:** Tim Van Deelen, University of Wisconsin

**Customer programs:** WDNR Bureau of Wildlife Management.

**Project timeline:** 2011 - 2013

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## 2009-2012 Wildlife and Forestry Research Publications

The professionals employed by the Wildlife and Forestry Research Section routinely publish the results of their work in technical reports and peer-reviewed journals, serials, monographs, and books produced by scientific societies and other publishers. They also make their findings available to people who make and influence decisions about natural resources and environmental management through internal reports, impact assessment and guidance documents, brochures, fact sheets, and informational leaflets. A subset of staff publications appearing in print from 2009 into 2012 are listed below, with Wildlife and Forestry authors appearing in bold type. Internal management reports, and unpublished grant products are not included. We list customer programs benefiting directly from the work and briefly overview the significance/management implications of each effort.

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“What factors explain differential use within Swainson’s warbler home ranges?” by **Nicholas M. Anich**, T.J. Benson, and J.C. Bednarz. In press. *Auk* 129(3).

**Customer programs:** U.S. Fish and Wildlife Service, U.S. Forest Service, Arkansas Game and Fish Commission, Arkansas State University, Illinois Natural History Survey.

**Significance/management implications:** This study examines why birds use some areas of their home ranges more than others. We measured vegetation at used points within core areas of home ranges, used points within low-use areas of home ranges, and random points (that may or may not have been used) within home ranges of Swainson’s warblers. We expected there would be a gradient of habitat quality from core area to low-use area to random. However, instead we found that, for all habitat metrics that showed significant differences, used points (core and low-use) were significantly different from random points. This suggests that measuring habitat at nearby areas (such as within a home range at points of unknown use) may not be equivalent to measuring habitat at the exact points used by an animal.

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“The first report of Sutton’s Warbler (Northern Parula x Yellow-throated Warbler) in Wisconsin” by **Nicholas M. Anich**, J.A. Swelstad, and B. Pierce. 2012. *Passenger Pigeon* 74(2):149-155.

**Customer programs:** Wisconsin Society for Ornithology.

**Significance/management implications:** This paper reports a sighting of a hybrid warbler (northern parula x yellow-throated warbler) near Green Bay in 2011. There are relatively few recent reports of this hybrid combination, which was once thought to be a full species.

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“Characteristics of a red pine plantation occupied by Kirtland’s warblers in Wisconsin” by **Nicholas M. Anich**, J.A. Trick, K.M. Grveles, and J.L. Goyette. 2011. *Wilson Journal of Ornithology* 123(2):199–205.

**Customer programs:** WDNR Bureau of Endangered Resources, U.S. Fish and Wildlife Service, Wisconsin Society for Ornithology, commercial timber managers.

**Significance/management implications:** This paper describes the characteristics of a pine plantation used by Kirtland’s warbler at the main known breeding site in Wisconsin. While typical stands used by Kirtland’s in the core area of Michigan are dominated by jack pine, the Wisconsin stands are basically failed red pine stands, with many clearings and natural recruitment of jack pine. We conclude that significant red pine die-off combined with substantial jack pine recruitment made this site suitable whereas typical young red pine plantations would not be suitable for Kirtland’s warblers.

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“Habitat availability for bottomland hardwood forest birds: the importance of considering elevation” by T.J. Benson, J.D. Brown, **Nicholas M. Anich**, and J.C. Bednarz. 2011. *Wilson Journal of Ornithology* 123(2): 199–205.

**Customer programs:** U.S. Fish and Wildlife Service, Illinois Natural History Survey, Arkansas Game and Fish Commission, Arkansas State University.

**Significance/management implications:** Methods for estimating habitat availability for species at large scales often examine things like patch size. However, the largest tracts of intact bottomland forest habitat are generally on low-elevation sites unsuitable for agriculture. For species that require dense understory vegetation or leaf litter layers, elevation appears to be a critical component of habitat availability, as we found Swainson’s warblers only on the highest bottomland sites.

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“Swainson's warbler (*Limnothlypis swainsonii*)” by **Nicholas M. Anich**, T.J. Benson, J.D. Brown, C. Roa, J.C. Bednarz, R.E. Brown and J.G. Dickson. 2010. *The Birds of North America* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology.

**Customer programs:** Cornell Lab of Ornithology.

**Significance/management implications:** Comprehensive life history account of Swainson’s warbler, summarizing findings from over 200 sources.

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“Effects of a flood on foraging ecology and population dynamics of Swainson’s warblers” by **Nicholas M. Anich** and B.M. Reiley. 2010. *Wilson Journal of Ornithology* 122: 165–168.

**Customer programs:** U.S. Fish and Wildlife Service, Arkansas Game and Fish Commission, Arkansas State University.

**Significance/management implications:** This paper reports observations of Swainson’s warblers foraging in the tree canopy and on floating debris during a flood. Swainson’s warblers are obligate leaf-litter foragers, so this behavior was quite unusual. Some warblers managed to persist on the site during the flood using this technique, but overall return rates at the study site were reduced drastically, and the flood negatively affected breeding habitat. Spring flooding at the study site was exacerbated by the altered hydrology of rivers constrained by levees.

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“The root and microbial respiration response to an experimental warming of a boreal black spruce forest” by J.G. Vogel, **Dustin R. Bronson**, S.T. Gower, and E.A.G. Schuur. (in review)

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“QuickBird-derived land cover classification of Alaskan arctic coastal plain tundra and its utility for change assessment” by C.E. Tweedie, C.G. Andresen, R.D. Hollister, J. May J, **Dustin R. Bronson**, A. Gaylord, and P.J. Webber (in review).

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“Changes in net primary production with ecosystem warming in a boreal black spruce plantation” by **Dustin R. Bronson**, and S.T. Gower (in review).

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“A comparison of trenched plot techniques for partitioning soil respiration” by B. Bond-Lamberty, **Dustin R. Bronson**, E. Bladyka, and S.T. Gower. 2011. *Soil Biology & Biochemistry* 43(10): 2108-2114.

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“Effects of climate warming on canopy water dynamics of a boreal black spruce plantation” by I.G. Van Herk, S.T. Gower, **Dustin R. Bronson**, and M. Tanner. 2011. *Canadian Journal of Forest Research* 41(2):217-227.

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“Ecosystem warming does not affect photosynthesis or aboveground autotrophic respiration for boreal black spruce” by **Dustin R. Bronson**, and S.T. Gower. 2010. *Tree Physiology* 30(4):441-449.

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“Effects of ecosystem warming on boreal black spruce bud burst and shoot growth” by **Dustin R. Bronson**, S.T. Gower, M. Tanner M, and I. VanHerk. 2009. *Global Change Biology* 15(6):1534-1543.

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“Ten Week Brood Observations, 2011; Black Bear Hunter Questionnaire, 2011; Deer Hunter Wildlife Survey, 2011; Gun Deer Hunting Questionnaire, 2011; Spring Turkey Hunting Questionnaire, 2011; Fall Turkey Hunting Questionnaire, 2011; and Wild Turkey Landowner Brood Survey, 2011” by **Brian J. Dhuey**, K. Wallenfang, and **Jessica L. Rees** in 2012 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 22(2) 153pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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“Small Game Harvest, 2010-11; Ruffed Grouse Drumming Survey, 2011; Rural Mail Carrier Pheasant Survey, 2011; Regional Bobwhite Quail and Cottontail Rabbit Survey, 2011; Bobcat Harvest, 2010; Fisher Harvest, 2010; Otter Harvest, 2010-2011; Bobcat Hunter/Trapper Survey, 2010; Winter Track Counts, 1977-2011; Beaver Trapping Questionnaire, 2010-2011; Fur Trapper Survey, 2010-2011; and Wisconsin Fur Buyers Report, 2010-2011” by **Brian J. Dhuey**, **Jessica L. Rees**, and J.F. Olson in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(5) 210pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

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“Wisconsin Canada Goose Harvest Report” by K. Van Horn, J. Christopoulos, and **Brian J. Dhuey**. 2011. Wisconsin Department of Natural Resources, Madison. 21(3) 44pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

**Significance/management implications:** This report summarizes the results of the 2011 Canada goose harvest. Data obtained aids in estimating population levels, setting hunter permit levels, and setting season lengths.

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“Ten Week Brood Observations, 2010; Deer Hunter Wildlife Survey, 2010; Gun Deer Hunting Questionnaire, 2010; Spring Turkey Hunting Questionnaire, 2010; Fall Turkey Hunting Questionnaire, 2010; and Wild Turkey Landowner Brood Survey, 2010” by **Brian J. Dhuey, Jessica L. Rees, J. Olson, S. Walter, and A. Wydeven** in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(2) 129pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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“Small Game Harvest, 2009-10; Ruffed Grouse Drumming Survey, 2010; Rural Mail Carrier Pheasant Survey, 2010; Bobcat Harvest, 2009; Fisher Harvest, 2009; Otter Harvest, 2009-10; Bobcat Hunter/Trapper Survey, 2009; Winter Track Counts, 1977-2010; Beaver Trapping Questionnaire, 2009-10; Fur Trapper Survey, 2009-10; and Wisconsin Fur Buyers Report, 2009-10” by **Brian J. Dhuey**, and J.F. Olson in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(5) 194pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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“The 2010 Wisconsin Deer Hunting Summary; Wisconsin Black Bear Harvest Report 2010; Spring Turkey Harvest Report 2010; and Fall Turkey Harvest Report 2010” by **Brian J. Dhuey**, L. Olver, S. Gericke Fandel, and S. Walter in 2010 Wisconsin Big Game Hunting Summary. Wisconsin Department of Natural Resources, Madison. 21(1) 83pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

**Significance/management implications:** This report summarizes the results of the 2010 deer, black bear, and wild turkey harvest. Data obtained aids in estimating population levels, setting hunter permit levels, and setting season lengths.

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“Ten Week Brood Observations, 2009; Archery Hunting Questionnaire, 2009; Gun Deer Hunting Questionnaire, 2009; Spring Turkey Hunting Questionnaire, 2009; Fall Turkey Hunter Questionnaire, 2009; and Wild Turkey Landowner Brood Survey, 2009” by **Brian J. Dhuey** in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(2) 129pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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“Wisconsin Canada Goose Harvest Report” by K. Van Horn, J. Christopoulos, and **Brian J. Dhuey**. 2010. Wisconsin Department of Natural Resources, Madison. 20(3) 37pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

**Significance/management implications:** This report summarizes the results of the 2010 Canada goose harvest. Data obtained aids in estimating population levels, setting hunter permit levels, and setting season lengths.

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“Small Game Harvest, 2008-09; Ruffed Grouse Drumming Survey, 2009; Rural Mail Carrier Pheasant Survey, 2009; Regional Bobwhite Quail and Cottontail Rabbit Survey, 2009; Bobcat Harvest, 2008; Fisher Harvest, 2008; Otter Harvest, 2008-2009; Bobcat Hunter/Trapper Survey, 2008; Winter Track Counts, 1977-2009; Beaver Trapping Questionnaire, 2008-2009; Fur Trapper Survey, 2008-2009; and Wisconsin Fur Buyers Report, 2008-2009” by **Brian J. Dhuey**, and J.F. Olson in 2009 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 19(5) 194pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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“The 2009 Wisconsin Deer Hunting Summary; Wisconsin Black Bear Harvest Report 2009; Spring Turkey Harvest Report 2009; and Fall Turkey Harvest Report 2009” by **Brian J. Dhuey**, L. Olver, K. Warnke, S. Gericke Fandel, and S. Hull in in 2009 Wisconsin Big Game Hunting Summary. Wisconsin Department of Natural Resources, Madison. 20(1) 82pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

**Significance/management implications:** This report summarizes the results of the 2009 deer, black bear, and wild turkey harvest. Data obtained aids in estimating population levels, setting hunter permit levels, and setting season lengths.

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“Wisconsin Canada Goose Harvest Report” by K. Van Horn, J. Christopoulos, and **Brian J. Dhuey**. 2009. Wisconsin Department of Natural Resources, Madison. 19(3) 34pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; US Military; WI Tribal Members; Media Outlets; and the general public.

**Significance/management implications:** This report summarizes the results of the 2009 Canada goose harvest. Data obtained aids in estimating population levels, setting hunter permit levels, and setting season lengths.

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“Managed Old-growth Study: A research status update” by **Karin S. Fassnacht**. 2011.

**Customer programs:** WDNR Division of Forestry.

**Significance/management implications:** This article updates Forestry staff on the progress of a research project investigating new forest management techniques. It also provides contact information should that staff desire additional information.

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“Olson Oak Woods SNA – Can oak woodlands survive?” by **Richard A. Henderson**. 2011. WDNR Wildlifer (December issue). WDNR Bureau of Wildlife Management, Madison, WI.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, Parks and Recreation, and Division of Forestry; US Fish & Wildlife Service Private Lands Program; regional land trusts; and private landowners.

**Significance/management implications:** Raises awareness among land managers and decision makers as to the pending loss of oak ecosystems, which are prime habitat for many wildlife species, including many terrestrial game species. Provide information on the effectiveness of possible management tools for retaining oak ecosystems.

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“Influence of Patch Size, Isolation, and Fire History on Hopper (Homoptera: Auchenorrhyncha) Communities of eight Wisconsin Prairie Remnants” by **Richard A. Henderson**. 2010. Research Report 189. Wisconsin Department of Natural Resources, Madison, WI. 19pp.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources; US Fish & Wildlife Service Private Lands Program; University of Wisconsin-Madison Arboretum; regional land trusts; and private landowners.

**Significance/management Applications:** Fire is critical to the recovery and maintenance of prairie ecosystems. Such sites often harbor rare prairie-specialist insects that may be sensitive to fire and possibly eliminated by it. The findings of this work provide land managers with critical information about how best to use fire as a management tool on such sites.

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“Rosinweed Gall Wasp Response to Fire” by **Richard A. Henderson**. 2012. Pp. 110-115 in D. Williams, B. Butler, and D. Smith (eds.). Proceedings of the 22<sup>nd</sup> North American Prairie Conference, Cedar Falls, IA.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources; US Fish & Wildlife Service Private Lands Program; University of Wisconsin-Madison Arboretum; regional land trusts; and private landowners.

**Significance/management Applications:** Fire is critical to the recovery and maintenance of prairie ecosystems. The rosinweed gall wasp is an uncommon species that lives only on rosinweed plants in prairie habitats, however it is extremely sensitive to fire. The findings of this work provide land managers with critical information about how best to use fire as a management tool on such sites.

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“*Silphium* Gall Wasps: Little-Known Prairie Specialists” by **Richard A. Henderson** and S.B. Sauer. 2012. Pp. 116-121 in D. Williams, B. Butler, and D. Smith (eds.). Proceedings of the 22<sup>nd</sup> North American Prairie Conference, Cedar Falls, IA.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources; US Fish & Wildlife Service Private Lands Program; University of Wisconsin-Madison Arboretum; regional land trusts; and private landowners.

**Significance/management Applications:** Four species of *Silphium* were among the most dominant plant species in the prairies of the upper Midwest. They are now very limited on the landscape. They are also the sole hosts to 8 species of *Antistrophus* gall wasps. The distribution and status of these wasps is unknown. This paper raises awareness among conservationists and land managers of such prairie-restricted, and fire sensitive insects, and solicits their help in documenting the wasp’s existence on the landscape.

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“Wisconsin Sharp-tailed Grouse: A Comprehensive Management and Conservation Strategy” by S. Fandel and **Scott D. Hull**. 2011. Final Report to the Natural Resources Board, Wisconsin Department of Natural Resources. 57 pp.

**Customer Programs:** WDNR Bureaus of Wildlife Management and Endangered Resources; WDNR Division of Forestry; Wisconsin County Forest Association, U.S. Forest Service, Wisconsin Sharp-tailed Grouse Society, Friends of Crex Meadows, Friends of Namekagon Barrens, Wisconsin Conservation Congress, Wisconsin Wildlife Federation, Wisconsin Ornithological Society.

**Significance/management implications:** This report, approved by the Wisconsin Department of Natural Resources Board, includes a strategy for ensuring the persistence of sharp-tailed grouse in Wisconsin for the foreseeable future.

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“The Wisconsin Greater Prairie-Chicken Program: Integrating Research, Management, and Community Outreach in the 21st Century” by **Scott D. Hull, David W. Sample**, D. Drake, S. Fandel, L. Kardash, O. Ledee and S. Schwab. 2011. *The Passenger Pigeon* 173:89-99.

**Customer Programs:** WDNR Bureaus of Wildlife Management and Endangered Resources; Wisconsin Sharp-tailed Grouse Society; Wisconsin Conservation Congress; Wisconsin Wildlife Federation; Wisconsin Bird Conservation Initiative, USDA-FSA and NRCS; Wisconsin Ornithological Society, Dane County Conservation League, Central Wisconsin Grassland Conservation Area Partnership.

**Significance/management implications:** A review of accomplishments and management strategies for the state threatened Greater-Prairie Chicken.

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“Northwest Sands Habitat Corridor Plan” by M. Reetz, **Scott D. Hull**, S. Fandel and R.S. Lutz. 2011. Final Report to Wisconsin Department of Natural Resources. 76 pp.

**Customer Programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, and Division of Forestry; Wisconsin County Forest Association; U.S. Forest Service; Wisconsin Sharp-tailed Grouse Society; Friends of Crex Meadows; Friends of Namekagon Barrens; Wisconsin Conservation Congress; Wisconsin Wildlife Federation; Wisconsin Bird Conservation Initiative; Wisconsin Society of Ornithology.

**Significance/management implications:** This report completes a specific action item outlined in the 2011 Sharp-tailed Grouse Management Plan which called for designing a corridor plan for re-establishing connections between core barrens properties in the Northwest Sands Ecological Landscape.

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“Wisconsin Sustainable Planting and Harvesting Guidelines for Nonforest Biomass” by **Scott D. Hull**, C. Bleser, A. Crossley, R. Jackson, E. Lobner, L. Paine, G. Radloff, **David W. Sample**, J. Vandenbrook, S. Ventura, S. Walling, J. Widholm, and C. Williams. 2010. Wisconsin Department of Natural Resources, Wisconsin Department of Agriculture, Trade and Consumer Protection, and UW-Madison. 98 pp.

**Customer programs:** WDNR Land, Water, and Forestry Division's; Wisconsin legislators; Wisconsin farmers/producers; Wisconsin extension educators; Wisconsin land managers; Wisconsin energy producers/users; U.S. Departments of Agriculture and Forestry; Wisconsin Bioenergy Council.

**Significance/management implications:** This report is the first set-of guidelines in Wisconsin and likely the United States that uses a landscape scale and ecosystem services approach to developing sustainable planting and harvesting guidelines for

Nonforest biomass (e.g. grasses, short-rotation woody crops) and also fulfilled a legislative mandate of the Wisconsin Bioenergy Council.

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“Guidelines for sustainable planting and harvest of nonforest biomass in Wisconsin” by S. Ventura, **Scott D. Hull**, R. Jackson, G. Radloff, **David W. Sample**, S. Walling, and C. Williams. 2012. *Journal of Soil and Water Conservation* 67(1): 17A-20A.

**Customer programs:** WDNR Land, Water, and Forestry Division’s; Wisconsin legislators; Wisconsin farmers/producers; Wisconsin extension educators; Wisconsin land managers; Wisconsin energy producers/users; U.S. Departments of Agriculture and Forestry; Wisconsin Bioenergy Council.

**Significance/management implications:** This article is a brief overview that describes the process the Wisconsin nonforest biomass team used to develop their sustainability guidelines as well as some key guidelines and recommendations within the larger report.

