Nebraska Cooperative
Fish and Wildlife Research Unit

Report of Activities
October 2006 – October 2007

Nebraska Cooperative Fish and Wildlife Research Unit—USGS
University of Nebraska–Lincoln
School of Natural Resources
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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) – Biological Resources Division

Cover: Unit Logo

We extend our appreciation to Nathan Ohlrich for designing our logo. Nathan incorporated the Nebraska state fish (channel catfish), state bird (western meadowlark), and state mammal (white-tailed deer) into his design.

At the time he submitted his design, Nathan was a senior studio arts major at the University of Nebraska–Lincoln. In May 2007, he received his Bachelor of Fine Arts Degree. He has an art design business, www.nathanohlrich.com.

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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 between USGS, state natural resource agencies, host universities, the Wildlife Management Institute and the U.S. Fish and Wildlife Service. The first unit was located at Iowa State University in Ames, Iowa. The program currently has 40 units in 38 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 between 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.

The Nebraska Cooperative Fish and Wildlife Research Unit was established in 2004 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

Kevin L. Pope, Assistant Unit Leader – Fisheries

UNIT STAFF – UNIVERSITY OF NEBRASKA–LINCOLN

Valerie Egger, Administrative Assistant

Christopher Kelly, Coordinator, Monitoring, mapping, risk and management of invasive species in Nebraska (8/06 – 9/07)

Annabel Major, Coordinator, Monitoring, mapping, risk and management of invasive species in Nebraska (9/07 -)

CURRENT GRADUATE DEGREE CANDIDATES

Ph.D., Fisheries

Chris Lewis, School of Natural Resources, UNL, January 2007 – present

Ph.D., Wildlife

Tim Davis, Department of Entomology, Clemson University, co-advisor (advisor P. M. Horton), January 1999 – present

Aaron Lotz, School of Natural Resources, UNL, January 2005 – present

Kristine Nemec, School of Natural Resources, UNL, August 2006 – present

Chad Smith, School of Natural Resources, UNL, August 2007 – present

Katherine Weeks, Department of Biological Sciences, Clemson University, July 2003 – present, Charles E. Springs, Jr. Fellowship recipient, Battelle Fellowship recipient

M.S., Fisheries

Nathan Gosch, School of Natural Resources, UNL, May 2006 – present

Dustin Martin, School of Natural Resources, UNL, January 2007 – present

M.S., Wildlife

Aaron Alai, School of Natural Resources, UNL, August 2007 – present

Elizabeth Forbus, School of Natural Resources, UNL, January 2005 – present

Thad Miller, School of Natural Resources, UNL January 2006 – present

Lindsey Reinarz, Biology, University of Nebraska Omaha, co-advisor (advisor L. Wolfenbarger), May 2006 – present

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

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

GRADUATES, 2006-07

Fisheries

Chris Chizinski, Ph.D., Department of Natural Resources Management, Texas Tech University, August 2007

Caleb Huber, M.S., Department of Natural Resources Management, Texas Tech University, May 2007

Wildlife

Don Wardwell, M.S., School of Natural Resources, UNL, December 2006

POST-DOCTORAL RESEARCH ASSOCIATES

Ahjond Garmestani

UNL UCARE STUDENT

Andrew Furman

RESEARCH TECHNICIANS

Katy Dornbos
Kent Fricke
Meghan Halibisky
Scott Jarecki
Landon Pierce
Ryan Rezac
Jeffrey Stittle

FEDERAL WORK-STUDY STUDENTS

Ted Ehly
Garth Goede
Sam Tobin
John Walrath

COORDINATING COMMITTEE MEMBERS

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NEBRASKA GAME AND PARKS COMMISSION

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THE WILDLIFE MANAGEMENT INSTITUTE

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93 Central Station Place
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U.S. FISH AND WILDLIFE SERVICE, REGION 6

Greg Watson, Energy and Science Coordinator
134 Union Blvd, PO Box 25486
Denver CO 80225
(303) 236-4514

COOPERATORS

UNIVERSITY OF NEBRASKA–LINCOLN FACULTY

Scott Hygnstrom, School of Natural Resources
Stevan Knezevic, Northeast Research and Extension Center
Gary Lynne, Agricultural Economics
Jim Merchant, School of Natural Resources
Mark Pegg, School of Natural Resources
Larkin Powell, School of Natural Resources
Tom Powers, Department of Plant Pathology
John Stansbury, Engineering Department
Drew Tyre, School of Natural Resources
Dave Wedin, School of Natural Resources

NEBRASKA GAME AND PARKS COMMISSION

Rex Amack, Director
Jim Douglas, Wildlife Division Administrator
Don Gabelhouse, Jr., Fisheries Division Administrator
Alicia Hardin, Assistant Wildlife Division Administrator
Jeff Hoffman, Wildlife Division
Richard Holland, Assistant Fisheries Division Administrator
Caleb Huber, Fisheries Division
Keith Hurley, Fisheries Division
Keith Koupal, Fisheries Division
Kirk Nelson, Assistant Director
Steve Riley, Assistant Wildlife Division Administrator
Dean Rosenthal, Assistant Fisheries Division Administrator
Rick Schneider, Natural Heritage Program
Scott Taylor, Assistant Wildlife Division Administrator
Dave Tunink, Assistant Fisheries Division Administrator
Sam Wilson, Wildlife Division
Gene Zuerlein, Assistant Fisheries Division Administrator

FEDERAL AGENCIES

NOAA Great Lakes Environmental Research
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service, Boyer Chute National Wildlife Refuge
U.S. Fish and Wildlife Service, DeSoto National Wildlife Refuge
U.S. Fish and Wildlife Service, Ecological Services, Nebraska Field Office
U.S. Fish and Wildlife Service, Fort Niobrara–Valentine National Wildlife Refuge
U.S. National Park Service / Great Plains Cooperative Ecosystems Studies Unit
USDA Animal and Plant Health Inspection Service (APHIS)
USDA Forest Service, Rocky Mountain Research Station
USDA National Resource Conservation Service (NRCS)

