

Nebraska Cooperative Fish and Wildlife Research Unit—USGS

REPORT OF ACTIVITIES October 2010 – October 2011



Cooperating Agencies

Nebraska Game and Parks Commission
The Wildlife Management Institute
University of Nebraska—Lincoln
U.S. Fish and Wildlife Service
U.S. Geological Survey (USGS) – Ecosystems Division



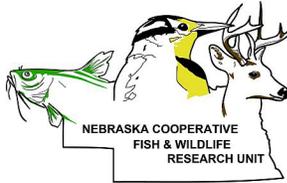
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UNIVERSITY OF
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Report of Activities October 2010 – October 2011



Nebraska Cooperative Fish and Wildlife Research Unit—USGS

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INTRODUCTION

The U.S. Geological Survey (USGS) Cooperative Research Units Program has been in existence for over 70 years as a partnership among USGS, state natural resource agencies, host universities, the Wildlife Management Institute, and the U.S. Fish and Wildlife Service. The first unit was founded at Iowa State University in Ames, Iowa. The program currently has 40 units in 39 states.

In 1960, the U.S. Congress gave statutory recognition to the program when they enacted Public Law 86-686, the Cooperative Research Units Act. The intent of the act was to “facilitate cooperation among the Federal Government, colleges, and universities, the States, and private organizations for . . . research and education relating to fish and wildlife, and for other purposes [by developing] coordinated, cooperative research and training programs for fish and wildlife resources. . . .”

The three-part mission of the Cooperative Research Units Program is focused on education, research and technical assistance.

- *Education.* Unit scientists teach graduate-level university courses and provide graduate students academic guidance, linking the research mission with student training.
- *Research.* Unit scientists conduct research that supports the needs of local cooperators and partners. Research can be of local, regional or national interests.
- *Technical Assistance.* Units provide technical assistance and training to state and federal natural resource managers, and to other natural resource managers as needed. Cooperators benefit from the expertise of unit scientists, cooperating university faculty, and biologists at state natural resource agencies.

In 2004, the Nebraska Cooperative Fish and Wildlife Research Unit became the newest state Cooperative Research Unit through a Cooperative Agreement signed by the U.S. Geological Survey, the University of Nebraska–Lincoln, the Nebraska Game and Parks Commission, the U.S. Fish and Wildlife Service and the Wildlife Management Institute.

PERSONNEL AND COOPERATORS

UNIT PERSONNEL

UNIT STAFF – U.S. GEOLOGICAL SURVEY, COOPERATIVE RESEARCH UNITS PROGRAM

Craig R. Allen, Unit Leader
Joseph J. Fontaine, Assistant Unit Leader – Ecology
Kevin L. Pope, Assistant Unit Leader – Fisheries

UNIT STAFF – UNIVERSITY OF NEBRASKA–LINCOLN

Christopher Chizinski, Post-Doctoral Research Associate and Coordinator, Angler Survey Project
Caryl Cashmere, Staff Assistant
Karie Decker, Coordinator, Nebraska Invasive Species Project
Valerie Egger, Administrative Assistant
Caroline Jezierski, Coordinator, Nebraska Wind and Wildlife

RESEARCH TECHNICIANS

Erin Andresen	E. Ashley Manley
Joseph Churilla	Lindsey Messinger
Chris Dietrich	Melissa Mills
Brent Dinkel	Kyle Morton
Lawrence (Dan) Drimmel	Mary O'Brien
Tricia Dudley	Alexander Prentice
Amber Fandrich	Lisa Prowant
Alvin Finley	James Schalles
Julianna Gehant	Caryn Senn
Maria Glaser	Bethany Teeters
Michael Godin	Kelly Turek
Travis Kinsell	Jacob Walker
Natalie Luben	Clare Welch
	Sarah Zink

CREEL CLERKS

Tyler Anderson	Jared Meiergerd
Robert Barg	Minnie Petsch
Don Bohenkamp	Robert Pierson
Ryan Foley	Brett Roberg
Ron Grandi	Patricia Rossmeier
Rhonda Lawing	Gerald Ryschon
Dennis Liess	Tyler Sanders
George Maynard	Shelby Sidel
	Phil Stollberg

STUDENT WORKERS

Reece Allen	Bryce Hatfield
William (Alex) Avery	Hannah Hummel
Nathan Baird	Adam Kendall
Suzanne Decker	Amy Larson
Cameron Depue	Isaac Mertens
Alex Engle	Sarah Moy
Garrett Hanquist	Trisha Quon
	Anthony White

UNL UCARE STUDENTS

Tanner Stevens
Alec Wong

CURRENT GRADUATE DEGREE CANDIDATES

Fisheries

Lindsey Chizinski, M.S., School of Natural Resources, UNL, January 2008 – present

Jason DeBoer, Ph.D., School of Natural Resources, UNL, January 2009 – present

Danielle Haak, Ph.D., School of Natural Resources, UNL, August 2011 – present

Robert Kill, M.S., School of Natural Resources, UNL, January 2011 – present

Carla Knight, M.S., School of Natural Resources, UNL, March 2009 – present

Lucas Kowalewski, M.S., School of Natural Resources, UNL, March 2010 – present

Alexis Maple, M.S., School of Natural Resources, UNL, March 2009 – present

Dustin Martin, Ph.D., School of Natural Resources, UNL, January 2009 – present

Peter Spirk, M.S., School of Natural Resources, UNL, January 2009 – present

Chris Wiley, M.S., School of Natural Resources, UNL, August 2011 – present

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Noelle Chaine, Ph.D., School of Natural Resources, UNL, August 2011 – present

Kent Fricke, Ph.D., School of Natural Resources, UNL, June 2011 – present

Michelle Hellman, M.S., School of Natural Resources, UNL, August 2009 – present

Christopher Jorgensen, M.S., School of Natural Resources, UNL, January 2010 – present

Jessica Laskowski, M.S., School of Natural Resources, UNL, August 2011 – present

Kristine Nemeck, Ph.D., School of Natural Resources, UNL, August 2006 – present

Nick Smeenck, Ph.D., School of Natural Resources, UNL, August 2010 – present

Chad Smith, Ph.D., School of Natural Resources, UNL, co-advisor (advisor Kyle Hoagland), August 2007 – present

Ryan Stutzman, M.S., School of Natural Resources, UNL, January 2010 – present

Shana Sundstrom, Ph.D., School of Natural Resources, UNL, August 2011 – present

Daniel Uden, M.S., School of Natural Resources, UNL, August 2010 – present

Kody Unstad, M.S., School of Natural Resources, UNL, May 2009 – present

Ashley VanderHam, M.S., School of Natural Resources, UNL, June 2011 – present

Justin Williams, M.S., School of Natural Resources, UNL, August 2006 – present

Sam Wilson, M.S., School of Natural Resources, UNL, August 2006 – present

GRADUATES, 2010–11

Ryan Lueckenhoff, M.S., Natural Resource Sciences, UNL, May 2011

Aaron Lotz, Ph.D., Natural Resource Sciences, UNL, August 2011

Amy Williams, M.S., Natural Resource Sciences, UNL, May 2011

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Nebraska Public Power District
Nebraska Weed Control Association
Pheasants Forever
Smithsonian National Zoological Park Migratory Bird Center
The Nature Conservancy
University of Nebraska Center for Public Policy
University of Nebraska College of Law
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U.S. EPA-Cincinnati
U.S. National Park Service
U.S. National Park Service / Great Plains Cooperative Ecosystems Studies Unit
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University of Nebraska-Lincoln, Department of Plant Pathology
University of Nebraska-Lincoln, Earth and Atmospheric Sciences
University of Nebraska-Lincoln, Northeast Research and Extension Center
University of Nebraska-Lincoln, School of Biological Sciences
University of Nebraska-Lincoln, School of Natural Resources
University of Nebraska-Lincoln, Water Center
USDA Animal and Plant Health Inspection Service, APHIS
USDA Forest Service, Rocky Mountain Research Station
USDA National Resource Conservation Service
USFWS DeSoto National Wildlife Refuge
USFWS Ecological Services, Nebraska Field Office
USFWS Fort Niobrara-Valentine National Wildlife Refuge
USFWS Habitat and Population Evaluation Team
USFWS Nebraska Field Office
USFWS Playa Lakes Joint Venture
USFWS Prairie Pothole Joint Venture
USFWS Rainwater Basin Joint Venture
USFWS Region 6
USGS Cryospheric Studies
USGS Fort Collins Science Center
USGS Northern Prairie Wildlife Research Center
USGS Sonoran Desert Research Station
USGS South Dakota Water Science Center
USGS Water Center, Lincoln

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Keith Koupal, Fisheries Division, Nebraska Game and Parks Commission

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Steve Riley, Pheasants Forever

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Valery Forbes, School of Biological Sciences, UNL

Vicki Wohlers, USDA Animal and Plant Health Inspection Service, APHIS–PPQ

Wayne Hubert, USGS Wyoming Cooperative Fish and Wildlife Research Unit, Univ. of Wyoming

Wayne Landis, Inst. of Environmental Toxicology, Huxley College of the Environment, Western Washington Univ.

Zac Brashears, Fisheries Division, Nebraska Game and Parks Commission

MILESTONES

GRANTS

Unit scientists secured over nine million in research funds, with more than one million in new funding this period.

STUDENTS

Currently, we have twenty-five degree candidates, nine Ph.D. and sixteen M.S., advised by Craig Allen, Joseph Fontaine or Kevin Pope. In the past year, three students earned degrees in Natural Resource Sciences. In August 2011, Aaron Lotz was the first NE Coop Unit student to receive a Ph.D. The Unit has two students in UNL's Undergraduate Creative Activities and Research Experiences (UCARE) Program.

STAFFING INCREASES

Staffing has increased dramatically. In addition to 3 federal scientists, 6 permanent university staff, and 25 graduate students, the Unit employed nearly 60 temporary (short-term and long-term) staff during the past year consisting of research technicians, creel clerks, and undergraduate students.

SPECIAL JOURNAL ISSUE

Coop Unit scientists developed a special issue on *Adaptive Management for Natural Resources*. Guest editors were: Craig R. Allen, Kevin L. Pope and Joseph J. Fontaine. The May 2011 issue was published by the *Journal of Environmental Management* and features thirteen articles from authors at eleven institutions, including some of the most prominent scientists involved in the development of adaptive management. The cover of the special issue was designed by Nebraska Coop Unit student Sarah Rehme (M.S. 2010). The national office of the USGS Cooperative Research Units Program provided the funding for this special issue. The articles are available on line at www.sciencedirect.com. Search for Journal/Book title "environmental management," Volume "92," Issue "5."

STATEWIDE AQUATIC NUISANCE SPECIES PLAN

The Nebraska Aquatic Invasive Species Management Plan was approved by the federal Aquatic Nuisance Species Task Force in November 2010. Approval of the plan enabled Nebraska to apply for and receive federal funding under the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990. To help fulfill the objectives in the management plan, funding was received to develop an Aquatic Invasive Species Prevention Program in Nebraska.

THESES AND DISSERTATIONS

RYAN LUECKENHOFF, M.S. MAY 2011

Morphological variation between juvenile white bass and juvenile hybrid striped bass
University of Nebraska–Lincoln. Advisor, Kevin Pope.

AMY WILLIAMS, M.S. MAY 2011

*River otter (*Lontra canadensis*) use of *Phragmites australis* and density estimation using genetic techniques*
University of Nebraska–Lincoln. Advisor, Craig Allen.

AARON LOTZ, PH.D. AUGUST 2011

Discontinuities: Predicting invasions and extinctions
University of Nebraska–Lincoln. Advisor, Craig Allen.

AWARDS AND RECOGNITIONS

RESILIENCE IN STRESSED WATERSHEDS IGERT TRAINEESHIPS

Danielle Haak and **Noelle Chaine** were awarded prestigious National Science Foundation IGERT Traineeships in support of their Ph.D. programs.

OTHER GRANTS AND AWARDS

Michelle Hellman won best student presentation at the Missouri River Natural Resource Committee Conference held in Nebraska City, NE March 2011.

Chris Jorgensen won second place in the student poster division at the 2010 Midwest Fish and Wildlife Conference in Minneapolis, MN. **Ryan Lueckenhoff's** paper took first place in the papers category.

The Cooper Ornithological Society Student Membership Award was given to **Chris Jorgensen** and **Ryan Stutzman** in March 2011. The award covers the cost of a 2-year membership with full membership benefits. **Chris Jorgensen** also received a one year membership to the Wildlife society at the National, Regional and State levels as well as \$50 from the North Central Section of The Wildlife Society.

Jessica Laskowski received the \$3,000 William J. Curtis Endowed Fellowship, which is awarded to an exceptional new graduate student in the College of Agricultural Sciences and Natural Resources.

Dustin Martin was the recipient of the \$500 School of Natural Resources Doctoral Meritorious Graduate Student Award. The award was added to his assistantship. The UNL Agricultural Research Division awarded Dustin \$500 from the David H. and Annie E. Larrick Memorial Travel Fund, which supported Dustin's participation in the 6th Annual World Recreational Fishing Conference in Berlin, August 2011.

Kristine Nemeč received an Honorable Mention, Viewer's Choice Poster Competition at the Water for Food Conference in May 2011.

UCARE student **Tanner Stevens** won the poster presentation at the University of Nebraska-Lincoln Undergraduate Research Fair held in April 2011.

Shana Sundstrom was awarded an SNR assistantship and an Othmer Fellowship from UNL. She also received a scholarship to attend the New England Complex Systems Institute (NECSI) summer program.