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“Wisconsin Sharp-tailed Grouse Survey and Status 2011” by **Scott D. Hull** and S. Fandel in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(5): 14-17.

**Customer Programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, and Division of Forestry; Wisconsin County Forest Association; U.S. Forest Service; Wisconsin Sharp-tailed Grouse Society; Friends of Crex Meadows; Friends of Namekagon Barrens; Wisconsin Conservation Congress; Wisconsin Wildlife Federation; Wisconsin Ornithological Society.

**Significance/management implications:** This report details the annual sharp-tailed grouse lek surveys and, in part, is used to set annual harvest quotas.

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“Wisconsin Sharptail Grouse Status 2010” by **Scott D. Hull** and S. Fandel in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(5): 12-14.

**Customer Programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, and Division of Forestry; Wisconsin County Forest Association; U.S. Forest Service; Wisconsin Sharp-tailed Grouse Society; Friends of Crex Meadows; Friends of Namekagon Barrens; Wisconsin Conservation Congress; Wisconsin Wildlife Federation; Wisconsin Ornithological Society.

**Significance/management implications:** This report details the annual sharp-tailed grouse lek surveys and, in part, is used to set annual harvest quotas.

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“Sharp-tailed Grouse Harvest & Hunter Survey 2011” by **Scott D. Hull**, S. Fandel and K. McGinley in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(2): 2-4.

**Customer Programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, and Division of Forestry; Wisconsin County Forest Association; U.S. Forest Service; Wisconsin Sharp-tailed Grouse Society; Friends of Crex Meadows; Friends of Namekagon Barrens; Wisconsin Conservation Congress; Wisconsin Wildlife Federation; Wisconsin Ornithological Society.

**Significance/management implications:** This report details the annual sharp-tailed grouse harvest and hunter survey.

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"Sharp-tailed Grouse Harvest & Hunter Survey 2010" by **Scott D. Hull**, S. Fandel and K. McGinley in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(2):2-4.

**Customer Programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, and Division of Forestry; Wisconsin County Forest Association; U.S. Forest Service; Wisconsin Sharp-tailed Grouse Society; Friends of Crex Meadows; Friends of Namekagon Barrens; Wisconsin Conservation Congress; Wisconsin Wildlife Federation; Wisconsin Ornithological Society.

**Significance/management implications:** This report details the annual sharp-tailed grouse harvest and hunter survey.

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"Spring Ring-Necked Pheasant Surveys 2011" by **Scott D. Hull** and J. Arntzen in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(5):21-30.

**Customer Programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report details the results of the annual spring ring-necked pheasant survey and is used, in part, to develop the fall upland hunting forecast.

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"Summer Wildlife Inquiry, 2011; Annual Mammal Survey, 2011" by **Jessica E. Kitchell** in 2012 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 22(2) 153pp.

**Customer programs:** WDNR Bureaus of Wildlife Management and Science Services.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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"Wisconsin Youth Waterfowl Hunt Days, 2010; Frog and Toad Survey, 2010" by **Jessica E. Kitchell**, J. Christopoulos, K. Van Horn, J. Olson, and T. Bergeson in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(5) 210pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, and Science Services.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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"Summer Wildlife Inquiry, 2010; Annual Mammal Survey, 2010" by **Jessica E. Kitchell** in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(2) 129pp.

**Customer programs:** WDNR Bureaus of Wildlife Management and Science Services.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and

monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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"Wisconsin Youth Waterfowl Hunt Days, 2009; Frog and Toad Survey, 2009" by **Jessica E. Kitchell**, J. Christopoulos, K. Van Horn, J. Olson, and T. Bergeson in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(5) 194pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, and Science Services.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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"Summer Wildlife Inquiry, 2009; Annual Mammal Survey, 2009" by **Jessica E. Kitchell** in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(2) 129pp.

**Customer programs:** WDNR Bureaus of Wildlife Management and Science Services.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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"Wisconsin Youth Waterfowl Hunt Days, 2008; Frog and Toad Survey, 2008" by **Jessica E. Kitchell**, J. Christopoulos, K. Van Horn, and T. Bergeson in 2009 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 19(5) 194pp.

**Customer programs:** WDNR Bureaus of Wildlife Management, Endangered Resources, and Science Services.

**Significance/management implications:** Investigates Wisconsin Hunter attitudes to season frame works, proposed legislative initiatives, Conservation Congress proposals, and monitors hunter participation trends. Examines registered harvest, aids in estimating population levels, setting hunter and trapper permit levels and season lengths. Disseminates harvest, population, and survey information within WDNR, to the public, and other wildlife agencies.

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"A multiscale approach to understanding snake use of conservation buffer strips in an agricultural landscape" by **Tricia G. Knoop**, and L.B. Best. 2011. *Herpetological Conservation & Biology* 6(2):191-201.

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"Best management practices and timber harvesting: The role of interpersonal networks in shaping landowner decisions" by **Tricia G. Knoop**, and M. Rickenbach. 2011. *Scandinavian Journal of Forest Research* 26:171-182.

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“Book Review: Conservation psychology: Understanding and promoting human care for nature” by **Tricia G. Knoot**. 2011. *Landscape Ecology* 26(2): 297-299.

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“The state of the system and steps toward resilience of disturbance-dependent oak forests” by **Tricia G. Knoot**, L.A. Schulte, J.C. Tyndall, and B.J. Palik. 2010. *Ecology and Society* 15(4):5.

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“Oak conservation and restoration on private forestlands: Negotiating a social-ecological landscape” by **Tricia G. Knoot**, L.A. Schulte, and M. Rickenbach. 2010. *Environmental Management* 45(1):155-164.

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“Book Review: A love of the land, selected writings of John Fraser Hart” by **Tricia G. Knoot** in J.C. Hudson, editor. 2009. *Landscape Ecology* 24(10):1421-1423.

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“The changing social landscape in the Midwest: A boon for forestry and bust for oak?” by **Tricia G. Knoot**, L.A. Schulte, N. Grudens-Schuck, and M. Rickenbach. 2009. *Journal of Forestry*. 107(5):260-266.

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“Downed wood associated with roundwood harvest, whole-tree harvest, and unharvested stands of aspen in Wisconsin” by T.A.G. Rittenhouse, **David M. MacFarland**, **Karl J. Martin**, and **Timothy R. Van Deelen**. 2012. *Forest Ecology and Management* 266:239-245.

**Customer programs:** WDNR Division of Forestry

**Significance/management implications:** New bioenergy markets are emerging for forest biomass. Techniques used to extract these resources are different from traditional forestry techniques and have the potential to reduce the amount of residual downed wood after harvest. We quantified the volume of woody debris following harvest using different techniques. Results will help inform the development of woody biomass harvesting guidelines in Wisconsin.

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“Nesting patterns of southern flying squirrels in managed northern hardwoods” by S.G. Steinhoff, **Timothy R. Van Deelen**, **Karl J. Martin**, **David M. MacFarland**, and K. R. Witkowski. 2012. *Journal of Mammalogy* 93(2):532-539.

**Customer programs:** WDNR Division of Forestry and Bureau of Wildlife Management.

**Significance/management implications:** Nest trees are an important habitat resource for southern flying squirrels and can be influenced by harvest. We investigated nesting patterns in stands under differing management strategies. Results further inform the impact of forest management activities on wildlife.

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“Using simulation to explore the functional relationships of terrestrial carnivore population indices” by **David M. MacFarland**, and **Timothy R. Van Deelen**. 2011. *Ecological Modeling* 222:2761-2769.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** The models used to estimate carnivore populations rely heavily upon index data for calibration. The relationship between indices and population size is poorly understood. We developed a simulation to explore these relationships. This research improves our understanding of the underlying statistical theory influencing carnivore population estimates.

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“Bobcat Population Analyses, 2010” by **David M. MacFarland**, **Robert E. Rolley**, and **Michael L. Worland** in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(5):92-96.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report describes the sex and age structure of bobcat harvest, reproductive rates estimated from carcass analysis, modeled population estimates, and harvest recommendations.

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“Fisher Population Analyses, 2010” by **David M. MacFarland**, **Robert E. Rolley** and **Michael L. Worland** in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(5):97-100.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report describes the sex and age structure of fisher harvest, modeled population estimates, and harvest recommendations.

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“Otter Population Analyses, 2010” by **David M. MacFarland**, **Robert E. Rolley** and **Michael L. Worland** in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(5):101-107.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report describes the sex and age structure of otter harvest, reproductive estimated from carcass analysis, observations of otter tracks on aerial surveys, modeled population estimates, and harvest recommendations.

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“Mercury and other element exposure in tree swallows nesting at low pH and neutral pH lakes In northern Wisconsin USA” by T.W. Custer, C.M. Custer, W.E. Thogmartin, P.M. Dummer, R. Rossmann, K.P. Kenow, and **Michael W. Meyer**. 2012. *Environmental Pollution* 163:68-76.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources

**Significance/management implications:** Similar to fish-eating birds, avian insectivores nesting on low pH lakes in northern Wisconsin have elevated exposure to methylmercury. However this exposure is not associated with reductions in tree swallow reproduction and survival. New Hg reduction rules will likely also reduce meHg exposure to this species.

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“Bi-phasic trends in mercury concentrations in blood of Wisconsin common loons during 1992-2010” by **Michael M. Meyer**, P. Rasmussen, C. Watras, K. Kenow, and B. Fevold. 2011. *Ecotoxicology* 20:1659-1668.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Significance/management implications:** Common loon blood mercury levels dropped consistently through the 1990s, similar to levels of mercury in fish and lakes throughout the Great Lakes region. However Wisconsin loon blood Hg levels rose in the early to mid-2000s, though the increase is thought to be associated with drought-related mobilization of in-lake mercury, not an increase in atmospheric deposition. It is likely that new mercury emission reduction rules and alleviation of drought conditions will result in a continued decline in loon mercury exposure in Wisconsin.

“Spatial gradients of methylmercury for breeding common loons in the Laurentian Great Lakes region” by D.C. Evers, K.A. Williams, **Michael W. Meyer**, A.M. Scheuhammer, N. Schoch, A.T. Gilbert, L. Siegel, R.J. Taylor, R. Poppenga, and C.R. Perkins. 2011. *Ecotoxicology* 20:1609-1625.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Significance/management implications:** This study uses fish and loon mercury exposure data to identify “mercury hot-spots” in the Great Lakes region, providing managers with a spatial image of mercury exposure across the region.

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“Effects of injected methylmercury on the hatching of common loon (*Gavia immer*) eggs” by K.P. Kenow, **Michael W. Meyer**, R. Rossman, A. Gendron-Fitzpatrick, and B. Gray. 2011. *Ecotoxicology* 20:1684-1693.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Significance/management implications:** This laboratory and field experiment has established that the level of mercury exposure found in eggs of common loons on some acidic lakes in northern Wisconsin exceed that associated with reduced hatching rates in the laboratory. New mercury emission reduction rules in Wisconsin should result in a decline in loon egg mercury concentrations.

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“Contaminant Concentrations in Bald Eagles Nesting on Lake Superior, the Upper Mississippi River, and the St. Croix River” by C. Dykstra, **Michael W. Meyer**, W. Route, and P. Rasmussen. 2010. *Journal of Great Lakes Research* 36:561-569.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Significance/management implications:** Legacy contaminant concentrations (PCBs and DDE) have declined steadily over the past 20 years, and eagle populations along Lake Superior, the Upper Mississippi River, and the St. Croix River have increased in abundance. However emerging contaminant concerns related to flame retardants and plasticizers have surfaced in eagles nesting near the Twin Cities and the lower St. Croix, likely in relationship to industrial practices in the vicinity. At this time, reproduction impacts are not observed.

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“Effects of methylmercury exposure on the behavior of captive-reared Common Loon (*Gavia immer*) chicks” by K.P. Kenow, R.K. Hines, **Michael W. Meyer**, S.A. Suarez, and B.R. Gray. 2010. *Ecotoxicology* 19:933–944.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Significance/management implications:** This laboratory and field experiment has established that the level of mercury exposure found in common loon chicks on some acidic lakes in northern Wisconsin is associated with subtle impacts on behaviors associated with survival in the laboratory. New mercury emission reduction rules in Wisconsin should result in a decline in loon chick mercury concentrations.

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“Population Growth and Demography of a Long-lived Piscivorous Bird in Lakes of the Northern United States” by J.S. Gear, **Michael W. Meyer**, J.H. Cooley, A. Kuhn, W. Piper, K. Taylor, K. Kenow, M. Mitro, H. Vogel, and D. Nacci. 2009. *Journal of Wildlife Management* (73) 1108-1113.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Significance/management implications:** A 2-stage projection matrix model was developed for common loons in the Wisconsin and New Hampshire. Modeled results indicate Wisconsin's loon population was stable to slowly increasing during the 1990s and early 2000s. Simulations of this model will be used to assess the population level impacts of exposure to mercury, botulism E, and lead fishing tackle by common loons breeding in Wisconsin.

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"Techniques for capturing Common Loons during pre-nesting and nesting periods" by K.P. Kenow, J. Wilson, and **Michael W. Meyer**. 2009. *Journal of Field Ornithology* 80(4): 427–432.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources.

**Significance/management implications:** Capturing common loons during nesting and pre-nesting allows biologists to assess mercury exposure of adult loons shortly after arriving on the breeding grounds. These measures are most closely related to egg mercury levels, and it has been found are closely related to fish consumed by adults on breeding lakes. This reinforces the theory that mercury emission reductions in the breeding grounds will result in lower mercury exposure during reproduction.

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"Variation in soil temperature, moisture, and plant growth with the addition of downed woody material on lakeshore restoration sites" by D. Haskell, D. Flaspohler, C. Webster, **Michael W. Meyer**. 2012. *Restoration Ecology* 20: 113-121.

**Customer programs:** WDNR Bureaus of Air Management, Fisheries Management, Watershed Management, Wildlife Management, and Endangered Resources.

**Significance/management implications:** This study provides findings supporting the use of coarse wood augmentation when installing shoreland restoration projects. Coarse wood reduced temperature fluctuations, enhanced soil moisture, and improved plant survival. Findings such as these will promote the practice of shoreland restoration throughout Wisconsin.

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"Wisconsin Checklist Project: 1982-2010" by **Robert E. Rolley**. 2012. *Passenger Pigeon* 74: 9-25.

**Customer programs:** WDNR Bureaus of Endangered Resources and Wildlife Management.

**Significance/management implications:** This article describes the Wisconsin Checklist Project, a citizen-science program to assess the status of birds in Wisconsin. Originally developed at the University of Wisconsin in 1982, the program was coordinated by the WDNR since 1989. Data collection ended in 2010 due to declining number of cooperators and the development of eBird, a web-based checklist database run by the Cornell Lab of Ornithology. More than 100,000 checklists of weekly bird observations, from all 72 counties in Wisconsin, were submitted by 444 cooperators during the 29 years of the checklist project. Long-term trends in reporting frequencies were described. Significant linear declines in reporting rates were noted for 59 species and significant increases were found for 94 species.

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“Black Bear Population Analyses, 2009” by **Robert E. Rolley** and **Michael L. Worland** in 2009 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 19(5):30-35.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This paper reports on bear visitations to bait station surveys in northern and central Wisconsin, the sex and age structure of harvest, population estimates, and harvest recommendations.

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“Beaver Population Analyses, 2008” by **Robert E. Rolley**, J. F. Olson and **Michael L. Worland** in 2009 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 19(5):94-96.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report presents the results of a helicopter quadrat survey conducted in fall 2008 in the northern 1/3 of Wisconsin and compares estimates of beaver population size to those from prior surveys.

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“Bobcat Population Analyses, 2009” by **Robert E. Rolley** and **Michael L. Worland** in 2009 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 19(5):97-99.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report describes the sex and age structure of bobcat harvest, reproductive rates estimated from carcass analysis, modeled population estimates, and harvest recommendations.

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“Fisher Population Analyses, 2009” by **Robert E. Rolley** and **Michael L. Worland** in 2009 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 19(5):100-103.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report describes the sex and age structure of fisher harvest, modeled population estimates, and harvest recommendations.

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“Otter Population Analyses, 2009” by **Robert E. Rolley** and **Michael L. Worland** in 2009 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 19(5):104-110.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report describes the sex and age structure of otter harvest, reproductive estimated from carcass analysis, observations of otter tracks on aerial surveys, modeled population estimates, and harvest recommendations.

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“Wisconsin Checklist Project, 2008” by **Robert E. Rolley** in 2009 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 19(5):180-190.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources.

**Significance/management implications:** This report describes changes in observation rates since 1983 for 266 bird species based on weekly checklists submitted by volunteer cooperators.

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“White-tailed Deer Population Status, 2009” by **Robert E. Rolley** in 2009 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(2):22-28.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report documented deer population estimates for deer management units in Wisconsin and regional deer population trends since 1981.

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“Black Bear Population Analyses, 2010” by **Robert E. Rolley**, **Michael L. Worland** and **David M. MacFarland** in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(5):27-32.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This paper reports on bear visitations to bait station surveys in northern and central Wisconsin, the sex and age structure of harvest, population estimates, and harvest recommendations.

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“Wisconsin Checklist Project, 2009” by **Robert E. Rolley** in 2010 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 20(5):180-190.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources.

**Significance/management implications:** This report describes changes in observation rates since 1983 for 266 bird species based on weekly checklists submitted by volunteer cooperators.

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“White-tailed Deer Population Status, 2010” by **Robert E. Rolley** in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(2):22-28.

**Customer programs:** WDNR Bureaus of Wildlife.

**Significance/management implications:** This report documented deer population estimates for deer management units in Wisconsin and regional deer population trends since 1981.

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“Black Bear Population Analyses, 2011” by **Robert E. Rolley** and **David M. MacFarland** in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(5):35-41.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This paper reports on bear visitations to bait station surveys in northern and central Wisconsin, the sex and age structure of harvest, population estimates, and harvest recommendations.

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“Bobcat Population Analyses, 2011” by **Robert E. Rolley** and **David M. MacFarland** in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(5):101-104.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report describes the sex and age structure of bobcat harvest, reproductive rates estimated from carcass analysis, modeled population estimates, and harvest recommendations.

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“Fisher Population Analyses, 2011” by **Robert E. Rolley** and **David M. MacFarland** in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(5):105-108.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report describes the sex and age structure of fisher harvest, modeled population estimates, and harvest recommendations.

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“Otter Population Analyses, 2011” by **Robert E. Rolley** and **David M. MacFarland** in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(5):109-115.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This report describes the sex and age structure of otter harvest, reproductive estimated from carcass analysis, observations of otter tracks on aerial surveys, modeled population estimates, and harvest recommendations.

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“Wisconsin Checklist Project, 2010” by **Robert E. Rolley** in 2011 Wisconsin Wildlife Surveys. Wisconsin Department of Natural Resources, Madison. 21(5):196-206.

**Customer programs:** WDNR Bureaus of Wildlife Management and Endangered Resources.

**Significance/management implications:** This report describes changes in observation rates since 1983 for 266 bird species based on weekly checklists submitted by volunteer cooperators.

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“Guidelines for sustainable planting and harvest of nonforest biomass in Wisconsin” by S. Ventura, **Scott Hull**, R. Jackson, G. Radloff, **David Sample**, S. Walling, and C. Williams. 2012. *Journal of Soil and Water Conservation* 67: 17A-20A.

**Customer Programs:** WDNR Division of Forestry and Bureaus of Wildlife Management and Endangered Resources; Wisconsin Department of Agriculture, Trade, and Consumer Protection; USDA Farm Service Agency and Natural Resources Conservation Service; U.S. Fish and Wildlife Service; The Nature Conservancy; Energy Utilities.

