Annual Report

1 March 2007-29 February 2008

Kansas Cooperative
Fish and Wildlife Research Unit

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On Cover: Photo of the Salt Fork of the Arkansas River in Barber County Kansas. The picture was taken by former MS student Jesse Fischer and was one of his field sites for his thesis research.

Preface

The Kansas Cooperative Fish and Wildlife Research Unit is jointly sponsored and financed by the U.S. Geological Survey, Kansas Department of Wildlife and Parks, Kansas State University, and the Wildlife Management Institute.

In 1960, Congress gave statutory recognition to the Cooperative Research Unit program by enactment of Public Law 86-686. The act reads:

> "To facilitate cooperation between the Federal Government, colleges and universities, the States, and private organizations for cooperative unit programs of research and education relating to fish and wildlife, and for other purposes. Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, for the purpose of developing adequate, coordinated, cooperative research and training programs for fish and wildlife resources, the Secretary of the Interior is authorized to continue to enter into cooperative agreements with colleges and universities, with game and fish departments of the several States, and with nonprofit organizations relating to cooperative research units: Provided, That Federal participation in the conduct of such cooperative unit programs shall be limited to the assignment of the Department of the Interior technical personnel by the Secretary to serve at the respective units, to supply for the use of the particular unit's operations such equipment as may be available to the Secretary for such purposes, and the payment of incidental expenses of Federal personnel and employees of cooperating agencies assigned to the units. There is authorized to be appropriated such sums as may be necessary to carry out the purposes of this Act."

The Kansas Unit opened in October 1991 at Kansas State University in Manhattan. Dr. Timothy R. Modde was appointed as the first Unit Leader. Ms. Joyce Brite was hired as support staff. In May 1992, Dr. Modde left the Unit to take a position with the Colorado River Fisheries Project, U.S. Fish and Wildlife Service, in Vernal, Utah. Dr. Michael R. Vaughan of the Virginia Cooperative Fish and Wildlife Research Unit was assigned to the Kansas Unit as Acting Unit Leader for a six-week period.

Dr. Philip S. Gipson was selected as the Unit Leader in May 1993. In 1994, Dr. Christopher S. Guy was hired as Assistant Leader-Fisheries and Dr. Jack F. Cully, Jr. was hired as Assistant Leader-Wildlife.

Dr. Guy left in August 2002 to become Assistant Leader-Fisheries at the Montana Cooperative Fisheries Unit in Bozeman. In November 2003, Dr. Craig P. Paukert joined the Kansas Unit as Assistant Leader-Fisheries.

The Unit Leader and the Assistant Unit Leaders are faculty members in the Division of Biology at Kansas State University. Graduate students associated with the Unit are part of the Division of Biology and graduate degrees are awarded through the Division. Unit staff and students often

work on partnership projects that involve specialists from the University and other cooperating groups.

During the reporting period six new projects were initiated and three were completed. Two students finished Master's degrees.

New Projects:

Landscape Genetics of Deer and the Potential Spread of CWD Across Kansas: A Pilot Study to Examine Deer Density and Hunting Pressure as Factors

Variation in small mammal community structure in tallgrass prairie ecosystems in response to disturbance from military vehicle training

Occupancy and Interspecies Relationships of River Otters in Eastern Kansas

Deer Density, Movement Patterns, and Group Dynamics on Quivira National Wildlife Refuge: Assessing Potential Risk for Disease Transmission

Recruitment of Fishes in the Kansas River

Effects of Zebra Mussels on Reservoir Aquatic Communities

Completed Projects:

Land Condition Trend Analysis on Fort Riley, 2001-2006

Effects of Anthropogenic Disturbance on the Fish Community and Food Web Structure in a Great Plains River

Master's Theses Completed:

Jeffrey L. Eitzmann. (M.S., 2008; Advisor: Paukert) Effects of anthropogenic disturbance on the fish assemblage and food web structure in a Great Plains river.

Jesse R. Fischer (M.S., 2007; Advisor: Paukert) Structural organization of Great Plains stream fish assemblages: Implications for sampling and conservation.

KANSAS COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT

Mission Statement

The agreement establishing the Kansas Cooperative Fish and Wildlife Research Unit in 1991 stated that the purpose was to... "provide for active cooperation in the advancement, organization, and conduct of fish and wildlife research, graduate education, in- service training, technical assistance, public relations, and demonstration programs" (Cooperative Agreement, Section II, Purpose). Unit research contributes to understanding ecological systems within the Great Plains. Unit staff, collaborators, and graduate students conduct research with both natural and altered systems, particularly those impacted by agriculture. Unit projects investigate ways to maintain a rich diversity of endemic wild animals and habitats while meeting the needs of people.

The Unit focuses on projects that involve graduate students, and the research needs of cooperators are given priority. Unit professionals function as faculty in the Division of Biology at Kansas State University. Unit professionals work with state and federal agencies, private industry, nongovernmental organizations, and interest groups to develop and conduct projects. Partnership projects are common where graduate and undergraduate students, and Unit staff work with multidisciplinary teams, often including other university faculty members and specialists from collaborating groups.

Personnel and Cooperators

Coordinating Committee Members

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Craig P. Paukert, Ph.D.
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Faculty Cooperators at Kansas State University

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Other University Cooperators

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Dr. Chris Ray
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University of Nebraska
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University of Washington
Dr. Julian Olden

State of Kansas

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U.S. Department of Agriculture, Agricultural Research Service
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Missouri Department of Conservation
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Tennessee Wildlife Resources
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Utah Division of Wildlife Resources
Jon Sjoberg