Kody Unstad received the Nature Conservancy's J.E. Weaver Competitive Grant in 2011. This \$1,000 grant will help fund technician support for his research.

OUTREACH ACTIVITIES

Below is a *sample* of the many outreach activities that Unit staff and students participated in during the past year.

UNL NATUREPALOOZA

Coop Unit students, staff, and scientists participated in the first *NaturePalooza* hosted by the Nebraska State Museum and UNL's School of Natural Resources in October 2010. Joseph Fontaine, Karie Decker, Carla Knight, Chris Jorgensen, and Ryan Stutzman had games and activities that helped visitors better understand Nebraska's natural resources and how to protect them. Activities are also planned for the November 2011 NaturePalooza.

YOUTH CLUB PRESENTATION

In February 2011, Sam Wilson gave a presentation to the Palmyra Youth Club on native Nebraska mammals. The youth handled different pelts, and saw casts of tracks from many furbearers as well as deer and mountain lions.

NEBRASKA LEGISLATURE

Karie Decker spent many hours in the legislative halls of the Nebraska State Capital providing expert testimony for legislative hearings LB 391 and LB 392, both relating to invasive species in Nebraska.

MEDIA – RADIO, BILLBOARDS, AND MORE

In January, Karie Decker participated in a Lincoln, NE radio show, Nebraska Outdoor Radio, where she participated in a live discussion, "Invasive species in Nebraska and beyond."

Stop Aquatic Hitchhikers! Karie was instrumental in getting a billboard placed in Omaha and at Lake McConaughy (near Ogallala) to boost the public's knowledge and awareness of invasive species in Nebraska. In addition, a "Clean, Drain, Dry" promotional ad appeared in the July 2011 edition of *Prairie Fire* to promote efforts aimed at stopping the spread of harmful aquatic plants and animals in Nebraska that can be transported by boats.

WORKSHOPS/SYMPOSIA

In March 2011, Karie Decker set up an educational/outreach booth at the Association of Field Ornithologists/Cooper Ornithological Society/Wilson Ornithological Society in Kearney, NE as well as at the Rainwater Basin and Playa Lakes Joint Ventures Joint Conference in Grand Island, NE.

Carla Knight attended several Nebraska expos, including the March Triumph of Agriculture Expo at the Qwest Center in Omaha, Fremont Rural Living Expo, and Missouri River Expo in Ponca State Park where she conducted fish identification quizzes. Participants examined various fish models and identified the species. Information gained will allow Carla to quantify anglers' current abilities to correctly identify fish species, and evaluate several different products designed to educate anglers about fish identification.

OTHER

Robert Kill was a judge at the Nebraska Junior Academy of Sciences Southeast Regional Science Fair in March 2011 in Lincoln, NE. Kristine Nemecek was a judge in the poster session at the Environmental Studies Senior Thesis Spring Showcase in April 2011 held in Lincoln, NE. Kristine also volunteered as a facilitator for a breakout session at the Water for Food Conference in Lincoln, NE, May 2011. Jason DeBoer assisted Nebraska Game and Parks Commission with the Outdoor Discovery Program at Fort Kearney State Park in May 2011.

RESEARCH PROJECTS



ADAPTIVE MANAGEMENT FOR THE NEBRASKA NATURAL LEGACY PLAN

Principal Investigator(s): Craig R. Allen, Joseph J. Fontaine

Graduate Student(s): Kent Fricke, Ph.D.

Project Duration: June 2010 – July 2014

Funding: Nebraska Game and Parks Commission, U.S. Fish and Wildlife Service

Project Location: Statewide Nebraska

The Nebraska Natural Legacy Plan (NNLP) is a conservation strategy that identifies conservation targets and management approaches to decrease threats to Nebraska's biodiversity. In cooperation with the Nebraska Game and Parks Commission, an adaptive management framework will be developed for the NNLP. Goals are to:

1. Evaluate the effects of conservation activities;
2. Prioritize research and monitor activities;
3. Develop innovative programs to improve the ability to inventory and monitor at-risk species;
4. Develop theoretical and empirical techniques that facilitate the integration of research and monitoring into the management programs of at-risk, non-game species, including consideration of the complex trade-offs between social, economic, and biological factors that may facilitate and constrain effective wildlife management.

This project will produce a literature synthesis to identify effective techniques and approaches in the region, and test them in the field using an adaptive management framework. Ultimately, the project will serve as a demonstration of effective implementation of adaptive management for NNLP goals, which will then be used as a template for other projects across the state. Study areas, species, and cooperators will be identified in fall 2011, and fieldwork is expected to begin by summer 2012.

ANGLER BEHAVIOR IN RESPONSE TO MANAGEMENT ACTIONS ON NEBRASKA RESERVOIRS

Principal Investigator(s): Kevin L. Pope

Post-Doctoral RA: Christopher Chizinski

Graduate Student(s): Carla Knight, M.S. Alexis Maple, M.S.
Lucas Kowalewski, M.S. Peter Spirk, M.S.
Dustin Martin, Ph.D. Chris Wiley, M.S.

Project Duration: January 2009 – December 2013

Funding: Nebraska Game and Parks Commission

Project Location: Statewide Nebraska

Natural resource agencies invest substantial resources to recruit anglers. However, there is little understanding of human motives for participating in angling activities. Even less is known about the effects of management actions on angler participation.

Project goals are to understand 1) the participation patterns of anglers on local and regional scales, and 2) how participation patterns of anglers influence fish populations.

The project currently has six study components.

1. *Statewide Angler Survey*: Creel surveys are being conducted on Calamus Reservoir, Harlan County Reservoir, Lake McConaughy, Lewis and Clark Lake, Merritt Reservoir, and Sherman Reservoir from April through October, 2009–2013. These surveys provide continuation to long-term (>10–20 years) data sets that are valuable for assessment of temporal changes in angler participation. In particular, these extended data sets will allow for relational assessments of changes in angling participation with environmental conditions and management actions on large-scales.

In addition to the long-term assessments, creel surveys are being conducted at numerous smaller reservoirs. Effectively sampling smaller waterbodies is logistically difficult—there are fewer anglers to contact, which creates statistical issues due to small sample size. Small reservoirs to be sampled at least one year during this study include the Fremont Lakes, TaHaZouka Park Lake, Gracie Creek Pond, Willow Creek State Recreation Area, Skyview Lake, Cottonmill Lake, Johnson Reservoir and Yanney Park Lake. These surveys will be used for assessment of current guidelines used to sample small fisheries.

Creel surveys are also being used to target some unique situations around the state. Our first unique situation occurred in the Republican River basin. Four reservoirs (Swanson, Enders, Red Willow, and Medicine Creek) are being surveyed during 2009–2013 to identify possible changes in angler participation following a major drawdown at Red Willow due to safety concerns over the dam, which restricted access for several months. Lessons learned from these reservoirs will aide in understanding other situations across the state when access to a fishery is restricted. Our second unique situation occurred in the upper basin of the Niobrara River. Box Butte Reservoir is being surveyed during 2010–2011 to quantify the participation patterns by spear fishermen following a change in the spear-fishing season and to identify changes in harvest of northern pike following a change in the size limit.

2. *Regional Angler Survey*: An intensive year-round survey is being conducted on 19 reservoirs in the Salt Valley region of southeast Nebraska. The survey will provide baseline data necessary to develop a model predicting temporal

and spatial participation by anglers. This model will be especially useful for understanding changes in fishing pressure at specific reservoirs as influenced by conditions at nearby reservoirs.

Intensive, year round sampling continues on the 19 Salt Valley reservoirs. In 2011, Branched Oak, Holmes, Merganser, Wagon Train, Wild Plum, Wildwood and Yankee Hill reservoirs were sampled. Data from these reservoirs will be used along with data from 2009–2010 sampling to assess participation patterns of anglers within the Salt Valley region. Preliminary results indicate that the number of anglers harvesting fish is small across the region, whereas effort is great in most reservoirs, especially those within Lincoln.



Angler Survey Fish Models

3. *Ability of Anglers to Identify Fishes:* A fish-identification quiz was first given in August 2010 to participants of a Family Fishing event hosted by the Nebraska Game and Parks Commission. Since then, this quiz has been given at the UNL NaturePalooza, Fremont Rural Living Expo, Triumph of Agriculture Expo, and Missouri River Outdoor Expo. Participants are asked to examine fish models and identify the species. Information gained will allow us to quantify anglers' current abilities to correctly identify fish species, and evaluate several different products designed to educate anglers about fish identification. Understanding anglers' ability to correctly identify fish is important for predicting the success of complex fishing regulations.
4. *Angling Pressure and Bluegill Parasites:* Catch-and-release angling is extremely popular on the reservoirs within Nebraska's Salt Valley watershed. Fish that are captured and released by anglers are often subjected to stressors that alter physiology, potentially altering fish behavior and ultimately fish fitness. Additionally, increases in angling pressure should correlate positively with catch-and-release events. Finally, fish can become more susceptible to infestation by parasites when stress compromises the fish's immune system. Thus, we predict that a positive relationship exists between angling pressure and rate of parasite infestation. To test this prediction, we will examine angling pressure and larval trematode (i.e., *Neascus* spp. and *Clinostmum* spp.) abundance in juvenile bluegill for 16 Salt Valley reservoirs.
5. *Angler Effects on Sexually-Dimorphic Fish Species:* Differences in harvest between male and female fish can alter sex-specific rates of recruitment, growth, and mortality, and hence, the overall health of a fish population. Detailed information (species, length, total weight, age, sex, liver weight, and gonad weight) on harvested walleye, white bass, and white crappie was collected from Sherman and Calamus Reservoirs during spring 2009 and 2010. Sex-selective harvest (female-biased) was evident for white bass and white crappie, but not for walleye.
6. *Estimates of Fish Population Size—an Important Link to Understanding Harvest:* Fishery biologists routinely monitor relative abundance of fish populations by assessing catch in standardized gears; they also routinely monitor harvest by estimating total number of fish kept by anglers within a year. Unfortunately, it is difficult to understand the effect of harvesting 20,000 walleye from a reservoir where only six walleye were captured in a gillnet set overnight. As such, we are working to obtain population estimates for channel catfish in 10 Salt Valley reservoirs. In addition, we are investigating the applicability of techniques commonly used by wildlife biologists to estimate bird and mammal abundance, for estimating abundance of fish. Ultimately, information on fish population sizes will be linked with information on angler use and harvest.



Anchor worm
Photo credit: Alexis Maple

AQUATIC INVASIVE SPECIES (AIS) PREVENTION PROGRAM

Principal Investigator(s): Karie Decker, Craig R. Allen

Project Duration: April 2011 – June 2013

Funding: Nebraska Environmental Trust, USFWS Aquatic Nuisance Species Taskforce

Project Location: Statewide Nebraska

The Nebraska Invasive Species Project received a grant from the Nebraska Environmental Trust to develop the multi-institutional Aquatic Invasive Species Prevention Program. Goals are to:

1. decrease the risk of aquatic invasive species introduction into Nebraska by implementing a boat inspection and decontamination program,
2. increase public awareness of aquatic invasive species through an integrated outreach/education program,
3. continue aquatic invasive species monitoring efforts to help focus prevention efforts, and
4. increase local and regional collaboration in the prevention of aquatic invasive species.

In May 2011, technicians were hired by the Invasive Species Project and Nebraska Game and Parks Commission to conduct boater surveys designed to gauge public knowledge of invasive species, to track where boaters are coming from (and going to), and to educate boaters on aquatic invasive species prevention. Boater surveys continued through August 2011 and we anticipate final analyses to be completed fall 2011. As of June 30, over 2,000 surveys had been completed at 18 different locations around the state.

During surveys, technicians also educate the public regarding why aquatic invasive species are a problem, and train them in how to prevent spread of aquatic species. Approximately 10,000 individuals have been educated and trained on Nebraska's Clean, Drain, and Dry Protocol. In addition, technicians have completed over 350 voluntary watercraft inspections, and intercepted one high-risk boat that was subsequently decontaminated before launching into Nebraska waters.

Current preliminary results suggest that in western Nebraska, 22% of those surveyed had not heard of aquatic invasive species or how to prevent their spread. In central and eastern Nebraska, 9% and 13% (respectively) of those surveyed had not heard of aquatic invasive species. In addition, it appears that in western Nebraska, at least 40% of the boaters are from out-of-state (primarily Colorado, but also Iowa, Kansas, Wyoming, Oklahoma) but in central and eastern Nebraska, only 16% of the boaters are from out of state (Kansas, South Dakota, Iowa).

Additional funding from the U.S. Fish and Wildlife Service will enhance these activities.



Watercraft inspection training
Photo credit: Karie Decker



Aquatic invasive species outreach team
Photo credit: Karie Decker

ASSESSING LOCAL AND LANDSCAPE CONSTRAINTS ON HABITAT MANAGEMENT FOR UPLAND BIRDS

Principal Investigator(s): Joseph J. Fontaine, Larkin Powell

Graduate Student(s): Christopher Jorgensen, M.S.

Project Duration: January 2010 – December 2012

Funding: Nebraska Game and Parks Commission

Project Location: Southern Nebraska

Throughout the Great Plains, changing land-use practices are resulting in large-scale biodiversity loss and an ever increasing dependence on effective conservation and restoration efforts provided by private, state, and federal agencies. Yet far too often, local management efforts fail to demonstrate the desired outcome for wildlife populations. Understanding why management actions are unsuccessful is paramount, but past studies often fail to consider the importance of ecological mechanisms that act across multiple spatial and temporal scales. By exploring how grassland bird communities select habitat based on local vegetative composition as well as landscape attributes, we can gain perspective on why populations and communities fail to react to apparently suitable habitat improvements.