**Significance/management implications:** This paper is based on a 2011 report prepared by the WI DNR, WI Department of Agriculture, Trade, and Consumer Protection, and the University of Wisconsin – Madison for the Wisconsin Bioenergy Council, entitled “Wisconsin sustainable planting and harvest guidelines for nonforest biomass”. The paper outlines the process of preparing the 2011 report and summarizes the content. The paper demonstrates how agencies and universities can collaborate to produce voluntary guidelines for the bioenergy industry and diverse management agencies that promote ecosystem services and the sustainability of agricultural and natural resources in the production of nonforest biomass crops. The concept of sustainability also includes economic and community/societal principles.

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“Bird Productivity and nest predation in agricultural grasslands” by **Christine A. Ribic**, M.J. Guzy, T.R. Anderson, **David W. Sample**, and J.L. Knack. 2012. Pp. 119-134 in C.A. Ribic, F.R. Thompson, and P.J. Pietz (eds). *Video surveillance of nesting birds*. University of California Press, Berkeley. 224 Pp.

**Customer Programs:** WDNR Bureaus of Wildlife Management and Endangered Resources; USDA Farm Service Agency and Natural Resources Conservation Service; U.S. Fish and Wildlife Service; The Nature Conservancy.

**Significance/management implications:** This paper illustrates the value of using miniature video cameras to identify nest predators of birds in grassland habitats; knowledge of the local predator community is key to understanding the system that underlies bird productivity. The research presented shows that grassland bird productivity varied as a function of habitat type and vegetation structure, habitat features (e.g., edge types, presence of suitable hibernacula sites for snakes), bird community, composition of the predator community, predator habitat availability and prey base. To design effective management strategies for grassland birds, we need to use a systems approach that takes into account all of these factors.

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“Grassland bird use of remnant prairie and Conservation Reserve Program fields in an agricultural landscape in Wisconsin” by **Christine A. Ribic**, M.J. Guzy, and **David W. Sample**. 2009. *American Midland Naturalist* 161:110-122.

**Customer Programs:** WDNR Bureaus of Wildlife Management, and Endangered Resources; USDA Farm Service Agency and Natural Resources Conservation Service; U.S. Fish and Wildlife Service Partners for Fish and Wildlife program; The Nature Conservancy.

**Significance/management implications:** This study demonstrates that the densities of individual grassland bird species vary among habitats in a landscape, depending on their preferences for vegetation structure. Successful management for grassland birds will include providing a continuum of habitat types and vegetation structure.

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“Area sensitivity in North American grassland birds: Patterns and processes” by **Christine A. Ribic**, R.R. Koford, J.R. Herkert, D.J. Johnson, N.D. Niemuth, D.E. Naugle, K.K. Bakker, **David W. Sample**, and R.B. Renfrew. 2009. *Auk* 126(2):233-244.

**Customer Programs:** WDNR Bureaus of Wildlife Management, and Endangered Resources; Other states’ natural resources agencies’ USDA Natural Resources Conservation Service; U.S. Fish and Wildlife Service Nongame Bird Program; The Nature Conservancy.

**Significance/management implications:** This study examines the concept of area sensitivity in grassland bird species, specifically a) what evidence is there for it, b) what the historical explanations for it are, c) what ecological processes could produce it, d) how differences in landscape composition affect the ability to detect area sensitivity, and e) what the conservation implications of knowing the processes behind it are.

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“Comparison of visual-based helicopter and fixed-wing forward-looking infrared surveys for counting white-tailed deer” by **Daniel J. Storm**, **Michael D. Samuel**, **Timothy R. Van Deelen**, K. D. Malcolm, **Robert E. Rolley**, N. A. Frost, D. P. Bates, and B. J. Richards. 2011. *Wildlife Biology* 17(4):431-440.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This study compared fixed-wing forward-looking infrared (FLIR) surveys to helicopter-based counts for estimation of white-tailed deer abundance. We assessed relative bias, influence of snow cover and cost. None of the methods counted more deer than the other when snow was present. Helicopter counts were lower in the absence of snow, but lack of snow cover did not apparently affect FLIR. We found that FLIR counts were generally precise when two or three replicate surveys were conducted within a few hours. However, FLIR counts differed greatly between seasons, suggesting that detection rates vary over larger time scales. Fixed-wing FLIR was more costly than visual observers in helicopters and was more restrictive in terms of acceptable survey conditions.

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“Effects of earn-a-buck and special antlerless-only seasons on Wisconsin’s deer harvest” by **Timothy R. Van Deelen, Brian J. Dhuey**, Chris N. Jacques, K. R. McCaffery, **Robert E. Rolley**, and K. Warnke. 2010. *Journal of Wildlife Management* 74(8): 1693-1700.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This paper presents an analysis of the effectiveness of earn-a-buck regulations and adding additional days of antlerless-only hunting. Earn-a-buck regulations were associated with an average increase of 2.07 deer/km<sup>2</sup> in antlerless harvest and a 0.60 deer/km<sup>2</sup> decrease in harvest of antlered deer. Providing more opportunity for hunting of antlerless deer in the form of 4- and 8-day supplemental firearm seasons was associated with 1.08 and 1.33 deer/km<sup>2</sup> increases, respectively, in antlerless harvest with trivial (0.02 and 0.09 deer/km<sup>2</sup>) decreases in harvests of antlered deer. Our analysis suggests that extra days of hunting opportunity coupled with the earn-a-buck incentive was 156 – 191% more effective at increasing antlerless harvest relative to additional days of hunting without the incentive although use of the incentive also resulted in decreased harvest of antlered deer and was disliked by many hunters. Quantifying these relationships is important for helping managers predict the costs and benefits of various hunting programs.

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“Managing second-growth forests for old-growth characteristics” by **Mike L. Worland** and **Karin S. Fassnacht**. 2012.

**Customer programs:** WDNR Bureau of Wildlife Management.

**Significance/management implications:** This article introduces Wildlife Management staff to an on-going study investigating the impact of new forest management techniques on the abundance and assemblages of bird species. Preliminary results from the pre-treatment phase of the study are presented.

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*Nest of the State-Threatened, forest-interior species Acadian Flycatcher, containing two Acadian Flycatcher eggs and one of the nest parasite Brown-headed Cowbird.*

## 2007-2009 Wildlife and Forestry Research Presentations

In addition to publishing research results, the professionals employed by the Wildlife and Forestry Research Section routinely present the results of their work in the form of presentations. Presentations range from hour-long academic seminars to short scientific talks and are given to a variety of audiences. A subset of staff presentations conducted from 2007 into 2009 is listed below.

### Nicholas Anich

Anich, N.M. Spruce grouse ecology and habitat use in Northern Wisconsin. Western Great Lakes Resource Management Conference, 18 April 2012, Ashland, WI.

Anich, N.M., M.L. Worland, and K.J. Martin. Spruce grouse in Wisconsin. Friends of Vaughn Library Program, 23 February 2012, Ashland, WI.

Anich, N.M. and T.G. Prestby. Intermediate eBird session. Wisconsin Bird Conservation Initiative Statewide Meeting, 1 October 2011, Green Bay, WI.

Anich, N.M. and T.G. Prestby. Beginner eBird session. Wisconsin Bird Conservation Initiative Statewide Meeting, 1 October 2011, Green Bay, WI.

Anich, N.M., M.L. Worland, and K.J. Martin. Spruce grouse ecology in Wisconsin. Wisconsin Bird Conservation Initiative Statewide Meeting, 30 September 2011, Green Bay, WI.

Anich, N.M. Spruce grouse research update. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Anich, N.M., M.L. Worland, and K.J. Martin. Spruce grouse in Wisconsin. Wisconsin DNR Northern Region Wildlife Management Annual Summer Meeting, 30 August 2011, Ashland, WI.

Grveles, K., N. Anich, J. Trick, and J. Goyette. Kirtland's Warblers in Wisconsin. Joint Meeting of the Wisconsin Chapter of The Wildlife Society and Society of American Foresters, 3 March 2011, Wisconsin Dells, WI.

Anich, N.M., M.L. Worland, and K.J. Martin. Spruce grouse research in Northern Wisconsin. Joint Meeting of the Wisconsin Chapter of The Wildlife Society and Society of American Foresters, 2 March 2011, Wisconsin Dells, WI.

Anich, N.M., M.L. Worland, and K.J. Martin. Spruce grouse in Wisconsin. Chequamegon Bay Birders, November 2010, Washburn, WI.

Anich, N.M., M.L. Worland, and K.J. Martin. Spruce grouse habitat use in Wisconsin. 2<sup>nd</sup> Science in the Northwoods Conference, 30 September 2010, Boulder Junction, WI.

Anich, N.M., M.L. Worland, and K.J. Martin. Spruce grouse in Wisconsin. Kemp Natural Resources Station, 7 July 2010, Woodruff, WI.

Anich, N.M., J.A. Trick, and K. Grveles. Kirtland's Warblers nesting in Wisconsin. Wisconsin Bird Conservation Initiative, 6 November 2009, La Crosse, WI.

Anich, N.M., J.A. Trick, and K. Grveles. 2009 Kirtland's Warbler monitoring in Wisconsin. Kirtland's Warbler Recovery Team Summer Meeting, 16 July 2009, Grayling, MI.

### **Dustin Bronson**

Bronson, D.R., X. Song, M. Goulden, K.C. Clark, T.P. Meyers, P. Bolstad, J. Chen, A. Noormets, D. Dragoni, D.Y. Hollinger, J.W. Munger, S.C. Wofsy, T.C. Martin, R.K. Monson, D.D. Baldocchi, A.R. Desai, E.S. Euskirchen, B.R. Helliker, B. R.. Forest Canopy Temperature: a comparison between an isotopic approach and photosynthesis-weighted air temperature. American Geophysical Union annual meeting, December 2011, San Francisco, CA.

Bond-Lamberty, B., D.R. Bronson, E. Bladyka, and S.T. Gower. A comparison of trenched plot techniques for partitioning soil respiration. American Geophysical Union annual meeting, December 2010, San Francisco, CA.

### **Brian Dhuey**

Dhuey B.J. Operation Deer Watch. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Dhuey B.J. Wildlife surveys and database project. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Dhuey B.J. Public involvement in deer management. Deerfest, July 2011, Oshkosh, WI.

Dhuey B.J. Deer hunter wildlife survey. Milwaukee Sports Show, March 2011, Milwaukee WI.

Dhuey B.J. Deer hunter wildlife survey. Wisconsin Deer Classic, January 2011, Green Bay, WI.

Dhuey B.J., T. Kropf-Beringer, J. Fleener, and S. Rossler. Online deer hunter wildlife surveys. Midwest Fish and Wildlife Conference, 12-15 December 2010, Minneapolis, MN.

### **Karin Fassnacht**

Worland, M.L. and K.S. Fassnacht. Managed old-growth research. Joint Meeting of Science Services Wildlife and Forestry Research Section and the Bureau of Wildlife Management, 21 September 2011, Madison, WI.

Fassnacht, K.S., M.L. Worland, E.A. Padley, N.M. Anich. Measurements for forest and wildlife research. UW-Madison Wildlife Summer Camp, 24 May 2011, various sites in northcentral WI.

Martin, K.J., K.S. Fassnacht, B.J. Palik, T.W. Steele, C.G. Lorimer, M. Worland, and S. Steinhoff. Managing northern hardwood forests for old-growth characteristics and forest products. Joint meeting of the Wildlife Society & the Society of American Foresters, 2 March 2011, Wisconsin Dells, WI. Poster session.

Padley, E.A., D.M. Donner, K.S. Fassnacht, R.S. Zalesny, B. Birr, and K.J. Martin. Managing carbon sequestration and storage in northern hardwood forests. Joint meeting of the Wildlife Society & the Society of American Foresters, 2 March 2011, Wisconsin Dells, WI. Poster session.

Worland, M.L., K.J. Martin, K.S. Fassnacht, and M.J. Mossman. Managing northern hardwood forests for old growth characteristics: impacts on avian communities. Joint meeting of the Wildlife Society & the Society of American Foresters, 2 March 2011, Wisconsin Dells, WI. Poster session.

Martin, K.J., K.S. Fassnacht, B.J. Palik, T.W. Steele, C.G. Lorimer, M. Worland, and S. Steinhoff. Managing northern hardwood forests for old-growth characteristics and forest products. 2011 WDNR Science Open House, 18 February 2011, Madison, WI. Poster session.

Martin, K.J., K.S. Fassnacht, B.J. Palik, T.W. Steele, C.G. Lorimer, M. Worland, and S. Steinhoff. Managing northern hardwood forests for old-growth characteristics and forest products. 2011 WDNR Science Services Statewide, 17 February 2011, Madison, WI. Poster session.

Worland, M.L., K.J. Martin, and K.S. Fassnacht. How the diversity and conservation value of northern hardwood avian communities vary with old growth forest attributes. Midwest Fish and Wildlife Conference, December 2010, Minneapolis, MN.

Fassnacht, K.S. Managed old-growth research in Northern Wisconsin. WDNR Wildlife Management Ecology Section retreat, 20 September 2010, Woodruff, WI.

Steinhoff, S., K.S. Fassnacht, and M.L. Worland. Managed old-growth study. Wisconsin Woodland Owners Association Field Day, 28 August 2010, Star Lake, WI.

Fassnacht, K.S., K.J. Martin, M.L. Worland, T. Steele, and S. Steinhoff. Managed old-growth research in Northern Wisconsin. WDNR Science Seminar Series, 19 October 2009, Madison, WI.

Fassnacht, K.S. Managed old-growth study. The Lake Country Institute, Institutes for Journalism & Natural Resources, and Society of Environmental Journalists as the SEJ post-conference tour, 13 October 2009, Hiles, WI.

Fassnacht, K.S., E.A. Padley, K.J. Martin, C.G. Lorimer, T.W. Steele, B.J. Palik, M. Worland, S. Steinhoff. Managing second-growth northern hardwood forests for old-growth characteristics and forest products. Science in the Northwoods, 29 September 2010, Boulder Junction, WI.

Fassnacht, K.S., K.J. Martin, M.L. Worland, T. Steele, and S. Steinhoff. Managed old-growth research in Northern Wisconsin. UW-Madison Forest Landscape Ecology Laboratory gathering, 23 September 2009, Madison, WI.

### **Ron Gatti**

Gatti, R. Evaluating factors limiting blue-winged teal survival and production in Wisconsin. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Gatti, R. Evaluation of landscape management in the Stewardship Fund's Habitat Restoration Area Program. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

### **Rich Henderson**

Henderson, R.A. Fire effects: response of species and ecosystems to fire in WI. WI DNR-NER Prescribed Burn In-Service, 7 March 2012, Shawano, WI.

Henderson, R.A. Converting cool-season fields and pastures to native prairie. The Prairie Enthusiasts Annual Conference, 25 February 2012, Menomonie, WI.

Henderson, R.A. History and ecology of prairie in Wisconsin and the Upper Midwest. Kettle Moraine Natural History Association meeting, 19 January 2012, Fond du Lac, WI.

Henderson, R.A. Oak ecosystem management. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Henderson, R.A. Burn refugia: invertebrate conservation. WI DNR-SER Prescribed Burn In-Service, 7 February 2011, West Bend, WI.

Henderson, R.A. Burn refugia: invertebrate conservation. WI DNR-SCR Prescribed Burn In-Service, 25 January 2011, Fitchburg, WI.

Henderson, R.A. Converting non-native cool-season grass to native prairie. Grassland Restoration Network Workshop, 4 October 2010, Richmond, IL.

Henderson, R.A. Influence of patch size, isolation, and fire history on hopper communities in eight WI prairies. 22<sup>nd</sup> North American Prairie Conference, 5 August 2010, Cedar Falls, IA.

Henderson, R.A. Rosinweed gall wasp response to fire. 22<sup>nd</sup> North American Prairie Conference, 3 August 2010, Cedar Falls, IA.

Henderson, R.A. and S.B. Sauer. Silphium gall wasps: little-known prairie specialists. 22<sup>nd</sup> North American Prairie Conference, 3 August 2010, Cedar Falls, IA.

Henderson, R.A. Prairie restoration planning, techniques, and methods. Military Ridge Prairie Heritage Area Landowner Workshop, 13 March 2010, Dodgeville, WI

Henderson, R.A. History and ecology of prairie in Wisconsin and the Upper Midwest. Kettle Moraine Natural History Association meeting, 6 March 2010, Eagle, WI.

Henderson, R.A. History and ecology of prairie in Wisconsin and the Upper Midwest. UW-Madison Arboretum's Naturalist Winter Enrichment Lecture Series, 4 February 2010, Madison, WI.

### **Scott Hull**

Walling, S., S.D. Hull, and C. Williams. Wisconsin sustainable planting and harvesting guidelines for nonforest biomass. International Biomass Conference, 16 April 2012, Denver, CO.

Reetz, M., S. Lutz, S.D. Hull, and S. Fandel. A GIS-based approach to understanding Wisconsin's sharp-tailed grouse at larger scales. Western Great Lakes Resources Conference, April 2012, Ashland, WI.

Reetz, M., S. Lutz, S.D. Hull, and S. Fandel. The Northwest Sands Corridor Plan. Wisconsin Sharp-tailed Grouse Society Meeting, April 2012, Phillips, WI.

Williams, C., S.D. Hull, and J. Artnzen. Wisconsin's sustainable planting and harvest guidelines for nonforest biomass: a collaborative effort to encourage greater sustainability of natural resource use and development. Wisconsin Chapter of The Wildlife Society, 1 March 2012, Wausau, WI.

Reetz, M., S. Lutz, S.D. Hull, and S. Fandel. Wisconsin's sharp-tailed grouse: a plan for conservation success. Wisconsin Chapter of the Wildlife Society, March 2012, Wausau, WI.

Dittrich, J., J. Riddle and S.D. Hull. Preliminary estimates of detection probability and abundance from ring-necked pheasant point count methods. Wisconsin Chapter of the Wildlife Society Winter Meeting, 28 February 2012, Wausau, WI.

Godar, A., J.D. Riddle, and S.D. Hull. Understanding northern bobwhite distribution and abundance changes in Wisconsin using an occupancy modeling approach. Wisconsin Chapter of The Wildlife Society, 28 February 2012, Wausau, WI.

Kamke, C., S.D. Hull, P. Engman, and M. Reetz. Sharp-tailed grouse daily movements and home range size in declining and stable subpopulations in northwestern Wisconsin. Wisconsin Chapter of The Wildlife Society, 28 February 2012, Wausau, WI.

Hull, S.D., C. Williams, and J. Arntzen. Wisconsin's sustainable planting and harvest guidelines for nonforest biomass: a collaborative effort to encourage greater sustainability of natural resource use and development. Midwest Fish and Wildlife Conference, 7 December 2012, Des Moines, IA.

Dittrich, J., J. Riddle, and S.D. Hull. Detection probability, modern point count methods, and forthcoming advances in Wisconsin. Wisconsin Bird Conservation Initiative Conference, 29 September 2011, Green Bay, WI.

Hull, S.D. Wisconsin's sustainable planting and harvesting guidelines for nonforest biomass. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Hull, S.D., S. Fandel, M. Reetz, and S. Lutz. Sharp-tailed grouse research project update. Wisconsin Sharp-tailed Grouse Society Annual Meeting, 21 April 2012, Phillips, WI.

Reetz, M., S. Lutz, S.D. Hull, and S. Fandel. Sharp-tailed grouse from the shadows? What Wisconsin's grouse are telling us about conserving an important ecological landscape. 72nd Midwest Fish & Wildlife Conference, 7 December 2011, Des Moines, IA.

