
THE COMMUNICATOR

NEWS FROM THE NEBRASKA COOPERATIVE FISH & WILDLIFE RESEARCH UNIT

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January 2009

Faces – New and Old

We welcome master's students **Cassie Manhart** (advised by Craig Allen) and **Peter Spirk** (advised by Kevin Pope). Cassie and Peter joined the Coop Unit in January.

This fall, **Nate Gosch** (MS 2008) accepted a position as a fisheries biologist with the Missouri Department of Conservation in Jefferson City, Missouri.

Beth Forbus (MS 2007) is enjoying her land management work at Camp Pendelton in sunny California. This summer she hiked the Santa Margarita River to see first-hand the impact of the *Arundo* (giant reed) invasion on the river ecology. Getting paid to hike rivers with no shoes isn't all bad! ❖

Changes

Fisheries student, **Dustin Martin**, received his M.S degree in December 2008. Dustin is continuing his education with Kevin Pope as a Ph.D. student. He and Peter Spirk will work on a new project funded by the Nebraska Game and Parks Commission that will strive to understand how anglers' participation responds to the management of Nebraska reservoirs.

In December, we said, "Farewell," to graduate student **Chris Lewis** who returned to Canada.

Thad Miller and **Justin Williams** are both enjoying their work with Li-Cor and URS Corp, respectively, as they finalize preparations for May graduations. (More in the Graduate Student section.) ❖

New Federal Staff

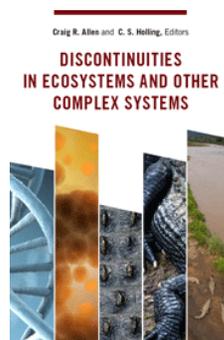
We are excited to announce that, in early January, Dr. Joseph (TJ) Fontaine became the second assistant unit leader at the Nebraska Cooperative Fish and Wildlife Unit, with a focus on adaptive management. TJ is presently stationed in Arizona and will relocate to the unit offices in Lincoln around May 1.

TJ received his Ph.D. in Wildlife and Fisheries from the University of Montana. Before joining the Nebraska Coop Unit, he held a joint post-doc position at the USGS Sonoran Desert Research Station and the University of Arizona School of Natural Resources studying the evolution and maintenance of avian migration behaviors in human-altered landscapes.

Broadly, TJ is interested in wildlife conservation and evolutionary ecology. His passion is understanding variation in life history strategies, both within and among species. Recently he examined how vegetative phenology, food availability, competition, and predation risk interact with individual condition to influence stopover site selection and subsequent behaviors in migratory birds. ❖

Publications

This fall, *Discontinuities in Ecosystems and Other Complex Systems* was released by Columbia University Press. The book is the culmination of about ten years of work for editors Craig Allen and C. S. Holling. The views of the various contributors delve into the background, patterns, and consequences of discontinuities in ecosystems and other complex systems. ❖



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New Research

Angler Behavior in Response to Management Actions on Nebraska Reservoirs

GOALS: Natural resource agencies invest substantial resources to recruit anglers—the Nebraska Game and Parks Commission is no different. However, there is little understanding of human motives for participation in angling activities. Even less is known about how management actions influence the participation patterns of anglers. This project will provide baseline information of angler-participation patterns on different spatial and temporal scales, and assess changes in angler participation in response to changes in management actions. In addition, this project will document how the harvest of sexually dimorphic fishes varies with different regulations (i.e., length limits) in order to better understand how harvest regulations affect sportfish populations.

CURRENT STATUS: This new project began in January. Preparations are underway to initiate field research in mid-March 2009.

GRADUATE RESEARCH ASSISTANTS: Dustin Martin, Peter Spirk

FUNDING: The Nebraska Game & Parks Commission

Missouri River Mitigation: Implementation of Amphibian Monitoring and Adaptive Management for Wetland Restoration Evaluation

GOALS: This new project will gather the data needed to determine what constitutes a successful wetland restoration, given the desired endpoints of the U.S. Army Corps of Engineers. Herpetofauna—primarily amphibians—will be 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. This study area is the Missouri River corridor of Iowa, Kansas, Missouri and Nebraska.