Using Geographic Information System spatial analysis tools, researchers are analyzing data from avian point count surveys and local vegetation assessments within a larger land cover layer of Nebraska. The resulting outputs are being employed to create species-specific and community-level spatial models for Nebraska, which identify key focus areas to implement management efforts with the goal of maximizing management benefits to grassland bird communities.

Avian point count surveys were conducted during 2010 and 2011 at 24 state and federal Wildlife Management Areas scattered across southern Nebraska. This past field season, 19 private properties were added which are enrolled in the unique Pheasants Forever and Nebraska Game and Parks Commission CRP-MAPS program, and an additional 23 sites which are located on private lands. Thus far, we completed 2023 surveys, counted more than 22,000 individuals, and detected 106 species. Preliminary results indicate that across multiple spatial scales woody vegetation may negatively influence grassland bird distribution and abundance, such that areas with as little as 20% woody vegetation in the landscape may experience local extirpation of a variety of grassland obligate species.



Dickcissel perched on a snag.
Photo credit: Christopher Jorgensen



Jess Laskowski conducting an avian point count.
Photo credit: Christopher Jorgensen



Grasshopper Sparrow perched on a sapling.
Photo credit: Christopher Jorgensen

ASSESSING THE RELATIONSHIP BETWEEN STABLE ISOTOPES AND GRASSLAND BIRD PRODUCTIVITY ON GREAT PLAINS NATIONAL PARK SERVICE PROPERTIES

Principal Investigator(s): Larkin Powell, Craig R. Allen

Graduate Student(s): Sarah Rehme, M.S. (2010)

Project Duration: June 1, 2007 – May 1, 2012

Funding: U.S. Geological Survey Natural Resource Preservation Program (NRPP) (RWO 2), and The National Parks Service

Project Location: Three National Park Service Units in Kansas, Minnesota, Nebraska

National Park Service (NPS) units in the Great Plains provide breeding habitat for many grassland birds. However, little is known about the quality of this habitat and more extensive study into the avian breeding ecology at these sites has been recognized as necessary. A short-term study on songbirds at three NPS properties complemented current NPS monitoring, providing an among-park comparison of nest success—a prohibitively labor-intensive and expensive process when conducted on a regional scale. Park managers need lower-cost data for informed decision-making; measuring site fidelity is a potentially less expensive means of monitoring breeding site quality.

The project used unique methods—stable isotope analyses of avian tissues—to evaluate variability in site fidelity of grassland birds at three NPS units in the Great Plains: Homestead National Monument, Nebraska; Pipestone National Monument, Minnesota; and Tallgrass Prairie National Preserve, Kansas. Birds that breed successfully at a location will often return to that location again (site fidelity). Current extrinsic markers used in monitoring site fidelity were inadequate for small birds; stable isotope analyses provided an alternative approach. This project evaluated the extent to which stable isotope analyses could be utilized to measure site fidelity in breeding grassland birds, specifically four target species: dickcissel (*Spiza americana*), grasshopper sparrow (*Ammodramus saviannarum*), eastern meadowlark (*Sturnella magna*), and western meadowlark (*Sturnella neglecta*).

All years of field research have been completed at all three sites. Grassland bird species richness was highest at Pipestone and Tallgrass. Grassland obligate nest success for both years was 39% at Homestead and 6–29% for target species at Tallgrass. No target species nests were found at Pipestone. Mean adult feather hydrogen ratios (δD) were separable among study sites ($P < 0.05$). Site fidelity tended to be higher at the large site, Tallgrass (63%), and lower at the small site, Homestead (50%). Mean blood δD values were 46% more depleted than mean δD feather values. Analyses of nest success, site species richness, avian density, site fidelity, and stable isotopes have been completed. Results were compiled and reported in a master's thesis available at: <http://digitalcommons.unl.edu/natresdiss/11>.



Bird banding
Photo credit: Sarah Rehme



Extraction of feather for analysis
Photo credit: Sarah Rehme



Pipestone Prairie, MN
Photo credit: Sarah Rehme

CROSS-SCALE STRUCTURE AND SCALE BREAKS IN COMPLEX SYSTEMS

Principal Investigator(s): Craig R. Allen

Graduate Student(s): Aaron Lotz, Ph.D. (2011)
Aaron Alai, M.S. (2010)

Project Duration: July 1, 2004 – December 2010

Funding: James S. McDonnell Foundation

Project Location: University of Nebraska–Lincoln, Clemson University

Scale breaks (discontinuities) in attributes of animal communities (such as body masses) correlate strongly with a set of poorly understood biological phenomena that seem to mix contrasting attributes. These phenomena include invasion, extinction (high species turnover), increased population variability, migration and nomadism. The clustering of these phenomena at predictable scale breaks suggests that variability in resource distribution or availability is greatest at scale breaks. Location at scale breaks affords species great opportunity, but also potential crisis. Complex behaviors such as migration and rapid adaptation leading to speciation may evolve most efficiently and commonly at scale breaks, where there is the greatest potential reward, although with the highest potential cost.

The causes of nomadism, migration, and decline in vertebrates are poorly understood. Literature suggests nomadism may arise in species that specialize in granivory, nectivory, or the utilization of rodent outbreaks. Literature also suggests that species become migratory because they exploit certain scarce or variable food types. Species decline is hypothesized to be the result of many different factors as well; large species, island species and specialists may be more prone to decline.

Results of analyses suggest that a combination of species characteristics, including the distance to the edge of a body mass aggregation, explain the complex phenomena of nomadism, migration and decline. Generally no single predictive model was supported. However, results suggest that position in which a species exists within a body mass distribution can aid in predicting nomadic and migratory bird species. Almost all models tested show that as a species approaches the edges of a body mass aggregation, it has a greater likelihood of being nomadic or migratory. Models testing for species decline, however, yield less robust results and instead indicate that larger body masses of species indicate a declining population. However, these results may be due in part to human observation of declining species being biased towards larger species.

THE EFFECT OF COMMON REED ON RIVER OTTER HABITAT USE

Principal Investigator(s): Craig R. Allen

Graduate Student(s): Amy Williams, M.S. (2011)

Project Duration: May 2009 – December 2010

Funding: Nebraska Game and Parks Commission
The Nebraska Environmental Trust

Project Location: Big Bend Region of the Platte River, Nebraska

The recent invasion of *Phragmites australis* (common reed) in the Big Bend region of the Platte River has made the need to examine its potential effects on river otters more critical. The ability of *P. australis* to rapidly alter both landscapes and habitats could have large effects on vulnerable populations, such as river otters (*Lontra canadensis*). This study will increase our understanding of the effects of this invasive plant on river otters—a flagship species for non-game conservation.

The study examined how otters use rivers with *P. australis* infestation, if otter den use in areas with *P. australis* was more or less than expected relative to availability, and identified differences in otter use of areas before and after *P. australis* treatments. Otter positions along the central Platte River were determined from radio tagged river otters in conjunction with GIS. Data collection ended in December 2009 with eighteen otters successfully implanted with transmitters and over 1,000 locations being recorded. The data analysis is complete and results were compiled into a master's thesis.

Below are some of the findings of how otters use different habitats.

- River otters used habitat non-randomly for unique den and resting sites. Agricultural areas were used less than expected; water, riparian vegetation and *P. australis* were used more than expected.
- Female river otters used habitat for den and resting sites differently than what was expected. Agriculture was used less; water, riparian vegetation and *P. australis* were used more than expected.



Study Otter (implanted with transmitter)
Photo credit: Sam Wilson



Phragmites australis
Robert H. Mohlenbrock @ USDA-NRCS PLANTS
Database / USDA SCS. 1989. *Midwest wetland flora*:

THE EFFECTS OF ALTERED STOPOVER HABITAT ON RESOURCE AVAILABILITY, HABITAT SELECTION, AND STOPOVER BEHAVIORS

Principal Investigator(s): Joseph J. Fontaine, Susan Skagen (USGS Fort Collins Science Center)

Graduate Student(s): Ryan Stutzman, M.S.

Project Duration: January 2010 – January 2013

Funding: U.S. Geological Survey National Climate Change and Wildlife Science Center (RWO 12)

Project Location: North Central South Dakota

Throughout the central Great Plains of North America, changing climatic conditions are expected to alter ecosystem phenology, productivity, and function as well as the distribution and management of agricultural lands in the region. In conjunction, these processes could act to inextricably alter the agroecosystems of the Great Plains and have a corresponding impact on the multitude of species that depend upon this region. Understanding how species respond to changing conditions is thus critical to our consideration of future management efforts within the Great Plains and beyond.

The wetlands of the Great Plains are increasingly altered by changing conditions, but remain an important stopover and breeding habitat for a variety of migratory bird species, including 37 species of shorebirds. Although shorebirds use highly altered wetlands, the extent to which these habitat decisions demonstrate preference and are adaptive remains unclear.

To identify the influence of changing land-use practices and local phenology on avian habitat preferences, surveys were conducted for migrating and breeding shorebirds from April to June of 2010 and 2011 in three counties in north-central South Dakota. Initial findings suggest a clear distinction in habitat preference between breeding and migratory populations, as breeding shorebirds were most abundant in grassland wetlands, while migrating populations showed a strong preference for wetlands in agricultural fields despite the reduced availability of critical food resources.

These findings beg the questions: what is driving the selection of seemingly maladaptive habitats by migrating shorebirds and, more importantly, what are the implications of these decisions to individuals and ultimately populations? Future work will address these questions using a combination of experimental and observations studies that consider how habitat cues are changing independent of the ecological conditions they formally indicated, and the corresponding impacts on migratory shorebird populations throughout the Great Plains.



Shore birds
Photo credit: Joseph Fontaine

ESTIMATING NORTH AMERICAN RIVER OTTER (*LONTRA CANADENSIS*) POPULATION SIZE USING DNA FROM SCAT

Principal Investigator(s): Craig R. Allen

Graduate Student(s): Amy Williams, M.S. (2011)

Project Duration: September 2009 – January 2011

Funding: Nebraska Game and Parks Commission

Project Location: Big Bend Reach of the Platte River between Gibbon and Alda, Nebraska

This project used DNA from river otter scat to estimate otter density in the Big Bend Reach of the Platte River and evaluated the feasibility of using the technique to estimate otter population densities throughout Nebraska.

River otters (*Lontra canadensis*) are a state threatened species in Nebraska. Their rare and elusive nature makes them particularly difficult to study. Non-invasive genetic sampling is a new technique in which the DNA of the target species is collected from scat or hair samples and used to answer questions regarding the population.

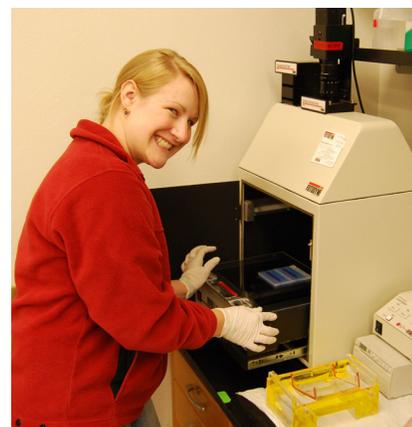
Density was estimated using DNA from scat and mark-recapture methods. Otter scat were collected along 29 kilometers of the Big Bend Reach of the central Platte River during two independent sampling sessions in fall of 2009. DNA was extracted from the scats and genotyped at 10 microsatellite loci. Unique individuals were identified for both sampling sessions, noting recaptures between sessions. River otter density was 0.99-1.13 otters/kilometer. The density is higher than previously reported for otters in North America. The complexity of the central Platte River, the prevalence of sand pits, and the fact that this population has been unexploited since its initial reintroduction, likely accounts for the relatively high density.

This project not only provided valuable insight into the status of a reintroduced otter population, but also demonstrated the relative ease and efficiency with which this method can be utilized to estimate otter density throughout Nebraska's rivers.

This project was completed in January 2011 and the Nebraska Game and Parks Commission plans to utilize these techniques in the future to obtain a state-wide population estimate to evaluate the success of the reintroduction.



Both Photos:
Amy Williams learning DNA analysis techniques
Photo credits: Craig Allen



EVALUATING THE BENEFITS OF HIGHER DIVERSITY CRP PLANTINGS FOR AT-RISK SPECIES

Principal Investigator(s): Craig R. Allen

Graduate Student(s): TBD

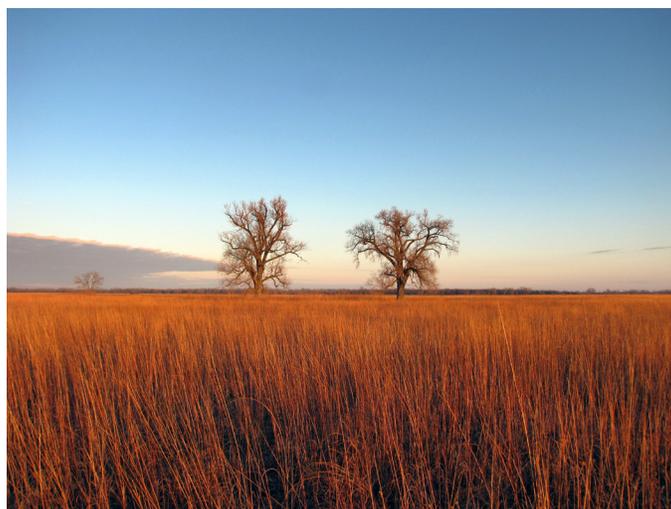
Project Duration: April 2011 – December 2013

Funding: Nebraska Game and Parks Commission

Project Location: Statewide Nebraska

Land enrolled in the USDA Conservation Reserve Program (CRP) covers over a million acres in Nebraska. However, little attention has been given to the potential of CRP as a resource in the conservation of at-risk species. For policy and planning purposes, it is important to quantify the species composition of CRP plantings and the relative impacts of different grass and forb planting mixes on local diversity. For example, several designated at-risk butterfly species require specific plant species for successful reproduction. Additionally, forbs are needed as nectar sources for most adult species of butterflies. Landowners are not currently required to include any specific species in their CRP seeding mix, and forb diversity plantings vary.