STATE AGENCIES

Nebraska Department of Agriculture, Noxious Weed Program
Texas Parks and Wildlife Department
The Nebraska Environmental Trust

PRIVATE SECTOR COOPERATORS

Aquatic Consultants, Inc.
In-Fisherman, Inc.
The Nature Conservancy
Turner Foundation

OTHER FACULTY COOPERATORS

John Dettmers, Great Lakes Fishery Commission and University of Illinois at Urbana–Champaign
Lance Gunderson, Department of Environmental Studies, Emory University
C. S. Holling, Department of Zoology, University of Florida
Mac Horton, Department of Entomology, Clemson University
Wayne Hubert, USGS–Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming
Wayne Landis, Institute of Environmental Toxicology, Huxley College of the Environment, Western Washington University
Steve Lockmann, Department of Aquaculture and Fisheries, University of Arkansas at Pine Bluff
Pablo Marquet, Departamento de Ecología, Universidad Católica de Chile, Santiago, Chile
John McCarty, Department of Biology, University of Nebraska Omaha
Garry Peterson, School of the Environment and the Department of Geography, McGill University, Montreal, Canada
Reynaldo Patiño, USGS–Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University
Jan Sendzimir, International Institute for Applied Systems Analysis, Austria
Richard Strauss, Department of Biology, Texas Tech University
Joan Walker, USDA Forest Service, Clemson University
Gene Wilde, Department of Biology, Texas Tech University
L. LaReesa Wolfenbarger, Department of Biology, University of Nebraska Omaha

Milestones

► STUDENTS

—Donald Wardwell was the unit's first student to earn a graduate degree: a M.S. in Natural Resources Sciences on December 16, 2006 from the University of Nebraska–Lincoln. Don took a position with the Bureau of Land Management, Roseburg, Oregon, District Office.

—The unit now has over ten active graduate students.

► GRANTS

—Unit scientists secured nearly two million dollars in external research funds.

► PUBLICATIONS

—The unit generated the first peer-reviewed publications that were focused on Nebraska research.

—The unit's first graduate student manuscript was printed in the *Journal of Wildlife Management*.

Projects in Fishery Science

IMPACT OF WHITE PERCH ON WALLEYE AT BRANCHED OAK AND PAWNEE RESERVOIRS

Principal Investigator:	Kevin L. Pope
Graduate Student(s):	Nathan Gosch, M.S.
Project Duration:	January 2006 – December 2008
Funding:	U.S. Geological Survey (RWO 4)
Project Location:	Branched Oak Lake (Lancaster County) and Pawnee Lake (Lancaster County), Nebraska

Habitat alterations and accidental introduction of white perch into Branched Oak Lake have shifted the fish community from one dominated by littoral (near-shore) species (e.g., largemouth bass and bluegill) to one dominated by pelagic (open-water) species (e.g., white perch and gizzard shad). Along with the change in the fish community, angler trips to Branched Oak Reservoir have declined by 85% over the last two decades. Further, the white perch population has become stunted (high density of slow growing individuals that mature at a small size). Like Branched Oak Lake, Pawnee Lake historically supported an active and diverse fishery, and has experienced similar habitat alterations and accidental introduction of white perch. However, unlike Branched Oak Lake, stunting has not yet occurred for the white perch population in Pawnee Lake. This provides an opportunity to examine white perch interactions with other fishes in two similar Nebraska water bodies at different white perch population stages (i.e., stunted and non-stunted). This project will help document potential competition bottlenecks that exist between white perch and other fish species of importance in the hopes of developing a management program to eliminate the stunted status for the white perch population in Branched Oak Lake and to prevent stunting of the white perch population in Pawnee Lake.

Food habits and diet-overlap among white perch, crappie, walleye, white bass, and channel catfish are currently being evaluated. Stomach content samples collected in 2006 from potential white perch predators have been analyzed and data are being synthesized. Stable isotope analysis of stomach contents is being conducted to confirm results. The second field season which runs March through November, 2007, is nearly complete.

PREDATORS OF WHITE PERCH AT BRANCHED OAK AND PAWNEE RESERVOIRS

Principal Investigator:	Kevin L. Pope
Graduate Student(s):	Nathan Gosch, M.S.
Project Duration:	January 2006 – December 2008
Funding:	Nebraska Game and Parks Commission
Project Location:	Branched Oak Lake (Lancaster County) and Pawnee Lake (Lancaster County), Nebraska

Sedimentation and erosion have significantly altered the habitat of Branched Oak Lake, resulting in loss of usable littoral habitat and a predominance of turbid open-water areas. This loss of critical near-shore habitat, coupled with the introduction of the white perch, has changed the population dynamics within the fish community. White perch numbers have increased precipitously over the last decade resulting in a stunted white perch population in Branched Oak Lake. It has been hypothesized that the unchecked white perch population is severely limiting recruitment of sportfishes such as walleye. Control is thus needed for this stunted white perch population. Chemical renovation of Branched Oak Lake has been considered; however, logistical difficulties have precluded this action. Work is currently underway to assess the feasibility of biological control of white perch via predation.

The purpose of this project is to quantify food habits of adult white crappie, walleye, channel catfish, flathead catfish, hybrid striped bass and white bass to determine which, if any, of these fishes prey on white perch. Like Branched Oak Lake, Pawnee Lake historically supported an active and diverse fishery, and has experienced similar habitat alterations and accidental introduction of white perch. However, unlike Branched Oak Lake, the Pawnee Lake white perch population has not yet stunted. Thus, an opportunity exists to document predators of white perch in populations with two different size structures, allowing for predictions of likely changes in food habits of predators with purposeful changes in the targeted prey (white perch) population. This project will provide information about food habits of predatory fishes that could allow for refinement of the current management program for stunted white perch populations in Nebraska reservoirs.