CURRENT STATUS: We are in the initial phase of implementing a monitoring program that will focus 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 Nebraska Coop Unit is focusing on wetland complexes in the Falls City to Omaha, Nebraska reach of the Missouri River.

GRADUATE RESEARCH ASSISTANT: Cassie Manhart

FUNDING: United States Army Corps of Engineers ❖

Current Research

Assessing the Relationship between Stable Isotopes and Grassland Bird Productivity on Great Plains National Park Service Properties

GOALS: This project will provide National Park Service (NPS) managers with an assessment of habitat quality for breeding grassland birds at three NPS sites, and assess the success of the unique stable isotope techniques used in the study. Little is known about the relative value of NPS grassland habitats to regional songbird production. Data collected should determine if bird reproduction is successful at these sites and provide insight for the best allocation of resources to promote grassland bird populations.

CURRENT STATUS: Park sites are Pipestone National Monument, MN; Homestead National Monument, NE; and Tallgrass Prairie National Preserve, KS. Research is targeting four species of grassland birds, Dickcissel (*Spiza americana*), Grasshopper Sparrow (*Ammodramus saviarum*), Eastern Meadowlark (*Sturnella magna*), and Western Meadowlark (*Sturnella neglecta*).

The first year of field research (2008) found that avian nest survival for Homestead and Tallgrass was about 40% for target species. Low numbers of nests for all parks made this year's results tentative. No target species nests were found in Pipestone. Pipestone had estimates of 0.9 Dickcissels and 3.9 Western Meadowlarks for the entire park. Homestead had estimates of 44.9 Dickcissels and 0.8 Eastern Meadowlarks. Tallgrass had estimates of 5,067 Dickcissels, 3,048 Eastern Meadowlarks, and 4,588 Grasshopper sparrows for the western portion of the park.

Six technicians will be hired for the second field season that begins in May. Results for stable isotope values from feather

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Editor, Valerie A. Egger

Welcome to the Nebraska Coop Unit newsletter! The newsletter will be distributed two or three times a year.

Questions or newsletter ideas can be directed to vegger1@unl.edu, or
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OUR COOPERATORS:

U.S. Geological Survey, Department of the Interior
University of Nebraska–Lincoln
Institute of Agriculture and Natural Resources
School of Natural Resources
Nebraska Game and Parks Commission
The Wildlife Management Institute
U.S. Fish and Wildlife Service

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and blood samples taken from nestlings and adults have yet to be completed. DNA analysis will determine the sex of each chick and calculate the ratio of male to female chicks in each nest. Results will be used to test the assumption that sex ratios are equal when calculating fecundity estimates.

GRADUATE RESEARCH ASSISTANT: Sarah Rehme

FUNDING: USGS Natural Resource Preservation Program (NRPP) and the National Park Service

Cross-Scale Structure in Ecosystems

GOALS: A series of empirical analyses will determine the distribution of functional groups within and across scales, the association of measures of biotic variability in vertebrates (e.g., invasions, extinctions) with discontinuities in body mass distributions, and cross-scale analyses of patterns in body mass distributions from local to hemispheric scales. This project specifically investigates cross-scale structure and its implications in ecosystems.

CURRENT STATUS: Analysis of Mediterranean-climate data is complete, reports were submitted and two manuscripts are in preparation.

GRADUATE RESEARCH ASSISTANT: Aaron Lotz

FUNDING: The James S. McDonnell Foundation—*Studying Complex Systems*

Diversity and Ecological Functions

GOALS: This project seeks to understand how grassland plant diversity affects the provision of ecological services.

CURRENT STATUS: In 2005, pollination and herbivory data were collected from restoration plots. Field research in 2006 and 2007 focused on herbivory and invasion resistance. Data collections are nearly complete with data analyses to follow.