The project objective is to evaluate potential habitat benefits of a variety of CRP planting mixes for at-risk species, including birds, butterflies, bees and fish. We are currently recruiting a Ph.D. student to begin this project in spring 2012.



CRP Grassland

Photo credit: Joseph J Fontaine

INFLUENCE OF TROUT STOCKING ON TIER I/II FISHES

Principal Investigator(s): Kevin L. Pope, Mark Pegg

Project Duration: May 2011 – April 2012

Funding: Nebraska Game and Parks Commission

Project Location: Statewide Nebraska

The Nebraska Game and Parks Commission (NGPC) continually receives political pressure to stock native and non-native fish throughout the state. In many instances, stocking fish enhances recreational opportunities for anglers. However, in some instances, stocking fish mars the integrity, stability and beauty of biotic communities.

Currently, the NGPC discourages stocking trout in streams that are home to tier I/II fishes because of concern for these communities. (Tier I/II fishes are species of concern, identified as needing intervention now to avoid the potential of becoming threatened or endangered in the future.) Specifically, concern exists that introduced trout will (a) consume tier I/II individuals and (b) outcompete tier I/II individuals during certain life stages—that is to say, introduced trout could potentially harm tier I/II fishes (species of concern), which is prohibited by law.

The purpose of this project is to provide scientific information necessary to determine the likely outcome of stocking trout in streams containing tier I/II fishes. Research conducted will provide the necessary background information to either predict the outcome of stockings, or develop an *in situ*, controlled experiment designed to provide further information necessary to make such a prediction



Brown Trout Pair
Photo credit: USFWS

MAKING ADAPTIVE MANAGEMENT MEANINGFUL: TRANSLATING SCIENCE LEARNING INTO POLICY DECISION-MAKING

Principal Investigator(s): Craig R. Allen, Kyle Hoagland

Graduate Student(s): Chad Smith, Ph.D.

Project Duration: July 2008 –

Funding: No external funding

Project Location: Platte River in Nebraska, Colorado, Wyoming

Chad Smith continues his research into the gap between science and decision-making in adaptive management programs and tools to successfully bridge that gap.

The working title of his dissertation is “Making Adaptive Management Meaningful: Translating Science Learning into Policy Decision-Making.” Adaptive management has been and continues to be implemented around the country and world, yet few examples exist of programs successfully implementing all six steps (Assess → Design → Implement → Monitor → Evaluate → Adjust) of adaptive management. A key break point in this process seems to be synthesizing collected data and using that synthesis to tell a story about what data say in regard to key questions and hypotheses in a way that is useful to decision-makers and results in positive changes in management or policy.

Research will:

1. explore the science and policy interface in a comparative study of several adaptive management programs,
2. provide specific background on this issue as it relates to the Platte River Recovery Implementation Program,
3. showcase decision analysis other tools that can be used as decision support in the Platte River and other adaptive management programs, and
4. discuss opportunities for and challenges to bridging the science/policy gap.

Smith is applying learning from his research in the real world, serving as Adaptive Management Plan implementation coordinator for the Platte River Recovery Implementation Program. He is also co-lead of a small team writing an Adaptive Management Plan for the Middle Rio Grande Endangered Species Collaborative Program.

MISSOURI RIVER MITIGATION: IMPLEMENTATION OF AMPHIBIAN MONITORING AND ADAPTIVE MANAGEMENT FOR WETLAND RESTORATION EVALUATION

Principal Investigator(s): Craig R. Allen, Martin Simon (Benedictine College)

Graduate Student(s): Michelle Hellman, M.S.,
Ashley VanderHam, M.S.

Project Duration: July 1, 2009 – March 2014

Funding: U.S. Geological Survey (RWO 11)
U.S. Army Corps of Engineers

Project Location: Missouri River Corridor of Iowa, Kansas, Missouri and Nebraska

Data are being collected to determine what constitutes a successful wetland restoration, given the desired goals of the U.S. Army Corps of Engineers. Herpetofauna—primarily amphibians—are being used as indicators of wetland quality. This will be accomplished by quantifying the occurrence and recruitment of amphibians at existing mitigation sites and formulating models of quality wetland restorations. These models will be used by managers in future restorations and for adaptive management approaches to the design of new wetland restorations. The study area is the Missouri River corridor of Iowa, Kansas, Missouri and Nebraska.

This project is a multi-institutional monitoring program that focuses on tightly linking monitoring with hypothesis testing in an adaptive framework. The design consists of frog call surveys to determine occupancy rates for a large number of wetlands on numerous restoration properties, coupled with intensive sampling of frogs, turtles and salamanders to assess abundance and recruitment on eight restored wetland complexes in four states. The focus areas for the Nebraska Coop Unit are three Missouri River wetland complexes located from Falls City to Omaha, Nebraska. Project collaborators at Benedictine College in Kansas are focusing on the Benedictine Wetlands in Kansas.

The second season of the Wetland Herpetofaunal Survey has been completed. Breeding anuran call surveys were conducted as well as tadpole dip-netting over three seasons in April, May and June 2011. In July 2010, turtle trapping was implemented to obtain species richness and abundance estimates.

The results will be used to create spatial models of the herpetofauna's distribution during the survey period. The third field season will begin April 2012.



Snapping Turtle
Photo credit: Jessica Umberger



Credit: USGS

MONITORING, MAPPING, RISK ASSESSMENT, AND MANAGEMENT OF INVASIVE SPECIES IN NEBRASKA

Principal Investigator(s): Craig R. Allen

Coordinator: Karie Decker

Project Duration: January 1, 2010 – December 31, 2014

Funding: Nebraska Game and Parks Commission

Project Location: Statewide, Nebraska

Website: <http://snr5.unl.edu/invasives/index.htm>

With new funding provided by the Nebraska Game and Parks Commission (Federal Aid Grant), the Invasive Species Project has taken on many new tasks in collaborating with the Commission and other agencies and organizations. In November 2010, the Nebraska Aquatic Invasive Species Management Plan was approved by the federal Aquatic Nuisance Species Task force, enabling Nebraska to receive federal funding to help implement the plan. Additional funding from Nebraska Game and Parks Commission in 2011 allowed for the hiring of technicians to help fulfill the plan objectives. For example, technicians sampled weekly May–August for zebra and quagga mussel larvae at various lakes around Nebraska (in response to a recent infestation at an urban lake in Omaha). Several watercraft decontamination units were purchased to help prevent the spread of aquatic invasive species. A state-wide watercraft decontamination protocol was developed and is now a requirement by several state agencies and organizations. The protocol and more information can be found at: <http://snr.unl.edu/invasives/boater.htm>. The Invasive Species Project also received additional funding from the Nebraska Environmental Trust to begin a new Aquatic Invasive Species Prevention Program.



Boater education pocket card

In April 2011, the Nebraska Invasive Species Advisory Council released the newly developed list of invasive plants in Nebraska. New categories were created and species were prioritized using a new ranking chart based on the impact that the species causes and our ability to eradicate it. The document includes recommended actions for each new category, focusing eradication efforts towards those species that are less abundant and for which eradication is feasible. This framework is currently being used to develop other invasive species lists for Nebraska (i.e., aquatic invasives, insects, mammals, etc). The newly developed list and documents can be found at: <http://snr.unl.edu/invasives/invasiveplantslist.htm>.

The education and outreach portion of program has improved and is reaching out to broad audiences across the state. Not only are efforts targeted toward the general public and state agencies, but recently K-12 curriculum was developed to help educate the next generation. In addition, the project coordinator has helped to educate state policy makers in hopes of solidifying upcoming invasive species legislation. During 2010–2011, the Invasive Species project coordinator gave numerous presentations, provided outreach booths, and gave radio and news interviews totaling more than 40 different events. The invasive species website (and newsletter) has record-breaking numbers, now receiving over 2,000 visitors each month. With several more years of funding, the future of the project lies in many more collaborative efforts in invasive species research and management in Nebraska.



Lake McConaughy Billboard

POPULATION ASSESSMENT OF CHANNEL CATFISH IN NEBRASKA

Principal Investigator(s): Kevin L. Pope

Graduate Student(s): Lindsey Chizinski, M.S.

Project Duration: January 2008 – December 2010

Funding: Nebraska Game and Parks Commission

Project Location: Statewide Nebraska

Despite the popularity of channel catfish as a sport fish, little is known of its population dynamics or habitat requirements, and assessment of management strategies is lacking. This project is assessing the present variability in the dynamics (recruitment, growth and mortality) and structure (abundance, size- and age-structure, and condition) of channel catfish populations found in standing water bodies throughout Nebraska. Channel catfish populations from across Nebraska are being compared among water-body types and among stocking strategies. The results will help managers determine the need for future stockings and harvest regulations of channel catfish. Further, catches of channel catfish in tandem, baited hoop nets (a new approach for sampling catfish) will be compared with catches of channel catfish in experimental gill nets; this comparison will help NGPC evaluate a potential change in sampling standards for channel catfish in standing water bodies.

Approximately 5,200 catfish were collected from 22 Nebraska water bodies during the first sampling season (summer 2008); ages were estimated for about 2,400 of those catfish. An additional 20 water bodies were sampled during the second and final 2009 sampling season. The 2009 sampling season also included return visits to three water bodies sampled during the first season to document temporal variability in catch rates. Aging of collected spines is completed, and assessment of recruitment, growth and mortality is in progress.

Preliminary assessments indicate that condition was not influenced by stocking rate or ecosystem type. Relative weight varied among water bodies, but did not differ among treatments. Preliminary assessments also indicate that stocking rate influenced abundance in two of three ecosystem types. In sand pits and flood-control reservoirs, catch per unit effort (CPUE) was greatest in frequently stocked water bodies, and least in those that were not stocked; however, there was no apparent relationship between abundance and stocking rate in irrigation/power-generation reservoirs. Ecosystem type also influenced abundance; CPUE was greatest in flood-control reservoirs. Preliminary assessments indicate that stocking rate influences size structure in sand pits and flood-control reservoirs, but not in irrigation reservoirs. In sand pits and flood-control reservoirs, increased stocking rates result in a shift towards greater proportions of small fish. Preliminary assessment indicates that catch of channel catfish in hoop nets varies within season and among years.

In gear comparisons, length-frequency distributions and proportional stock density values of captured fish were similar between hoop nets and gill nets in flood-control reservoirs and irrigation/power-generation reservoirs. In sand pits, low total catch of gill net surveys prevented size structure comparison between gears. Catch per unit effort was greater with hoop nets than gill nets in flood-control reservoirs, but similar between gears in irrigation/power-generation reservoirs and sand pits. For gill nets, ecosystem type did not influence CPUE, whereas for hoop nets, CPUE was greatest in flood-control reservoirs and least in irrigation/power-generation reservoirs.

Hoop nets
Photo credit: Lindsey Chizinski



Removing catfish spine
Photo credit: Lindsey Chizinski



RECRUITMENT OF WALLEYE AND WHITE BASS IN IRRIGATION RESERVOIRS

Principal Investigator(s): Kevin L. Pope

Graduate Student(s): Jason DeBoer, Ph.D. Dustin Martin, M.S. (2008)
Robert Kill, M. S. Christopher Lewis, Ph.D.
Ryan Lueckenhoff, M.S. (2011)

Project Duration: September 2006 – August 2013

Funding: Nebraska Game and Parks Commission

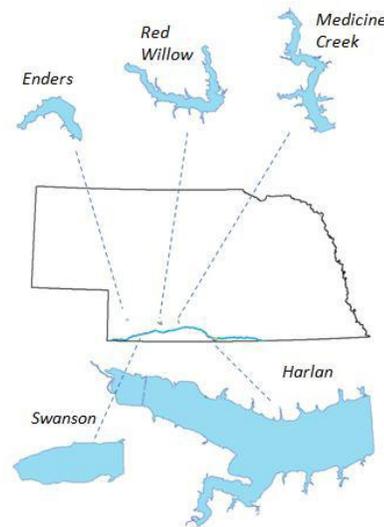
Project Location: Enders Reservoir, Medicine Creek Reservoir, Red Willow Reservoir, and Swanson Reservoir, Nebraska

The five reservoirs within Nebraska's Republican River watershed (Swanson, Enders, Red Willow [also referred to as Hugh Butler Lake], Medicine Creek [Harry Strunk Lake], and Harlan County) were built primarily for flood control and irrigation, resulting in large in-reservoir water-level fluctuations within and among years. These reservoirs also provide important fisheries for anglers in southwest Nebraska. Walleye and white bass are of particular importance in these reservoirs. However, continued annual stockings of walleye are necessary because natural production is limited. In contrast, white bass populations are self-sustaining within these reservoirs, although recruitment is extremely erratic (i.e., weak or missing year-classes are common) in all but Harlan County Reservoir. A "recruitment bottleneck" likely exists for walleye and perhaps white bass in these irrigation reservoirs.

The purpose of this project is to gain an understanding of the factors affecting recruitment of walleye and white bass in irrigation reservoirs. The primary foci are documenting the relative importance of spawning habitats and determining when the suspected recruitment bottleneck for walleye and white bass occurs in southwest Nebraska irrigation reservoirs. This information is vital for understanding reservoir fish ecology in semiarid regions.