RECRUITMENT OF WALLEYE AND WHITE BASS IN IRRIGATION RESERVOIRS

Principal Investigator: Kevin L. Pope

Graduate Student(s): Christopher Lewis, Ph.D.
Dustin Martin, M.S.

Project Duration: September 2006 – August 2011

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], Medicine Creek [Harry D. Strunk], and Harlan County) were built primarily for flood control and irrigation, resulting in large water-level fluctuations within and between 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 of low natural reproduction and recruitment of young. 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 Enders, Medicine Creek, Red Willow, and Swanson 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.

Last fall (2006), thirty walleye and thirty white bass from both Enders and Red Willow Reservoirs were implanted with acoustic transmitters. Fish movements were tracked this spring to identify spawning habits. Adult walleye and white bass were also sampled with spring electrofishing to determine habitat use during peak spawning. Larval fish sampling was completed this spring at Enders, Medicine Creek, Red Willow, and Swanson Reservoirs. Juvenile walleye and white bass sampling were completed this fall. Walleye and white bass were collected during the Nebraska Game and Parks standardized fall gill-net surveys. These fish were measured, weighed, and aged. This fall, an additional thirty walleye and thirty white bass were implanted with transmitters to facilitate tracking during next year's spawning season. Next spring, sampling will be concentrated heavily on Enders and Red Willow Reservoirs to gain a more complete picture of spawning and recruitment dynamics in these two reservoirs.

Projects in Wildlife Science

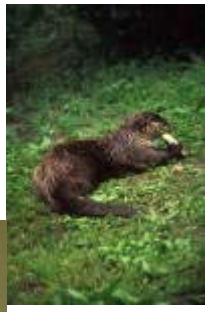
Purple Loosestrife

Phragmites

Invasive Species

Leafy Spurge

Salt Cedar



AMPHIBIAN MONITORING TECHNIQUES (IN RELATION TO WETLAND QUALITIES AND THE SURROUNDING LANDSCAPE – RAINWATER BASIN REGION)

Principal Investigator: Craig R. Allen

Graduate Student(s): Aaron Lotz, Ph.D.

Project Duration: January 1, 2005 – September 30, 2006

Funding: Nebraska Game and Parks Commission

Project Location: Rainwater Basin, Nebraska

This pilot program focused on the spatial distribution of wetlands in Nebraska's Rainwater Basin landscape. Areas of south-central Nebraska, heavy influenced by human activity, were selected as study sites for monitoring amphibian populations in an effort to detect changes in amphibian presence in these sites.

The data is providing inferential insight into changes in the presence (or absence) of individual species of amphibians, and in their community composition. Data collections reflect responses to restoration activities and anthropogenic land use and land cover changes, as well as relationships to existing wetland-patch network characteristics, adjacent upland land use and land cover, and environmental contaminants originating as runoff from farm lands. Results will guide management activities in this region and serve as a model for other areas. Data collected will be provided to the national monitoring program as well. In addition, we assessed biases associated with amphibian call surveys and utilized methods to account for differences in detectability inherent in call survey techniques.

A manuscript was published in the February 2007 issue of the *Journal of Wildlife Management*, "Observer Bias in Anuran Call Surveys." GIS spatial analysis continues.

ASSESSING LOCAL AND REGIONAL VARIABILITY IN PRODUCTIVITY AND FIDELITY OF GRASSLAND BIRDS ON NATIONAL PARK SERVICE UNITS IN THE GREAT PLAINS

Principal Investigator: Larkin Powell, Craig R. Allen

Graduate Student(s): TBA

Project Duration: June 1, 2007 – September 30, 2010

Funding: U.S. Geological Survey and the National Parks Service (RWO 2)

Project Location: Kansas, Minnesota, Nebraska

National Park Service (NPS) units in the Great Plains are a source of breeding habitats for many grassland birds. But the value of the NPS units to regional songbird production is unknown. To understand if management practices in NPS grasslands are effective for songbird production, or if the size of NPS units is adequate for providing the necessary habitat, nest survival needs to be documented—a prohibitively labor-intensive and expensive process when conducted on a regional scale. Park managers need lower-cost data for informed decision-making.

The project will use unique methods—stable isotope analyses of avian tissues—to evaluate variability in productivity and 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. Stable isotope analyses may allow biologists to efficiently gauge the importance of grassland habitat patches to regional productivity. In forested habitats, analyses of the variability in isotope values inferred that second-year ovenbirds (*Seiurus aurocapillus*) had lower fidelity to a study area than older individuals. This project will evaluate whether stable isotope analyses can be extended to breeding grassland birds and will target two species of grassland birds, dickcissel (*Spiza americana*) and meadowlarks (eastern [*Sturnella magna*] or western [*Sturnella neglecta*]), which are common in the study parks.

Upon completion, NPS managers will receive a habitat-quality assessment for breeding grassland birds at the three study areas, as well as our assessment of stable isotope techniques.

CROSS SCALE STRUCTURE AND SCALE BREAKS IN COMPLEX SYSTEMS

Principal Investigator:	Craig R. Allen
Graduate Student(s):	Aaron Lotz, Ph.D. Donald Wardwell, M.S. (2006)
Project Duration:	July 1, 2004 – January 1, 2007
Funding:	James S. McDonnell Foundation
Project Location:	University of Nebraska–Lincoln, Clemson University

This research was motivated by the discovery of regular patterns of deviation from scaling laws and the continuous distributions of attributes of complex systems. This suggests that systems organize over discrete ranges of scale, and that organization abruptly shifts with changes in scale. If this is so, scaling laws serve only as the baseline from which to measure those departures, and those departures indicate "scale breaks" (transitions) between scales of structure in complex systems. Patterns of scale breaks from a scaling law baseline may provide clues to the processes that lead to the emergence of the scaling relationships themselves. At the minimum, investigating departures from scaling laws give us a clue into the nature of the structure and process of the system in question. These investigations also help us understand and perhaps predict phenomena that have puzzled ecologists and other scientists, such as the generation of biological diversity and the emergence of phenomena such as resilience.