Kristine Nemeč conducted her third field season in 2008 on restoration plots located in south central Nebraska with technician Michelle Hellman. Michelle continues to make great progress sorting invertebrate specimens that were collected in pitfall traps during 2008 sampling. A taxonomist has nearly finished identifying the spider specimens from the 2007-2008 sampling seasons and another expert will be identifying ant specimens in the spring. The data collected are being used to compare ecosystem services provided by the plant and invertebrate communities in high- and low-diversity grassland restorations.

Lindsey Reinartz has finished three samples of herbivory rates and insect sweeps. Insect analysis and identification are nearly complete.



Sampling Plot (Photo courtesy of Lindsey Reinartz)

GRADUATE RESEARCH ASSISTANTS: Lindsey Reinartz (University of Nebraska at Omaha, advised by L. Wolfenbarger and Craig Allen), and Kristine Nemeč (employee of U.S. Army Corps of Engineers)

GRADUATE RESEARCH TECHNICIAN: Michelle Hellman

FUNDING: The James S. McDonnell Foundation—*Studying Complex Systems*, Nebraska Game and Parks Commission, University of Nebraska at Omaha, and the Nature Conservancy

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Conferences/Meetings/Workshops

In November 2008, Craig Allen delivered a workshop on complex adaptive systems at the International Institute of Applied Systems Analysis in Laxenburg, Austria. Other presenters included Annabel Major, Aaron Alai, Ahjond Garmestani, Shana Sundstrom, Jan Sendzimir and Garry Peterson.

The annual Midwest Fish and Wildlife Conference was held in mid-December in Columbus, Ohio. Attending and presenting

from the Nebraska Coop Unit were Kevin Pope, Lindsey Richters and Justin Williams.

Dustin Martin and Annabel Major both presented at the January 25, 2009 annual meeting of the Izaak Walton League in Lincoln, Nebraska. ❖

Teaching

Foundations of Ecological Resilience is being taught by Craig Allen. This new course develops an understanding of the concept of resilience, especially ecological resilience. Students will explore both theoretical and applied aspects of ecological resilience, and the development of resilience theory. To further explore these concepts, students will develop and complete a group project focusing on the resilience assessment of the Platte River Valley. At the conclusion of the course, students will be familiar with a number of prominent issues in resilience theory, its development and application.

Kevin Pope is team-teaching **Managed Aquatic Systems** with Mark Pegg, UNL School of Natural Resources. This course is 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 is 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.

Aaron Lotz is teaching NRES 311, **Wildlife Ecology and Management**. This course explores concepts in wildlife ecology, conservation biology, population biology, and managing for of wildlife population enhancement. Emphasis is placed on game and nongame species, as well as management options that include human/wildlife interactions, habitat, and wildlife populations.

As an outcome of Craig Allen's Spring 2008 **Ecology of Biological Invasions**, his class submitted the manuscript "Urban parks and trails as tree invasion sources and corridors in the Great Plains, USA" to the *Journal of Biological Invasions*. ❖

Awards & Recognitions

Sarah Rehme received a \$1,000 award from the J.E. Weaver Competitive Grants Program in 2008. The grant program is offered to graduate students through the Nebraska Chapter of The Nature Conservancy for research that enhances knowledge and conservation of Great Plains species or ecosystems. Grants are awarded on the basis of scientific merit rather than need.

Kristine Nemecek and Sarah Rehme each received \$500 Graduate Student Grant-in-Aid awards from the UNL Center for Great Plains Studies. Kristine's award helped off-set expenses for insect identification. Both of Sarah's awards funded the analysis of DNA samples taken from target-species bird chicks. ❖

UCARE Project

The UNL Undergraduate Creative Activities and Research Experiences (UCARE) Program is managed by the Office of Undergraduate Studies. The goal of UCARE is to link UNL faculty and undergraduates by providing funds for research. Program funding is provided by Pepsi Endowment and Program of Excellence.