Hull, S.D., C. Williams, and S. Walling. Wisconsin sustainable planting and harvesting guidelines for nonforest biomass: overview, vision, and next steps. The Nature Conservancy Webinar, 29 November 2011, Madison, WI.

Walling, S. and S.D. Hull. Wisconsin sustainable planting and harvesting guidelines for nonforest biomass. Wisconsin Department of Agriculture, Trade and Consumer Protection Board Meeting, 7 September 2011, Madison, WI.

Reetz, M., S. Lutz, S.D. Hull, and S. Fandel. Improving linkages in the Northwest Sands Ecological Landscape. Wisconsin DNR Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, September 2011, Madison, WI.

Reetz, M., S. Lutz, S.D. Hull, and S. Fandel. A landscape approach to understanding sharp-tailed grouse persistence. Wisconsin DNR Central Office Ecological Retreat, September 2011, Grantsburg, WI.

Hull, S.D. Upland wildlife research in Wisconsin. The Wildlife Society-Stevens Point Student Chapter, 25 October 2011, Stevens Point, WI.

Hull, S.D. Wisconsin sustainable planting and harvesting guidelines for nonforest biomass. Wisconsin Bioenergy Initiative – Biomass Conference, 6 October 2011, Madison, WI.

Hull, S.D. and S. Walling. Update on nonforest biomass sustainability guidelines. Wisconsin Department of Natural Resources Board Meeting, 28 September 2011, Kenosha, WI.

Hull, S.D. and S. Walling. Update on nonforest biomass sustainability guidelines. Wisconsin Bioenergy Council, 27 July 2011, Madison, WI.

Hull, S.D., D.W. Sample, B. Sadler, L. Kardash, S. Fandel, B. Hess, P. Dunn, and D. Drake. Greater prairie-chicken translocation update. Central Wisconsin Grassland Conservation Area Partnership Meeting, July 2011, Stevens Point, WI.

Hull, S.D. U.S. Agricultural policy and wildlife conservation. Guest lecture to UW-Madison Wildlife Ecology Class, 20 April 2011, Madison, WI.

Fandel, S. and S.D. Hull. Sharp-tailed grouse in Wisconsin conservation planning for the future. Wisconsin County Forest Association Annual Meeting, April 2011, Wisconsin Rapids, WI.

Fandel, S. and S.D. Hull. Sharp-tailed grouse in Wisconsin conservation planning for the future. WDNR Forest Operations Team Meeting, February 2011, Wisconsin Rapids, WI.

Reetz, M., S. Lutz, S.D. Hull, and S. Fandel. Building a Conservation Plan for the sharp-tailed grouse of Wisconsin. WDNR Policy Team Meeting, February 2011, Wisconsin Dells, WI.

Hull, S.D., J. Arntzen, and K.J. Martin. Nonforest biomass sustainability: lessons from Wisconsin. Midwest Fish and Wildlife Conference, 12 December 2010, Minneapolis, MN.

Reetz, M., S. Lutz, S.D. Hull, and S. Fandel. Wisconsin's sharp-tailed grouse: a new take on old wisdom. Wisconsin Sharp-tailed Grouse Society Meeting, September 2010, Gilman, WI.

Sparrow, M., S.D. Hull, S. Fandel, B. Vander Zouwen, and D. Weidert. Voluntary public access – Habitat Incentive Program. Partners Meeting, 13 August 2010, Madison, WI.

Hull, S.D., D.W. Sample, B. Sadler, L. Kardash, S. Fandel, B. Hess, P. Dunn, and D. Drake. Greater prairie-chicken translocation update. Central Wisconsin Grassland Conservation Area Partnership Meeting, July 2010, Stevens Point, WI.

Lutz, R.S., M. Reetz, S.D. Hull, and K.J. Martin. Sharp-tailed grouse research program. Wisconsin Department of Natural Resources Science Operations Center Seminar Series, March 2010, Madison, WI.

### **Rich Kahl**

Kahl, R. Coordination of the Migratory Bird Banding Program. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

### **Tricia Knoot**

Knoot, T.G., J. Tyndall, J. Randall, and J. Blanchong. Woody biomass harvesting on private lands. Tri-state Forestry Conference, March 2012, Sinsinawa, WI.

Knoot, T.G. and M. Rickenbach. The social networks of professional foresters in a private lands context: the opportunities and constraints of who you know. The 17<sup>th</sup> International Symposium on Society and Resource Management (ISSRM), University of Wisconsin-Madison, June 2011, Madison, WI.

Tyndall, J.C. and T.G. Knoot. The social potential for developing alternative bioenergy markets in the Midwest: A tale of three feedstocks. The 17<sup>th</sup> International Symposium on Society and Resource Management (ISSRM), University of Wisconsin-Madison, June 2011, Madison, WI.

Bosworth, L., T G. Knoot, J.C. Tyndall, and L. Westphal. Variation and synergies in natural resource policy across state borders: implications for understanding and addressing forest change across the Driftless Area of the Midwest. The 17<sup>th</sup> International Symposium on Society and Resource Management (ISSRM), University of Wisconsin-Madison, June 2011, Madison, WI. Poster session.

Knoot, T.G., J. Tyndall, J. Randall, and J. Blanchong. The adaptive capacity of urban communities to address threats to their green infrastructure: A case study of the spread of the Emerald Ash Borer. Resilience 2011, Second International Science & Policy Conference, March 2011, Tempe, AZ.

Knoot, T.G., J. Tyndall, J. Randall, and J. Blanchong. The ecological and social potential for woody biomass utilization in the U.S. Cornbelt. Midwest Biomass Conference, November 2010, Dubuque, IA.

Knoot, T.G., and M. Rickenbach. Social capital and private forests: The role of personal networks in environmental decision-making. Association of American Geographers (AAG) annual meeting, April 2010, Washington, D.C.

Knoot, T.G., M. Rickenbach, and C. Wagner. 2008 Statewide BMP Monitoring Report: Non-industrial forest owners and their social networks. Wisconsin DNR Forestry BMP Advisory Committee Meeting, October 2009, Stevens Point, WI.

Knoot, T.G., M. Rickenbach, and J. Breschak. Linking biophysical landscape patterns and social network structures: Framing the analytical tasks through hypothetical case studies of rivers and land use. Capturing Context Conference, Columbia University, June 2009, New York, NY.

### **David MacFarland**

MacFarland, D.M. Carnivore research and management in Wisconsin. Wisconsin Bear Hunters Association annual convention, April 2012, Wausau, WI.

MacFarland, D.M. Black bear research update. Wisconsin Bear Hunters Association Executive Board, March 2012, Wausau, WI.

MacFarland, D.M. Trapping wildlife for research. Wisconsin Department of Natural Resources Fur School, March 2012, Wausau, WI.

MacFarland, D.M. Current state of beaver management and research in Wisconsin. Wisconsin Beaver Task Force, February 2012, Wausau, WI.

MacFarland, D.M. Beaver research in Wisconsin, past, present and future. Beaver Management Public Listening Sessions, October 2011, Onalaska, Oshkosh, Hayward and Rhinelander, WI.

MacFarland, D.M. Central Wisconsin bobcat population estimate and habitat model. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

MacFarland, D.M. Tetracycline-based black bear population estimate. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

MacFarland, D.M. Management implications of current bear and bobcat research. Science Services Statewide Meeting, September 2011, Fitchburg, WI.

MacFarland, D.M. Carnivore recovery in the upper Great Lakes. Wisconsin Coverts Project Reunion Banquet, August 2011, Trego, WI.

MacFarland, D.M. Furbearer population monitoring in Wisconsin. Quad-State Mississippi River Management Committee, July 2011, Onalaska, WI.

MacFarland, D.M. Current and future carnivore research. USDA Wildlife Services Statewide Meeting, April 2011, Wausau, WI.

MacFarland, D.M. Bear research and monitoring on public lands. Wisconsin County Forest Management Seminar, March 2011, Keshena, WI.

MacFarland, D.M. Current furbearer research and monitoring programs. Wisconsin Trappers Association Annual Meeting, March 2011, Wausau, WI.

MacFarland, D.M. Study design and public involvement in Wisconsin's bear monitoring program. Wildlife Management Statewide Meeting, January 2011, Sheboygan, WI.

MacFarland, D.M. Current state of the bear population and future research. Conservation Congress Bear Committee, December 2010, Stevens Point, WI.

MacFarland, D.M. Bears and bear hunting in Wisconsin. Edgar Whitetail Night, November 2010, Edgar, WI.

MacFarland, D.M. Recovery and expansion of Wisconsin's native carnivores. Friends of Crex Meadows Banquet, November 2010, Grantsburg, WI.

MacFarland, D.M. Bears of the Northwoods: ecology, physiology and management. Nicolet College Learning in Retirement, October 2010, Rhinelander, WI.

MacFarland, D.M. Using math and science to manage Wisconsin's black bears. Rhinelander Environmental Studies Academy, October 2010, Rhinelander, WI.

MacFarland, D.M. Management implications of current carnivore research. Wildlife Ecology Section Meeting, September 2010, Woodruff, WI.

MacFarland, D.M. Bear management in Wisconsin, past and present. Michigan Natural Resources Commission, August 2010, Escanaba, MI.

MacFarland, D.M. Bobcat population trends. Furbearer Committee Midwest Association of Fish and Wildlife Agencies, April 2010, Deadwood, SD.

Bartnick, T., T.R. Van Deelen, J. Van Stappen, and D.M. MacFarland. Estimating the white-tailed deer population using remote infrared-triggered cameras in the Apostle Islands National Lakeshore. The Wildlife Society Wisconsin Chapter Conference, March 2010, Rothschild, WI.

Clare, J.D., B.L. Sloss, D.M. MacFarland, and E.M. Anderson. Population structure and source sink dynamics of the bobcat in Northern Wisconsin. The Wildlife Society Wisconsin Chapter Conference, March 2010, Rothschild, WI.

Clare, J.D., E.M. Anderson, D.M. MacFarland, and B.L. Sloss. Estimating bobcat density using scat-detecting dogs and trail camera grids. The Wildlife Society Wisconsin Chapter Conference, March 2010, Rothschild, WI.

Clare, J.D., E.M. Anderson, J.I. Larson, and D.M. MacFarland. Bobcat intra-carnivore guild relations in Central Wisconsin at multiple scales. The Wildlife Society Wisconsin Chapter Conference, March 2010, Rothschild, WI.

MacFarland, D.M., T.R. Van Deelen, and K.J. Martin. Reduced woody debris levels associated with biomass removal. The Wildlife Society Wisconsin Chapter Conference, March 2010, Sheboygan, WI.

MacFarland, D.M. Where's the slash? Quantifying woody debris after harvest and evaluating its role in small mammal communities. Wisconsin DNR Science Services research seminar, November 2009, Madison, WI.

MacFarland, D.M. and T.R. Van Deelen. A simulation of station-based population index response to changes in population density. The Wildlife Society Annual Conference, September 2009, Monterey, CA.

### **Karl Martin**

Martin, K.J. The benefits of being a Wildlife Society Member and an overview of DNR's research program. 2012. University of Wisconsin, Madison.

Martin, K.J. DNR's research program and the role of professional societies in your career. University of Wisconsin Stevens Point Wildlife Society Chapter. 2011. Stevens Point, WI.

Martin, K.J. Adaptation Planning in Wisconsin: The Wisconsin Initiative on Climate Change Impacts (WICCI) Wildlife Working Group. Ohio's Wildlife in a Changing Climate: Sustaining Habitats and Diversity, December 2011, Columbus, OH.

Martin, K.J. The history and future of state agency research programs. Midwest Fish and Wildlife Conference, December 2011, Des Moines, Iowa.

Martin, K.J. Wisconsin's Wildlife and Forestry Research Program. North American Wildlife and Natural Resource Conference, Association of Fish and Wildlife Agencies (AFWA) Science and Research Committee, September 2011, Omaha, NB.

Martin, K.J. Research Update: Upper Midwest Great Lakes Landscape Conservation Cooperative Climate Change Research Update. Association of Fish and Wildlife Workshop Midwest Fish and Wildlife Conference, December 2010, Minneapolis, MN.

Martin, K.J., O.E. LeDee, and M.W. Meyer. Building a coalition for conservation under climate change. The Wildlife Society's 17th Annual Conference, October 2010, Snowbird, UT.

Martin, K.J. Moderator/Organizer – WI DNR/USFWS Undergraduate Conservation Training Pilot Project Meeting. The Wildlife Society's 17th Annual Conference, October 2010, Snowbird, UT.

Martin, K.J. Impacts of Climate Change on Wisconsin's Wildlife Communities. The Wildlife Society's 16th Annual Conference, September 2009, Monterey, CA.

**Michael Meyer**

Meyer, M.W. Mercury exposure trends in fish-eating birds of the Western Great Lakes. Western Great Lakes Resource Management Conference, 17-18 April 2012, Ashland, WI.

Meyer, M.W. Recent advances in avian telemetry - Wisconsin common loon migration study. WBCI Annual Meeting, 29 September 2011, Green Bay, WI.

Meyer, M.W. Measuring the value of wildlife habitat restoration on northern Wisconsin lakes – the Wisconsin Lakeshore Restoration Project. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Meyer, M.W. Migration ecology of common loons and exposure to avian botulism in the Great Lakes. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Meyer, M.W. Bald eagle and osprey research and management in Wisconsin. Land o Lakes Wildlife Club, 13 September 2011.

Meyer, M.W. Implications of climate change for Wisconsin wildlife. Wisconsin Coverts Conference, August 2011, Winter, WI.

Meyer, M.W., P. Rasmussen, C. Watras K. Kenow, and B. Fevold. Bi-phasic trends in mercury concentrations in blood of Wisconsin common loons during 1992-2010. 10<sup>th</sup> Annual Conference on Mercury as a Global Pollutant, 24 July 2011, Halifax, NS, CA. Poster session.

Meyer, M.W. Recent advances in avian telemetry - Wisconsin common loon migration study. Vilas County Lakes Fair, 17 June 2011, St. Germain, WI.

Meyer, M.W. Using citizen scientists to monitor loons and lakes in Northern Wisconsin. Wisconsin Association of Lakes Annual Meeting, 12 April 2011, Green Bay, WI.

Meyer, M.W. Natural resources research in Northern Wisconsin. USFS Brown Bag Seminar Series, March 2011, Rhinelander, WI.

Meyer, M.W. WICCI Wildlife Working Group Assessment. USFS Brown Bag Seminar Series, October 2010, Rhinelander, WI.

Meyer, M.W. The Wisconsin shoreland restoration project. 2<sup>nd</sup> Science in the Northwoods Conference, 29 August 2010, Boulder Junction, WI.

Meyer, M.W. Two decades of loon research in Wisconsin. 2<sup>nd</sup> Science in the Northwoods Conference, 29 August 2010, Boulder Junction, WI.

Meyer, M.W. Evaluating the ecological benefits of lakeshore restoration in Northern Wisconsin. Northwestern Wisconsin Lakes Conference, Muskellunge Lake Association Annual Meeting, 7 August 2010.

Meyer, M.W. Indicators and assessments of shoreland health. Northern Lakes Workshop, Nicolet College, 19 June 2010, Rhinelander, WI.

Meyer, M.W. Wildlife responses to changing lake levels. Our Changing Lakes: Low Lake Levels in Northern Wisconsin, A Workshop for Lake Communities, 28 July 2009, Eagle River, WI.

### **Mike Mossman**

Mossman, M.J. Nature's resilience in Baxters Hollow State Natural Area. Natural Resources Foundation, 17 May 2012.

Mossman, M.J. Canoe exploration of the Lower Baraboo River. Natural Resources Foundation, 15 May 2012, Portage, WI.

Mossman, M.J. Birds of the Leopold-Pine Island Important Bird Area (IBA). Wisconsin Society for Ornithology Annual Convention, 13 May 2012, Baraboo WI.

Mossman, M.J. and J. Kenney. Badger Army Ammunition Plant: history, nature & future. Natural Resources Foundation, 12 May 2012.

Mossman, M.J., Y. Steele, and M. McDonald. Pioneering eBird to monitor birds of the Leopold-Pine Island Important Bird Area. Wisconsin Soc for Ornithology, Annual Convention, 11 May 2012, Baraboo WI.

Mossman, M.J. Birds of the Badger Army Ammunition Plant. Wisconsin Society for Ornithology, Annual Convention, 11 May 2012.

Mossman, M.J., B. Hutnik, and A. Pidgeon. Forest management and birds on the Lower Wisconsin State Riverway. Field class for Wildlife Habitat Relationships course, UW Department of Forestry and Wildlife Ecology, 26 April 2012.

Mossman, M.J. Birds and wildflowers at Baxters Hollow. Madison Audubon Society, 21 April 2012, Baraboo, WI.

Mossman, M.J., Y. Steele, and S. Swenson. The Leopold-Pine Island Important Bird Area: science, partnership and adaptive management. Annual Meeting of the Wisconsin Chapter, The Wildlife Society, 1 March 2012, Rothschild, WI.

Mossman, M.J. and L. Hartman. Natural history of the turkey vulture. Kettle Moraine State Forest, 13 October 2011, Campbellsport, WI.

Mossman, M.J. and L. Hartman. A closer look at turkey vultures. Natural Resources Foundation, 9 October 2011.

Mossman, M.J. and L.M. Hartman. A closer look at turkey vultures. Baraboo Range Preservation Association and Stevens Point Audubon Chapter, 8 October 2011, Devils Lake State Park, WI.

Mossman, M.J., Y. Steele, and S. Swenson. Monitoring, adaptive management and partnership on the Leopold-Pine IBA. Annual WI Bird Conservation Initiative Meeting "Evaluating our work: Moving beyond surveillance monitoring", 29 September 2011, Green Bay, WI.

Mossman, M.J. Ecology, history and management at the Badger Army Ammunition Plant. UW-Richland Campus Biology field trip, 28 September 2011, Baraboo, WI.

Mossman, M.J. Management of forest communities for birds. Forest Guild Lake States Regional Meeting, 23 September 2011, Prairie du Chien, WI.

Mossman, M.J. The Leopold-Pine Island Important Bird Area. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Mossman, M.J. Small mammals of the Lower Wisconsin River. Natural Resources Foundation, 24 August 2011, Blue River, WI.

Simoni, J., M. Mossman, S. Swenson and Y. Steele. Implementing citizen-based monitoring on the Leopold-Pine Island Important Bird Area (IBA), an IBA Prototype. Poster. Midwest Bird Conservation and Monitoring Conference, 2-4 August 2011, Zion, IL.

Mossman, M.J. and L. Hartman. Natural history of the turkey vulture. Hunt Hill Audubon Sanctuary, 16 July 2011, Spooner, WI.

Mossman, M.J. Bird and habitat walk. Wisconsin Tree Farm Annual Field Day, 6 June 2011, Boaz, WI.

Mossman, M.J. Powder, people, and place: conservation and sustainability on the Sauk Prairie. International Symposium on Society and Resource Management, 5 June 2011, Baraboo WI.

Mossman, M.J., S. Swenson, and Y. Steele. Birds and conservation on the Leopold-Pine Island Important Bird Area. Madison Audubon Society, 22 May 2011, Baraboo, WI.

Mossman, M.J. Bird ecology at Baxters Hollow. Stevens Point Audubon Society, 21 May 2011, Baraboo, WI.

Mossman, M.J., Y. Steele, and R. Roth. Birds and habitats at Mazomanie Wildlife Area. Natural Resources Foundation, 18 May 2011, Mazomanie, WI.