Scale breaks 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. Recently, it has been demonstrated that the body masses of endangered and invasive species in a community occur at the edges of body mass aggregations two to four times as often as expected by chance. That correlation is consistent in all data sets examined so far. Those include four different taxa in two different ecosystems. It may seem surprising that both invasive and declining species are located at the edge of body-mass aggregations. These results suggest that something similar must be shared by the two extreme biological conditions represented by invasive species and declining species. An examination of the phenomena of nomadism in birds in an Australian Mediterranean climate ecosystem found that nomadic birds also cluster about scale breaks (occur at the edge of body mass aggregations). The clustering of these phenomena at predictable scale breaks suggests that variability in resource distribution or availability is greatest at these states. 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.

This project is specifically investigating cross-scale structure and its implications in ecosystems. Currently data collection and organization are nearly complete in preparation for analyses.

EVALUATION OF THE NEBRASKA LANDOWNER INCENTIVES PROGRAM FOR SPECIES AT RISK

Principal Investigator: Craig R. Allen

Graduate Student(s): Elizabeth Forbus, M.S.

Project Duration: September 7, 2004 – December 31, 2007

Funding: Nebraska Game and Parks Commission
U. S. Geological Survey (RWO1)

Project Location: Southeastern Nebraska

The Nebraska Landowner Incentive Programs assists landowners with invasive tree removal. Landowners benefit from increased forage on pasturelands and restorations of prairie plants and wildlife, and management practices that sustain prairie and grassland communities.

The size of the Landowner Incentive Programs (LIP) and partnerships in terms of funding, cooperation and stakeholder involvement requires an assessment of program success. Such an assessment should be an adaptive process that will continue throughout the implementation of the program. This research project is assessing the response of species at risk. Assessment has focused on elements that are likely to respond rapidly, such as vegetation structure (which are directly manipulated in the LIP), insect communities (which have short generation times), and bird communities (which respond to vegetative structure). Other programs and management activities identical to LIP activities (e.g., invasive tree removal is supported by LIP programs and also occurs on many state and federally managed properties) may be utilized to assess the success of the LIP programs.

In 2005, pretreatment, base-line data were collected and followed by the removal of invasive trees such as red cedar. This data included assessment of vegetation using the Floristic Quality Index, and estimation of bird densities. Herpetofauna data was collected using coverboards, but was sparse and discontinued for 2006. The second season of data, collected in 2006, focused on bird response to the altered prairie conditions. The third (2007) and final season of field work included analyses of how landscape context influenced avian response to tree removal. Post-treatment vegetation data were collected this summer by Nebraska Game and Parks Commission staff and will be incorporated into further analysis with bird and tree densities.

Grassland and non-grassland bird densities have been analyzed for changes over the three-year study, as well as changes in vegetation structure, content, and native quality. Landowners were notified of the changes in bird species and populations resulting from tree removal on their property. Predictive models were built using this data as well as environmental assessments such as patch size, edge effects, and surrounding land use. The results are currently being written into a Masters thesis and will be presented in a defense at the end of the fall 2007 semester.

MONITORING, MAPPING AND RISK ASSESSMENT FOR NON-INDIGENOUS INVASIVE SPECIES IN NEBRASKA

Principal Investigator:	Craig R. Allen and Jim Merchant; Chris Kelly and Annabel Major, Program Coordinators
Graduate Student(s):	Justin Williams, M.S.
Project Duration:	May 4, 2006 – December 31, 2008
Funding:	Nebraska Environmental Trust
Project Location:	Statewide, Nebraska

Biological invasions are a growing threat to both human enterprise and ecological systems. This project provides resources to the public and private sector on 1) the potential spread and impact of non-indigenous species in Nebraska, 2) actual and potential maps of non-indigenous species range (habitat specific maps at high resolution), 3) information regarding identification and management of potential invaders, 4) centralized information on management and impacts and potential spread of currently established non-indigenous species (a Web portal), 5) outreach within Nebraska to county-level governments and individual stakeholders regarding the management, surveillance and control of non-indigenous species, and 6) an organizational and informational Nebraska conference on non-indigenous species impacts—their spread and management—focusing on state-of-our-knowledge, and coordination of disparate management and information-provisioning efforts with a goal towards unifying disparate efforts.

A Web site has been developed: http://calmit.unl.edu/invasives/. The site is a centralized clearinghouse on identification, management, impact and potential spread of currently and potentially established non-indigenous species. Plans are on course for hosting an invasive species conference February 7 – 8, 2008 in Lincoln, Nebraska.

Research is moving forward to determine the invasion and distribution potential of non-native plant species in Nebraska. First, existing data from scientific collections, agency reports, and solicited expert opinion will be combined to rank the risk of potentially invasive species. Using the I-Rank risk assessment framework, a qualitative species assessment will be developed to rank invasion threat or impact of non-native species. Second, a subset of species will be selected to predict their potential geographic range in Nebraska. Classification trees will be used to model the species' potential range using species occurrence data and environmental predictive variables. Together, these two research components will yield information about which species pose the greatest invasion risk and where in Nebraska they are likely to occur.

THE RELATIONSHIP BETWEEN DIVERSITY AND ECOLOGICAL FUNCTIONS

Principal Investigator:	Craig R. Allen, Chris Helzer, LaReesa Wolfenbarger
Graduate Student(s):	Kristine Nemec, Ph.D. Lindsey Reinarz, M.S. (University of Nebraska Omaha)
Project Duration:	July 1, 2005 – June 30, 2010
Funding:	James S. McDonnell Foundation Nebraska Game and Parks Commission
Project Location:	Platte River Valley, Nebraska

The relationship between restoration diversity and ecological functions (e.g. pollination, soil development, resistance to invasion and herbivore control) remains poorly understood. Ecological functions, goods and services include such factors as pollination of native and crop plants, control of herbivore populations, resistance to biological invasion, production of soils, production of biodiversity, etc. Invasion by aggressive plant species, erosion of diversity over time, and failure to withstand drought or other disturbances are all possible results of unsuccessful restoration efforts.