Since October 2007, Kevin Pope has worked with UNL undergraduate Andrew Furman on the research project: *Latitudinal Influence on Age Estimates of Bluegill*. Read more about this project in the Current Research section. ❖

Graduate Student News

Aaron Alai

M.S. Graduate Research Assistant, Wildlife

Aaron is analyzing South African bird species for discontinuities and body mass, and building models for predicting species decline, migration, and nomadism (in collaboration with Graeme Cumming at the University of Capetown). Organisms located closer to discontinuities may be more prone to these phenomena with greater frequency than one would expect by chance. He is also investigating the hypothesis that competition amongst species is a driving force for the structure of aggregations.

Using C++, Aaron is developing a computer program to most efficiently find the fewest number of gaps in a bird community while keeping the variance within gaps at the lowest possible levels. It will include user-friendly comments that will enable non-programmers to modify the code.

Aaron Lotz

Ph.D. Graduate Research Assistant, Wildlife

Aaron continues to work on his dissertation research, focusing on empirical analyses of body size distributions.

During Spring 2009, Aaron is also teaching NRES 311, **Wildlife Ecology and Management**, with about 50 students.

Ryan Lueckenhoff

M.S. Graduate Research Assistant, Fisheries

Ryan is working on developing a technique to distinguish juvenile white bass from juvenile hybrid striped bass. He finished his first sampling season this past fall and is awaiting results from the genetic analysis.

Annabel Major

Ph.D. Graduate Research Assistant, Wildlife

Annabel has been coordinating the Nebraska Invasive Species Project with Craig Allen. This fall she worked with Craig to develop and submit new grant proposals for continuing the work begun initially by this project. She is working with agencies and state legislators to create legislation that would establish an official Nebraska Invasive Species Council.

Annabel will be working towards the creation of an adaptive management plan for invasive species in the state that would provide a framework for successful management practices based on stakeholder participation.

Cassie Manhart

M.S. Graduate Research Assistant, Wildlife

Cassie received her B.S. in Environmental Studies with a Biological Sciences emphasis from UNL. Her master's research will focus on amphibian response to Missouri River restorations as an assessment of restoration success.

Dustin Martin

Ph.D. Graduate Research Assistant, Fisheries

Dustin received his M.S. in Natural Resources in December 2008 from the University of Nebraska–Lincoln (UNL). He will further his education at UNL by pursuing a Ph.D. focused on modeling the spatial and temporal participation of anglers in southeastern Nebraska.

Thaddeus (Thad) Miller

M.S. Graduate Research Assistant, Wildlife

Thad has successfully defended his thesis and plans to graduate in May 2009. Currently he is working as a scientific writer for Li-Cor (in Lincoln). Li-Cor designs and manufactures instrument systems for biotechnology and environmental research.

Kristine Nemec

Ph.D. Graduate Research Assistant, Wildlife

Kristine conducted her third field season in 2008 on restoration plots located in south central Nebraska. She received a Center for Great Plains Study grant towards insect identification expenses. Throughout her Ph.D. program, Kristine has continued her work with the U.S. Army Corps of Engineers.

Sarah Rehme

M.S. Graduate Research Assistant, Wildlife

Sarah completed her first field season in 2008 working with Larkin Powell (UNL) and Craig Allen on a National Park Service project assessing productivity and site fidelity of grassland birds in three national parks.

Sarah was awarded a J.E. Weaver Competitive Grant by The Nature Conservancy, and also the Center for Great Plains Studies Graduate Student Grant-in-Aid. The grants are funding DNA analyses of samples taken from target species chicks.

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Lindsey Reinarz

M.S. Graduate Research Assistant, Wildlife

Lindsey wants to develop a method of evaluating success of prairie restorations. She continues to make progress on her master's thesis.

Lindsey Richters

M.S. Graduate Research Assistant, Fisheries

Lindsey continues to work for the Nebraska Game and Parks Commission while pursuing her master's degree. Her second field season will start in June.

Chad Smith

Ph.D. Graduate Research Assistant, Wildlife

Chad will serve as an instructor and graduate research assistant for the upcoming workshop *Adaptive Management Standards of Practice* in February. The one-week seminar is being led by Dr. Steve Light and will be conducted in Omaha for staff with the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service working on the Missouri River.