Manitoba Conservation and Wildlife Ecosystem Protection Branch
Robert Bruce

Private Organizations and NGOs

Great Lakes Indian Fish and Wildlife Commission
Rick Madsen

National Wildlife Federation
Dr. Sterling Miller

Rocky Mountain Elk Foundation
Tom Toman

The Watershed Institute
Chris Mammoliti
Brock Emmert
Phil Balch

Wolf Creek Nuclear Operation Corporation
Dan Haines

Turner Properties, Inc.
Dr. Carter Kruse

Graduate Students Supported by Unit Projects, 2007-present

Student and Degree Sought	Thesis Project	Previous Education	Advisor
Wes Bouska, M.S.	Impacts of road crossings on prairie stream fishes	B.S., South Dakota State University	Dr. Paukert
Jonathan Conard, Ph.D.	Elk population dynamics in the tallgrass prairie	B.S., Southwestern College M.S., Kansas State University	Dr. Gipson
*Jeff Eitzmann, M.S.	Effects of disturbance on fishes and food web structure in a Great Plains River	B.S., Kansas State University	Dr. Paukert
*Jesse Fischer, M.S.	Structural organization of Great Plains stream fish assemblages	B.S., University of Nebraska	Dr. Paukert
Joe Gerken, Ph.D.	Recruitment of fishes in the Kansas River	B.S., Miami University (Ohio) M.S., University of Central Arkansas	Dr. Paukert
Derek Moon, M.S.	Range and training lands assessment on Fort Riley	B.S., Kansas State University	Dr. Gipson
Kristen Pitts, M.S.	Assessing threats to Lower Colorado River Basin native fishes	B.S., University of Wisconsin-LaCrosse	Dr. Paukert
Josh Schloesser, M.S.	Evaluation of sampling methods and habitat use of Missouri River fishes	B.S., University of Wisconsin-Stevens Point	Dr. Paukert
Andrea Severson, M.S.	Effects of zebra mussels on reservoir aquatic communities	B.S., Utah State University	Dr. Paukert
Mackenzie Shardlow, M.S.	Status of river otters in eastern Kansas	B.S., University of Idaho	Dr. Gipson
Ron VanNimwegen, Ph.D.	Movement and habitat selection of *Onychomy leucogaster* and *Peromyscus maniculatus*	B.S., Iowa State University M.S., Iowa State University	Dr. Cully

*Student received Master's degree during reporting period.

Fisheries Projects

Structural Organization of Great Plains Stream Fish Assemblages: Implications for Sampling and Conservation

Investigators
Jesse Fischer, M.S. student
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
Turner Enterprises, Inc.

Cooperators
Kansas Department of Wildlife and Parks

Nebraska Game and Parks Commission

Objectives
Determine the increment of sampling length (10, 20, 40, and 60 MSWs) and number of reaches needed to collect precise (75, 90, and 100%) estimates of segment species richness.

Identify the physical parameters and/or community structure that best explain the variation in sampling effort among streams.

Determine the relationship of fish community structure in response to environmental variation in two regions of the Great Plains with limited disturbance

Location
Nebraska and Kansas

Completion
May 2007

Status
Completed

Progress and Results
Stream fish assemblages were investigated in Nebraska and Kansas to determine the effects of habitat and sampling methodologies on the community structure and abundance of prairie stream fishes of the Great Plains. The number of reaches (<1 km) required to estimate segment (20-30 km) species richness decreased with increased reach length (10, 20, 40, or 60 mean stream width [MSW]) whereas total sampling effort decreased with more and shorter reaches. Only after all 10 reaches was total species richness obtained with 40 to 60 MSW. A greater number of reaches was needed to detect 90% of species richness and 25% changes in relative abundance when community similarity and habitat heterogeneity was lower. Our results suggest homogenous stream segments require more reaches to characterize fish community structure and monitor trends in fish abundance and a greater number of shorter reaches may be better than fewer longer (e.g. 40 or larger MSW) reaches. Effects of local environmental influences on the structure of fish assemblages were evaluated from 159 sites in two regions of the Great Plains with limited anthropogenic disturbance. These least disturbed regions offered an opportunity to evaluate the structure and natural variation of streams and fish assemblages within the Great Plains. Similar environmental factors structured streams and fish assemblages, despite differences in environmental conditions and species composition between regions. Variance in fish assemblages was best explained by stream size and habitat features linked with stream size.

Products
Fischer, J. R., and C. P. Paukert. 2008. Historical and current environmental influences of an endemic Great Plains fish. American Midland Naturalist 159:364-377.

Fischer, J. R. 2007. Structural organization of Great Plains stream fish assemblages: implications for sampling and conservation. M.S. Thesis, Kansas State University.

Fischer, J. R., and C. P. Paukert. 2007. Spatial scale of stream fish assemblages and abundance estimates: effects of sampling effort, community structure, and habitat heterogeneity. American Fisheries Society Annual Meeting, San Francisco, CA.

Fischer, J., and C. Paukert. 2007. Sampling effort required to estimate species richness in wadeable Great Plains streams with a towed electrofishing. Kansas, Nebraska, Iowa Tri-State American Fisheries Society Meeting, Council Bluffs, IA.

Fischer, J., and C. Paukert. 2007. Historical and current environmental influences on an endemic great plains fish. Kansas, Nebraska, Iowa Tri-State American Fisheries Society Meeting, Council Bluffs, IA

Fischer, J. R., and C. P. Paukert. 2006. Environmental influences structuring Great Plains stream fish assemblages. 67th Midwest Fish and Wildlife Conference, Omaha, NE.

Fischer, J. R., and C. P. Paukert. 2006. Historical and environmental influence on an endemic Great Plains fish. 67th Midwest Fish and Wildlife Conference. Omaha, NE.

Fischer, J., and C. P. Paukert. 2006. Factors influencing lotic fish-habitat relationships in the Great Plains. American Fisheries Society Annual Meeting, Lake Placid, NY.

Fischer, J., and C. P. Paukert. Habitat use of stream fishes in South Central Kansas. Kansas State University Biology Graduate Student Research Forum, Manhattan, KS.

Fischer, J., and C. P. Paukert. 2006. Environmental influences of stream fish in the Nebraska Sandhills. Nebraska Chapter of the AFS Annual Meeting, Gretna, NE.

Brinkley, P., J. Fischer, and C. P. Paukert. 2006. Effect of fixative on total length of small-bodied stream fish. 31st Kansas Chapter of the American Fisheries Society Annual Meeting, Hays, KS.

Fischer, J., and C. P. Paukert. 2006. Fish habitat relationships in South Central Kansas. 31st Kansas Chapter of the American Fisheries Society Annual Meeting, Hays, KS.