Because restoration of grasslands is an important on-going management activity on many public lands in Nebraska, we are 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. We have identified existing high diversity restorations and low diversity remnant grasslands (pastures) as large scale study sites (~100 acre). We also established twenty-four 0.75-acre plots which are planted to six replicates each of four treatments: high diversity sites of ~100 species, high diversity sites at twice the normal seeding rates (to be similar with NRCS practices), and CP25 sites (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.

Initial results from 2006 data show lower abundances of bull thistle and sweet clover in high diversity plots compared to low diversity plots. Populations of economically-significant grasshoppers and predatory invertebrates were sampled from June through August 2007. Data collections for soil development, nematodes, and invasion resistance were started in 2006 and repeated in 2007. Large scale sites are currently being used to investigate differences in herbivory, and 2006 data indicate that herbivory rates are lower on high diversity sites.

RESILIENCE IN ECOSYSTEMS

Principal Investigator: Craig R. Allen

Graduate Student(s): Donald Wardwell, M.S. (2006)

Project Duration: July 1, 2004 – January 1, 2007

Funding: James S. McDonnell Foundation

Project Location: Lancaster County, Nebraska

Discontinuous structure in landscapes may result in discontinuous, aggregated species body mass patterns, reflecting the scales of structure available to animal communities within a landscape. Ecological resilience may be generated, in part, in the discontinuous structure of complex systems. One prediction following from this model is that birds of different body size respond differently to resources as they "scale up" and aggregate in larger concentrations. An example of this occurs with pest outbreaks—when larger volumes of trees are infested with insects such as spruce budworm, larger bird species begin to exploit the pest, and are drawn from broader areas to do so. This provides a robust check on outbreaks over a broad range of spatial and temporal scales.

To evaluate this cross-scale resilience model, we conducted both experimental field tests and simulations of empirical data. Field research measured the difference in spatial response of birds having different body size to resources aggregated at different levels in row crop agricultural fields. Variance in the richness of functional groups across scales was significantly lower in real communities than in simulations. Field tests demonstrated that birds of the same functional group forage at larger scales as their body masses increased. The results of these analyses support the contentions of the cross-scale resilience model.

The edges of these body mass aggregations reflect transitions between available scales of landscape structure. Such transitions, or scale breaks, are theoretically associated with increased biological variability. By examining the effects of proximity to discontinuities on variability in population abundance and ecological specialization in birds, population abundance was determined to be significantly more variable with increasing proximity to the edges of body mass aggregations. Diet and habitat generalists were found to be more likely species of greater body masses than specialists, and that proximity to discontinuity is an important determinant of ecological specialization.

RIVER OTTER HOME RANGE AND HABITAT USE PILOT STUDY

Principal Investigator: Craig R. Allen

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

Project Duration: May 1, 2006 – December 31, 2007

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 (S2). 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 (NGPC) 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 plan to capture and radio-tag approximately ten northern river otters on and near the Platte River, a core component of the species' distribution in Nebraska. During the approximately one year long monitoring portion of the pilot project, we will collect data on daily and seasonal movements, home range, habitat use, survival, response to hydrological changes in the Platte, and relationship to abundance data from bridge surveys. These data, in conjunction with the results of the recently completed river otter health and reproductive survey and results from NGPC's annual otter bridge survey, will help to close existing information gaps and contribute to the creation of the Nebraska River Otter Management Plan and the Statewide Comprehensive Conservation Plan.

As of late December, 2006, five river otters had been captured and implanted with motion and mortality sensing transmitters. Tracking of the five river otters continues. The two females set up natal dens this spring and are presently moving about again. We documented one female feeding her two young and believe the second female may have young with her as well. One elusive male river otter was tracked about eighty miles downstream. Ten more river otters will be trapped and implanted this fall.

SPATIAL RISK ASSESSMENT OF INVASIVE SPECIES IMPACTS ON NATIVE SPECIES IN NEBRASKA

Principal Investigator:	Craig R. Allen and Jim Merchant
Graduate Student(s):	Thad Miller, M.S.
Project Duration:	August 31, 2005 – December 31, 2008
Funding:	Nebraska Game and Parks Commission U. S. Geological Survey (RWO 5)
Project Location:	Statewide, Nebraska

This project conducts spatially-based risk analyses for species and communities identified as at-risk. The project focuses on assessing the potential risk to native Nebraska species from invasive non-native species. It will also conduct community-level risk assessments to evaluate the risk faced by those communities identified as "at-risk" by the Nebraska Game and Parks Commission Legacy Project. Modeling of both stressors and targets will be based on species-habitat associations with the use of relevant auxiliary data, as per Gap Analysis protocols. Several different GIS land covers are available for the State of Nebraska and we will likely have to make use of several of them, as all have different strengths and weaknesses. Where possible, we will utilize the methods described in Allen et al. (2001) to incorporate minimum viable population modeling based on minimum critical areas for vertebrate models. Products will include spatial models of stressors and targets, models of spatial overlap, hazard indices, and relative risk indices for each target. Stressors (invasive species on the Nebraska Watch List) and targets have been identified and modeling is currently underway.

Where possible, the project incorporated the methodologies and terminology of a regional risk assessment using the relative risks model. Nebraska invasive species were selected from the Nebraska Weed Control Association watch list. The nine species selected were evaluated by the NatureServe invasive species ranking system and given an I-rank of "High." The rare and endangered species selected are from the Nebraska Natural Legacy Project "Tier I" list and have a state rank of 1 or 2 and a global rank of 1, 2, or 3. This resulted in a list of nine rare and endangered species. A manuscript is being developed and should be complete this winter.