Mossman, M.J., J. Kenney, and A. Duff. Inside Badger Army Ammunition Plant. Natural Resources Foundation, 7 May 2011, Baraboo, WI.

Mossman, M.J. and Y. Steele. The Lower Wisconsin River Important Bird Area, and bird history at Westpoint. Westpoint Area Historical Society, 7 May 2011, Lodi, WI.

Mossman, M.J. Baraboo Hills spring wildflower and bird hike. Madison Audubon Society, 23 April 2011, Messenger Creek, Devils Lake State Park, Baraboo, WI.

Mossman, M.J. The Baraboo Hills and Badger Army Ammunition Plant: birds, history and management of a huge forest and grassland ecosystem. Stevens Point Audubon Society, 20 April 2011, Stevens Point, WI.

Mossman, M.J. Birds and habitats of the Lower Wisconsin State Riverway. Steuben Community presentation, 19 February 2011, Steuben, WI.

Mossman, M.J. Birds of the Lower Wisconsin State Riverway: research, monitoring and adaptive management. WDNR Science Services Open House "Science Supporting Decisions" 18 February 2011. Poster session.

Mossman, M.J., Y. Steele, and S. Swenson. The Leopold-Pine Island Important Bird Area: science, partnership and adaptive management. Wisconsin Wetlands Association Annual Conference, 16-17 February 2011, Baraboo, WI.

Mossman, M.J. and L.M. Hartman. Turkey vulture natural history. Kickapoo Valley Reserve Winter Fest, 9 January 2011, LaFarge, WI.

Mossman, M.J. and L.M. Hartman. Natural history of the turkey vulture. Wehr Nature Center, Milwaukee County Parks, 17 November 2010, Franklin, WI.

Mossman, M.J. and L.M. Hartman. Natural history of the turkey vulture. Horicon Marsh WDNR Naturalist Series, 6 October 2010, Horicon, WI.

Mossman, M.J. and L.M. Hartman. Natural history of the turkey vulture. Whooping Crane Festival, 13 September 2010.

Mossman, M.J. Birds and management issues on the Lower Wisconsin State Riverway. Lower Wisconsin State Riverway Board and public meeting, 9 September 2010, Spring Green, WI.

Mossman, M.J. and J. Barzen. Ecology, history and management on the Badger Army Ammunition Plant. Sauk Prairie Conservation Alliance, 5 September 2010, Prairie du Sac, WI.

Mossman, M.J. Birds of the Baraboo Hills. For Celebration: 50 years of Conservation in the Baraboo Hills. The Nature Conservancy, Baraboo Range Preservation Association, 27 June 2010.

Mossman, M.J. and Y. Steele. Bird and habitat Walk. Wisconsin Woodland Owners Association Field Day, 12 June 2010, Excelsior, WI.

Mossman, M.J., Y. Steele, and D. Goltz. Swamp birds of the Lower Wisconsin River. Natural Resources Foundation, 21 May 2010.

Mossman, M.J., Y. Steele, and D. Goltz. Birds of the Millville Forest. Natural Resources Foundation, 20 May 2010.

Mossman, M.J. Update on Bird Studies on the Lower Wisconsin State Riverway. WDNR LWSR Staff Refresher Training, 19 May 2010, Sauk City, WI.

Mossman, M.J. Baxters Hollow ecology and history. The Nature Conservancy, 15 May 2010, Baraboo, WI.

Mossman, M.J., Y. Steele, and S. Swenson. Leopold's land ethic in action: conservation and management on the Leopold-Pine Island Important Bird Area. Natural Resources Foundation, 14 May 2010, Baraboo, WI.

Mossman, M.J. and Y. Steele. Birds of the Leopold-Pine Island Important Bird Area: an introduction to bird identification and bird-habitat relationships. Leopold Legacy Center, 8 May 2010, Baraboo, WI

Mossman, M.J., A. Duff, and J. Kenney. Exploring the Badger Army Ammunition Plant. Natural Resources Foundation, 7 May 2010, Baraboo, WI.

Mossman, M.J. Baraboo Hills wildflowers and ecology. Madison Audubon Society, 25 April 2010, Leland, WI.

Mossman, M.J., Y. Steele, and S. Swenson. Nocturnal frog and bird survey on the Leopold-Pine Island Important Bird Area. Natural Resources Foundation, 23 April 2010. Baraboo WI.

Mossman, M.J. and Y. Steele. The Lower Wisconsin River Important Bird Area, and management implications. WDNR LWSR Planning Team, 18 March 2010, Dodgeville, WI.

Mossman, M.J. Monitoring forests and birds on the Lower Wisconsin State Riverway: providing a missing link in adaptive management. WDNR Wildlife and Forestry Research Seminar Series, 16 December 2009, Madison, WI.

Mossman, M.J. and L.M. Hartman. Turkey vulture biology and esthetics. Baraboo Range Preservation Association, 10 October 2009, Devils Lake State Park, WI.

Mossman, M.J. and L.M. Hartman. Natural history of the Turkey Vulture. Coulee Region Audubon Society, 16 September 2009, LaCrosse, WI.

Mossman, M.J., J. Kenney, and C. Karr. Birds of Badger Army Ammunition Plant. Natural Resources Foundation, 22 August 2009, Baraboo, WI.

Mossman, M.J. and J. Kenney. Birds and history at the Badger Army Ammunition Plant. Madison Audubon Society, 14 June 2009, Baraboo, WI.

Mossman, M.J. and Y. Steele. Bird friendly forestry. Driftless Area Initiative Landowner Workshop, 6 June 2009, LaFarge, WI.

### **Robert Rolley**

Rolley, R.E. Bobcat population monitoring and harvest management in Wisconsin and furbearer population modeling. Wisconsin Department of Natural Resources, Wildlife Management, Fur School, 7 March 2012, Madison, WI.

Rolley, R.E. Deer population estimation. Lecture for complexity and conservation of white-tailed deer course at University of Wisconsin, Department of Forestry and Wildlife Ecology, 15 November 2011, Madison, WI.

Rolley, R.E. Deer population monitoring in Wisconsin. Initial DNR meeting with the White-tailed deer trustee, 8 November 2011, Madison, WI.

Rolley, R.E. Spatial and temporal trends in CWD prevalence. Initial DNR meeting with the White-tailed deer trustee, 8 November 2011, Madison, WI.

Rolley, R.E. Investing in Wisconsin's whitetails. Midwest Deer and Wild Turkey Study Group Annual Meeting, 26 September 2011, Grayling, MI.

Rolley, R.E. Monitoring deer populations in the CWD Management zone. Joint meeting of Wildlife and Forestry Research Section and Bureau of Wildlife Management, 21 September 2011, Madison, WI.

Rolley, R.E. Beaver population monitoring and effects on ecosystems. Beaver Task Force Meeting, 20 July 2011, Wausau, WI.

Rolley, R.E. CWD surveillance update and deer population status. Interagency CWD Health and Science Team, 12 April 2011, Madison, WI.

Rolley, R.E. CWD surveillance update. Joint Meeting on Chronic Wasting Disease, Illinois DNR & Wisconsin DNR, 8 April 2011, Janesville, WI.

Rolley, R.E. Bobcat population monitoring and harvest management in Wisconsin and furbearer population modeling. Wisconsin Department of Natural Resources, Wildlife Management, Fur School, 6 April 2011, Madison, WI.

Rolley, R.E. Bobcat population monitoring and harvest management in Wisconsin. Wisconsin Society of Science Teachers Convention, 18 March 2011, Wisconsin Dells, WI.

Rolley, R.E. Bobcat population monitoring. Wisconsin Department of Natural Resources, Science Services Open House, 18 February 2011, Madison, WI.

Rolley, R.E. CWD Vaccine: panacea or pipedream? Wildlife Management Statewide, 12 January 2011, Sheboygan, WI.

Rolley, R.E. Deer population estimation. Lecture for complexity and conservation of white-tailed deer course at University of Wisconsin, Department of Forestry and Wildlife Ecology, 4 November 2010, Madison, WI.

Rolley, R.E. Deer-vehicle collisions. Lecture for complexity and conservation of white-tailed deer course at University of Wisconsin, Department of Forestry and Wildlife Ecology, 29 September 2010, Madison, WI.

Rolley, R.E. Deer-vehicle collisions. Lecture for complexity and conservation of white-tailed deer course at University of Wisconsin, Department of Forestry and Wildlife Ecology, 21 September 2010, Madison, WI.

Rolley, R.E. Investing in Wisconsin's whitetails. Midwest Deer and Wild Turkey Study Group Annual Meeting, 23 August 2010, Fort Grafton, ND.

Rolley, R.E. Bobcat population monitoring and harvest management in Wisconsin. Wisconsin Department of Natural Resources, Wildlife Management, Fur School, 24 March 2010, Madison, WI.

Rolley, R.E. Bobcat population monitoring and harvest management in Wisconsin. Felid Ecology and management in the Midwest Symposium, Midwest Fish and Wildlife Conference, 8 December 2009, Springfield, IL.

Rolley, R.E. Deer population estimation. Lecture for complexity and conservation of white-tailed deer course at University of Wisconsin, Department of Forestry and Wildlife Ecology, 12 November 2009, Madison, WI.

Storm, D., M. Samuel, R. Rolley, B. Richards, and T. Van Deelen. The role of deer density in transmission and management of chronic wasting disease in Wisconsin. The Wildlife Society Annual Conference, 23 September 2009, Monterey, CA.

Rolley, R.E. Deer-vehicle collisions. Lecture for complexity and conservation of White-tailed deer course at University of Wisconsin, Department of Forestry and Wildlife Ecology, 17 September 2009, Madison, WI.

Langenberg, J.A., D.O. Joly, and R.E. Rolley. Wisconsin's approach to CWD detection and monitoring: efficacy and challenges. 3rd International Chronic Wasting Disease Symposium, 22 July 2009, Park City, UT.

Samuel, M.D., J.A. Langenberg, and R.E. Rolley. The Wisconsin experience with chronic wasting disease management: lessons learned. 3rd International Chronic Wasting Disease Symposium, 22 July 2009, Park City, UT.

### **David Sample**

Koch, K., S. Lor, E. Lonsdorf, E. Grant, M. Ahlering, L. Barnhill, T. Dailey, R. Drum, M. Knutson, C. Mueller, D. Pavlacky, C. Ribic, C. Rideout, D. Sample, D.C. Brewer, and M. Runge. Delivering grassland bird conservation throughout the Eastern and Central United States. The Southeastern Prairie Symposium, 14-17 May 2012, Starkville, MS. Poster session.

Sample, D. Grassland Birds 101. Riveredge Nature Center Science For Everyone Lecture Series, 15 May 2012, Newburg, WI.

Sample, D.W. Grassland Birds 101. Military Ridge Prairie Heritage Area landowner workshop, 3 March 2012, Dodgeville, WI.

Schmitz, C., J. Dadisman, C.A. Ribic, D.W. Sample, and D. Schneider. An assessment of Henslow's Sparrow density and nesting productivity in native warm season grass fields spanning a vegetation diversity gradient in southwestern Wisconsin. Wisconsin Chapter of The Wildlife Society Winter Meeting, 28 February-1 March 2012, Rothschild, WI.

Schmitz, C., J. Dadisman, C.A. Ribic, D.W. Sample, and D. Schneider. Henslow's Sparrow in native warm season grass fields in southwestern Wisconsin. 72nd Midwest Fish and Wildlife Conference, 4-7 December 2011, Des Moines, IA.

Sample, D., D. MacFarland, J. Doyle, T. Van Deelen, E. Latch, and L. Kierepka. American Badger genetics, population size, distribution, and ecology in Wisconsin. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Sample, D., J. Dadisman, D. Schneider, C. Schmitz, and C. Ribic. Avian use of native warm season grass fields in southwestern Wisconsin. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Ellison, K., C.A. Ribic, D.W. Sample, and M.E. Jones. Effects of fencerow vegetation removal on grassland birds & their predators – 4 year summary. America's Grasslands: Status, Threats, and Opportunities Conference, 15-17 August 2011, Sioux Falls, SD.

Ellison, K., E.K. Hofmeister, C.A. Ribic, and D.W. Sample. Pox seroprevalence and missing digits in the Henslow's Sparrow. America's Grasslands: Status, Threats, and Opportunities Conference, 15-17 August 2011, Sioux Falls, SD. Poster session.

Schmitz, C., J. Dadisman, C.A. Ribic, D.W. Sample, and D. Schneider. Impacts of potential herbaceous bioenergy crops on wildlife: grassland bird use across a diversity gradient of native warm season grass fields in southwestern Wisconsin. America's Grasslands: Status, Threats, and Opportunities Conference, 15-17 August 2011, Sioux Falls, SD. Poster session.

Sample, D.W. and C.A. Ribic. Strategic Grassland Bird Conservation: A Case Study. Midwest Bird Conservation and Monitoring Conference, 2-4 August 2011, Zion, IL.

Schmitz, C., J. Dadisman, C.A. Ribic, D.W. Sample, and D. Schneider. Impacts of potential herbaceous bioenergy crops on wildlife: grassland bird use across a diversity gradient of

native warm season grass fields in southwestern Wisconsin. Midwest Bird Conservation and Monitoring Conference, 2-4 August 2011, Zion, IL. Poster session.

Sample, D. Grassland Birds 101. The Wild Ones annual meeting, 29 January 2011, Oshkosh, WI.

Paulios, A. and D. Sample. Manufacturing Multitudes of Melodius Meadowlarks. WI DNR Wildlife Management statewide meeting, 12 January 2011, Wausau, WI.

Hull, S., J. Arntzen, K. Martin, and D. Sample. Sustainable Planting and Harvesting Guidelines for Nonforest Biomass in Wisconsin. WI DNR Wildlife Management statewide meeting, 12 January 2011, Wausau, WI.

Schmitz, C., J. Dadisman, C.A. Ribic, D.W. Sample, and D. Schneider. Impacts of potential herbaceous bioenergy crops on wildlife: grassland bird use across a diversity gradient of native warm season grass fields in southwestern Wisconsin. 71st Midwest Fish and Wildlife Conference, 12-15 December 2010, Minneapolis, MN. Poster session.

Sample, D., A. Paulios, J. Herkert, and C. Ribic. Grassland birds and area sensitivity, landscape context, issues of scale, and habitat quality: How do we translate this to management decision making? Midwest Coordinated Bird Monitoring Meeting, 14 September 2011, Onalaska, WI.

Sample, D. Grassland Birds 101. The Prairie Enthusiast's annual meeting, 26 February 2011, Platteville, WI.

Ribic, C.A. and D.W. Sample. Southwest Wisconsin: an important landscape for grassland birds. USFWS Grassland Bird Workshop, 20-22 July 2010, Morris, MN.

Ribic, C.A., D.W. Sample, and K. Ellison. Removing tree rows as a way to improve habitat for grassland birds. USFWS Grassland Bird Workshop, 20-22 July 2010, Morris, MN.

Williams, C.L., C.A. Ribic, D.W. Sample, and C. Kucharik. Identifying potential wildlife impacts of biomass production for bioenergy: future landscape scenarios in a case study of planned biomass co-firing in Wisconsin. US-IALE annual meeting, 5-9 April 2010, Athens, GA.

Sample, D. Grassland Birds 101. Military Ridge Prairie Heritage Area landowner workshop, 13 March 2010, Dodgeville, WI.

Ribic, C.A., D.W. Sample, J. Dadisman, and D. Schneider. Nest success of grassland birds in warm season Conservation Reserve Program fields in southwestern Wisconsin. Wisconsin Chapter of the Wildlife Society Winter Meeting, 4-5 March 2010, Stevens Point, WI. Poster session.

Williams, C.L., C.A. Ribic, and D.W. Sample. Bioenergy and the renewal of the Agricultural Ecosystems Research Group: focus on ecosystem services and enhanced communications. Wisconsin Chapter of the Wildlife Society Winter Meeting, 4-5 March 2010, Stevens Point, WI. Poster session.

Sample, D.W. and C.A. Ribic. Bioenergy in Wisconsin: boon or bane for wildlife? Chapter of the Wildlife Society annual meeting, 3-5 March 2010, Wausau, WI.

Sample, D.W. and C.A. Ribic. Bioenergy in Wisconsin: boon or bane for grasslands and wildlife? The Wisconsin Grasslands Bioenergy Symposium, 16 February 2010, Madison, WI.

Ribic, C.A., K.S. Ellison, M.E. Jones, and D.W. Sample. Removal of wooded fencerows as a conservation strategy for grassland birds. The Wildlife Society 16th Annual Conference, 20-24 September 2009, Monterey, CA.

Sadler, B., D.W. Sample, L. Kardash, S. Hull, B. Hess, P. Dunn, and D. Drake. Greater Prairie-chicken translocation research update: July 2009. Central Wisconsin Grassland Conservation Area annual meeting, 30 July 2009, Milladore, WI.

Sample, D.W. American badger genetics, population size, distribution, and ecology in Wisconsin. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Sample, D.W. Avian use of native warm season grass fields in southwestern Wisconsin. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Sadler, B., D.W. Sample, L. Kardash, S. Hull, B. Hess, P. Dunn, and D. Drake. Greater Prairie-chicken translocation research update: July 2009. Central Wisconsin Grassland Conservation Area annual meeting, 30 July 2009, Milladore, WI.

### **Daniel Storm**

Storm, D.J., M.D. Samuel, R.E. Rolley, P. Shelton, N.S. Keuler, B.J. Richards, and T.R. Van Deelen. Chronic wasting disease in Midwestern white-tailed deer populations. Health & Science Team meeting, 12 May 2011, Madison, WI.

Storm, D.J., R.E. Rolley, and T.R. Van Deelen. Deer-vehicle collision data as indices to deer population size. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Storm, D.J. Influence of deer density and landscape variation on CWD transmission. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Storm, D.J., M.D. Samuel, R.E. Rolley, P. Shelton, N.S. Keuler, B.J. Richards, and T.R. Van Deelen. Chronic wasting disease in Midwestern white-tailed deer populations. Bureau of Science Services Statewide Meeting, 2011, Madison, WI.

### **Michael Watt**

Jacques, C.N., T.R. Van Deelen, A.S. Norton, M.A. Watt, C.A. Priest, C.H. Warbington, and M. Preisler. Investing in Wisconsin's whitetails: research 2010–2015. Buck Fever Night hosted by the Manitowoc County Hunter Safety Instructors, 2011, Manitowoc, Wisconsin.

Jacques, C.N., M.A. Watt, A.S. Norton, and T.R. Van Deelen. Investing in Wisconsin's whitetails: research 2010–2015. Presented to landowners and deer hunters of the community during a deer research landowner/volunteer appreciation day 2011, Shawano, Wisconsin.

Jacques, C.N., M.A. Watt, A.S. Norton, and T.R. Van Deelen. Investing in Wisconsin's whitetails: research 2010–2015. Whitetails Unlimited Donor Group, 2011, Marshfield, Wisconsin.

Jacques, C.N., M.A. Watt, A.S. Norton, and T.R. Van Deelen. Investing in Wisconsin's whitetails: research 2010–2015. Presented to landowners and deer hunters of the

community during a deer research landowner/volunteer appreciation day, 2011, Winter, Wisconsin.

Jacques, C.N., T.R. Van Deelen, M.A. Watt, and A.S. Norton. Estimating survival and cause-specific mortality of adult male white-tailed deer in Wisconsin: First year results. Wisconsin Annual Deer Fest, 2011, Oshkosh, Wisconsin. Poster session.

Jacques, C.N., T.R. Van Deelen, M.A. Watt, A.S. Norton, and C.H. Warbington. Impact of predation, winter weather, and habitat on white-tailed deer fawn recruitment in Wisconsin: First year results. Wisconsin Annual Deer Fest, 2011, Oshkosh, Wisconsin. Poster session.