High Water Habitat: Fish Populations in Two Kansas River Backwaters

Investigators
Andrea Severson, REU student
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
National Science Foundation
Kansas State University

Objectives
Determine of flooded backwaters are used by mainchannel fishes

Determine if growth differs among mainchannel and backwater fishes

Location
Kansas River in eastern Kansas

Completion
August 2007

Status
Completed

Progress and Results
The Flood Pulse Concept states that flooding in large rivers may benefit fishes by providing spawning and nursery habitats as well as increased productivity. The Kansas River flooded in May 2007 and provided an opportunity to test the Flood Pulse Concept. We hypothesized that the flooding would result in greater fish abundances in the backwaters than in the main channel, and that fish would experience faster growth in the nutrient-rich backwater areas. Fishes in two Kansas River backwater and adjacent main channel areas were sampled using electrofishing and seining. No differences were found in fish abundances in the main channel or backwater areas, which did not support the hypothesis that the backwater areas would have greater fish abundances. However, two small-bodied fish species in one of the backwaters averaged greater lengths than the same species sampled in the adjacent main channel. These data appear to support the hypothesis that fish would experience faster growth in backwater areas. However, it is possible that these larger fish were the result of increased sampling efficiency or an increased proportion of larger, spawning fish in the backwater versus the main channel. Also, it was assumed that these fish were all of the same age class, although no aging or determination of hatch date was attempted, and thus it is possible that the larger fish were older than their main channel counterparts. Nevertheless, backwater areas do appear to be productive, and further sampling in the future may reveal the true effects of the 2007 flooding.

Products
Severson, A., J. Schloesser, K. Pitts, J. Eitzmann, and C. Paukert. 2008. Abundance and growth of fishes in main and secondary channels of the Kansas River. Kansas Natural Resources Conference, Wichita, KS.

Severson, A. 2007. High-water habitat: fish populations in two Kansas River backwaters. Research Experience For Undergraduates Student Research Symposium, Manhattan, KS.

Effects of Anthropogenic Disturbance of Fish Community and Food Web Structure in a Great Plains River

Investigators
Jeff Eitzmann, M.S. student
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
Kansas Department of Wildlife and Parks

Cooperators
Kansas Department of Wildlife and Parks

Objectives
Determine the fish community structure within the Kansas River and how the structure relates to anthropogenic disturbance.

Determine if trophic structure differs by anthropogenic disturbances (e.g. land use and instream habitat) or fish density within a large river.

Location
Kansas River in eastern Kansas

Completion
December 2008

Status
Data analysis is complete; MS thesis by Jeff Eitzmann is complete and manuscripts submitted.

Progress and Results
Fishes were collected at ten sites throughout the Kansas River for assessing assemblage structure in summer 2007 using fish community metrics and at 3 sites in 2006 for food web structure using stable isotope analysis. Satellite imagery indicated the Kansas River was dominated by agriculture in the upper reaches and tended to increase in urban land use in the lower reaches. Instream habitat also decreased with increased urban area. Reaches directly above Bowersock Dam in Lawrence, Kansas and below the Johnson County Weir, near Kansas City, Kansas had low percent similarity compared to other reaches, suggesting the dam and the weir affect community composition. Canonical correspondence analysis indicated that species that prefer high velocity flows and sandy substrate (blue sucker and shovelnose sturgeon) are associated with the upper river reaches. The lower reaches contain more tolerant, macrohabitat generalist species and the upper river contained more intolerant, fluvial specialist species. The agricultural reach had higher variability in $\delta^{13}C$ for fish classified as piscivores/insectivores and macroinvertebrates suggesting the heterogeneous habitat in the agricultural reach provided more variable food sources. The $\delta^{15}N$ values also indicated that ten of the twelve fish species tended to consume prey at higher trophic levels in the agricultural reach suggesting a more complex food web. Conserving intolerant, native species in the Kansas River may require maintaining suitable habitat for these species and restoration of impacted areas of the river.

Products
Eitzmann, J. L. 2008. Effects of anthropogenic disturbance on the fish assemblage and food web structure in a Great Plains river. M.S. Thesis, Kansas State University.

Paukert, C. P., and J. Eitzmann. 2008. Food web dynamics of a Great Plains river: effects of habitat alteration. Arizona/New Mexico Joint Annual Meeting, Prescott, AZ.

Eitzmann, J. L., and C. P. Paukert. 2008. Effects of anthropogenic changes on food web dynamics in a Great Plains river. Kansas Natural Resources Conference, Wichita, KS.

Eitzmann, J. L., and C. P. Paukert. 2007. Evaluation of multiple gears to assess a Great Plains river fish community. American Fisheries Society Annual Meeting, San Francisco, CA.

Eitzmann, J., and C. Paukert. 2007. Electrofishing and hoopnetting gear comparisons for fish communities in the Kansas River, Kansas. Kansas, Nebraska, Iowa Tri-State American Fisheries Society Meeting, Council Bluffs, IA.

Eitzmann, J. L., and C. P. Paukert. 2006. Comparison of electrofishing and trammel netting of shovelnose sturgeon in the Kansas River. 67th Midwest Fish and Wildlife Conference, Omaha, NE.

Developing Conservation Priorities to Protect Fish Biodiversity in the Lower Colorado River Basin

Investigators
Kristen Pitts, M.S. student
Dr. Craig Paukert
Dr. Joanna Whittier
Dr. Julian Olden, Univ. of Washington

Project Supervisors
Dr. Craig Paukert
Dr. Joanna Whittier

Funding
USGS GAP Analysis Program

Cooperators
Over 12 partners from state and federal agencies, NGO's and universities in the Southwest

Objectives
Identify landscape-level habitat metrics associated with native fish presence in the Lower Colorado River Basin (LCRB).

Develop a classification hierarchy for aquatic habitats for determining conservation areas.

Create an ecological risk index based on anthropogenic stressors; and maintain an online database on unpublished documents related to the LCRB.

Location
Lower Colorado River Basin, AZ, NM, UT, CA

Expected Completion
July 2009

Status
Data analysis is ongoing.

Progress and Results
Non-native introductions and habitat alteration have substantially changed the native fish fauna in the Lower Colorado River Basin. Identifying the areas that have the highest loss of native fish diversity (or highest increase in non-native fish diversity) can help identify areas that resource managers may focus on for conservation. Although anthropogenic activities often influence ecosystem processes and biotic communities, rarely are they integrated into conservation planning due to the difficulty in quantifying threats to biotic integrity. Over 1.5 million fish records have been collected and complied into a database. Various landscape-level habitat metrics and anthropogenic stressors have also been calculated. To date, all stressor and landscape level metrics have been summarized by catchment and upstream watershed. Stressor data are currently being related to fish metrics. The boundaries for the classification hierarchy have been completed and are under review by regional biologists. Ultimately, these data will be synthesized to allow land managers to set conservation priorities.