Sampling walleye and white bass populations continues in these reservoirs. Several more years of data are needed to begin initial explorations for potential recruitment bottlenecks of walleye and white bass in southwest Nebraska irrigation reservoirs. We have finished processing otoliths from fall gillnet surveys conducted with Nebraska Game and Parks Commission from 2007–2011, which allows us to evaluate the age structure of the walleye and white bass populations in these reservoirs. Furthermore, mathematical models are allowing us to gain insight into the mechanisms affecting recruitment of walleye and white bass, and the spatial scale at which these mechanisms are operating. Future efforts include comparing walleye egg size (theoretically related to reservoir productivity) among reservoirs, and evaluating larval white bass feeding efficiency under variable turbidity conditions and zooplankton densities.

In an effort to improve the walleye fishery in the reservoirs, annual stocking strategies are being evaluated. The effect of in-reservoir water-level fluctuations on the success of walleye stocking is being examined, with the goal of constructing a mathematical model to predict maximum stocking efficiency.



THE RELATIONSHIP BETWEEN DIVERSITY AND ECOLOGICAL FUNCTIONS

Principal Investigator(s): Craig R. Allen, Chris Helzer (The Nature Conservancy),
LaReesa Wolfenbarger (UNO)

Graduate Student(s): Kristine Nemeč, Ph.D.
Lindsey Reinarz, M.S. (UNO)

Project Duration: July 1, 2005 – June 30, 2012

Funding: James S. McDonnell Foundation
Nebraska Game and Parks Commission
The Nature Conservancy
The National Science Foundation IGERT Program

Project Location: Central Platte River Valley, Nebraska

Restoration of grasslands is an important ongoing management activity on many public lands in Nebraska. This project is investigating the relationship between species diversity in prairie restorations and ecological functions at relatively large spatial and temporal scales utilizing restorations along the Platte River in south central Nebraska. The relationship between restoration diversity and ecological functions (e.g., pollination, soil development, resistance to invasion and herbivore control) remains poorly understood. Invasion by aggressive plant species, erosion of diversity over time, and failure to withstand drought or other disturbances are all possible results of unsuccessful restorations. This project seeks to understand how grassland plant diversity affects the provision of ecological services.

We have identified existing high diversity restorations and low diversity remnant grasslands (pastures) as large scale study sites (approximately 100 acres). We also established twenty-four 0.75-acre plots which are planted to six replicates each of four treatments:

- high diversity sites of about 100 species normally planted by The Nature Conservancy, and at double the normal seeding rate; and
- sites using the Natural Resources Conservation Service CP25 seed mix (15 species) at normal and half-normal seeding rates.

These sites are currently being used to assess invasion resistance among the treatments, and to assess soil development and nematode populations.

All invertebrate identification is complete. Soil samples were collected in July 2011 and will be analyzed for soil nutrients. A second season of herbivory data were collected in late July and early September 2011. Data analysis is ongoing.



Soil sample for assessing soil development
Photo Credit: Kristine Nemeč



Upright prairie coneflower leaves eaten by insect herbivores
Photo Credit: Kristine Nemeč

RIVER OTTER HOME RANGE AND HABITAT USE

Principal Investigator(s): Craig R. Allen

Graduate Student(s): Sam Wilson, M.S.
Amy Williams, M.S. (2011)

Project Duration: May 1, 2006 – December 31, 2010

Funding: Nebraska Game and Parks Commission

Project Location: Platte River, Nebraska

River otters became reestablished in Nebraska following their reintroduction in the mid 1980s and early 1990s. The species is currently listed as threatened in Nebraska. Despite the high profile of the reintroduction and the otters' role as a flagship species, relatively little is known about river otter ecology in Nebraska.

The Nebraska Cooperative Fish and Wildlife Research Unit with the Nebraska Game and Parks Commission initiated this project in October 2006 with the objective of collecting home range and habitat use information on river otters along the Big Bend area of the Platte River using remote sensing (radio telemetry). We captured and radio-tagged 18 northern river otters on and near the Platte River, a core component of the species distribution in Nebraska.

This project has recently completed the collection of home range and habitat use information on river otters along the Big Bend area of the Platte River. Data collected, in conjunction with the results of an ongoing river otter health and reproductive survey and results from the Nebraska Game and Parks Commission's annual otter bridge survey, will help close existing information gaps and contribute to the creation of the Nebraska River Otter Management Plan and the Statewide Comprehensive Conservation Plan. This is one of the largest otter tracking projects in the United States, and the only current project in the Midwest.



Sam Wilson and Kent Frick releasing an implanted otter

SCENARIOS OF CLIMATE CHANGE AND LAND USE CHANGE AND BIOLOGICAL INVASIONS IN THE HIGH PLAINS

Principal Investigator(s): Craig R. Allen

Graduate Student(s): Daniel Uden, M.S.

Project Duration: August 2010 –

Funding: U.S. Geological Survey (RWO 14)
USGS Water Center

Project Location: Greater Platte River Basin

Rainwater Basin grasslands and wetlands provide essential habitat for grassland birds and migratory waterfowl, respectively. Since European settlement, the landscape of the Rainwater Basin has been largely converted from native prairie to annual row crops. As a result, more than 90 percent of Rainwater Basin wetlands have been destroyed, remaining wetlands are degraded, and grasslands have substantially declined. Climate change could further impact wetlands and grasslands directly through temperature and precipitation changes, or indirectly by driving changes in landuse. Switchgrass (*Panicum virgatum*) is promoted as a biofuel feedstock in the Great Plains, because it may be environmentally and economically superior to corn grain for the production of ethanol. Under projections for future climatic changes, switchgrass may also be more efficiently produced than traditional row crops in non-irrigated areas. The ecological impacts of the conversion of annual row crops to switchgrass stands are not certain. Switchgrass stands could improve habitat for some grassland bird species if they replace annual row crops, but could worsen habitat if they replace native prairie. Dense, ungrazed switchgrass buffers surrounding wetlands could decrease wetland inundation during precipitation events, but could also prevent soil erosion and siltation of wetlands caused by raising annual row crops around wetlands and provide foraging habitat for migratory waterfowl.

This study develops biofuel-based landuse change scenarios for the Rainwater Basin, driven by soil and agricultural field characteristics and plausible changes in climate, policy, and demand for energy. For each scenario, we will generate landcover maps of potential switchgrass distribution and determine where those stands overlap with wetlands. Assumptions concerning the impacts of switchgrass on grassland and wetland quality and area will assess how grassland bird and migratory waterfowl habitat area and quality could be affected under each scenario. Changes in habitat area and quality will be used to conduct vulnerability assessments for Rainwater Basin wetlands, migratory waterfowl, and grassland birds, and sensitivity analysis on the factors impacting wildlife habitat. Finally, the HABS (Hierarchical All Birds Strategy) model and waterfowl energetics models will be utilized to assess individual species responses of grassland birds and waterfowl, respectively, to predicted landuse changes.



***Panicum virgatum* L. – switchgrass**
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown.
1913. An illustrated flora of the northern United States,
Canada and the British Possessions. 3 vols. Charles
Scribner's Sons, New York. Vol. 1: 141.

SE PRAIRIES BIOLOGICALLY UNIQUE LANDSCAPE AND SANDSTONE PRAIRIES BUL RESEARCH

Principal Investigator(s): Craig R. Allen, Chris Helzer (TNC), Jarren Kuipers (NPLT), Gerry Steinauer (NGPC)

Graduate Student(s): Kody Unstad, M.S.
Christopher Wood, M.S. (UNO)

Project Duration: June 2008 – June 2013

Funding: Nebraska Game and Parks Commission

Project Location: Southeast Nebraska

The Southeast Nebraska Flagship Initiative is a partnership that includes The Nature Conservancy, Northern Prairies Land Trust, Spring Creek Prairie Audubon Center and the Nebraska Game and Parks Commission. The implementation of Flagship Initiatives—including that in the Southeast Prairies Biologically Unique Landscape (BUL)—follows from the Nebraska Legacy Plan to implement a proactive approach to conserving non-game wildlife and biological diversity in an adaptive management framework. The overall goal is to most effectively and efficiently manage prairies, while maintaining critical plant-insect relationships indicative of system fluctuation.

Specifically, this project is evaluating current, private-lands habitat work to improve the location, conservation goals, and methods of those projects, and evaluating the current and potential viability of ecological systems within priority landscapes. Understanding population viability for various taxa and how that status differs between more and less fragmented areas, as well as other variables, will help improve site selection and strategies for management and conservation projects.

Research currently focuses on three key insect groups that provide important ecosystem services: pollinators, ants and ground beetles. Sixty-five percent of flowering plants depend upon pollinators for reproduction, including many prairie plant species. Ants make up a huge proportion of the insect biomass in a prairie and are important for soil aeration and drainage, seed dispersal and nitrogen cycling. Ants, and most ground beetles, are important predators in the prairie, keeping many potential pest insect populations in check. The goal is to determine what factors have the greatest impact on the abundance and species richness of these key insect groups in tallgrass prairie fragments. Factors include time of haying, vegetation structure, floral composition, litter depth, fragment size, fragment shape and composition of the surrounding landscape. Understanding the impact of these factors may guide more efficient use of conservation resources through targeted decision-making about what fragments to preserve or where grassland should be planted to best supplement native prairie fragments. As most prairie fragments are privately owned, this knowledge will be useful when approaching landowners about management techniques that benefit both agriculture and prairie conservation.

In 2011, Kody Unstad completed his second season of ant and ground beetle pitfall trap collection. All ants from the 2010 collection have been identified to species while identification of the 2011 ant collection is in progress. Ground beetles are being sorted and pinned in preparation for identification by a taxonomist. After finishing his second season of collection in 2010, Chris Wood has identified all of his pollinator species and is in the process of analyzing his data. Research technician, Bethany Teeters, began a pilot study in 2011 looking at pollinators, and is focused specifically on the difference between extremely isolated prairie fragments versus large, well-connected fragments.

Studies were conducted on 23 privately-owned tallgrass prairie hay meadows scattered throughout the SE Nebraska BUL region. A floral quality assessment of the 23 sites began in 2009 and was completed in 2010. Vegetation structural data was also collected on all sites in 2010 and 2011. Preliminary results from 2010 indicate that ground beetle abundance increases with vegetation biomass while grassland ant abundance has a strong positive correlation with the amount of haymeadow in the surrounding landscape.

WETLAND CONDITION ASSESSMENT

Principal Investigator(s): Craig R. Allen, Ted LeGrange (Nebraska Game and Parks Commission)

Graduate Student(s): Nick Smeenck, Ph.D.

Project Duration: August 2010 – May 2014

Funding: Nebraska Game and Parks Commission
U.S. Environmental Protection Agency (EPA)

Project Location: Statewide Nebraska

Since 1867, Nebraska has lost nearly 35% of its wetland resources, which equates to a loss of over one million acres of wetlands across the state. As of 2005, only 3% of remaining wetlands in Nebraska were owned by state, federal, or other conservation and management organizations. Although the quantity of these wetlands is known, the quality of the remaining, privately owned wetlands is less well understood.

As an extension of the U.S. Environmental Protection Agency's (EPA) National Wetland Condition Assessment (NWCA), eleven wetland complexes will be visited, many in recognized Biologically Unique Landscapes, and wetland conditions will be measured in ten individual wetlands in each complex. One wetland in each complex will be what is considered the "reference standard" in terms of condition for wetlands in each complex, which provides a reference point to which other wetlands in that complex are compared. The data collection methods conform to those developed by the EPA, in which three levels of assessment are used to quantify wetland condition including landscape assessment, intensive on-site assessment focusing on vegetative, soil, and hydrologic characteristics and amphibian presence, and a rapid assessment method (USA-RAM) developed by the EPA.

The primary goal of this wetland condition assessment project is to quantify the condition of important wetland resources in Nebraska and aid in the development of wetland-specific, rapid assessment methods and state-wide wetland management strategies. The knowledge gained will be increasingly important as many federal and state easements protecting privately owned wetlands come to an end, allowing federal and state agencies to target areas of wetlands for protection where the most gains can be recognized.

Data collection began in April 2011. Anuran call surveys were used to determine amphibian presence in 30 wetlands located in three wetland complexes (Eastern saline, Missouri River, and Central Platte River). In addition, oral swabs were collected from tadpoles in wetlands in order to detect the presence of the Chytrid fungus, a disease known to cause significant amphibian population declines. In May 2011, the graduate student and research technicians attended EPA Wetland Condition Assessment training in Kansas City, Missouri. During the summer of 2011, condition assessments of 32 wetlands in Nebraska were completed including 12 sites associated with the NWCA. Unfortunately, due to severe flooding on the Missouri River, researchers were unable to visit sites associated with this complex. During the spring and summers of 2012 and 2013, amphibian surveys will be completed as well as condition assessments of 90 additional sites associated with nine other wetland complexes.



Frog in a Pond
Photo credit: Valerie Egger

WIND AND WILDLIFE PROJECT

Principal Investigator(s): Craig R. Allen, Joseph J. Fontaine

Coordinator: Caroline Jezierski

Graduate Student(s): TBD

Project Duration: March 2011 – February 2014

Funding: Nebraska Game and Parks Commission

Project Location: Statewide Nebraska

Wind energy is a growing sector of the renewable energy industry. Although it is considered green energy because no greenhouse gases are emitted during operation, the potential implications to local flora and fauna resulting from increasing wind power development remain largely unknown.