Jacques, C.N., M.A. Watt, B.J. Dhuey, and T.R. Van Deelen. Investing in Wisconsin's whitetails: deer research and public survey updates. Wisconsin Annual Deer Fest, 2011, Oshkosh, Wisconsin.

Jacques, C.N., M.A. Watt, and T.R. Van Deelen. Investing in Wisconsin's whitetails: deer research 2010–2015. Shawano County Optimist Club, Shawano, Wisconsin.

### **Michael Worland**

Worland, M.L., K.J. Martin, K.S. Fassnacht, and M.J. Mossman. Avian Associations with Old-growth Characteristics in Even-aged Northern Hardwoods. Wisconsin Bird Conservation Initiative Annual Meeting, 30 October 2011, Green Bay, WI.

Fassnacht, K.S. and M.L. Worland. Managed Old-growth research. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

Worland, M.L., K.J. Martin, and K.S. Fassnacht. Responses of Avian Communities to Management for Old-growth Characteristics. Midwest Fish and Wildlife Conference, 13 December 2010, Minneapolis, MN.

Worland, M.L., K.J. Martin, and L. Gregg. Spruce Grouse Distribution and Habitat Relationships in Wisconsin. UWSP Student Chapter of The Wildlife Society, 9 February 2010, Stevens Point, WI.

Worland, M.L., K.J. Martin, and L. Gregg. Spruce Grouse Distribution and Habitat Relationships in Wisconsin. Northeast Wisconsin Birding Club, November 2009, Green Bay, WI.

Worland, M.L., K.J. Martin, and L. Gregg. Spruce Grouse Distribution and Habitat Relationships in Wisconsin. Annual Birding Festival at the North Lakeland Discovery Center, 16 May 2009, Manitowish Waters, WI.



*Creating canopy gaps may lead to development of old-growth structure while allowing timber harvest.*

## 2009-2012 Publications and Presentations by UW Collaborators

### Publications

#### Suzanne Hagell

"Climate change impacts on Wisconsin's wildlife: a preliminary assessment" by **Olivia E. LeDee, Suzanne E. Hagell, Karl J. Martin, David M. MacFarland, Michael M. Meyer, A. Paulios, Christine A. Ribic, David W. Sample, and Timothy R. Van Deelen.** Forthcoming in 2012. *Technical Bulletin* Wisconsin Department of Natural Resources.

"Inbreeding within spider monkey populations in a human-dominated landscape and the future of *Ateles* in Central America" by **Suzanne E. Hagell, A. Whipple, and C. Chambers.** *Conservation Genetics*: in review.

"Testing forest connectivity using genetic distance: spider monkeys and dry forest restoration, Nicaragua" by Suzanne E. Hagell, C. Chambers, and S. Otterstrom. 2011. In *Principles and Practice of Forest Landscape Restoration*, A.C. Newton and N. Tejedor (editors). IUCN, Switzerland.

#### Olivia LeDee

"Climate change impacts on Wisconsin's wildlife: a preliminary assessment" by **Olivia E. LeDee, Suzanne E. Hagell, Karl J. Martin, David M. MacFarland, Michael M. Meyer, A. Paulios, Christine A. Ribic, David W. Sample, and Timothy R. Van Deelen.** Forthcoming in 2012. *Technical Bulletin* Wisconsin Department of Natural Resources.

"Climate change and spotted owls: potentially contrasting responses in the Southwestern United States" by M. Perry, R. Gutiérrez, R. Kirby, **Olivia E. LeDee, and W. LaHaye.** 2011. *Global Change Biology* DOI: 10.1111/j.1365-2486.2011.02564.x.

"Envisioning the future of wildlife in a changing climate: collaborative learning for adaptation planning" by **Olivia LeDee, W. Karasov, Karl J. Martin, Michael W. Meyer, Christine A. Ribic, and Timothy R. Van Deelen.** 2011. *Wildlife Society Bulletin* 35:508-513.

"Training a "new scientist" to meet the challenges of a changing environment" by **Olivia E. LeDee, R. Barnes, R. Emanuel, P. B. Fisher, S. Henkel, and J. Marlon.** 2011. *Eos* 16:135-136.

"Wisconsin's changing climate: impacts and adaptation" by **Olivia Le Dee,** Contributing Author, in February 2011 <http://www.wicci.wisc.edu>.

#### David Mladenoff

"Spatial patterns of soil surface C flux in experimental canopy gaps" by J.D. Schatz, J.A. Forrester and **David J. Mladenoff.** 2012. *Ecosystems* 15:616-623.

"Interactions of temperature and moisture with respiration from coarse woody debris in experimental forest canopy gaps" by J.A. Forrester, **David J. Mladenoff, S.T. Gower and J.L. Stoffel.** 2012. *Forest Ecology and Management* 265:124-132.

“The roles of environmental filtering and colonization in the fine-scale spatial patterning of ground-layer plant communities in north temperate deciduous forests” by J.I. Burton, **David J. Mladenoff**, M.K. Clayton, and J.A. Forrester. 2011. *Journal of Ecology* 99: 764-776.

“Broadscale variability in tree data of the historical Public Land Survey and its consequences for ecological studies” by F. Liu, **David J. Mladenoff**, N.S. Keuler, and L.S. Moore. 2011. *Ecological Monographs* 81(2): 259-275.

“Effects of winter selective tree harvest on soil microclimate and surface CO<sub>2</sub> flux of a northern hardwood forest” by J.L. Stoffel, S.T. Gower, J.A. Forrester, and **David J. Mladenoff**. 2010. *Forest Ecology and Management* 259: 257-265.

“Effects of selective tree harvests on aboveground biomass and net primary productivity of a second-growth northern hardwood forest” by J.H. Dyer, S.T. Gower, J.A. Forrester, C.G. Lorimer, **David J. Mladenoff**, and J.I. Burton. 2010. *Canadian Journal of Forest Research* 40: 2360-2369.

“Modeling regional-scale habitat of forest birds when land management guidelines are needed but information is limited” by F. Beaudry, A.M. Pidgeon, V.C. Radeloff, R.W. Howe, **David J. Mladenoff**, and G.A. Bartelt. 2010. *Biological Conservation* 143: 1759-1769.

“Change in occupied wolf habitat in the northern Great Lakes region” by **David J. Mladenoff**, M. K. Clayton, S. D. Pratt, T. A. Sickley, and A. P. Wydeven. 2009. In *Recovery of gray wolves in the Great Lakes region of the United States*, A. P. Wydeven, **Timothy R. Van Deelen** and E. J. Heske (editors). Springer, New York, USA.

“Legacies of historical land use on regional forest composition and structure in Wisconsin, USA (mid-1800s to 1930s to 2000s)” by J.M. Rhemtulla, **David J. Mladenoff**, and M. K. Clayton. 2009. *Ecological Applications* 19: 1061-1078.

### **Christine Ribic**

“Grassland bird use of remnant prairie and Conservation Reserve Program fields in an agricultural landscape in Wisconsin” by **Christine A. Ribic**, M.J. Guzy, and **David W. Sample**. 2009. *American Midland Naturalist* 161: 110-122.

“Area sensitivity in North American grassland birds: patterns and processes” by **Christine A. Ribic**, R. R. Koford, J. R. Herkert, D. H. Johnson, N. D. Niemuth, D. Naugle, K. K. Bakker, **David W. Sample**, and R.B. Renfrew. 2009. *The Auk* 126: 233-244.

“Red-headed woodpecker habitat associations in southwest Wisconsin” by L. D. Murray, **Christine A. Ribic**, and K. Ellison. 2009. *Passenger Pigeon* 71: 367-373.

“Grassland bird use of oak barrens and dry prairies in Wisconsin” by S. M. Vos, and Christine A. Ribic. 2011. *Natural Areas Journal* 31: 26-33.

“Envisioning the future of wildlife in a changing climate: collaborative learning for adaptation planning” by **Olivia E. LeDee**, W.H. Karasov, **Karl J. Martin**, **Michael W. Meyer**, **Christine A. Ribic**, and **Timothy R. Van Deelen**. 2011. *Wildlife Bulletin* 35: 508-513.

### **Michael Samuel**

“The walk is never random: subtle landscape effects shape gene flow in a continuous white-tailed deer population in the Midwestern United States” by S.J. Robinson, **Michael D. Samuel**, D.L. Lopez, and P. Shelton. *Molecular Ecology*: In Press.

- “Association mapping of genetic risk factors for chronic wasting disease in wild deer” by T. Matsumoto, **Michael D. Samuel**, T. Bolinger, M. Pybus, and D.W. Coltman. *Evolutionary Applications*: In Press.
- “Emerging prion disease drives host selection in a wildlife population” by S.J. Robinson, **Michael D. Samuel**, C.J. Johnson, M. Adams, and D.I. McKenzie. 2012. *Ecological Applications* 22: 1050-1059.
- “The role of genetics in chronic wasting disease of North American cervids” by S.J. Robinson, **Michael D. Samuel**, K.I. O’Rourke, and C.J. Johnson. 2012. *Prion* 6: 155-164.
- “Highly efficient amplification of chronic wasting disease agent by protein misfolding cyclic amplification with beads (PMCAb)” by C.J. Johnson, J.M. Aiken, D. McKenzie, Michael D. Samuel, and J.A. Pedersen. 2012. *PLoS ONE* e35383.
- “Effects of chronic wasting disease on reproduction and fawn harvest vulnerability in Wisconsin white-tailed deer” by J.A. Blanchong, D.A. Gear, B.V. Weckworth, D.P. Keane, K.T. Scribner, and **Michael D. Samuel**. 2012. *Journal of Wildlife Diseases* 48: 361-370.
- “Diversity and distribution of white-tailed deer mtDNA lineages in CWD outbreak areas in southern Wisconsin, USA” by K.G. Rogers, S.J. Robinson, and **Michael D. Samuel**. 2011. *Journal of Toxicology and Environmental Health* 74: 1521-1535.
- “Comparison of Visual-based Helicopter and Fixed-wing Forward-looking Infrared Surveys for Counting White-tailed Deer” by **Daniel J. Storm**, **Michael D. Samuel**, **Timothy R. Van Deelen**, K.D. Malcolm, **Robert E. Rolley**, N.A. Frost, D.P. Bates, and B.J. Richards. 2011. *Wildlife Biology* 17: 431-440.
- “Influence of genetic relatedness and spatial proximity on chronic wasting disease infection among female white-tailed deer” by D.A. Gear, **Michael D. Samuel**, K.T. Scribner, B.V. Weckworth, and J.A. Langenberg. 2010. *Journal of Applied Ecology* 47: 532-540.
- “Host culling as an adaptive management tool for chronic wasting disease – a modeling study” by G. Wasserberg, E.E. Osnas, **Robert E. Rolley**, and **Michael D. Samuel**. 2009. *Journal of Applied Ecology* 46: 457-466.
- “Spatial and temporal patterns of an emerging epidemic: fine scale mapping of a wildlife epidemic in Wisconsin” by E.E. Osnas, D.M. Heisey, **Robert E. Rolley**, and **Michael D. Samuel**. 2009. *Ecological Applications* 19: 1311-1322.
- “Genetic susceptibility to chronic wasting disease in free-ranging white-tailed deer: Complement component C1q and Prnp polymorphisms” by J.A. Blanchong, D.M., Heisey, S. Libants, K.T. Scribner, C. Johnson, J.M. Aiken, J.A. Langenberg, and **Michael D. Samuel**. 2009. *Infection, Genetics, and Evolution* 9: 1329-1335.
- “White-tailed deer carcass decomposition and potential exposure of scavengers to chronic wasting disease” by C.S. Jennelle, **Michael D. Samuel**, C.A. Nolden, and E.A. Berkley. 2009. *Journal of Wildlife Management* 73: 655-662.
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## **Presentations**

### **Suzanne Hagell**

Hagell S.E., O.E. LeDee, K.J. Martin, M.W. Meyer, and C.A. Ribic. The challenges of climate change adaptation for wildlife managers in Wisconsin. Developing Ecologically-Based Conservation Targets Under Global Change: The 2nd Emerging Issues Conference of the Ecological Society of America, 28 February 2012, Shepherdstown, WV.

### **Olivia LeDee**

LeDee, O.E. Identifying vulnerable species and robust management strategies across the UMGL Geography. Joint Bureau of Wildlife Management and Wildlife and Forestry Research Section Meeting, 21 September 2011, Madison, WI.

LeDee, O.E., W.H. Karasov, K.J. Martin, M.W. Meyer, C.A. Ribic, and T.R. Van Deelen. Collaborative learning to address the impacts of climate change on Wisconsin wildlife. 71st Midwest Fish and Wildlife Conference, December 2010, Minneapolis, MN.

Martin, K.J., O.E. LeDee, and M.W. Meyer. Building a coalition for conservation under climate change. The Wildlife Society's 17th Annual Conference, October 2010, Snowbird, UT.

### **David Mladenoff**

Mladenoff, D.J. Disturbance dynamics and legacies in historical ecology. Frontiers in historical ecology, international conference, September 2011, Birmensdorf, Switzerland.

Mladenoff, D.J. The future of old-growth forest conservation under climate change. International Conference on northern primeval forests: Ecology, conservation, management, August 2010, Sundsvall, Sweden.

Muss, J.M., and D.J. Mladenoff. Using LIDAR remote sensing to model snowpack formation under mixed species forests in northern Wisconsin. American Geophysical Union, December 2009.

Mladenoff, D.J. Distinguished Ecologist Lecture. Michigan Tech University, October 2009, Houghton, MI.

Mladenoff, D.J. Columbia University Workshop on carbon sequestration. September 2009.

Forrester, J.A., J.L. Stoffel, D.J. Mladenoff, and S.T. Gower. Near-term results of soil and wood CO<sub>2</sub> flux from experimental manipulation of northern hardwood forest structure. Ecological Society of America annual meeting, August 2009, Albuquerque, NM.

Stoffel, J.L., S.T. Gower, D.J. Mladenoff, T.C. Balsler, and J.A. Forrester. Microbial dynamics following small scale harvesting in northern hardwood forests. Ecological Society of America annual meeting, August 2009, Albuquerque, NM.

Dyer, J.H., C.G. Lorimer, S.T. Gower, J.A. Forrester, and D.J. Mladenoff. Initial response of saplings and stump sprouts to experimental canopy gap formation in a northern hardwood forest. North American Forest Ecology Workshop, July 2009, Logan, UT.

Forrester, J.A., D.J. Mladenoff, S.T. Gower, J.L. Stoffel, and J.H. Dyer. Near-term results of forest productivity and carbon cycling following and experimental manipulation of northern

hardwood forest structure. Carbon in Northern Forests: Integration of Research and Management meeting, June 2009, Traverse City, MI.

Mladenoff, D.J., and J. Rhemtulla. Historic potential for carbon sequestration in northern Lake States forests. Conference on carbon management in northern forests USFS Northern Institute of Applied Carbon Science, June 2009, Traverse City, MI.

Mladenoff, D.J. Forest landscape history and regional forest conservation. American Society for Environmental History, February 2009, Tallahassee, FL.

Muss, J.M., and D.J. Mladenoff. Measurement of three-dimensional canopy structure using coarse-scale discrete lidar data. Ecological Society of America annual conference, 2009, Albuquerque, NM.

### **Christine Ribic**

Koch, K., S. Lor, E. Lonsdorf, E. Grant, M. Ahlering, L. Barnhill, T. Dailey, R. Drum, M. Knutson, C. Mueller, D. Pavlacky, C. Ribic, C. Rideout, D. Sample, D.C. Brewer, and M. Runge. Delivering grassland bird conservation throughout the Eastern and Central United States. The Southeastern Prairie Symposium, 14-17 May 2012, Starkville, MS. Poster session.

Schmitz, C., J. Dadisman, C.A. Ribic, D.W. Sample, and D. Schneider. An assessment of Henslow's Sparrow density and nesting productivity in native warm season grass fields spanning a vegetation diversity gradient in southwestern Wisconsin. Wisconsin Chapter of The Wildlife Society, Winter Meeting, 28 February-1 March 2012, Rothschild, WI.

Hagell, S., O. LeDee, K.J. Martin, M.W. Meyer, and C.A. Ribic. The challenges of climate change adaptation for wildlife managers in Wisconsin. The Ecological Society of America's 2012 Emerging Issues Conference, 27 February-March 1 2012, Shepardstown, WV. Poster session.

Schmitz, C., J. Dadisman, C.A. Ribic, D.W. Sample, and D. Schneider. Henslow's Sparrow in native warm season grass fields in southwestern Wisconsin. 72nd Midwest Fish and Wildlife Conference, 4-7 December 2011, Des Moines, IA.

Ellison, K., C.A. Ribic, D.W. Sample, and M.E. Jones. Effects of fencerow vegetation removal on grassland birds & their predators – 4 year summary. America's Grasslands: Status, Threats, and Opportunities Conference, 15-17 August 2011, Sioux Falls, SD.

Ellison, K., E.K. Hofmeister, C.A. Ribic, and D.W. Sample. Pox seroprevalence and missing digits in the Henslow's Sparrow. America's Grasslands: Status, Threats, and Opportunities Conference, 15-17 August 2011, Sioux Falls, SD. Poster session.

Schmitz, C., J. Dadisman, C.A. Ribic, D.W. Sample, and D. Schneider. Impacts of potential herbaceous bioenergy crops on wildlife: grassland bird use across a diversity gradient of native warm season grass fields in southwestern Wisconsin. America's Grasslands: Status, Threats, and Opportunities Conference, 15-17 August 2011, Sioux Falls, SD. Poster session.

Sample, D.W., and C. A. Ribic. Strategic Grassland Bird Conservation: A Case Study. Midwest Bird Conservation and Monitoring Conference, 2-4 August 2011, Zion, IL.

Schmitz, C., J. Dadisman, C.A. Ribic, D.W. Sample, and D. Schneider. Impacts of potential herbaceous bioenergy crops on wildlife: grassland bird use across a diversity gradient of

native warm season grass fields in southwestern Wisconsin. Midwest Bird Conservation and Monitoring Conference, 2-4 August 2011, Zion, IL. Poster session.

LeDee, O.E., C.A. Ribic, K.J. Martin, and M.W. Meyer. Collaborative learning to address the impacts of climate change on Wisconsin wildlife. 71st Midwest Fish and Wildlife Conference, 12-15 December 2010, Minneapolis, MN.

Schmitz, C., J. Dadisman, C.A. Ribic, D.W. Sample, and D. Schneider. Impacts of potential herbaceous bioenergy crops on wildlife: grassland bird use across a diversity gradient of native warm season grass fields in southwestern Wisconsin. 71st Midwest Fish and Wildlife Conference, 12-15 December 2010, Minneapolis, MN. Poster session.

Ribic, C.A., and D.W. Sample. Southwest Wisconsin: an important landscape for grassland birds. USFWS Grassland Bird Workshop, 20-22 July 2010, Morris, MN.

Ribic, C.A., D.W. Sample, and K. Ellison. Removing tree rows as a way to improve habitat for grassland birds. USFWS Grassland Bird Workshop, 20-22 July 2010, Morris, MN.

Williams, C.L., C.A. Ribic, D.W. Sample, and C. Kucharik. Identifying potential wildlife impacts of biomass production for bioenergy: future landscape scenarios in a case study of planned biomass co-firing in Wisconsin. US-IALE annual meeting, 5-9 April 2010, Athens, GA.