Products

Whittier, J. B., C. P. Paukert, and K. Gido. 2006. Development of an Aquatic GAP for the Lower Colorado River Basin. Maxwell et al., editors. Gap Analysis Bulletin No. 14 USGS/BRD/Gap Analysis Program. Moscow, Idaho.

Pitts, K.L., C. Paukert, and J. Whittier. 2008. Utility of an ecological risk index to assess threats to native fishes: insights from the Verde River Basin, Arizona. Kansas Natural Resources Conference, Wichita, KS.

Pitts, K.L., C. Paukert, and J. Whittier. 2008. Alteration of flow regime and its influence on fish assemblages within the Lower Colorado River Basin. Arizona/New Mexico Joint Annual Meeting, Prescott, AZ.

Pitts, K.L., C. Paukert, and J. Whittier. 2008. Evaluation of an ecological risk index in quantifying threats to fishes. Arizona/New Mexico Joint Annual Meeting, Prescott, AZ.

Whittier, J.B., C.P. Paukert, K.L. Pitts, and J. Olden. 2008. Building a classification hierarchy for the Lower Colorado River Basin to provide an ecological basis for selecting conservation areas. Arizona/New Mexico Joint Annual Meeting, Prescott, AZ.

Pitts, K.L., C. Paukert, and J. Whittier. 2007. Development and assessment of an ecological risk index for fishes in the Verde River Basin, Arizona. Midwest Fish and Wildlife Conference, Madison, WI.

Whittier, J.B., C.P. Paukert, K.L. Pitts, and J.D. Olden. 2007. Lower Colorado River aquatic GAP: meeting the needs of stakeholders. National GAP Meeting, Asheville, NC.

Pitts, K.L., C.P. Paukert and J.B. Whittier. 2007. Hydrologic variability in the Lower Colorado River Basin: implications for fish conservation. American Fisheries Society Annual Meeting, San Francisco, CA.

Whittier, J.B., C.P. Paukert, K.L. Pitts, and J.D. Olden. 2007. The Lower

Colorado River aquatic GAP project-an update. Arizona-New Mexico American Fisheries Society Annual Meeting, Albuquerque, NM

Whittier, J. B., C. P. Paukert, and K. B. Gido. 2006. Development of an aquatic GAP for the Lower Colorado River Basin. Arizona/New Mexico American Fisheries Society Annual Meeting, Flagstaff, AZ

Whittier, J. B., C. P. Paukert, and K. B. Gido. 2005. Development of an aquatic GAP for the Lower Colorado River Basin. National GAP Meeting, Reno, NV.

Evaluation of Sampling Methods and Habitat Use of Missouri River Fishes

Investigators
Joshua Schloesser, M.S. student
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
US Geological Survey, SSP Program

Cooperators
US Army Corps of Engineers

US Fish & Wildlife Service

Missouri Department of Conservation

Nebraska Game and Parks Commission

Objectives
Determine the most appropriate gears, mesh sizes, and deployment strategy to sample 25 species of Missouri River fishes with the goal of detecting trends in abundance.

Determine if Missouri River fishes associate with specific habitats and how these change along a latitudinal gradient.

Location
Missouri River, lower 1,207 km in Missouri and Nebraska

Completion
September 2008

Status
Data analysis is complete and write-up is in progress.

Progress and Results
Evaluating gear bias in large scale monitoring programs can help refine sampling protocols to increase the ability to detect trends in abundance. We sampled 210 river bends (each bend averages 3.5 rkm) in the lower 1,207 km of the Missouri River as part of the pallid sturgeon monitoring and assessment program using gill nets, trammel nets, otter trawls, and mini fyke nets during 2003-2006. Occupancy modeling was used to estimate detection probabilities (p) by gear type for each species' maturity class (juvenile and adult) from its presence or absence at each sampled river bend. Generally gill nets were most effective for sampling large bodied fishes and otter trawls and mini fyke nets were most effective for small-bodied fishes. Since detection probabilities generally differed among species' maturity class and gear type, it is necessary to sample with multiple gears to adequately monitor the entire fish community in the Missouri River. Final sampling recommendations for detecting trends in abundance will favor gears with the highest detection probabilities and lowest variability (e.g. coefficient of variation) in catch per unit effort.

Products
Schloesser, J. T., and C. P. Paukert. 2008. The use of occupancy modeling to aid the Missouri River pallid sturgeon monitoring program. Missouri River Natural Resources Conference, Nebraska City, NE.

Schloesser, J. T., C. Paukert, W. Doyle, T. Hill, G. Mestl, and V. Travnichek. 2008. Comparison of sampling gear detection probabilities and variability for Missouri River fishes. Kansas Natural Resources Conference, Wichita, KS.

Schloesser, J. T., C. Paukert, W. Doyle, T. Hill, G. Mestl, and V. Travnichek. 2007. Probability of detection and catch rate variability by gear type for Missouri River fishes. Midwest Fish and Wildlife Conference, Madison, WI.

Schloesser, J. T., J. Finley, C. P. Paukert, W. Doyle, and T. Hill. 2007. Comparison between push trawls and mini fyke nets to sample shallow water fish communities. American Fisheries Society National Meeting, San Francisco, CA.

Schloesser, J. T., J. Finley, C. P. Paukert, W. Doyle, and T. Hill. 2007. Comparison between push trawls and mini fyke nets to sample shallow water fish communities. Missouri River Natural Resources Conference & BiOp Forum, Nebraska City, NE.

Impacts of Road Crossings on Prairie Stream Fishes

Investigators
Wes Bouska, M.S. student
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
Kansas Department of Transportation

Cooperators
Kansas Department of Wildlife and Parks

United States Fish and Wildlife Service

Kansas Department of Transportation

The Watershed Institute, Inc.

Objectives
Quantify fish passage among different road-stream crossing designs both in the Kansas Flint Hills and in controlled experimental streams.

Determine which crossing design is best for fish passage

Location
Flint Hills stream in Northeast Kansas

Completion
March 2009

Status
Field mark-recapture study completed; experimental stream study and analysis ongoing.