The goal of the project is to facilitate wind power site selection and operation in a manner that allows for increasing energy development while balancing the aesthetic, ecological, and sociological needs of Nebraska. After a national search, a coordinator was hired, and arrived at the UNL campus in late July 2011 to begin the initial groundwork for the project.

The coordinator will encourage communication among stakeholders (e.g., wind developers, land owners, private and non-profit organizations, communities, local interest groups, state and federal management agencies, and research institutions) and will help coordinate the Nebraska Wind and Wildlife Working Group. With collaborators, the coordinator will assist in identifying priority research, establishing standardized monitoring protocols, and developing wind power site development and operation recommendations. Project information and educational materials will be available on a website and other digital and print mediums.



Wind Turbines
Photo credit: Joseph Fontaine

OTHER AFFILIATED RESEARCH PROJECTS

The following research projects are being led by non-unit faculty. They are funded through the USGS Cooperative Research Units Research Work Order process, or by modifications to the Nebraska Game and Parks Commission Cooperative Agreement.

QUANTIFYING UNCERTAINTY IN MISSOURI RIVER ADAPTIVE MANAGEMENT PROCESSES

Principal Investigator(s): Andrew Tyre

Graduate Student(s): Adam Schapaugh, Ph.D.

Project Duration: April 2009 – July 2011

Funding: U.S. Geological Survey (RWO 9) and U.S. Army Corps of Engineers

Project Location: Missouri River Basin from Montana to Missouri

The Missouri River Recovery Project is arguably one of the largest ecosystem recovery projects ever attempted. Choosing actions and resolving conflicts among stakeholders is difficult because predicting the consequences of actions is fraught with uncertainty. This is particularly true of endangered species responses to recovery actions. In response to this uncertainty, the U.S. Army Corps of Engineers (USACE) has committed to taking an adaptive management approach to the recovery of the Missouri River. Initial efforts at developing adaptive management plans for endangered species are presently underway. However, building a predictive capacity that integrates hydrology, climate, sociology, and ecology is technically challenging. The critical need is for a linked set of decision tools that provides a simple and transparent linkage between management actions and responses. These linked tools can only be built by a dedicated team of scientists with expertise in all of the disciplines as well as a strong central linkage. Without this dedicated team, the development of the necessary integrated science takes place only slowly, if at all.

The long-term goal of this project is to develop an integrated system of predictive tools used iteratively to guide the recovery project. Ultimately, the capacity to both develop and use these tools needs to be transferred to the management agency, the USACE. Thus, training is needed in addition to scientific development.

The specific goals of this project are:

1. Quantify uncertainty in ecological responses to management in a manner that is useful for decision makers.
2. Develop decision support tools that link hydrological inputs with ecological outputs and use existing monitoring data both as validation and to improve parameter estimation.
3. Train USACE and other federal agency personnel in the use of these tools to ensure the continued development of the tools and successful use beyond the life of the project.

The primary outcome of this project will be a decision support system that is trusted and highly regarded by the diverse stakeholders in the Missouri River Basin. This will lead to improved medium to long-term decision making in the Recovery Project, and these decisions will be robust and unlikely to be challenged by stakeholders. The system will be flexible enough to adapt as new challenges emerge. The adaptive management expertise and technical modeling capacity built within the USACE during the project will be transferable to other river management issues at many scales.

This project is now complete. A final report is being prepared

SUBSURFACE INVESTIGATION FOR EOLIN AND INTERDUNE DEPOSITS NEAR CRESCENT LAKE NATIONAL WILDLIFE REFUGE

Principal Investigator(s): Paul Hanson

Graduate Student(s): Rebecca Puta, M.S. (2011)

Project Duration: August 2010 – December 31, 2011

Funding: U.S. Geological Survey (RWO 13) and USGS Water Center–Lincoln

Project Location: Crescent Lake National Wildlife Refuge, Nebraska Sandhills

Recent and long-term dune activation records, and the nature and persistence of interdune deposits will be studied near Crescent Lake National Wildlife Refuge in the Nebraska Sandhills. Previous studies from the region did not produce detailed investigations on the nature of the interdune areas, or produce age estimates for interdune longevity. Many of these regions currently hold lakes, which would make them sinks for dust. However, during drought periods they may have acted as dust sources for locations to the south and east.

This project will study the response of this region to drought events of the past and address the nature of these interdune areas as potential dust sources or dust sinks throughout the past approximate 16,000 years.

- Cores will be collected, described, and sub-sampled for optical dating and particle size analysis.
- Optical dating and particle size analysis will be completed. The single-grain optical dating technique is relevant for use in sediments deposited in hillslope, alluvial or lacustrine environments. The interdune deposits that will be dated in this study will likely have sediments from one or more of these environments.
- A database containing both previous and active paleoclimate and geologic data available from the region will be generated and will become available online as data is collected.



Nebraska Sandhills
Jim Swinehart, UNL School of Natural Resources

TOTAL VEGETATION CONTROL ON SANDBARS ALONG THE MISSOURI RIVER UTILIZING LIME AND HERBICIDES

Principal Investigator(s): Stevan Knezevic, Charlie Shapiro, Tom Hunt, Mark Bernards

Post-Doctoral RA: Avishek Datta

Project Duration: June 1, 2007 – December 31, 2010

Funding: U.S. Geological Survey (RWO 6) and U.S. Army Corps of Engineers

Project Location: Missouri River

Lack of bare sand areas due to vegetative overgrowth is the main reason for the reduction of nesting habitats for two endangered bird species, piping plover (*Charadrius melodus*) and interior least tern (*Sterna antillarum*), in the backwaters of Lewis and Clark Lake along the Missouri River. It is important to identify practices that will maintain sandbars free of vegetation; thus, protect proper nesting habitats for the above bird species. To create suitable nesting habitats (e.g., large open bare sand), a series of vegetation management practices were tested on the existing sandbars. The research team studied the effects of lime, ash, and imazapyr either applied alone or in combination as tools for long-term vegetation control in maintaining suitable habitat for piping plover and interior least tern on the existing sandbars.

This project is now complete. Some of the findings include:

- The best treatments for long-term vegetation control on existing sandbars were 3 quarts/acre of imazapyr applied alone, or following 1.2 ton/acre of pel-lime, which provided satisfactory (~80%) vegetation control on both sandbars for at least two full seasons.
- Imazapyr applied over soda ash treated plots did not provide as good weed control as imazapyr applied over pel-lime, especially at later rating dates. This is due to the fact that imazapyr has a tendency to leach at the higher pH. In our study, soda ash increased soil pH quicker than pel-lime, which resulted in faster imazapyr leaching, and overall poorer vegetation control compared to the pel-lime treated plots.
- Pel-lime or soda ash applied alone did not provide adequate vegetation control during the four seasons on Sandbar-1 and three seasons on Sandbar-2.
- None of the treatments provided adequate weed control for more than two full seasons, suggesting that repeated application of imazapyr is needed every other year.



PROFESSIONAL ACTIVITIES

TEACHING

CRAIG ALLEN

Spring 2011: *Foundations of Ecological Resilience*

This course introduced students to the concept of resilience, especially ecological resilience. Students explored both theoretical and applied aspects of ecological resilience, and the development of resilience theory. To further explore these concepts, students developed and completed a project focusing on resilience; the exact nature of the project varies according to the student cohort. By the conclusion of the course students were familiar with a number of prominent issues in resilience theory, its development and application.

JOSEPH FONTAINE

Fall 2010: *Adaptive Natural Resource Management*

From cultural taboos to the current socio-ecological framework, the art and science of natural resource management has and continues to evolve. The primary focus of this course was to introduce students to the concepts of structured decision making and adaptive management, but in doing so the course explored the history of natural resource management and the various management paradigms that have and continue to dominate resource management. At the completion of this course students had an understanding of the theory and practice of adaptive management as well as an understanding of why we continue to move toward a more transparent and scientific methodology of natural resource management.

KEVIN POPE

Spring 2011: *Managed Aquatic Systems*

This course, team-taught with Mark Pegg (UNL School of Natural Resources), was designed to increase students' understanding of ecological processes that occur in regulated river basins and associated problems or opportunities that arise with fishery management. The focus was primarily on fishes and understanding how structure, process and function of aquatic systems are influenced by human activities. A unique aspect of this course is the presence of both professors in the classroom; that is, this course is truly team-taught, providing students the formal opportunity to interact with two faculty members that have differing experiences and sometimes differing opinions.

GRADUATE COMMITTEE SERVICE

CRAIG ALLEN

- Donald Pan (Ph.D., School of Biological Sciences, UNL) (Co-advisor)
- Christina Hoffman (Ph.D., School of Natural Resources, UNL)
- Jamie McFadden (M.S., School of Natural Resources, UNL) (Graduated December 2010)
- Wayne Ohnesorg (Ph.D., Entomology, UNL)
- Bruce Stephen (Ph.D., School of Natural Resources, UNL)
- Christopher Wood (M.S., Biology, UNO)

JOSEPH FONTAINE

- Jason DeBoer (Ph.D., School of Natural Resources, UNL)
- Mary Brown (Ph.D., School of Natural Resources, UNL) (Graduated May 2011)
- Irina Skinner (M.S., Department of Wildlife Ecology and Conservation, University of Florida)

KEVIN POPE

- Tara Anderson (M.S., School of Natural Resources, UNL) (Graduate May 2011)
- Aaron Blank, (M.S., School of Natural Resources, UNL)
- Cameron Goble (M.S., School of Natural Resources, UNL) (Graduated May 2011)
- Jeremy Hammen (Ph.D., School of Natural Resources, UNL)
- Brenda Pracheil (Ph.D., School of Natural Resources, UNL) (Graduated Dec. 2010)
- Mathew Rugg (M.S., School of Natural Resources, UNL)
- Christopher Uphoff (M.S., Department of Biology, University of Nebraska at Kearney)

PROFESSIONAL AND FACULTY SERVICE

CRAIG ALLEN

- Associate Editor (Macro and Landscape Ecology), Ecology and Society
- Board of Directors, The Resilience Alliance
- Midwest Fish and Wildlife Board of Directors
- Steering Committee and Scientific Committee, Nebraska Bird Partnership
- Fellow, Center for Great Plains Studies and Member: Scholarship Committee
- Core Team, Invasive Plants State Technical Committee, Natural Resources Conservation Service (NRCS)
- Associate, Center for Grassland Studies, University of Nebraska
- Alternate committee member, Institutional Animal Care and Use Committee, UNL
- Working group member, USGS Adaptive Management Working Group
- Missouri River Mitigation, Herpetofauna Monitoring and Evaluation Subcommittee
- Southeast Nebraska Flagship Initiative, Research and Evaluation Steering Committee
- Guest Associate Editor, Journal of Environmental Management
- Scientific Committee, Nebraska Natural Legacy Plan

KEVIN POPE

- President, Nebraska Chapter, American Fisheries Society
- Associate Editor, Transactions of the American Fisheries Society
- Guest Associate Editor, Journal of Environmental Management
- Book Editorial Advisory Board, American Fisheries Society
- Research Committee, UNL School of Natural Resources
- Graduate Committee, UNL School of Natural Resources

JOSEPH FONTAINE

- Assistant Secretary, Cooper Ornithological Society
- Local Committee, 2011 AFO/COS/WOS Joint Annual Meeting, Kearney, NE
- Guest Associate Editor, Journal of Environmental Management
- Scientific Committee, Nebraska Bird Partnership
- Scientific Committee, Nebraska Natural Legacy Plan
- Adaptive Management Plan Creative Team, Nebraska Natural Legacy Plan
- Avian Priority Species Expert Panel, Nebraska Natural Legacy Plan
- Technical Committee, Rainwater Basin Joint Venture
- Graduate Student Awards Committee, Cooper Ornithological Society

OTHER PROFESSIONAL SERVICE

CHRISTOPHER CHIZINSKI

- Post Doctoral Advisory Council, University of Nebraska–Lincoln

VALERIE EGGER

- Staff Advisory and Professional Development Committee (SAPDC), UNL School of Natural Resources
- SAPDC liaison, School of Natural Resources Faculty Advisory Committee
- Editor, USGS *Coop Catch-up* newsletter

KARIE DECKER

- Local committee, 2011 AFO/COS/WOS Conference, Kearney NE
- Vice president, Missouri River Watershed Coalition
- Working group member, Zorinsky Lake Zebra Mussel Task Force
- Expert witness, Nebraska Legislative Session 2011

TRAINING ASSISTANCE, WORKSHOPS AND OUTREACH ACTIVITIES

CHRISTOPHER CHIZINSKI

- Statewide Creel Clerk Workshop, March 2011. Lincoln, NE.
- Motorboat Operators Certification Course (MOCC), April 2011 and May 2011. Lincoln, NE.