UNDERSTANDING INVASIONS AND EXTINCTIONS

Principal Investigator: Craig R. Allen

Graduate Student(s): Aaron Lotz, Ph.D.

Project Duration: August 31, 2005 – December 31, 2008

Funding: U.S. Geological Survey (RWO 3)

Project Location: Lincoln, Nebraska

Mediterranean-climate regions support large human populations resulting in extensive and, outside the Mediterranean Basin proper, rapid, anthropogenic transformation. 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. This empirical analysis of global Mediterranean-climate ecosystems will 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.

Data sets were developed from published literature and by communications with scientists in five countries. Analysis is complete and a report is in final revision.

Other Research Projects

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

An Adaptive Management Approach for Selecting Habitat Improvement Targets in the Shortgrass Prairie Ecosystem. Andrew Tyre (PI), Craig Allen, Mike Fritz and Scott Taylor; post-doc, Naikoa Aguilar-Amuchastegui. September 1, 2006 – August 31, 2007. U.S. Fish and Wildlife Service and Nebraska Game and Parks Commission.

> The project focus is to develop some of the models needed for an adaptive resource management approach to managing the shortgrass prairie ecosystem, and to outline how they could be applied to one important management decision: the selection of land for conservation incentive programs. For the past year, the research team has worked to develop a resource management tool that could predict the quality of restoration activities in order to help direct limited restoration dollars to sites that will yield the most gain.

Individual-Based Models to Predict the Spread of Chronic Wasting Disease in Nebraska. Scott Hygnstrom (PI). September 28, 2007 – September 28, 2008. U.S. Geological Survey (Research Work Order 8).

> This final phase of research on Chronic Wasting Disease (CWD) will complete parameter estimation and develop individual-based models to predict the spread of CWD in Nebraska. This research in Nebraska is unique because it is evaluating the role of sympatric mule deer and white-tailed deer in the spread of CWD. Results will be used to develop strategies to control the spread of CWD in North America. The 2007-08 objectives—relative to mule deer and white-tailed deer in riparian areas across Nebraska—will determine the overlap of utilization distributions by species; evaluate resource selection by species, sex, and age classes; and estimate the extent and rate of spread of CWD.

Multi-Criteria Assessment of Habitat Restoration for the Missouri River. John Stansbury (PI), Istvan Bogardi. August 20, 2007 – August 20, 2009. U.S. Geological Survey and U.S. Army Corps of Engineers. (Research Work Order 7).

> This project is focused on restoration of habitat for three endangered or threatened species: pallid sturgeon, least tern, and piping plover. Management and restoration of the Missouri River is a complex endeavor that affects many people with many and often conflicting priorities. For example, habitat restoration activities for one species may interfere with habitat needs for another species. The primary objective of this project is to develop a multi-criteria assessment tool that can be used to assess the overall status and progress of the habitat restoration efforts on the Missouri River (or portions of the river) to help the U.S. Army Corps of Engineers and cooperators assess the status and the progress of the habitat restoration program. Secondary objectives are to determine the indicators needed to make an overall assessment of the habitat and to develop methods to collect and measure those indicators.

Productivity and Biology of Ducks Nesting in the Sandhills of Nebraska. Larkin Powell (PI). January 1, 2007 – August 31, 2009. Nebraska Game and Parks Commission.

While the grasslands in the Nebraska Sandhills do not appear to be at high risk of conversion to cropland, the potential risk does exist. In addition, the wetlands and soils of the Sandhills face other threats such as sale of groundwater to high-demand areas. Potential developers need information to help assess the inherent risks to the wildlife populations that depend on this unique landscape for survival. This project will evaluate the importance of Sandhills wetlands to duck populations. The study intends to 1) design and develop an annual, repeatable brood survey for estimating relative production across the Sandhills; 2) conduct the brood survey for two years and refine survey and analysis methods; 3) examine female age ratios of ducks nesting in the Sandhills; 4) examine patterns of recaptured male mallards south of Bassett, Nebraska; and 5) determine the origin of females nesting in the Sandhills via feather stable isotopes (depending on additional funding).

Total Vegetation Control on Sandbars along the Missouri River Utilizing Lime and Herbicides. Stevan Knezevic (PI), Charlie Shapiro, Tom Hunt and Mark Bernards. June 1, 2007 – December 31, 2009. U.S. Geological Survey and U.S. Army Corps of Engineers (Research Work Order 6).

In an effort to increase suitable nesting habitat for piping plovers (*Charadrius melodus*) and Interior least terns (*Sterna antillarum*), sandbars are being constructed in the backwaters of Lewis and Clark Lake along the Missouri River. However, vegetative encroachment usually renders these sandbars unsuitable for nesting habitat within three to five years. Consequently, it is important to identify practices that will maintain the sandbars free of vegetation in the absence of scouring flows. This project will study the effects of liming and the use of the herbicide imazapyr as tools for long-term vegetation control on both existing and newly-created sandbars in an effort to maintain suitable habitat for piping plovers and least terns in the back waters of Lewis and Clark Lake.

Professional Activities

TEACHING

CRAIG ALLEN

Spring 2007:
Natural Resources (NRES) 896, Landscape Ecology

The course focused on the investigation of spatial heterogeneity and pattern: how to characterize patterns, how they develop and change through time, and its implications for populations, communities, and ecosystem processes. It explored both theoretical and applied aspects of landscape ecology. Additionally, students developed and completed a project which focused on some aspect of landscape ecology and employed methods of spatial analysis. Upon completing this course, students had knowledge of a number of prominent issues in landscape ecology.

KEVIN POPE

Spring 2007:
Natural Resources (NRES) 896, Managed Aquatic Ecosystems
(team-taught with Mark Pegg, UNL)

Anthropogenic disturbances are commonplace in the inland waters of developed and developing countries. 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. Topics covered include river continuum concept, Thorton's reservoir continuum model, nutrient cycling, population dynamics, biotic interactions and river-reservoir interfaces. 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.