Progress and Results
Inappropriate road-stream crossings may prohibit the movement of stream fishes by creating physical or behavioral barriers. Impeding the natural migrations of these fish can result in negative impacts including reductions in species abundance and diversity, loss of genetic diversity, habitat fragmentation, and species extirpation. A mark-recapture study was conducted to evaluate fish passage through three types of vehicle crossings located on streams that contain federally endangered Topeka shiners (*Notropis topeka*) in the Flint Hills of Northeast Kansas. We tested passage through five concrete box culverts, five low-water crossings (concrete slabs vented by one or multiple culverts), and two single corrugated culverts. In addition, each site had a control reach where fish were marked below a natural barrier in the same stream allowing movement patterns to be compared between control and road crossing reaches for each site. A total of 6,539 fish including 192 Topeka shiners were marked in April and May 2007 and 723 (11.1%) were recaptured in June, July, and August 2007. Fish passage occurred at all crossing types. However, Topeka shiner passage was observed only through box culverts and corrugated culverts. Of the recaptured fish at each site, upstream movement was higher at the controls (41.1%) than at the crossing reaches (19.1%) for low-water crossings ($P<0.0001$). There was no difference in the proportion of fish that moved upstream, compared to control reaches, at box culverts ($P=0.665$) or corrugated culverts ($P=0.171$). These results suggest that crossing type affects the degree of fish passage, with low-water crossings having the greatest impact. Use of properly designed and installed crossing structures has great promise in conserving critical stream habitat, preserving native fish communities and aiding the recovery of the Topeka shiner.

Products
Bouska, W. W. and C. P. Paukert. 2008. Effects of road crossing design on movement and species composition of Great Plains stream fishes. Kansas Natural Resources Conference, Wichita, KS

Bouska, W. W. and C. P. Paukert. 2007. Impacts of Road Crossings on Prairie Stream Fishes. Midwest Fish and Wildlife Conference, Madison, WI.

Recruitment of Fishes in the Kansas River

Investigators
Joe Gerken, Ph.D. student
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
Kansas State University
Kansas Department of Wildlife and Parks

Cooperators
Kansas Department of Wildlife and Parks

Objectives
Identify the biological and environmental factors that influence recruitment in the Kansas River.

Determine if year class strength of selected fishes is related to river flows, and if year class strength is consistent throughout the Kansas River

Make recommendations of the conditions (flows) suitable for recruitment of large river fish.

Location
Kansas River in eastern Kansas

Expected Completion
December 2012

Status
Just started and in progress

Progress and Results
Large rivers in Kansas have been severely altered by habitat modification, altered hydrology, channelization, dam construction, pollution, and many fish species are declining because of these alterations. Recruitment is a critical factor in large river fishes because anthropogenic influences can destroy of modify spawning and juvenile rearing habitat (e.g. backwaters), block fish migrations, or otherwise limit recruitment. In addition, biotic factors such as predation, food availability, or competition may affect recruitment. Therefore, research to determine factors that influence recruitment of riverine fishes would aid managers in determining the critical factors that limit recruitment to possible mitigation or conservation efforts (e.g., habitat enhancements, minimum flow requirements, modifications of reservoir operations) that would help native river fishes.

This project began in January 2008 and will continue with at least three field seasons of fish sampling. Joe Gerken was selected at the Ph.D. student on the project and began in January 2008.

Effects of Zebra Mussels on Reservoir Aquatic Communities

Investigators
Andrea Severson, M.S. student
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
Kansas State University
Kansas Department of Wildlife and Parks

Cooperators
Kansas Department of Wildlife and Parks

Objectives
Determine if zooplankton abundance differed before and after zebra mussel establishment, and if these trends were similar to reservoirs without zebra mussels.

Determine if age-0 largemouth bass growth differed before and after zebra mussel establishment, and if these trends were similar to reservoirs without zebra mussels.

Location
El Dorado, Melvern, and Hillsdale reservoirs in eastern Kansas

Expected Completion
May 2010

Status
Just started and in progress

Progress and Results
In August 2003, zebra mussels were discovered in El Dorado Reservoir, Kansas and are currently at densities of up to 65,000/m^2 (J. Goeckler, Kansas Department of Wildlife and Parks [KDWP] personal communication). This study will provide evidence on the effects of zebra mussels on reservoir centrarchid abundance and largemouth bass growth. In 2003, zebra mussels were found in El Dorado Reservoir, but they have not been found in nearby Melvern or Hillsdale reservoirs. This study will evaluate age-0 largemouth bass growth, fish abundance, and zooplankton abundance prior to establishment of zebra mussels (2001-2002) and five years after establishment (2008-2009) in El Dorado Reservoir. In addition, non zebra mussel infected reservoirs will be sampled to use as controls so we can more clearly identify if growth and abundance patterns are from zebra mussels or are consistent with lakes without zebra mussels. A study funded by KDWP from 2001-2004 sampled age-0 centrarchid abundance, age-0 largemouth bass growth, and zooplankton abundance in coves in El Dorado, Melvern, and Hillsdale reservoirs and will be used as comparisons of fish growth and zooplankton abundance 5 years after zebra mussel establishment.

This project began in January 2008 and will continue through May 2010. Andrea Severson was selected as the M.S. student on the project and began in January 2008.

Long-Term Monitoring of Kansas River Fishes

Investigators
Andrew Makinster, M.S. student
Jeff Eitzmann, M.S. student
Joe Gerken, Ph.D. student
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
Kansas Cooperative Fish and Wildlife Research Unit

Cooperators
Kansas Department of Wildlife and Parks

Objectives
Develop long-term monitoring program for fishes in the Kansas River

Location
Kansas River in eastern Kansas

Completion
Ongoing

Status
Ongoing

Progress and Results
Developing long-term monitoring of fish and wildlife populations is essential to determine future effects of disturbance, climate change, or other effects that may impact biodiversity. We began a long term monitoring program of fishes in the Kansas River beginning March 2005. Since March 2005, we have electrofished 36 stations 5 times per year within 6 reaches of the Kansas River. These six reaches consist of sample sites near Kansas City, Lawrence below Bowersock Dam, Lawrence above Bowersock Dam, Topeka, Wamego, and Manhattan, Kansas. All species of fish are weighed and measured at each site, and individually numbered t-bar tags are attached to selected species (blue suckers, shovelnose sturgeon, flathead catfish, channel catfish, and other large bodied fishes). To date over 3,398 fish have been collected in this program. Data from this program have been used by the US Fish and Wildlife Service, Kansas Department of Wildlife and Parks, and in several research projects at Kansas State University.