Peter Spirk

M.S. Graduate Research Assistant, Fisheries

Peter received his Bachelors degree in Wildlife Biology from the University of Nebraska at Kearney in May 2008. His master's research project will examine population dynamics of sexually dimorphic fish that are managed with different regulations (i.e., length catch limits).

Amy Willaims

M.S. Graduate Research Assistant, Wildlife

Amy graduated from Washington State University with a B.S. in Wildlife Ecology. She plans to pursue a career in conservation

of endangered species. Amy will study otters' responses to phragmites control on the Platte River. This past fall, she completed her first field season trapping, tagging, and tracking otters.

Justin Williams

M.S. Graduate Research Assistant, Wildlife

Justin expects to graduate in May 2009. As he completes his thesis, he is also working as an environmental scientist with URS Corporation in Omaha. His duties are environmental field sampling, data analysis, preparation of various documents including sampling and work plans, investigation reports, environmental assessments, and environmental impact statements.



Sam Wilson & Amy Williams with Otter Traps (Photo courtesy of Adam Butler)

Sam Wilson

M.S. Graduate Research Assistant, Wildlife

Sam continues to track otters on the Platte River, and also continues his work controlling feral hog populations with the Nebraska Game and Parks Commission. Sam conducted at community meeting on January 9 in Beatrice, Nebraska regarding mountain lions in southeast Nebraska. It was attended by about 200 local residents. About an hour was spent on a presentation, with another devoted to questions and answers. ❖

Our Mission

Train graduate students for professional careers in natural resources research and management

Conduct research that will create new information useful for management of natural resources

Provide technical assistance to cooperators



Geographic Trends in Contamination of Nebraska's Surface Waters as Indexed by Sex Steroids of Common Carp

GOALS: During the past few years, endocrine disrupting compounds (EDCs) have been identified in Nebraska streams and rivers, particularly downstream from beef cattle feedlots and from local wastewater treatment plants. Evaluating the extent to which EDCs occur in these streams, and in lakes and reservoirs throughout Nebraska, is important because recruitment of fishes in these water bodies is extremely variable, and EDCs are sometimes suggested as responsible for limited recruitment.

This project will document the geographical variation of sex steroid concentrations in adult common carp—which is an indirect assessment of geographic trends in the occurrence of EDCs—from 20 Nebraska lakes and reservoirs. We hypothesize that sex steroid profiles will vary considerably across Nebraska, and will be associated with bioavailability of steroidogenic compounds within each reservoir. If correct, this seed project will provide data and direction for developing large, multi-year grant proposals for assessing potential risks associated with surface water contamination—one of Nebraska's top-ten water challenges.

CURRENT STATUS: Field sampling is complete and laboratory assessments are underway. Initial results suggest that sex steroid profiles do vary considerably across Nebraska, though not in a manner as initially predicted.

RESEARCH TECHNICIANS: Carla Knight, Alexis Maple

FUNDING: USGS 104b funds administered by UNL Water Center

Latitudinal Influence on Age Estimates of Bluegill

GOALS: This project is comparing age estimates of bluegill as determined from two common structures, scales and otoliths (fish ear bones), across a latitudinal gradient. Scales can be collected from fish without harming them. Otoliths can only be collected from fish that were sacrificed. It is assumed that age estimates from otoliths are not influenced by latitude within the USA. In contrast, little is known about the relationship between latitude and age estimates from scales—accuracy of age estimates could increase linearly for fish as one moves from north to south, or accuracy of age estimates may be constant (unaffected by latitude) on both sides of a threshold. This project intends to determine the latitudinal relationship, from North Dakota to Louisiana, for age estimates determined from bluegill scales.

CURRENT STATUS: Collection and aging of samples is ongoing.

UNDERGRADUATE RESEARCH TECHNICIAN: Andrew Furman

FUNDING: UNL Undergraduate Creative Activities and Research Experiences (UCARE) Program

Monitoring, Mapping and Risk Assessment for Non-Indigenous Invasive Species in Nebraska (Nebraska Invasive Species Project)

GOALS: This research project provides coordination of non-indigenous species management and research in Nebraska. This project is also mapping the potential spread of many invasive species in Nebraska.