Ribic, C.A., D.W. Sample, J. Dadisman, and D. Schneider. Nest success of grassland birds in warm season Conservation Reserve Program fields in southwestern Wisconsin. Wisconsin Chapter of the Wildlife Society Winter Meeting, 4-5 March 2010, Stevens Point, WI. Poster session.

Williams, C.L., C.A. Ribic, and D.W. Sample. Bioenergy and the renewal of the Agricultural Ecosystems Research Group: focus on ecosystem services and enhanced communications. Wisconsin Chapter of the Wildlife Society Winter Meeting, 4-5 March 2010, Stevens Point, WI. Poster session.

Sample, D.W., and C.A. Ribic. Bioenergy in Wisconsin: boon or bane for wildlife? Wisconsin Chapter of the Wildlife Society annual meeting, 3-5 March 2010, Wausau, WI.

Sample, D.W., and C.A. Ribic. Bioenergy in Wisconsin: boon or bane for grasslands and wildlife? The Wisconsin Grasslands Bioenergy Symposium, 16 February 2010, Madison, WI.

LeDee, O.E., C.A. Ribic, K.J. Martin, and M.W. Meyer. Assessment of impacts of climate change on Wisconsin wildlife. The Wildlife Society 16th Annual Conference, 20-24 September 2009, Monterey, CA.

Ribic, C.A., K.S. Ellison, M.E. Jones, and D.W. Sample. Removal of wooded fencerows as a conservation strategy for grassland birds. The Wildlife Society 16th Annual Conference, 20-24 September 2009, Monterey, CA.

Jones, M.E., and C.A. Ribic. Role of the 13-lined ground squirrel as an important grassland bird predator in CRP fields. The Wildlife Society 16th Annual Conference, 20-24 September 2009, Monterey, CA. Poster session.

## Michael Samuel

Blanchong, J., D. Grear, B. Weckworth, D. Keane, K. Scribner, and M. Samuel. Effects of chronic wasting disease on reproduction and recruitment in Wisconsin white-tailed deer. The Wildlife Society's 18<sup>th</sup> Annual Conference, 5-10 November 2011, Kona, HI.

Robinson, S., M. Samuel, D. Lopez, and P. Shelton. Landscape genetics shed light on deer dispersal and population contact in Wisconsin - Illinois chronic wasting disease zone. The Wildlife Society's 18<sup>th</sup> Annual Conference, 5-10 November 2011, Kona, HI.

Thiagarajan, B., C. Jennelle, G. Wasserberg, and M. D. Samuel. Modeling transmission dynamics of chronic wasting disease in Wisconsin white-tailed deer. The Wildlife Society's 18<sup>th</sup> Annual Conference, 5-10 November 2011, Kona, HI. Poster session.

Thiagarajan, B., C. Jennelle, G. Wasserberg, and M.D. Samuel. Modeling transmission dynamics of chronic wasting disease in Wisconsin white-tailed deer. Mathbio 3: Modeling, September 2011, Madison, WI. Poster session.

Blanchong, J., D. Grear, B. Weckworth, D. Keane, K. Scribner, and M. Samuel. Effects of chronic wasting disease on reproduction and recruitment in Wisconsin white-tailed deer. 60<sup>th</sup> Annual International Conference of the Wildlife Disease Association, August 2011, Quebec City, Quebec, Canada.

Jennelle, C., B. Thiagarajan, G. Wasserberg, and M.D. Samuel. Modeling transmission dynamics of chronic wasting disease in Wisconsin white-tailed deer. 60<sup>th</sup> Annual International Conference of the Wildlife Disease Association, August 2011, Quebec City, Quebec, Canada.

Robinson, S.J., M.D. Samuel, C.J. Johnson, M. Adames, and D.I. McKenzie. The power of good genes: Rapid host evolution driven by an emerging prion disease. 60<sup>th</sup> Annual International Conference of the Wildlife Disease Association, August 2011, Quebec City, Quebec, Canada.

Robinson, S.J., M.D. Samuel, C.J. Johnson, M. Adams, and D.I. McKenzie. Differential CWD Infection and Mortality of PRNP Genotypes in White-tailed Deer: Implications for Genetic Selection, Disease Modeling and Management. Prion 2011, May 2011, Montreal, Quebec, Canada.

Robinson, S., M. Samuel, C. Johnson, J. Aiken, J. Blanchong, D. Grear, and M. Adams. The power of good genes – Prion protein genotype impacts CWD infection and survival of Wisconsin white-tailed deer. Wisconsin Ecology, 14<sup>th</sup> Annual Spring Symposium, April 2011, Madison, WI.

Johnson, C.J., C.J. Booth, C.B. Smith, J.M. Aiken, M.D. Samuel, and J.A. Pedersen. Detection of Prion Protein Associated with Cervid Chronic Wasting Disease in Environmental Samples. NSF - Ecology of Emerging Infectious Diseases, Annual Principal Investigators Meeting, March 2011, Madison, WI. Poster session.

Robinson, S., M. Samuel, C. Johnson, J. Aiken, J. Blanchong, D. Grear, and M. Adams. The power of good genes – Prion protein genotype impacts CWD infection and survival of Wisconsin white-tailed deer. The Wildlife Society's 17<sup>th</sup> Annual Conference, October 2010, Snowbird, UT.

Johnson, C.J., C.J. Booth, C.B. Smith, J.M. Aiken, M.D. Samuel, and J.A. Pedersen. Detection of prion protein associated with cervid chronic wasting disease in environmental samples. 13<sup>th</sup> Annual Spring Ecology Symposium, April 2010, Madison, WI.

Johnson, C.J., C.J. Booth, C.B. Smith, J.M. Aiken, M.D. Samuel, and J.A. Pedersen. Detection of prion protein associated with cervid chronic wasting disease in environmental samples. Ecology and evolution of infectious disease – PI meeting, March 2010, Atlantic City, NJ. Poster session.

Matsumoto, T., M. Samuel, B. Johannes, and D. Coltman. Association mapping of genetic risk factors for chronic wasting disease in wild deer. PrP Canada Conference, March 2010, Ottawa, Canada. Poster session.

Storm, D., M. Samuel, K. Malcolm, R. Rolley, T. Van Deelen, and B. Richards. Comparison of helicopter and forward-looking infrared (FLIR) surveys for counting white-tailed deer. Wisconsin Wildlife Society Conference, March 2010, Wausau, WI.

Robinson, S., M. Samuel, J. Blanchong, J. Langenberg, K. Scribner, and D. Gear. Application of spatial genetic analyses to reveal correlations between white-tailed deer dispersal and CWD spread in Wisconsin. Midwest Wildlife Society Conference, December 2009, Springfield, IL.

Rogers, K., S. Robinson, M. Samuel, J. Langenberg, and D. Gear. Mitochondrial DNA sequencing of white-tailed deer within Wisconsin's CWD management zone, detailing population distribution and movement. Midwest Wildlife Society Conference, December 2009, Springfield, IL. Poster session.

Storm, D., M. Samuel, K. Malcolm, R. Rolley, T. Van Deelen, and B. Richards. Comparison of helicopter and forward-looking infrared (FLIR) surveys for counting white-tailed deer. Midwest Wildlife Society Conference, December 2009, Springfield, IL.

Gear, D., C. Jennelle, M. Samuel, B. Weckworth, K. Scribner, and J. Langenberg. CWD infection patterns in female deer. International WDA Conference, August 2009, Blaine, WA.

### **Timothy Van Deelen**

Van Deelen, T. R. Effects of wolves, bears, and hunters on deer populations in Wisconsin USA. Peking University, School of Life Sciences, 30 May 2012, Beijing, People's Republic of China.

Stenglein, J.L., T.R. Van Deelen, A.P. Wydeven, and J.F. Olson. Modeling individual wolves on a landscape of risk to understand population-level impacts of harvest scenarios.. Midwest Wolf Stewards Conference, 27 April 2012, Duluth, MN.

Stenglein, J. and T.R. Van Deelen. Learning more from censored individuals in a radio-telemetry survival analysis. 72<sup>nd</sup> Midwest Fish and Wildlife Conference, 5 December 2011, De Moines, IA.

Van Deelen, T.R. Deer dynamics and predation by bears, wolves, and humans in Wisconsin. Friday Seminar Series, Department of Natural Resource Ecology and Management, Iowa State University, 30 September 2011, Ames, IA.

Anhalt, C., A. Rissman, and T.R. Van Deelen. Cross boundary carnivore conservation: Are public-private ownership boundaries meaningful for the case of wolf-human conflict in

Wisconsin? Joint Meeting of the Wisconsin Chapters of the Society of American Foresters and The Wildlife Society, 3 March 2011, Wisconsin Dells, WI.

Anhalt, C., A.P. Wydeven, R. Schultz, and T.R. Van Deelen. Effectiveness of howl playbacks and scent marking in displacing grey wolves (*Canis lupus*) from rendezvous sites. Joint Meeting of the Wisconsin Chapters of the Society of American Foresters and The Wildlife Society, 3 March 2011, Wisconsin Dells, WI.

Karasov-Olson, A. and T.R. Van Deelen. Cross boundary carnivore conservation: Estimating the effects of climate on growth rate patterns in black bears (*Ursus americanus*) using analysis of cementum annuli. Joint Meeting of the Wisconsin Chapters of the Society of American Foresters and The Wildlife Society, 3 March 2011, Wisconsin Dells, WI.

Martin, H., M. Mossman, and T.R. Van Deelen. Habitat selection of Cerulean warblers in the lower Wisconsin riverway. Joint Meeting of the Wisconsin Chapters of the Society of American Foresters and The Wildlife Society, 3 March 2011, Wisconsin Dells, WI.

Stenglein, J.L. and T. R. Van Deelen. Modeling individuals in space: emerging patterns and the population level. Joint Meeting of the Wisconsin Chapters of the Society of American Foresters and The Wildlife Society, 3 March 2011, Wisconsin Dells, WI.

Rittenhouse, T.X., K.J. Martin, D.M. MacFarland, and T.R. Van Deelen. Biomass harvest in Wisconsin forests: changes to woody debris levels and small mammal communities. 71<sup>st</sup> Midwest Fish and Wildlife Conference, 15 December 2010, Minneapolis, MN.

Stenglein, J.L., A.P. Wydeven, and T.R. Van Deelen. Allee effects and growth of the recovering southern Lake Superior gray wolf population. 71<sup>st</sup> Midwest Fish and Wildlife Conference, 15 December 2010, Minneapolis, MN.

Van Deelen, T.R. Joint impacts of black bears, wolves, and hunters on population dynamics of deer in Wisconsin. Biology Seminar Series, Northern Michigan University, 22 April 2010, Marquette, MI.

Stenglein, J.L., T.R. Van Deelen, A.P. Wydeven, and D.J. Mladenoff. Allee effects in small carnivore populations: a case study of recovering gray wolves. Species introductions and re-introductions symposium 2010, 9 April 2010, Mississippi State University, MS.

Van Deelen, T.R. Resurgent predators of the Midwest. North Central Section of The Wildlife Society Student Conclave, 27 March 2010, West Lafayette, IN.

Walrath, R.D., T.R. Van Deelen and K.C. VerCauteren. Effects of relatedness and feeding regimes on contacts and durations between individual white-tailed deer. 70<sup>th</sup> Midwest Fish and Wildlife Conference, 8 December 2009, Springfield, IL.

Walrath, R.D., T.R. Van Deelen and K.C. VerCauteren. Efficacy of electronic proximity loggers for detection of contacts between individual white-tailed deer. 70<sup>th</sup> Midwest Fish and Wildlife Conference, 8 December 2009, Springfield, IL.

Steinhoff, S.G., T.R. Van Deelen, and K.J. Martin. Flying squirrel nest tree switching frequency in Northern Wisconsin hardwoods. 70<sup>th</sup> Midwest Fish and Wildlife Conference, 8 December 2009, Springfield, IL.

Van Deelen, T.R., B.J. Dhuey, C.N. Jacques, K.R. McCaffery, R.E. Rolley, and D.K. Warnke. Effects of earn-a-buck and special antlerless-only seasons on Wisconsin's deer harvest. 70<sup>th</sup> Midwest Fish and Wildlife Conference, 7 December 2009, Springfield, IL.

Jacques, C.N., T.R. Van Deelen, W.H. Hall, Jr., K.J. Martin, and K.C. VerCauteren. Evaluating how hunters see and react to radiotelemetry collars on white-tailed deer. 70<sup>th</sup> Midwest Fish and Wildlife Conference, 7 December 2009, Springfield, IL.

Storm, D., M.D. Samuel, T.R. Van Deelen, K.D. Malcolm, R.E. Rolley, N. Frost, D. Bates, and B. Richards. Comparison of helicopter and forward-looking infrared (FLIR) surveys for counting white-tailed deer. 70<sup>th</sup> Midwest Fish and Wildlife Conference, 7 December 2009, Springfield, IL.

Van Deelen, T.R. Effects of wolf recovery on growth of white-tailed deer populations in Wisconsin. Purdue University Department of Forestry and Natural Resources, 29 September 2009.

MacFarland, D.M. and T. R. Van Deelen. A simulation of station-based population index response to changes in population density. The Wildlife Society 16<sup>th</sup> Annual Conference, 23 September 2009, Monterey, CA.

Storm, D., M.D. Samuel, R.E. Rolley, T.R. Van Deelen, and B. Richards. The role of deer density in transmission and management of chronic wasting disease in Wisconsin. The Wildlife Society 16<sup>th</sup> Annual Conference, 23 September 2009, Monterey, CA.

Steinhoff, S.G., T.R. Van Deelen, and K.J. Martin. Flying squirrel responses to silvicultural treatments in northern Wisconsin. The Wildlife Society 16<sup>th</sup> Annual Conference, 23 September 2009, Monterey, CA.

Van Deelen, T.R. Wolf conservation in Wisconsin: considering the next step. Wolf Stewards Meeting, 15 April 2009, Iron Mountain, MI.

Van Deelen, T.R. Impacts of wolf recovery on the growth of Wisconsin's deer population. University of Georgia Warnell School of Forestry and Natural Resources, Student Chapter of the Society for Conservation Biology, 2 April 2009, Athens, GA.

Van Deelen, T.R. Will Wisconsin become the first state in the lower 48 to hunt wolves? University of Georgia Warnell School of Forestry and Natural Resources, Student Chapter of the Wildlife Society, 1 April 2009, Athens, GA.

Walrath, R.D. and T.R. Van Deelen. Data-logger collars as a new technology for studying close contact behaviors. Winter meeting of the Wisconsin Chapter of The Wildlife Society, 4 March 2009, Madison, WI.

Van Deelen T.R., C. Jacques, and R.E. Rolley. How can emerging diseases impact deer management? Successes and failures of disease management in wildlife – CWD in Wisconsin as an example. Conference: Emerging in white-tailed deer management and conservation, 26 February 2009, Lafayette, IN.

Storm, D.J., M.D. Samuel, T. Beissel, R. Osborn, B. Richards, and T.R. Van Deelen. Error in age estimates of deer obtained by the wear-and-replacement method. Conference: Emerging in white-tailed deer management and conservation, 26 February 2009, Lafayette, IN.

Jacques, C. and T.R. Van Deelen. Deer population growth winter to fall. Wisconsin Department of Natural Resources, Bureau of Wildlife Management Statewide Meeting, 14 January 2009, Appleton, WI.

Van Deelen, T.R. and A. P. Wydeven. Wolves and sustained yield in Wisconsin: first steps in population management. Wisconsin Department of Natural Resources, Bureau of Wildlife Management Statewide Meeting, 14 January 2009, Appleton, WI.

MacFarland, D.M. and T. R. Van Deelen. Bear tetracycline population estimates in Wisconsin and bear habitat and range expansion modeling. Wisconsin Department of Natural Resources, Bureau of Wildlife Management Statewide Meeting, 14 January 2009, Appleton WI.

### **Benjamin Zuckerberg**

Zuckerberg, B., G.M. Jones, and A. Paulios. Early bird gets earlier: shifts in migration phenology of early-spring migrants in the Midwest. Wisconsin Ornithological Society, 12 May 2012, Middleton, WI.

Zuckerberg, B. Hierarchical responses of wintering birds to weather and climate change. University of Wyoming, 4 April 2012 Laramie, Wyoming.

Zuckerberg, B. Bird, Forests, and Climate Change. Cabin Fever Lecture Series, Baraboo Range Preservation Association, 22 March 2012, Baraboo, WI.

Jones, G.M., B. Zuckerberg, and A. Paulios. The early bird gets earlier: changes in migration phenology. The Wildlife Society State Chapter, 29 February 2012, Rothschild, WI.

Jones, G.M., B. Zuckerberg, and A. Paulios. Regional changes in bird migration timing in Wisconsin. The Wildlife Society, 10 November 2012, Waikoloa, HI.

Sadoti, G., B. Zuckerberg, and W. F. Porter. Northward and upward? Detecting climate-induced shifts in New York bird distributions. 3rd Annual EPSCoR Tri-State Western Consortium Meeting, 6-8 April 2011, Santa Ana Pueblo, NM.

Jarzyna, M., W.F. Porter, and B. Zuckerberg. Threshold response of grassland breeding birds to landscape composition and configuration. US International Association of Landscape Ecology 26th Annual Symposium, 3-7 April 2011, Portland, OR.

Zuckerberg, B., D. Fink, S.T. Kelling, and J.L. Dickinson. Modeling avian distributions across time and space. US International Association of Landscape Ecology 26th Annual Symposium, 3-7 April 2011, Portland, OR.

Fink, D., W.M. Hochachka, B. Zuckerberg, and S.T. Kelling. Modeling species distribution dynamics with spatiotemporal exploratory models: discovering patterns and processes of broad-scale avian migrations. 1st Conference on Spatial Statistics: Mapping Global Change, University of Twente, 23-25 March 2011, Enschede, Netherlands.

Lang, M.A., B. Zuckerberg, J. Frair, and W.F. Porter. An evaluation of the effectiveness of protected lands at maintaining avian biodiversity over time. The Wildlife Society's 17th Annual Conference, 2-6 October 2010, Snowbird, UT.

Bonter, D.N., E. Bridge, and B. Zuckerberg. Studying supplemental feeding behavior with radio frequency identification. Association of Field Ornithologists Annual Conference, 12-14 August 2010, Ogden, UT.

Bonney, R., C.B. Cooper, B. Zuckerberg, and J. Shirk. Introduction: Contributions of citizen science to our understanding of ecological responses to climate change. Ecological Society of America 95th Annual Meeting, 1-6 August 2010, Pittsburgh, PA.

Zuckerberg, B. Citizen science and range shifts: the impacts of climate change on birds. Ecological Society of America 95th Annual Meeting, 1-6 August 2010, Pittsburgh, PA.

Zuckerberg, B. Songbirds and Climate Change. Birds of the Month, 18 October 2009, Montezuma National Wildlife Refuge, NY.

Bonter, D.N., B. Zuckerberg, and J.L. Dickinson. Invasive birds in a novel landscape: habitat associations and effects on established species. American Ornithologists' Union, 12-15 August 2009, Philadelphia, PA.

Koenig, W.D, W.M. Hochachka, J.L. Dickinson, and B. Zuckerberg. American Crow declines and West Nile virus support the dilution effect. American Ornithologists' Union, 12-15 August 2009, Philadelphia, PA.

Zuckerberg, B., D.N. Bonter, W.M. Hochachka, W.D. Koenig, and J.L. Dickinson. The dynamic role of temperature in limiting wintering bird distributions. American Ornithologists' Union, 12-15 August 2009, Philadelphia, PA.