Products
Eitzmann, J. L., A. S. Makinster, and C. P. Paukert. 2007. Distribution and growth of blue sucker in a Great Plains, USA river. Fisheries Management and Ecology 14:255-262.

Eitzmann, J., A. Makinster, and C. P. Paukert. 2006. Blue sucker population dynamics in a shallow, Great Plains river. American Fisheries Society Annual Meeting, Lake Placid, NY.

Eitzmann, J., A. Makinster, and C. P. Paukert. 2006. Population dynamics of blue suckers in the Kansas River, Kansas. 31st Kansas Chapter of the American Fisheries Society Annual Meeting, Hays, KS.

Eitzmann, J., A. Makinster, and C. P. Paukert. 2005. Spatial and temporal patterns in blue suckers in the Kansas River, Kansas. American Fisheries Society Annual Meeting, Anchorage, AK.

Wildlife Projects

Display at the Zoo, Chenai, India

Status and Distribution of Black-tailed Prairie Dogs on Small Cultural National Parks in the Western Great Plains.

Investigators
Dr. Jack Cully
Student to be selected

Project Supervisor
Dr. Jack Cully

Funding
USGS

Cooperators
Dr. Gary Willson
Dr. Pamela Benjamin

Objectives
Identify status of black-tailed prairie dogs at 4 culture parks in western Great Plains.
Document rate of migration
Document population trends.
Identify damage by prairie dogs to park resources.

Location Kansas, Colorado, Nebraska.

Completion
December 2011

Status: Will begin summer 2008

Study sites selected. Work to begin spring 2008.

Progress and Results:
Black-tailed prairie dogs pose a management dilemma for land managers because the species is considered an agricultural pest by many farmers and ranchers at the same time it is identified as a keystone species and ecological engineer that benefits many grassland plant and animal species. On Park Service lands, prairie dogs may also degrade cultural resources by digging burrows into cultural remains that the Parks are mandated to protect. This project, which will begin in spring 2008, will address four issues at four parks in the western Great Plains, Fort Larned National Historic Site, Kansas, Bent's Old Fort, Colorado, Sand Creek Massacre National Historic Site, Colorado, and Scott's Bluff National Monument, Nebraska: 1. What is the status of prairie dogs on four small prairie culture parks? 2. Are current population assessment methods adequate? 3. What is the extent of prairie dog movement from National Park lands to adjacent farm or ranch lands? 4. What is the extent of prairie dog damage to the parks' cultural resources?

Behavioral Ecology of Grasshopper Mice and Deer Mice

Investigators
Ron E. VanNimwegen , Ph.D. Student
Dr. Jack Cully

Project Supervisor
Dr. Jack Cully

Funding
Kansas Department of Wildlife and Parks
National Science Foundation / National Institute of Health

Cooperators
US Forest Service

Objectives
Determine social and genetic mating systems of grasshopper mice
- estimate home ranges (size, configuration, overlap) of individuals
- determine extra-pair paternity rates

Determine relative dispersal patterns of grasshopper mice and deer mice
- calculate genetic distances among sub-populations using microsatellite markers
- relate genetic distance to geographical dist-ance

Location
Cimarron and Comanche National Grasslands, SW Kansas and SE Colorado

Completion
Expected May 2009

Status In progress

Mating systems of grasshopper mice: three field seasons of telemetry data are complete (summer 2006 and 2007, winter 2007), and one season remains (summer 2008).
To determine the genetic mating system of grasshopper mice, we are developing a microsatellite library from blood and tissue samples to test for extra-pair paternity. Further screening in spring of 2008 and blood sampling in summer 2008 are required. Population-level analyses will be conducted in Fall 2008.

Dispersal patterns of grasshopper mice and deer mice: we have blood and animal samples from 2005-2007, and will complete sampling in summer 2008. The status of microsatellite library development is described above. Measures of relatedness within and among sampled populations will provide relative measures of gene flow between the two species. We will correlate genetic distances with various geographic distances (Euclidean, least-cost, and least-resistance), at two spatial scales: within-grassland and between grasslands (Cimarron and Comanche).

Progress and Results
Analysis of fine-scale movements indicates intra-sexual spacing mechanisms (territoriality) and inter-sexual overlap (pair bonding). Intra-sexual home ranges overlapped to a lesser degree during the breeding season ($\chi^2 = 547$, df = 1, $P < 0.001$), whereas inter-sexual overlap did not differ with season ($\chi^2 = 1.32$, df = 1, $P = 0.251$). Our data support the presence of a socially monogamous mating system, congruent with previous observations from literature. Further sampling is required to increase the statistical power of our initial conclusions.
The initial sequencing step of microsatellite development indicates that an adequate number of loci (8-12) can be obtained for further development (primer design, amplification, and screening for allelic variability). Most loci contain di-nucleotide repeats ranging between 5 and 20 base pairs in length, consistent with markers used in studies of closely related mammals. We are seeking funds to finish developing the library, after which population-level analyses will commence.

Products
One oral presentation on fine-scale movements of grasshopper mice delivered at the Kansas State University Biology Graduate Forum.

Landscape Effects on Disease Dynamics in Prairie Dogs

Investigators
Bala Thiagarajan, Ph.D. Student
Dr. Jack Cully

Project Supervisor
Dr. Jack Cully

Funding
NSF, USGS, KDWP

Cooperators
Sharon Collinge
Chris Ray
Ken Gage
Michael Kosoy

Objectives
Identify rodent associates of black-tailed prairie dogs
Identify fleas as potential plague vectors.
Identify potential routes of interspecific disease transmission.

Location Western Great Plains

Completion
April 2007

Status Completed

Fieldwork complete, Analysis complete, Manuscripts under revision.