TRAINING AND WORKSHOPS

CRAIG ALLEN

- Instructor/coordinator, Workshop on Invasions and Resilience, and Synthesis of Community Ecology with Hierarchy Theory, Stockholm University, Sweden, October, 2006

KEVIN POPE

- Co-instructor, Motorboat Operator Certification Course, Stillwater, Oklahoma, March 2007
- Instructor, Motorboat Operator Certification Course, Lincoln, Nebraska, September 2007

PEER-REVIEWED PUBLICATIONS

Allen, C. R. 2006. Discontinuities in ecological data. Proceedings of the National Academy of Sciences, USA 103: 6083-6084.

Allen, C. R. 2006. Predictors of introduction success in the South Florida avifauna. Biological Invasions 8:491-500.

Allen, C. R. 2006. Sprawl and the resilience of humans and nature: an introduction to the special feature. Ecology and Society 11 (1): 36. Online: http://www.ecologyandsociety.org/vol11/iss1/art36/

Allen, C. R., A. Garmestani, T. Havlicek, P. Marquet, G. D. Peterson, C. Restrepo, C. Stow, and B. Weeks. 2006. Patterns in body mass distributions: sifting among alternative competing hypotheses. Ecology Letters 9: 630-643.

Allen, C. R., Garmestani, A., LaBram, J., Peck, A., and L. Provost. 2006. When landscaping goes bad: the incipient invasion of *Mahonia bealei* in the Southeastern United States. Biological Invasions 8:169-176.

Allen, C. R. and C. S. Holling. 2008. Cross-scale structure and the generation of innovation and novelty in discontinuous complex systems. Chapter 12 in Allen, C. R. and C. S. Holling, eds. Discontinuity Theory in Ecosystems and other Complex Systems. University of Columbia Press, New York, NY.

Allen, C. R., and C. S. Holling, Editors. 2008. Discontinuity Theory in Ecosystems and other Complex Systems. University of Columbia Press, New York, NY.

Allen, C. R., A. R. Johnson, and L. Parris. 2006. A framework for spatial risk assessments: potential impacts of nonindigenous invasive species on native species. Ecology and Society 11 (1): 39. Online: http://www.ecologyandsociety.org/vol11/iss1/art39/

Allen, C. R., and D. A. Saunders. 2006. Multi-model inference and the understanding of complexity, discontinuity and nomadism. Ecosystems 9: 694-699.

Chizinski, C. J., C. L. Higgins, C. E. Shavlik, and K. L. Pope. 2006. Multiple hypotheses testing of fish incidence patterns in an urbanized ecosystem. Aquatic Ecology 40:97-109.

Chizinski, C. J., C. G. Huber, M. Langoria, and K. L. Pope. 2007. Intraspecific resource partitioning by an opportunistic strategist, inland silverside *Menidia beryllina*. Journal of Applied Ichthyology 23:147-151. Online: doi:10.1111/j.1439-0426.2006.00811.x

Chizinski, C. J., C. G. Huber, and K. L. Pope. In press. Development and validation of a bioenergetics model for inland silverside in freshwater systems. Transactions of the American Fisheries Society.

Durham, B. W., G. R. Wilde, and K. L. Pope. 2006. Temperature-caused fish kill in a flowing Great Plains river. The Southwestern Naturalist 51:397-401.

Garmestani, A. S., C. R. Allen, and K. M. Bessey. 2008. Discontinuities in urban systems: comparison of regional structure in the United States. Chapter 6 in Allen, C. R. and C. S. Holling, eds. Discontinuity Theory in Ecosystems and other Complex Systems. University of Columbia Press, New York, NY.

Garmestani, A. S., C. R. Allen, and C. M. Gallagher. In press. Power laws, discontinuities and regional city size distributions. Journal of Economic Behavior and Organization.

Garmestani, A. S., C. R. Allen, C. M. Gallagher and J. D. Mittelstaedt. 2007. Departures from Gibrat's law, discontinuities and city size distributions. Urban Studies 44:1997-2007.

Garmestani, A. S., C. R. Allen, J. D. Mittelstaedt, C. A. Stow, and W. A. Ward. 2006. Firm size diversity, functional richness and resilience. Environment and Development Economics 11: 533-551.

Gunderson, L., C. R. Allen, and D. Wardwell. 2007. Temporal scaling in complex systems: resonant frequencies and biotic variability. Pages 78-89 in Bissonette, J. A., and I. Storch, eds. Temporal dimensions in landscape ecology: wildlife responses to variable resources. Springer.

Holling, C. S., C. R. Allen, and G. D. Peterson. 2008. Panarchies and discontinuities. Chapter 1 in Allen, C. R. and C. S. Holling, eds. Discontinuity Theory in Ecosystems and other Complex Systems. University of Columbia Press, New York, NY.

LaBram, J. A., A. E. Peck, and C. R. Allen. In press. Monitoring-based Assessment of Gap Analysis models. Southeastern Naturalist.

Lotz, A., and C. R. Allen. 2007. Observer bias in anuran call surveys. Journal of Wildlife Management 71:675-679.

Pope, K. L., D. R. Blankinship, M. Fisher, and R. Patiño. 2006. Status of the common snook (Centropomus undecimalis) in Texas. Texas Journal of Science 58:325-332.

Pope, K. L., and C. G. Kruse. 2007. Condition. Pages 423-471 in M. L. Brown and C. S. Guy, eds. Analysis and interpretation of freshwater fisheries data. American Fisheries Society, Bethesda, Maryland.

Pope, K. L., G. R. Wilde, and D. W. Knabe. 2007. Effect of catch-and-release angling on growth and survival of rainbow trout, Oncorhynchus mykiss (Walbaum). Fisheries Management and Ecology 14:115-121.