Zuckerberg, B. and J.L. Dickinson. Potential for human dimensions research at the citizen–scientist–NGO interface. Conference on Computational Sustainability, Cornell University, 10 June 2009, Ithaca, NY.

Zuckerberg, B. and W.F. Porter. Long–term responses of breeding birds to habitat loss and fragmentation. New York State Biodiversity Research Institute, Biology and Conservation Lecture Series, 22 April 2009, Albany, NY.

Zuckerberg, B. Citizen Science: Challenges and Benefits. Standing on the Shoulders of Giants Seminar Series, State University of New York College of Environmental Science and Forestry, 26 March 2009, Syracuse, NY.



*Radio-collared adult female white-tailed deer being released from a box trap.*

## Scientist and Technician Biographies

Scientists in the Wildlife and Forestry Research Section are experts in their fields of study. In the following section, we provide information on their educational background, their area of expertise, and key collaborators.

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### Nicholas Anich, LTE Avian Research Scientist

**Education:**

B.A., 2002. Biology, St. Olaf College  
M.S., 2008. Biology, Arkansas State University

**Expertise:**

Avian ecology, avian habitat and space use, boreal birds, Kirtland's warbler, Swainson's warbler.

**Key Collaborators:**

Mike Worland, Tom Prestby, and Karl Martin (WDNR);  
WDNR Bureaus of Wildlife Management and Endangered Resources; U.S. Forest Service

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### Dustin Bronson, Forest Research Ecologist

**Education:**

B.S., 2004. Zoology, Michigan State University  
Ph.D., 2008. Forest Ecology; Minor: Soil Science, University of Wisconsin-Madison

**Expertise:**

Effects of climatic variation on forest ecosystem structure and function.



### John Dadisman, LTE Grassland Bird Technician

**Education:**

B.S., 1980. Limnology and Biology, University of Wisconsin-Stevens Point  
M.S., 1990. Natural Resources/Water Chemistry, University of Wisconsin-Stevens Point

**Expertise:**

Grassland birds

**Key Collaborators:**

David Sample (WDNR); Daniel Schneider and Christine Ribic (UW); many students of the University of Wisconsin-Madison, Forestry and Wildlife Department

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### **Brian Dhuey, Survey Database Manager**

**Education:**

B.S., 1987. Biology, Ecology Emphasis,  
University of Wisconsin-Oshkosh

**Expertise:**

Wildlife harvest, permits, season lengths, and population information for most hunted and trapped species in Wisconsin



**Key Collaborators:**

WDNR Bureaus of Wildlife Management, Endangered Resources, Division of Forestry, Customer Service and Licensing, and Law Enforcement; UW-System Universities; United States Fish and Wildlife Service; United States Forest Service; Great Lakes Indian Fish and Wildlife Commission; WI Tribal Member; US Military

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### **Karin Fassnacht, LTE Scientist MOSS Coordinator**

**Education:**

B.S., 1992. Forest Science, University of Wisconsin-Madison  
M.S., 1995. Environmental Monitoring, University of Wisconsin-Madison  
Ph.D., 1996. Forest Ecosystem Ecology, University of Wisconsin-Madison

**Expertise:**

Forest ecology, satellite remote sensing

**Key Collaborators:**

WDNR Wildlife and Forestry Research Section; WDNR Division of Forestry; UW-Madison Department of Forest and Wildlife Ecology; UW-Madison Kemp Natural Resources Station; US Forest Service - Northern Research Station Research Work Units 07 & 13; US Forest Service - Watershed, Fish, Wildlife, Air & Rare Plants program; WDNR Bureau of Wildlife Management

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### **Ron Gatti, Waterfowl Biologist**

**Education:**

B.S., 1974. Fisheries and Wildlife Biology, Iowa State University  
M.S., 1979. Wildlife Ecology, University of Wisconsin-Madison

**Expertise:**

Duck biology, ecology, and population management.  
Geese, pheasants, nongame birds in forests and grasslands,  
watershed modeling, GIS, and radio telemetry

**Key Collaborators:**

Christine Ribic (UW); Greg Soulierre (FWS Joint Venture Science Coordinator); Mississippi Flyway Council Technical Section; Kent Van Horn and Ricky Lien (WDNR)

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## Suzanne Hagell, Conservation and Wildlife Biologist

### Education:

B.A., 2000. Anthropology, University of Wisconsin-Madison  
M.Phil, 2006. Anthropology, City University of New York  
Ph.D., 2010. Forest Science, Northern Arizona University

### Expertise:

Conservation and climate change outreach, adaptive management and decision-making, learner-centered teaching, forest and wildlife ecology, tropical forest ecology, non-invasive genetic sampling, population and landscape genetics



### Key WDNR Collaborators:

Karl Martin, Scott Hull, Michael Meyer, Andy Paulios, Alan Crossley, Tara Bergeson

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## Richard Henderson, Plant Ecologist

### Education:

B.A., 1977. Biological Aspects of Conservation,  
University of Wisconsin-Madison  
M.S., 1981. Landscape Architecture: Natural Resources,  
University of Wisconsin-Madison

### Expertise:

Ecology of prairies, oak savannas, oak woodlands, sedge meadows, and purple loosestrife; and fire ecology and effects



### Key Collaborators:

University of Wisconsin – Departments of Botany, Landscape Architecture, and Entomology; Dr. Ron Panzer (NEIU); Eric Metzler (The Ohio Lepidopterists); Dr. Paul Goldsteing (FL Museum of Natural History); John Shuey (TNC); Dr. Zhiwei Lu (EIU); Dr. John Tooker (PSU)

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## Scott Hull, Upland Research Scientist

### Education:

B.S., 1991. Wildlife Management, University of Wisconsin-Stevens Point  
M.S., 1993. Biology, Kansas State University  
Ph.D., 2002. Zoology, The Ohio State University

### Expertise:

Upland/Grassland wildlife management, wildlife habitat relationships, endangered resources management, bioenergy impacts on wildlife, farm-bill policy and conservation implications



### Key Collaborators:

WDNR Bureaus of Wildlife Management, Endangered Resources, and the Division of Forestry; UW Forest and Wildlife Ecology Department, Department of Agronomy; UW-Stevens Point College of Natural Resources; USDA-NRCS and FSA; U.S. Forest Service

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**Rich Kahl, Waterfowl Biologist and  
Migratory Bird Banding Master Permittee**

**Education:**

B.S., 1976. Wildlife Management, University of Wisconsin-Stevens Point  
M.S., 1980. Wildlife Management, University of Missouri-Columbia

**Expertise:**

Shallow lake ecology, waterfowl biology

**Key Collaborators:**

WDNR Bureaus of Wildlife Management and Endangered Resources; USGS

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**Jessica Kitchell, LTE Survey Technician**

**Education:**

B.A., 2001. Biological Aspects of Conservation, with a certificate  
(minor) in Environmental Studies, University of Wisconsin-Madison  
Capstone Certificate, 2002. Geographic Information Systems,  
University of Wisconsin-Madison

**Expertise:**

Wildlife surveys, GIS

**Key Collaborators:**

WDNR Bureaus of Wildlife Management and Endangered Resources

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**Tricia Knoot, Forest Research Sociologist/Economist**

**Education:**

B.A., 1997. Zoology and Biological Aspects of Conservation,  
University of Wisconsin-Madison  
M.S., 2004, Ecology & Evolutionary Biology (emphasis in Wildlife Ecology),  
Iowa State University  
Ph.D., 2008, Forestry, Iowa State University

**Expertise:**

Human dimensions of natural resources, social and economic survey design  
and analysis, forest and wildlife ecology, landscape ecology, and GIS

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**Olivia LeDee, Climate Change Associate Scientist**

**Education:**

B.S., 2002. Biology with a minor in Chemistry, Loyola University  
M.S., 2005. Conservation Biology, University of Minnesota-Twin Cities  
Ph.D., 2008. Conservation Biology with a minor in Development Studies  
and Social Change, University of Minnesota-Twin Cities

**Expertise:**

Climate change, land conversion, population dynamics,  
and avian conservation

**Key WDNR Collaborators:**

Karl Martin, Mike Meyer, Scott Hull



### **David MacFarland, Wolf, Bear and Furbearer Ecologist**

#### **Education:**

B.S., 2000. Environmental Science, Messiah College  
M.S., 2005. Conservation Biology and Sustainable Development,  
University of Wisconsin-Madison  
Ph.D., 2009. Wildlife Ecology, University of Wisconsin-Madison

#### **Expertise:**

Wildlife population dynamics, population estimation and monitoring,  
management of harvested populations, habitat selection

#### **Key Collaborators:**

University of Wisconsin Department of Forest and Wildlife Ecology; University of Wisconsin-Stevens Point College of Natural Resources; Gaylord Nelson Institute for Environmental Studies; Great Lakes Indian Fish and Wildlife Commission; US Fish and Wildlife Service; and WDNR Bureaus of Wildlife Management, Endangered Resources, and Division of Forestry

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### **Karl Martin, Scientist and Chief**

#### **Education:**

B.S., 1991. Wildlife Ecology, University of Wisconsin-Madison  
M.S., 1994. Wildlife Science, Oregon State University  
Ph.D., 1998. Forest Science, Oregon State University

#### **Expertise:**

Forest and wildlife management, wildlife habitat relationships,  
silviculture, and endangered resources management

#### **Key Collaborators:**

UW-Madison Forest and Wildlife Ecology Department; UW Stevens Point College of Natural Resources; Gaylord Nelson Institute for Environmental Studies; US Forest Service; US Fish and Wildlife Service; US Geological Survey; Upper Midwest Great Lakes Landscape Conservation Cooperative; Northern Institute of Applied Climate Science; Northern Forest Research Station; University of Minnesota Department of Forest Resources; UW Extension; WDNR Bureaus of Wildlife Management and Endangered Resources, and the Division of Forestry.

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### **Michael Meyer, Wildlife Toxicologist**

#### **Education:**

B.S., 1978. Biology, University of Wisconsin-Stevens Point  
M.S., 1982. Animal Sciences, Texas A&M University  
Ph.D., 1989. Wildlife Ecology, University of Wisconsin-Madison

#### **Expertise:**

Impacts of contaminant exposure on Wisconsin wildlife populations,  
impacts of development on northern lakes wildlife populations, climate  
change impacts on wildlife and habitat.

#### **Key Collaborators:**

USGS Upper Midwest Environmental Sciences Center; National Park Service – Ashland; USFWS Green Bay and East Lansing; WDNR Bureau of Watershed Management; UW Forest and Wildlife Ecology Department; Michigan Technological University, Houghton; WDNR Bureaus of Wildlife Management and Endangered Resources, and the Northern Highlands/American Legion State Forests.



### David Mladenoff, Forest Landscape Ecologist

**Education:**

B.A., 1973. Anthropology/Psychology, University of Wisconsin-Madison  
M.S., 1979. Forest Ecology, University of Wisconsin-Madison  
Ph.D., 1985. Forest Ecology, University of Wisconsin-Madison

**Expertise:**

Forest ecology, landscape ecology

**Key WDNR Collaborators:**

Karl Martin, Darrell Zastrow, and Carmen Wagner



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### Mike Mossman, Forestry Community Ecologist

**Education:**

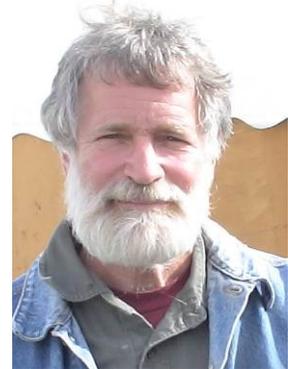
B.S., 1976. Biology, University of Wisconsin-Madison  
M.S., 1984. Wildlife Ecology, University of Wisconsin-Madison

**Expertise:**

Effects of land use on bird, amphibian, and small mammal populations

**Key Collaborators:**

Aldo Leopold Foundation; The Nature Conservancy; USFWS; US Army; Driftless Area Initiative; University of Wisconsin-Madison; and the WDNR Bureaus of Wildlife Management, Endangered Resources, and Division of Forestry



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### Tom Prestby, LTE Bird Research Technician

**Education:**

B.S., 2009. Forest and Wildlife Ecology, University of Wisconsin-Madison

**Expertise:**

Northern forest, grassland, and wetland birds of Wisconsin

**Key Collaborators:**

Andy Paulios, David Sample, Mike Worland, Nick Anich, Ryan Brady, John Dadisman (WDNR), and Daniel Schneider (UW)



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### Jessica Rees, LTE Research Technician

**Education:**

B.S., 2009. Wildlife Ecology, University of Wisconsin-Madison  
B.S., 2009. Biology, University of Wisconsin-Madison

**Expertise:**

Wildlife surveys, wildlife capture techniques, and radio telemetry

**Key Collaborators:**

WDNR Bureaus of Wildlife Management and Endangered Resources



### **Christine Ribic, Wildlife Cooperative Unit Leader**

**Education:**

B.S., 1976. Wildlife Biology, Colorado State University  
M.S., 1980. Ecology, University of Minnesota  
M.S., 1983. Statistics, University of Minnesota  
Ph.D., 1984. Ecology, University of Minnesota



**Expertise:**

Grassland vertebrate ecology and conservation, landscape ecology, biometrics, strategic decision making, alternate energy production impacts on terrestrial wildlife

**Key WDNR Collaborators:**

David Sample, Karl Martin, Ronald Gatti, Scott Hull, Andy Paulios

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### **Robert Rolley, Wildlife Population Ecologist**

**Education:**

B.S., 1977. Wildlife and Fisheries Biology, University of California-Davis  
M.S., 1979. Wildlife Ecology, University of Wisconsin-Madison  
Ph.D., 1983. Wildlife Ecology, Oklahoma State University



**Expertise:**

Wildlife population dynamics, monitoring wildlife population trends, effect of harvest on wildlife populations, modeling population response to management strategies, viability and management of small populations, Chronic Wasting Disease management

**Key Collaborators:**

Dr. Timothy Van Deelen and Dr. Michael Samuel (UW);  
Dr. Eric Anderson (UW-Stevens Point)

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### **David Sample, Grassland Community Ecologist**

**Education:**

B.A., 1978. Philosophy, Bowdoin College  
M.S., 1989. Land Resources, University of Wisconsin-Madison.



**Expertise:**

Birds and other vertebrates of grasslands and savannas: community ecology; habitat preferences; impacts of land use changes; ecology of the American Badger; habitat management on public and private lands – including the production of biomass energy crops; population monitoring; grassland and agricultural ecosystems research.

**Key Collaborators:**

Christine Ribic, Monica Turner, Randy Jackson, and Carol Williams (UW-Madison); Scott Walter, Scott Hull, Andy Paulios, and Maureen Rowe (WDNR); WDNR Bureau of Endangered Resources; Emily Latch and Peter Dunn (UW-Milwaukee)

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### **Michael Samuel, Assistant Wildlife Cooperative Unit Leader**

**Education:**

B.S., Computer Science, University of California-Berkeley  
M.S., Ecology, University of California-Berkeley  
M.S., Applied Statistics, University of Idaho  
Ph.D., Wildlife Management, University of Idaho

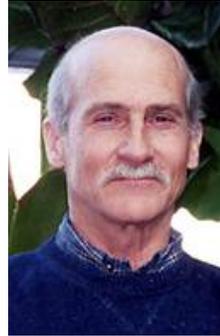
**Expertise:**

Ecology and epidemiology of wildlife diseases

**Key WDNR Collaborators:**

Robert Rolley, Chris Jacques, Karl Martin, Julie Langenberg, and Alan Crossley

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### **Daniel Schneider, Grassland Bird Specialist**

**Education:**

B.S., 2002. Philosophy, International Studies,  
University of Wisconsin-Stevens Point

**Expertise:**

Grassland birds

**Key Collaborators:**

David Sample, Ron Gatti, John Dadisman, Scott Hull,  
and Richard Henderson (WDNR); Christine Ribic (UW);  
UW-Madison graduate students Jimmy Doyle and  
Carolyn Schmitz; UW-Stevens Point graduate student Joe Dittrich.

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### **Daniel Storm, LTE Natural Resources Scientist**

**Education:**

B.S., 2002. Wildlife and Fisheries Sciences, South Dakota State University  
M.S., 2005. Zoology, Southern Illinois University Carbondale  
Ph.D., 2011. Wildlife Ecology, University of Wisconsin-Madison

**Expertise:**

Ungulate ecology and management, ecology and management  
of wildlife diseases, wildlife population monitoring

**Key Collaborators:**

UW Forest and Wildlife Ecology Department; Wisconsin Cooperative  
Wildlife Research Unit; WDNR Bureau of Wildlife Management

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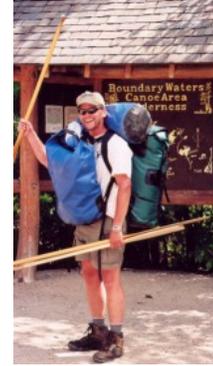
### Timothy Van Deelen, Deer and Furbearer Ecologist

**Education:**

B.S., 1988. Biology, Calvin College  
M.S., 1991. Wildlife Biology, University of Montana  
Ph.D., 1995. Wildlife Ecology, Michigan State University

**Expertise:**

Interactions of population dynamics, landscape-scale habitat use, behavior, and human impacts in terrestrial wildlife ecology, wildlife management, conservation of large mammals, ecology of exploited populations, deer ecology and management



**Key WDNR Collaborators:**

David MacFarland, Karl Martin, Robert Rolley, Daniel Storm, Michael Watt, and Adrian Wydeven

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### Jay Watson, LTE Botany/Entomology Technician

**Education:**

B.S., 2005. Biology and Environmental Science, University of Wisconsin-Green Bay  
M.S., 2009. Environmental Science and Policy, University of Wisconsin-Green Bay

**Expertise:**

Prairie insects, pollination ecology



**Key Collaborators:**

Richard Henderson (WDNR); University of Wisconsin-Department of Entomology; WDNR Bureau of Endangered Resources

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### Michael Watt, LTE Deer Research Project Leader

**Education:**

B.S., 2007. Wildlife Ecology, University of Wisconsin-Madison  
M.S., 2012. Wildlife Ecology, University of Wisconsin-Madison

**Expertise:**

Wildlife management, wildlife habitat relationships, Bats and Deer



**Key Collaborators:**

WDNR Wildlife and Forestry Research Section; UW Forest and Wildlife Ecology Department; UW Stevens Point; WDNR Bureau of Wildlife Management; Wisconsin Conservation Congress

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### **Michael Worland, LTE Research Scientist**

**Education:**

B.S., 1993. Wildlife Ecology and Conservation Biology,  
Northwest Missouri State University  
M.S., 2008. Conservation Biology, University of Minnesota-Twin Cities

**Expertise:**

Wildlife habitat relationships, population monitoring, avian survey methodology, avian community ecology

**Key Collaborators:**

WDNR Wildlife and Forestry Research Section; WDNR Bureaus of Wildlife Management and Endangered Resources; Division of Forestry; U.S. Forest Service

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### **Benjamin Zuckerberg, Landscape and Climate Ecologist**

**Education:**

B.A., 1998. Zoology, Connecticut College, New London, CT  
M.S., 2002. Wildlife and Fisheries Conservation,  
University of Massachusetts, Amherst, MA  
Ph.D., 2008. Ecology, SUNY College of Environmental Science  
and Forestry, Syracuse, NY



**Expertise:**

Analysis of citizen science data; range boundary shifts; occupancy modeling and estimation; ecology of wintering birds; wildlife population responses to habitat loss; ecological impacts of climate change; landscape ecology; species distribution modeling; geographical ecology

**Key WDNR Collaborators:**

Karl Martin, Andy Paulios, Michael Meyer, Robert Rolley, Scott Hull

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