Progress and Results
Black-tailed prairie dogs (*Cynomys ludovicianus*) are epizootic hosts for plague (*Yersinia pestis*); however, alternate enzootic hosts are important for the maintenance of the pathogen. We determined small rodents and prairie dog associations and quantified rodent and flea relationships in the presence and absence of prairie dog colonies and plague. We identified potential alternate hosts and flea vectors for the maintenance and transmission of plague in the prairie ecosystem. This is the first multi-year study to investigate associations between prairie dogs, rodents and fleas across the range of the black-tailed prairie dog. Two rodent species associated with black-tailed prairie dogs and were found to be highly abundant on colonies. Rodent species implicated in plague were present at study areas with and without plague. *Peromyscus maniculatus* and *Onychomus leucogaster*, two widely occurring species, were more abundant on colonies and in areas with a recent history of plague. Flea community characteristics varied within each study area in the presence and absence of prairie dogs. Based on flea diversity on rodents, and the role of rodents and fleas in plague, we identified *P. maniculatus* and *O. leucogaster* and their associated fleas, *Aetheca wagneri*, *Malareus telchinus*, *Orchopeas leucopus*, *Peromyscopsylla hesperomys*, and *Pleochaetis exilis* to be important for the dynamics of sylvatic plague in our study areas. *Peromyscus maniculatus* and *O. leucogaster* were consistently infected with *Bartonella* spp., another blood parasite. Presence of prairie dog fleas on other rodents at both off and on prairie dog colonies suggests the potential for intra and interspecific transmission of fleas between rodent hosts, and between other small rodents and prairie dogs.

Products:
Bala, T. 2006. Community dynamics of rodents, fleas and plague associated With black-tailed prairie dogs. Ph. D. Dissertation. Division of Biology, KSU.

Bai, Y., M. J. Kosoy, J. F. Cully, Jr., T. Bala, C. Ray, S. K. Collinge. 2007. Acquisition of nonspecific *Bartonella* strains by the northern grasshopper mouse (*Onychomys leucogaster*). FEMS Microbiol Ecol 61:438-448.

T. Bala, Y. Bai, K. L. Gage, and J. F. Cully, Jr. In press. Prevalence of *Yersinia pestis* in rodents and fleas associated with black-tailed prairie dogs at Thunder Basin National Grassland, Wyoming. Journal of Wildlife Diseases.

Brinkerhoff, R. J., C. Ray, B. Thiagarajan, S. K. Collinge, J. F. Cully, Jr., B. Holmes and K. L. Gage. In press. Keystone hosts: prairie dogs affect occurrence patterns of disease vectors on small mammals. Ecography.

Bala, T., Ying Bai, Micheal Kosoy, Ken Gage, Tom Loughin and J. F.

Cully, Jr. Prevalence of *Bartonella* in rodents and fleas associated with the black-tailed prairie dogs. 55th Annual Conference of the Wildlife Disease Association, University of Connecticut, Storrs, CT.

Bala, T., J. Cully**,** T. M. Loughin, Y. Bai, M. Kosoy, and K. L. Gage. *Prevalence of Bartonella species in rodents and fleas associated with black-tailed prairie dogs.* 62nd Annual Meeting, International Conference on Diseases in Nature Communicable to Man, Madison, WI, August 12-14, 2007.

Habitat Alteration and Disease Dynamics in Black-tailed Prairie Dogs

Investigators
Tammi Johnson,
M.S. Student
Dr. Jack Cully

Project Supervisor
Dr. Jack Cully

Funding
EPA, USGS, KDWP,
U.S. Forest Service

Cooperators
Sharon Collinge
Chris Ray
David Augustine

Objectives
Map prairie dog colonies.
Identify spatial dynamics of plague.
Determine effects of plague on prairie dog abundance.

Location Western Great Plains

Completion
April 30, 2007

Status Completed

Fieldwork complete, Analysis complete, Manuscripts under revision.

Progress and Results
Sylvatic plague (*Yersinia pestis*) is an exotic pathogen that is highly virulent in black-tailed prairie dogs (*Cynomys ludovicianus*), and causes widespread colony mortality and individual mortality rates > 95%. In this study, we investigated colony spatial characteristics that may promote intercolony transmission of plague Three spatial characteristics of colonies that may be important to plague transmission include: colony size, distance to nearest neighboring colony and distance to nearest drainage corridor. Multistate mark-recapture modeling was used to determine the relationship between colony characteristics and the probability of plague transmission among prairie dog colonies at three national grasslands in the Great Plains. At Thunder Basin National Grassland, Wyoming, and Rita Blanca National Grassland, Texas/Oklahoma, the probability of plague infection within a colony increased with colony size, and declined with increasing distance to the nearest colony or drainage corridor. The patterns at Thunder Basin and Rita Blanca were consistent with either epizootic or interspecific transmission. Colonies at Cimarron National Grassland, Kansas, exhibited similar patterns, except that plague occurrence increased with increasing distance to the nearest colony, suggesting primarily interspecific transmission. Connectivity among colonies may be important to maintain population viability of prairie dogs in regions without plague; however, limiting connectivity among colonies may be critical to reduce transmission in regions where plague is present.

Products
Johnson, T.L. 2005. Spatial Dynamics of a bacterial pathogen: Sylvatic plague in black-tailed prairie dogs. M.S. Thesis. Division of Biology, KSU. Manhattan.

Johnson, T. L., and J. F. Cully, Jr. 2005. Effects of colony connectivity on the spread of sylvatic plague (*Yersinia pestis*) in black-tailed prairie dogs across the Great Plains. Second Symposium proceedings, The history, ecology, and economy of the Thunder Basin prairie ecosystem. J. B. Haufler, ed. Compact Disk.

Augustine, D. J., J. F. Cully, Jr., and T. L. Johnson. 2007. Influence of fire on black-tailed prairie dog colony expansion in shortgrass steppe. Rangeland Ecosystem Management 60:538-542.

Augustine, D. J., M. R. Matchett, T. P. Toombs, J. F. Cully, Jr., T. L. Johnson, J. D. Sidle. 2007. Spatiotemporal dynamics of black-tailed prairie dog colonies affected by plague. Landscape Ecology DOI 10-1007/s10980-007-9175-6.

Johnson, T.L. and J.F. Cully, Jr. Colony Spatial Dynamics Influence the Transmission of Sylvatic Plague in Black-tailed Prairie Dogs. Featured Student Presenter, Wildlife Disease Association International Conference, Cairns, Queensland, Australia. *2005 Graduate Student Research Award.

J. F. Cully and T. L. Johnson. *Spatial dynamics of plague in three black-tailed prairie dog complexes*, (Oral presentation) at the Annual Meeting of the Wildlife Disease Association, Estes Park, CO, August 2007.

Landscape Genetics of Deer and the Potential Spread of CWD in Kansas: A Pilot Study to Examine Deer Density and Hunting Pressure as Factors.