KARIE DECKER

- News Article. Stopping the Invaders, Lincoln Journal Star, October 2010. Lincoln, NE.
- Education/outreach booth. NaturePalooza, University of Nebraska-Lincoln Natural History Museum, October 2010. Lincoln, NE.
- Workshop Organizer/Presentation. Aquatic Invasive Species in the Midwest, University of Nebraska, October 2010. Lincoln, NE.
- Invited Presentation. Nebraska's Aquatic Nuisance Species Management Plan. ANS Task Force Conference, November 2010. Arlington, VA.
- Invited Presentation. Nebraska invasives: Top concerns. Missouri River Futures Conference, November 2010. Ponca, NE.
- Invited Presentation. A new perspective for managing invasive plants in Nebraska. The Noxious Weed Advisory Committee Conference, November 2010. Grand Island, NE.
- Moderator. The Invasive Species Session at the 71st Midwest Fish and Wildlife Conference, December 2010. Minneapolis, MN.
- News Articles. Zebra Mussels and Zorinsky Lake (9), Lincoln Journal Star and Omaha World Herald, December 2010. Lincoln and Omaha, NE.
- News Interview. Zebra Mussels invading Nebraska, KETV Channel 7 Omaha, December 2010. Omaha, NE: <http://www.ketv.com/news/26052740/detail.html>.
- Radio Interview. The zebra mussel problem in Nebraska, KVAB Omaha News Radio, December 2010. Omaha, NE.
- Presentation. Zebra Mussels in Zorinsky Lake, Public information meeting, December 2010. Omaha, NE.
- Presentation. Procedures for Zebra Mussel Management in Zorinsky Lake, Public Information Meeting, December 2010. Omaha, NE.
- Presentation (training). A new mechanism for combating invasive plants in Nebraska, Nebraska Weed Control Association, Nebraska Association of County Officials Training, December 2010. Grand Island, NE.
- Presentation. Aquatic Invasive Species – Advice for private lakes. Capital Beach Lakes Association, January 2011. Lincoln, NE.
- Radio Show. Invasive species in Nebraska and beyond, Nebraska Outdoor Radio, January 2011. Lincoln, NE.
- Invited Presentation. Invasive species concerns for Nebraska's water resources. Nebraska Water Resources Advisory Panel Conference, January 2011. Lincoln, NE.
- Presentation. Aquatic Invasive Species Concerns for Public and Private Lakes. Nebraska Extension Watershed Group, February 2011. Omaha, NE.
- Testimony. Provided expert testimony for legislative hearings LB 391 and LB 392, relating to invasive species, February 2011. Lincoln, NE.
- Education/Outreach Booth. The Association of Field Ornithologists/Cooper Ornithological Society/Wilson Ornithological Society Conference, March 2011. Kearney, NE.
- Presentation. Aquatic Invasive Species Concerns in Nebraska: what to expect, Nebraska Cooperative Fish and Wildlife Unit Creel Clerk Training, March 2011. Lincoln, NE.

- Presentation. AIS Concerns for Private Lakes, Capital Beach Lakes Association Meeting, March 2011. Lincoln, NE.
- Invited Presentation. New perspectives on invasive plant management. Nebraska Weed Control Association Conference, March 2011. Hastings, NE.
- Invited Presentation. Dealing with aquatic invasive species in private lakes, Nebraska Lakes Association Annual Conference, April 2011. Mahoney State Park, NE.
- Presentation. Zebra mussel prevention strategies. Nebraska Surface Water Monitoring Council Conference, April 2011. Lincoln, NE.
- Radio Interview. Zorinsky Lake: status of zebra mussels in Nebraska, KFAB Radio Omaha, May 2011. Omaha, NE.
- Education/Outreach Booth. Zorinsky Lake Clean-up, May 2011. Omaha, NE.
- Radio Interview. Zebra Mussel Concerns in Nebraska, KQSK Radio Chadron, May 2011. Chadron, NE.
http://www.doubleccountry.com/artman2/publish/LOCAL_NEWS_9/3_PANHANDLE_LAKES_PART_OF_ZEBRA_MUSSEL_WATCH_with_audio.shtml
- Presentation. AIS Prevention Program in South-Central Nebraska, Harlan Reservoir Public Meeting, May 2011. Alma, NE.
- Education/Outreach Booth. 4th Annual Clean Boat Event, May 2011. Lewis and Clark Reservoir, NE.
- Presentation. AIS Prevention Program in Western Nebraska, Lake McConaughy Public Meeting, May 2011. Ogallala, NE.
- Presentation. AIS Prevention and Watercraft Decontamination, AIS Staff Training, May 2011. Lincoln, NE.
- Presentation. AIS Management on Private Lakes, Woodcliff Lakes Association Annual meeting, June 2011. Woodcliff, NE.
- Presentation. AIS Prevention and Watercraft Decontamination, AIS Staff Training, June 2011. Ogallala, NE.
- Invited Presentation. Invasive plant management: A new approach. Leafy Spurge Task Force Annual Conference, July 2011. Sargent, NE.
- Invited Presentation. AIS management update. Nebraska Game and Parks Commission, Fisheries Management Section Meeting, August 2011. Calamus Reservoir, NE.
- Presentation. AIS Sampling Update. Nebraska Game and Parks Commission, Fisheries District Meeting, August 2011. Platte River State Park, NE.
- Presentation. Incorporating invasive species into GK-12 curriculum. Nebraska Association of Teachers of Science, September 2011. Fremont, NE.

CHRIS JORGENSEN

- NaturePalooza, University of Nebraska-Lincoln Natural History Museum, October 2010. Lincoln, NE.

CARLA KNIGHT

- Angler Fish Identification. NaturePalooza, University of Nebraska-Lincoln Natural History Museum, October 2010. Lincoln, NE.
- Angler Fish Identification. Triumph of Agriculture Expo at the Qwest Center. March 2011. Omaha, NE.
- Angler Fish Identification. Fremont Rural Living Expo, April 2011. Fremont, NE.
- Angler Fish Identification. Missouri River Outdoor Expo, Ponca State Park, September 2011. Ponca, NE.

AARON LOTZ

- Cleaner Greener Lincoln Initiative, July 2011. Lincoln, NE.

NATALIE LUBEN

- Angler Fish Identification. Triumph of Agriculture Expo at the Qwest Center. March 2011. Omaha, NE.
- Angler Fish Identification. Fremont Rural Living Expo, April 2011. Fremont, NE.
- Angler Fish Identification. Missouri River Outdoor Expo, Ponca State Park. September 2011. Ponca, NE.

KEVIN POPE

- Nebraska Game and Parks Commission, Staff Conservation Workshop, March 2011. Brainard, NE.
- Motorboat Operators Certification Course (MOCC), April 2011 and May 2011. Lincoln, NE
- Presentation. Effects of Catch-and-release Angling on Growth and Survival of Freshwater Fishes, Nebraska Chapter of Trout Unlimited, April 2011. Omaha, NE.

RYAN STUTZMAN

- NaturePalooza, University of Nebraska-Lincoln Natural History Museum, October 2010. Lincoln, NE.

SAM WILSON

- Presentation. Mountain Lions in Nebraska, Nebraska Cattleman and the general public, December 2010. Chadron, NE.
- Presentation. Mountain Lions in Nebraska, Department of Environmental Quality, December 2010. Lincoln, NE.
- Presentation. Mountain Lions in Nebraska, Hastings Rotary Club, January 2011. Hastings, NE.
- Presentation. Mountain Lions in Nebraska, Wachiska Audubon Society, February 2010. Lincoln, NE.
- Presentation. Mountain Lions in Nebraska, Hastings Kiwanis Club, February 2011. Lincoln, NE.

PEER-REVIEWED PUBLICATIONS

Allen, C. R., E. A. Forsys, and C. S. Holling. 2010. Body mass patterns predict invasions and extinctions in transforming landscapes. Pages 281-297 in Gunderson, L., C. R. Allen and C. S. Holling, Editors. *Foundations of Ecological Resilience*. Island Press, New York, NY. (Reprinted from *Ecosystems* 2:114-121.)

Allen, C. R., G. S. Cumming, A. Garmestani, P. D. Taylor, and B. Walker. *In press*. Managing for resilience. *Wildlife Biology*.

Allen, C. R., J. J. Fontaine, and A. Garmestani. *In press*. Adaptive management of natural resources. Pp. xx. In: *Encyclopedia of Sustainability Science and Technology*. Springer, New York, NY.

Allen, C. R., J. J. Fontaine, K. L. Pope and A. S. Garmestani. 2011. Adaptive Management for a turbulent future. *Journal of Environmental Management* 92:13394– 1345.

Allen, C. R., and A. S. Garmestani. *In press*. Resilience. Pages xx in *Encyclopedia of Sustainability, Volume 5, Ecosystem Management and Sustainability*. Berkshire Publishing Group, Great Barrington, MA.

Allen, C. R. and L. H. Gunderson. 2011. Pathology and failure in the design and implementation of adaptive management. *Journal of Environmental Management* 92:1379–1384.

Allen, C. R. and C. S. Holling. 2010. Novelty, adaptive capacity and resilience. *Ecology and Society*. 15(3): 24. [online] URL: <http://www.ecologyandsociety.org/vol15/iss3/art24/>

Allen, C. R., J. Slater, and E. Wiggers. *In press*. The invasive ant, *Solenopsis invicta*, reduces herpetofauna richness and abundance. *Journal of Herpetology*.

Bajer, P. B., C. J. Chizinski, and P. W. Sorensen. *In press*. Using the Judas technique to locate and remove wintertime aggregations of invasive common carp. *Fisheries Management and Ecology*.

Chizinski, C. J., A. Peterson, J. Hanowski, C. R. Blinn, G. Niemi, and B. Vondracek. 2011. Breeding bird response to partially harvested riparian management zones. *Forest Ecology and Management* 261:1892-1900.

Chizinski, C. J., K. L. Pope, and G. R. Wilde. 2010. A modelling approach to evaluate potential management actions designed to increase growth of white perch in a high-density population. *Fisheries Ecology and Management* 17:262–271.

Chizinski, C. J., K. L. Pope, G. R. Wilde, and R. L. Strauss. 2010. Implications of stunting on morphology of freshwater fish. *Journal of Fish Biology* 76:564–579.

Decker, K. L., C. R. Allen, L. Acosta, M. Hellman, C. Jorgensen, R. Stutzman, K. Unstad, A. Williams, and M. Yans. *In press*. Landscapes, invasions and the changing flora of Nebraska. *Invasive Plant Science and Management*.

Decker, K. L., C. R. Allen, K. Bazata, M. Coffin, D. Eichner, J. King, J. McCauley, J. Runge, S. Schainost, D. Tunink. 2010. Nebraska Aquatic Nuisance Species Management Plan. Aquatic Nuisance Species Task Force.

- Decker, K. L., C. J. Conway, and J. J. Fontaine. *In press*. Nest predation, food, and female age explain seasonal declines in clutch size. *Evolutionary Ecology*.
- Dolph, C., D. Huff, C. J. Chizinski, and B. Vondracek. 2011. Implications of community concordance for assessing stream health at three nested spatial scales in Minnesota, USA. *Freshwater Biology* 56:1652–1669.
- Dolph, C. L., A. Y. Sheshukov, C. J. Chizinski, B. Vondracek, and B. Wilson. 2010. The Index of Biological Integrity and the bootstrap: Can random sampling error affect stream impairment decisions? *Ecological Indicators* 10:527–537
- Epperson, D. and C. R. Allen. 2010. Red imported fire ant impacts on upland arthropods in southern Mississippi. *American Midland Naturalist* 163:54–63.
- Fontaine, J. J. 2010. Changing climates and the incorporation of adaptive management into our state wildlife action plans. *Trans. North American Wildlife and Natural Resource Conference* 75:171–172.
- Fontaine, J. J. 2011. Improving our legacy: Incorporation of adaptive management into state wildlife action plans. *Journal of Environmental Management* 92:1403–1408.
- Fontaine, J. J., E. Arriero, H. Schwable, and T. E. Martin. *In press*. Nest predation and circulating corticosterone levels within and among species. *Condor*.
- Gosch, N. J. C., L. L. Pierce, and K. L. Pope. 2010. The effect of predation on stunted and nonstunted white perch. *Ecology of Freshwater Fish* 19:401–407.
- Gosch, N.J.C. and K.L. Pope. *In press*. Using consumption rate to assess potential predators for biological control of white perch. *Knowledge and Management of Aquatic Ecosystems*.
- Gosch, N. J. C., J. R. Stittle, and K. L. Pope. 2010. Food habits of stunted and non-stunted white perch (*Morone americana*). *Journal of Freshwater Ecology* 25:31–39.
- Gunderson, L., and C. R. Allen. 2010. Why resilience? Why now? Pages xii–xxv in Gunderson, L., C. R. Allen and C. S. Holling, Editors. *Foundations of Ecological Resilience*. Island Press, New York, NY.
- Gunderson, L., C. R. Allen, and C. S. Holling. 2010. *Foundations of Ecological Resilience*. Island Press, New York, NY. 466 pp.
- Gunderson, L., C. S. Holling, and C. R. Allen. 2010. The evolution of an idea—the past, present, and future of ecological resilience. Pages 423–444 in Gunderson, L., C. R. Allen and C. S. Holling, Editors. *Foundations of Ecological Resilience*. Island Press, New York, NY.
- Huber, C. G., T. B. Grabowski, K. L. Pope, and R. Patiño. *In press*. Distribution and habitat associations of juvenile common snook in the lower Rio Grande, Texas. *Southwestern Naturalist*.
- Hubert, W. A., K. L. Pope, and J. M. Dettmers. *In press*. Passive capture techniques. Pages 000–000 in A. V. Zale, D. L. Parrish, and T. M. Sutton (Eds.). *Fisheries Techniques*, 3rd edition. American Fisheries Society, Bethesda, MD.
- Huff, D. D., L. M. Miller, C. J. Chizinski, and B. Vondracek. *In press*. Mixed-source reintroductions lead to outbreeding depression in second-generation descendants of a native North American fish. *Molecular Ecology*.
- Kessler, A. C., J. W. Merchant, C. R. Allen, and S. D. Shultz. *In press*. Invasive plants impacts on sandhill crane (*Grus canadensis*) roosting habitat. *Invasive Plant Science and Management*.
- Martin, D. R. and K. L. Pope. 2010. Luring anglers to enhance fisheries. *Journal of Environmental Management* 92:1409–1413.
- Miller, T. K., C. R. Allen, W. Landis, and J. Merchant. 2010. Risk assessment: Simultaneously prioritizing the control of invasive plant species and the conservation of rare plant species. *Biological Conservation* 143:2070–2079.
- Nemec, K., C. R. Allen, A. Alai, G. Clements, A. Kessler, T. Kinsell, A. Major, and B. J. Stephen. 2011. Woody invasions of urban parks and trails and the changing face of urban forests in the Great Plains, USA. *American Midland Naturalist* 165:241–256.