CURRENT STATUS: Several grant proposals were developed and submitted to funding agencies in September and at least one additional proposal is in development. The proposals will continue, and further expand, work begun by the project.

Annabel Major is working with various agencies and Nebraska state senators to submit legislation that would establish a Nebraska Invasive Species Council, LB 582. The council will function as an independent advisory panel on invasive species. Through the invasive species council, the project will promote stronger partnerships in invasive species management, provide research based information to policy makers, and build awareness of these issues throughout the community.

Two master's theses are nearing completion.

GRADUATE RESEARCH ASSISTANTS: Justin Williams, Aaron Alai

PROJECT COORDINATOR: Annabel Major

WEB SITE: snr.unl.edu/invasives

FUNDING: Nebraska Environmental Trust

Population Assessment of Channel Catfish in Nebraska

GOALS: This project is focused on 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. Catfish populations from across Nebraska will be compared among water-body types and among stocking strategies. This information will help managers determine the need for future stockings and harvest regulations of channel catfish. Also, a relatively new gear configuration for collecting catfish samples will be compared to current standards.

CURRENT STATUS: The first sampling season was completed summer 2008 on 18 Nebraska water bodies with approximately 2,200 catfish collected.

GRADUATE RESEARCH ASSISTANT: Lindsey Richters (employee of Nebraska Game and Parks Commission)



Measuring a Catfish (Photo courtesy of Lindsey Richters)

RESEARCH TECHNICIAN: Dan Dobesh

UNDERGRADUATE RESEARCH TECHNICIAN: Nick Dobesh

FUNDING: Nebraska Game and Parks Commission

Recruitment of Walleye and White Bass in Nebraska's Southwest Irrigation Reservoirs

GOALS: Reservoirs in Nebraska's Republican River watershed were established for flood control and irrigation, but also attract many anglers. White bass populations in these reservoirs are self-sustaining. Walleye, however, must be restocked annually as natural reproduction and recruitment of young are limited. This project will increase our understanding of the factors affecting recruitment of walleye and white bass in these reservoirs—vital for understanding reservoir fish ecology in semi-arid regions.

CURRENT STATUS: Dustin Martin completed his thesis research, which assessed the relative importance of spawning habitats for walleye and white bass. Spawning habitat selection by adult walleye and white bass was studied at Enders and Red Willow reservoirs using acoustic telemetry and electrofishing. Adult walleye selected sites with cooler water temperatures and greater fetch at Enders Reservoir; at Red Willow Reservoir they selected sites with large rock substrate and no cover. These sites were limited to the area on or near the riprap dam at both reservoirs. Walleye egg abundance was also greatest in these areas. However, larval walleye abundance was not greatest in this area; larval walleye habitat selection was driven by the absence of cover and fetch. Habitat selection by adult white bass was undetected—white bass were distributed throughout both reservoirs during the spawning period.

Ryan Lueckenhoff continues work to determine what morphological differences exist between juvenile white bass and juvenile hybrid striped bass for identification purposes.

This past autumn, Chris Lewis withdrew from UNL and a search is underway to identify his replacement. Field sampling will resume in mid-April 2009.



Ryan with a Juvenile White Bass (Photo courtesy of Chris Lewis)

GRADUATE RESEARCH ASSISTANT: Ryan Lueckenhoff

UNDERGRADUATE RESEARCH TECHNICIANS: Ted Ehly, John Walrath

CREEL CLERKS: Greg Hoffman, M. Doug Miller

FUNDING: Nebraska Game and Parks Commission

River Otter Home Range and Habitats

GOALS: This project is collecting home range and habitat use information on river otters along the big bend area of the Platte River using radio telemetry. 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.

CURRENT STATUS: From fall 2006 to fall 2008, 18 transmitters were implanted into river otters in south central Nebraska. Tracking of the implanted otters continues. Dave Rempel joined the Nebraska Coop Unit in mid-January as a temporary research technician and will provide on-site assistance with the project.