Stow, C. A., C. R. Allen, and A. S. Garmestani. 2007. Evaluating discontinuities in complex systems: toward quantitative measures of resilience. Ecology and Society 12(1): 26. Online: http://www.ecologyandsociety.org/vol12/iss1/art26/

Weeks, K. F., J. L. Walker, and C. R. Allen. 2006. Chattahoochee National Recreation Area rare species survey – 2004. Final Report to the National Park Service, Award # 1434-HQ-97-RU-1569.

PRESENTATIONS AT SCIENTIFIC MEETINGS

Allen, C. R. Cross-scale structure and the generation of resilience and novelty in complex discontinuous systems. Percy Fitzpatrick Ornithological Institute, University of Cape Town. Cape Town, South Africa. July, 2007. (invited presentation)

Allen, C. R. Monitoring for invasive species. Governor's Conference on Invasive Species, Lincoln, Nebraska. March, 2007. (invited presentation)

Chizinski, C. J., and K. L. Pope. Latitudinal variation of life-history traits in Centrarchidae. 67th Annual Meeting, Midwest Fish and Wildlife Conference, Omaha, Nebraska (poster presentation). December, 2006.

Chizinski, C. J., and K. L. Pope. Life-history traits of white perch in stunted and non-stunted populations. 67th Annual Meeting, Midwest Fish and Wildlife Conference, Omaha, Nebraska (poster presentation). December, 2006

Chizinski, C. J., K. L. Pope, and G. R. Wilde. Latitudinal variation of life-history traits in Centrarchidae. 15th Annual Meeting, Southern Division, American Fisheries Society, Memphis, Tennessee (poster presentation). February, 2007.

Gosch, N. J. C., and K. L. Pope. Seasonal trends in empty stomachs. Annual Meeting, Nebraska Chapter, American Fisheries Society (joint meeting with Iowa and Kansas Chapters, American Fisheries Society), Council Bluffs, Iowa (poster presentation). January, 2007.

Huber, C. G., K. L. Pope, R. Patiño and R. Blankinship. Critical habitat and early reproductive development of juvenile common snook in the lower Rio Grande. International Center for Arid and Semiarid Land Studies Conference, Lubbock, Texas (poster presentation). November, 2006.

Kolasa, J., C. R. Allen, C. Stow and J. Sendzimir. Predictions and postdictions from the hierarchical representation of habitat. Annual meeting of the Ecological Society of America. San Jose, California. August, 2007.

Lindsey T. Reinarz, L. L. Wolfenbarger, J. P. McCarty, C. R. Allen, and C. Helzer. The relationship between plant diversity and ecological function in grasslands. Annual Meeting of the Nebraska Academy of Science, Lincoln, Nebraska. April, 2007.

Sanchez, F. C., C. J. Chizinski, K. L. Pope, and R. E. Strauss. Morphological differences between green sunfish from stunted and non-stunted populations. 15th Annual Meeting, Southern Division, American Fisheries Society, Memphis, Tennessee (poster presentation). February, 2007.

Wardwell, D., and C. R. Allen. Ecological specialization in birds. 67th Midwestern Fish and Wildlife Conference, Omaha, Nebraska. December, 2006.

GRADUATE COMMITTEE SERVICE

CRAIG ALLEN

- James Eckberg (Ph.D., School of Biological Sciences, UNL)
- Robert George (Ph.D., University of Queensland, Australia—external dissertation examiner)
- Mathew Giovanni (M.S., School of Natural Resources, UNL)
- Max Post van der Burg (Ph.D., School of Natural Resources, UNL)
- Shana Sundstrom (M.S., University of Calgary, Canada)

KEVIN POPE

- Michael Archer (M.S., School of Natural Resources, UNL)
- Tony Barada (M.S., School of Natural Resources, UNL)
- Bart Durham (Ph.D., Dept. of Natural Resources Management, Texas Tech University)
- Joy Ferenbaugh (Ph.D., Department of Biology, Texas Tech University)
- Jennifer Hogue (M.S., School of Natural Resources, UNL)
- Brenda Pracheil (Ph.D., School of Natural Resources, UNL)

PROFESSIONAL AND FACULTY SERVICE

CRAIG ALLEN

- Associate Editor (Macro and Landscape Ecology), *Ecology and Society*
- Board of Directors, The Resilience Alliance (http://www.resalliance.org)
- Steering Committee, Nebraska Partnership for All-Bird Conservation
- Co-organizer, McDonnell Foundation Novelty Working Group
- Fellow, Center for Great Plains Studies and Member: Scholarship Committee
- Planning Committee, Threats to Nebraska Rivers Conference

- Invited Commentary, Proceedings of the National Academy of Sciences
- Core Team, Invasive Plants State Technical Committee, Natural Resources Conservation Service (NRCS), January 2006 –
- Associate, Center for Grassland Studies, University of Nebraska
- Program Committee co-chair, December, 2006 Midwest Fish and Wildlife Conference
- Steering Committee, December, 2006 Midwest Fish and Wildlife Conference
- Alternate committee member, Institutional Animal Care and Use Committee, UNL

KEVIN POPE

- Associate Editor, *Transactions of the American Fisheries Society*
- Book Editorial Advisory Board, American Fisheries Society
- Instructor, Conservation Leaders for Tomorrow Program (Max McGraw Foundation)

AWARDS

CHRIS LEWIS

- On May 17, 2007, Chris Lewis was awarded the title of Fellow of the School of Graduate Studies from Memorial University (Newfoundland, Canada) for his efforts during his M.S. program. This award recognizes outstanding achievement and pursuit of excellence throughout a graduate program.

VALERIE EGGER

- Administrative Assistant Valerie Egger was the recipient of the Spring 2007 Staff Recognition Award from the UNL School of Natural Resources. School Director Mark Kuzila presented the award to Valerie during the staff field trip April 25, 2007.

We extend our appreciation to the staff and students of the Nebraska Cooperative Fish and Wildlife Research Unit, and to the U.S. Fish and Wildlife Service for photographs used in this report.