- Peterson, G., C. R. Allen, and C. S. Holling. 2010. Ecological resilience, biodiversity and scale. Pages 167-193 in Gunderson, L., C. R. Allen and C. S. Holling, Editors. *Foundations of Ecological Resilience*. Island Press, New York, NY. (Reprinted from *Ecosystems* 1:6-18.)
- Pope, K. L., S. E. Lochmann, and M. K. Young. 2010. Methods for assessing fish populations. Pages 325-351 in M. C. Quist and W. A. Hubert (Eds.), *Inland Fisheries Management in North America*, 3rd edition. American Fisheries Society, Bethesda, MD.
- Pope, K. L. and G. R. Wilde. 2010. Survival of foul-hooked largemouth bass (*Micropterus salmoides*). *Journal of Freshwater Ecology* 25:135-139.
- Porath, M. T., L. D. Pape, L. K. Richters, K. L. Pope, and M. A. Pegg. *In press*. Influence of throat configuration and fish density on escapement of channel catfish *Ictalurus punctatus* from hoop nets. Pages 000-000 in P. Michaletz and V. Travnicek (Eds.), *Conservation, ecology, and management of catfish: the second international symposium*. American Fisheries Society, Bethesda, MD.
- Rehme, S. E., L. A. Powell, and C. R. Allen. 2011. Mutlimodel inference and adaptive management. *Journal of Environmental Management* 92:1360-1364.
- Richters, L. K., and K. L. Pope. *In press*. Catch of channel catfish with tandem-set hoop nets and gill nets in lentic systems of Nebraska. Pages 000-000 in P. Michaletz and V. Travnicek (Eds.), *Conservation, ecology, and management of catfish: the second international symposium*. American Fisheries Society, Bethesda, MD.
- Robertson, B. A., R. L. Hutto and J. J. Fontaine. 2010. Evaluating food availability and nest predation as sources of bias in aural bird surveys. *Journal of Field Ornithology* 81:420-429.
- Skagen, S. K., J. J. Fontaine, R. Stutzman, V. Steen, C. Melcher, J. Stamm, G. Clow, M. Anderson, P. Norton, N. Niemuth, J. M. Friedman, R. Gleason, and B. Tangen. 2011. Avian conservation in the Prairie Pothole Region, Northern Great Plains: Understanding the links between climate, ecosystem processes, wetland management, and bird communities. USGS Fact Sheet FS11-3030.
- Sundstrom, S., C. R. Allen and C. Barichiev. *In press*. Species, functional groups, and thresholds in ecological resilience. *Conservation Biology*.
- Wan, H., C. J. Chizinski, C. L. Dolph, B. Vondracek, and B. N. Wilson. 2010. The impact of rare taxa on a fish index of biotic integrity. *Ecological Indicators* 10:781-788.

PRESENTATIONS AT SCIENTIFIC MEETINGS

- Allen, C. R. Adaptive management for ecosystem services. Soil and Water Conservation Society Annual Conference, Washington, D.C. July 2011. Invited presentation and panel member.
- Allen, C. R. Impact of biological invasions on the resilience of ecological systems. 71th Annual Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Invited presentation.
- Allen, C. R. Resilience and adaptive management of stressed watersheds. University of New Mexico, Albuquerque, NM. November 2010. Invited presentation.
- Allen, C. R. Discontinuities, resilience, and novelty. University of Alaska Seminar, Fairbanks, AL. October 2010. Invited presentation.
- Chan, J., K. Nemecek, and D. Pan. 2011. Food for thought for water for food: Integrating a resilient systems-based approach Water for Food Conference, Lincoln, NE. May 2011. Poster.
- Chizinski, C. J., P. B. Bajer, P. W. Sorensen. Spring spawning movements of the common carp and northern pike in Minnesota. UNL Water Center's 2011 Spring Seminar Series, Lincoln, NE. February 2011. Presentation.
- Chizinski, C. J., P. B. Bajer, P. W. Sorensen. Spring spawning movements of the common carp in Minnesota. 71st Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Presentation.

- DeBoer, J. A., T. M. Stevens, and K. L. Pope. Comparison of three models to estimate population size of largemouth bass. Joint AFS Technical Committees Summer Meeting, Dubuque, IA, July 2011. Presentation.
- DeBoer, J. A., and K. L. Pope. Water, walleye and corn: a conundrum in an arid landscape. 3rd Annual Meeting, Water for Food Conference, Lincoln, NE. May 2011. Poster.
- DeBoer, J. A., K. L. Pope, and K. D. Koupal. Scale influences our understanding of fish recruitment. Nebraska Chapter, American Fisheries Society. Gretna, NE. February 2011. Presentation.
- DeBoer, J. A., D. R. Martin, K. L. Pope, and G. R. Wilde. 2011. A LK @ 2DAYS ANGLR: How technology reveals patterns in the internet age. Great Plains Fishery Workers Conference, Sidney, NE. January 2011. Presentation.
- DeBoer, J. A., K. L. Pope, and K. D. Koupal. Scale influences our understanding of fish recruitment. Midwest Fisheries Student Colloquium, Brookings, SD. January 2011. Presentation.
- DeBoer, J. A., K. L. Pope, and K. D. Koupal. Scale influences our understanding of fish recruitment. Great Plains Fishery Workers Conference, Sidney, NE. January 2011. Presentation.
- DeBoer, J. A., K. L. Pope, and K. D. Koupal. How does reservoir retention time affect larval fish ontogeny? 71st Annual Meeting, Midwest Fish and Wildlife Conference. Minneapolis, MN. December 2010. Presentation.
- DeBoer, J. A., K. L. Pope, and K. D. Koupal. Irrigation and year-class strength of fishes—the importance of a species' spawning period. Greater Platte River Basins Symposium, Lincoln, NE. October 2010. Presentation.
- Decker, K. L. 2010. Invasions and the changing landscape of Nebraska. Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Symposium organizer and invited presentation.
- Decker, K., and C. R. Allen. Predicting non-native plant richness in Nebraska. 71st Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Invited presentation.
- Fontaine, J. J. and R. L. Stutzman. Changing climates and changing landscapes: A migrant bird's dilemma. Special symposium on migration ecology. Waterbird Society Meeting, Grand Island, NE. March 2011. Invited Presentation.
- Fontaine, J. J. Avian conservation in the Prairie Pothole Region: Understanding the links between climate, ecosystem processes, wetland management, and bird communities. Center for Grassland Studies. Lincoln, NE. 2010.
- Hellman, M. L., C. R. Allen and M. P. Simon. 2011. Detection and occupancy of anuran adults and tadpoles in wetland restorations. 96th Annual Ecological Society of America Conference, Austin, TX. August 2011. Presentation.
- Hellman, M. L. and C. R. Allen. Monitoring of herpetofauna in wetland restorations: anuran occupancy in southeast Nebraska. Missouri River Natural Resource Committee Conference, Nebraska City, NE. March 2011. Presentation.
- Hellman, M. L. and C. R. Allen. A survey of herpetofauna in restored wetlands in SE Nebraska. 71st Annual Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Poster.
- Jorgensen, C. F., L. A. Powell, and J. J. Fontaine. Multi-scaled assessment of avian response to habitat attributes in a grassland ecosystem. Playa Lakes Joint Venture Scientific Advisory Team Meeting, Fort Robinson State Park, Crawford, NE. June 2011. Invited presentation.
- Jorgensen, C. F., L. A. Powell and J. J. Fontaine. A hierarchical spatial model of ring-necked pheasant abundance in Nebraska. 2011 Graduate Student Poster Session, University of Nebraska–Lincoln Research Fair, Lincoln, NE. April 2011. Poster.
- Jorgensen, C. F., L. A. Powell and J. J. Fontaine. Multi-scaled assessment of avian response to habitat attributes in a grassland ecosystem. Association of Field Ornithologists, the Wilson Ornithological Society, and the Cooper Ornithological Society Joint Meeting, Kearney, NE. March 2011. Presentation.
- Jorgensen, C. F., L. A. Powell and J. J. Fontaine. Assessing landscape and habitat attributes at multiple scales: What drives avian abundance and distribution in grasslands? 71st Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Poster.

- Jorgensen, C. F., L. A. Powell, and J. J. Fontaine. 2010. Assessing Landscape and Habitat Factors at Multiple Scales: What Drives Avian Abundance and Distribution in Grasslands? Greater Platte River Basins Symposium, Lincoln, NE. October 2010. Poster.
- Kolasa, J., C. R. Allen, C. Stow, and J. Sendzimir. Predictions from the hierarchical habitat model. 7th European Conference on Ecological Modelling, Riva del Garda, Italy. June 2011. Presentation.
- Lueckenhoff, R. W., and K. L. Pope. Identification accuracy of juvenile white bass and hybrid striped bass. Annual Meeting, Nebraska Chapter of the American Fisheries Society, Gretna, NE. February 2011. Poster.
- Lueckenhoff, R. W., and K. L. Pope. Morphological variation between juvenile white bass and hybrid striped bass. Annual Meeting, Nebraska Chapter of the American Fisheries Society, Gretna, NE. February 2011. Presentation.
- Lueckenhoff, R. W., and K. L. Pope. Identification accuracy of juvenile white bass and hybrid striped bass. 71st Annual Meeting, Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Poster.
- Lueckenhoff, R. W., and K. L. Pope. Morphological variation between juvenile white bass and hybrid striped bass. 71st Annual Meeting, Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Presentation.
- Martin, D. R., and K. L. Pope. Maintaining resilience of regional fisheries through management of anglers. 6th World Recreational Fishing Conference, Berlin, Germany. August 2011. Presentation.
- Martin, D. R., and K. L. Pope. Scale influences predictions of angler effort from online fishing forum activity. 6th World Recreational Fishing Conference, Berlin, Germany. August 2011. Poster.
- Martin, D. R., and K. L. Pope. Predicting angler effort from online fishing forum use. Annual Meeting, Nebraska Chapter of the American Fisheries Society, Gretna, NE. February 2011. Poster.
- Martin, D. R., and K. L. Pope. Angler social networks: What can we learn? Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Poster.
- Maple, A. P., L. K. Kowalewski, M. A. Pegg, and K. L. Pope. Latitudinal influence on age estimates for bluegill using otoliths and scales. 71st Annual Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Poster.
- Pope, K. L., D. R. Martin, and G. R. Wilde. Angler choice of terminal tackle and water depth. 6th World Recreational Fishing Conference, Berlin, Germany. July 2011.
- Rehme, S., C. R. Allen, K. Hobson, and L. A. Powell. Can nesting songbirds reveal adult breeding site fidelity? Cooper's Ornithological Society/Association of Field Ornithologists/Wilson's Ornithological Society, Kearney, NE. March 2011. Presentation.
- Rehme, S. E., C. R. Allen, and L. A. Powell. Enhancing long-term avian monitoring programs with short-term, fine-scale data at National Park Service properties. 71st Annual Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Presentation.
- Richters, L. K., and K. L. Pope. The influence of habitat variability on channel catfish populations in Nebraska. Annual Meeting, Nebraska Chapter of the American Fisheries Society, Gretna, NE. February 2011. Presentation.
- Spirk, P. J., and K. L. Pope. Demographics of harvested walleye, white bass and white crappie in two Nebraska reservoirs. 60th Annual Workshop, Great Plains Fishery Workers Association, Sidney, NE. 2011. Presentation.
- Spirk, P. J., and K. L. Pope. Effects of different harvest regulations on the population dynamics of sexually size dimorphic fishes. 71st Annual Meeting, Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Presentation.
- Stutzman, R. J., S. K. Skagen, and J. J. Fontaine. Assessing the impacts of land use change on avian migration in the Prairie Pothole region. UNL Graduate Student Poster Session. Lincoln, NE. April 2011. Poster.
- Stutzman, R. J., S. K. Skagen, and J. J. Fontaine. 2011. Land use change: Migrant responses and implications. Cooper's Ornithological Society/Association of Field Ornithologists/Wilson's Ornithological Society, Kearney, NE. March 2011. Presentation.

- Stutzman, R. J., S. K. Skagen, and J. J. Fontaine. Land use change: Migrant responses and implications. Waterbird Society, Grand Island, NE. March 2011. Presentation.
- Stutzman, R. J., S. K. Skagen, and J. J. Fontaine. Avian migration in the face of an altered landscape and a changing climate. Midwest Fish and Wildlife Research Conference, Minneapolis, MN. December 2010. Poster.
- Uden, D. R. 2011. Climate change and biofuel production impacts on Rainwater Basin wetlands, migratory waterfowl, and grassland birds. Climate, Water and Ecosystems—Shaping the Great Plains Symposium. Lincoln, NE. October 2011. Poster.
- Wilde, G. R., and K. L. Pope. Use of Google Insights for Search in fisheries. 6th World Recreational Fishing Conference, Berlin, Germany. July 2011.
- Williams, A., S. Wilson, and C. R. Allen. North American river otter response to common reed invasion in the Big Bend region of the Platte River. 71th Annual Midwest Fish and Wildlife Conference, Minneapolis, MN. December 2010. Presentation.
- Wilson, S. P. 2011. River otter home range and habitat use in the Platte River, Nebraska. The Wildlife Society's Central Mountains and Plains Section Annual Conference. Gering, NE. August 2011. Presentation.

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