GRADUATE RESEARCH ASSISTANTS: Sam Wilson, Amy Williams

RESEARCH TECHNICIAN: Dave Rempel

FUNDING: Nebraska Game and Parks Commission, The Nature Conservancy

Southeast Prairies BUL and Sandstone Prairies BUL Research

GOALS: In 2007, the Southeast Prairies Biological Unique Landscape (BUL) and Sandstone Prairies BUL were included in a Flagship Initiative approved by the Nebraska Natural Legacy Project's Partnership Team. The Nature Conservancy is the

designated lead agency for conducting project research and monitoring. Designated partners are the Northern Prairies Land Trust, Nebraska Game and Parks Commission, Nebraska Cooperative Fish and Wildlife Research Unit, and the University of Nebraska at Omaha. Research and evaluation projects will be implemented to help guide conservation work within the Southeast Prairies and Sandstone Prairies BULs.

The fragmented nature of the landscape within the BULs creates challenges for conservation. The initial 2008 data collection sampled native prairies of various size, quality, and isolation to determine how these factors affect insect populations in tallgrass prairies. Understanding more about these issues will help inform decisions regarding project size, priority landscapes, and project design in managing eastern Nebraska landscapes. 2008 results will guide future research programs.

CURRENT STATUS: Preliminary data collections were completed in summer 2008. Floristic Quality Assessment data were collected on 16 research sites. Following this, insect sweep netting took place on the same sites.

RESEARCH TECHNICIAN: Chris Wood

GRADUATE RESEARCH TECHNICIAN: Michelle Hellman

BOTANIST: Alicia Admiraal

FUNDING: The Nebraska Game and Parks Commission

Spatial Risk Assessment of Invasive Species Impacts on Native Species in Nebraska

GOALS: This project is assessing the risks that native Nebraska species face from non-native invasive species. Products will include spatial models of stressors and targets, models of spatial overlap, hazard indices, and relative risk indices for each target.

CURRENT STATUS: Potential habitat for eight invasive plant species was modeled. This was combined with an assessment of the ecological impacts of each invasive species in a regional risk assessment framework to calculate relative risk scores and uncertainty. Results indicate that *Rhamnus cathartica* (buckthorn) and *Elaeagnus angustifolia* (Russian olive) currently pose the greatest risks to endangered plants, whereas *Elaeagnus umbellata* (autumn olive) may pose the highest risk in the future. *Elaeagnus angustifolia* currently presents the greatest risk to rare communities in the present and forecast scenarios. *Panax quinquefolius* (American ginseng) and Wet Messic Tallgrass Prairie are at greatest risk from invasive species, currently and in the future.

GRADUATE RESEARCH ASSISTANT: Thad Miller

FUNDING: Nebraska Game and Parks Commission, and U.S. Geological Survey

Understanding Invasions and Extinctions

GOALS: Compared to other continental areas, Mediterranean regions have been invaded by a large number of non-indigenous organisms, including vertebrates. Concomitant with invasions, declines and extinctions have transformed the faunas of Mediterranean ecoregions.

Project objectives are to 1) compare the vertebrate body mass structures of Mediterranean-climate ecosystems, and 2) examine the effects of invasions and extinctions in Mediterranean-climate ecosystems on body mass structure and alpha, beta and gamma diversity.

CURRENT STATUS: Discontinuous body-mass distributions were found in all Mediterranean climate ecosystems and taxa that were examined. More invasive and endangered species were found to occur at the edges of body mass aggregations than could be expected by chance in 40% of datasets and in all datasets when analyzed by taxonomic group. This supports the hypotheses suggesting a relationship between discontinuities in body size distributions and invasion and decline.

Analyses have been completed, and reports drafted. The introduction of invasive species and loss of declining species resulted in a general decrease in alpha functional diversity, contrary to expectations. Beta functional diversity decreased in birds and in most of the mammal comparisons, which supports studies reporting a regional scale decline in species diversity following invasions.

GRADUATE RESEARCH ASSISTANT: Aaron Lotz

FUNDING: U.S. Geological Survey ❖