Investigators
Dr. Samantha Wisely
Dr. Mark Stapham
Dr. Jack Cully

Project Supervisors
Dr. Jack Cully
Dr. Samantha Wisely

Funding
USGS

Cooperators
Lloyd Fox

Objectives
Identify risk factors for the spread of CWD. Document the roles of population density and hunting pressure on genetic population structure.

Location Kansas

Completion
September 2008

Status: In Progress

Fieldwork complete, Analysis under way.

Progress and Results

Chronic wasting disease (CWD) is a prion caused wasting disease of cervids that is expanding its range in the U.S. There is an established focus in Colorado, Wyoming, and Nebraska, and in 2005 the first, and so far only, case was documented in northwestern Kansas. There is no documented disease risk to humans, but because of the potential of another prion disease, bovine spongiform encephalopathy (mad cow disease) to cause new variant Creutzfeldt-Jakob disease in humans, there is uncertainty of the safety of venison from infected deer. CWD also has the potential to reduce the value of the high quality trophy deer herd in Kansas, which could have negative impacts on an important tourist recreational activity.

We identified two factors that may be correlated with transmission risk, density of groups (motivated by evidence that density of prairie dog colonies rather than density of prairie dogs per se is important for the transmission dynamics of plague), and hunting pressure, which cause deer to aggregate in large numbers in refugia where they are protected from hunting. Because disease transmission is often density dependent, the increased density in refugia may increase transmission rates. This is a pilot study to identify indices of genetic connectivity of white-tailed deer at nine study sites that vary in deer group density and hunting pressure. The study is in progress.

Biogeography and Molecular Epidemiology of the PRNP Gene in Kansas

Investigators
Dr. Samantha Wisely
Dr. Mark Stapham
Dr. Jack Cully

Project Supervisors
Dr. Jack Cully
Dr. Samantha Wisely

Funding
USGS

Cooperators
Lloyd Fox

Objectives
Identify risk factors for the spread of CWD. Identify the spatial extent and frequency of the PRNP gene in Kansas White-tailed deer.

Location Kansas

Completion
September 2008

Status: In Progress

Fieldwork complete, Analysis under way.

Progress and Results
This is an add-on to the CWD study above, and is in progress. The cervid PRNP gene has been identified as a genetic marker for increased risk of infection by CWD. This study will use the same samples to quantify the prevalence and spatial distribution of the PRNP gene in white-tailed deer in Kansas prior to CWD becoming established in the state. My role will be to incorporate the results of genetic analyses into the GIS.

Assessment of Elk Habitat Use, Population Dynamics, and Genetic Variability at Fort Riley Military Reservation, Kansas

Investigators
Jonathan Conard, Ph.D. Student
Dr. Philip Gipson

Project Supervisor
Dr. Philip Gipson

Funding
Rocky Mountain Elk Foundation, Fort Riley Conservation Division, U.S. Army Construction Engineering Research Laboratory, Safari Club International

Cooperators
Kansas Department of Wildlife and Parks, New Mexico Cooperative Fish and Wildlife Research Unit, Fort Riley Conservation Division

Objectives
Assess elk resource selection in tallgrass prairie

Estimate survival rates and mortality causes

Compare genetic variability to other reintroduced elk herds

Location: Fort Riley Military Reservation

Completion: 2008

Status
Fieldwork was completed during 2007, data analysis and preparation of dissertation and publications is currently being conducted.

Progress and Results

Elk resource selection patterns are being modeled in relation to variables including burn frequency, burn timing, land cover, and military training. Annual estimates of cow elk survival were generally high (0.74 – 1.0), and are comparable to rates reported in other harvested elk populations. Genetic variability at six microsatellite loci was assessed for elk in the Fort Riley population. Results indicated that allelic richness, expected heterozygosity, and observed heterozygosity are similar to levels of genetic variability found in other reintroduced and source elk populations.

Products

Conard, J.M., M. J. Statham, S. M. Wisely, and P. S. Gipson. 2007. Genetic structure of a reintroduced elk population. Midwest Fish and Wildlife Conference, Madison, WI.

Conard, J.M., P.S. Gipson, and M.S. Peek. 2007. Historical and current distribution of elk in Kansas. Kansas Chapter of The Wildlife Society.

Conard, J.M. and P.S. Gipson. 2006. Seasonal variation and timing of elk use of private lands adjacent to Fort Riley Military Reservation, Kansas. 138th Annual Meeting of the Kansas Academy of Science.

Conard, J.M. and P.S. Gipson. 2006. Patterns of private land use by elk around Fort Riley Military Reservation. Kansas Chapter of The Wildlife Society Spring Meeting.

Conard, J.M., P.S. Gipson, and M.S. Peek. 2006. Status of elk in Kansas. 20th North American Prairie Conference.

Conard, J.M., P.S. Gipson, M.S. Peek. *In press*. Historical and current status of elk in Kansas. Proceedings of the North American Prairie Conference.

Conard, J.M. and P.S. Gipson. 2005. Elk habitat selection in tallgrass prairie. American Society of Mammalogists Meeting.

Conard, J.M. and P.S. Gipson. 2005. Elk habitat use in tallgrass prairie. The Wildlife Society Meeting.

Conard, J.M. 2005. The influence of patch configuration and landscape features on diurnal elk habitat use at Fort Riley, KS. Geospatial Research Showcase. Kansas State University Geographic Information Systems / Spatial Analysis Laboratory.

Conard, J.M., P.S. Gipson, and L.C. Bender. 2004. “Elk in tallgrass prairie: home range size, habitat selection, and movement patterns.” Midwest Fish and Wildlife Conference.

Variation in Small Mammal Community Structure in Tallgrass Prairie Ecosystems in Response to Disturbance from Military Vehicle Training

Investigators
Derek A. Moon,
M.S. student
Dr. Philip Gipson

Project Supervisor
Dr. Philip Gipson

Funding
Department of Defense,
Fort Riley

Objectives
Estimate the threshold at which military vehicle training affects small mammal species richness and abundance.
Identify changes of small mammal community structure with varying levels of military vehicle training.

Location
Fort Riley Military Installation

Status
In progress

Progress and Results
A research plan is currently being developed to determine the threshold at which military vehicle training impacts the small mammal communities of Fort Riley. Small mammal communities will be sampled on study plots randomly dispersed across the installation beginning March 2008. Small mammal sampling will be conducted using standard live trapping techniques.

Vehicle disturbance to vegetation will be measured at all small mammal study plots with low level aerial digital photography and ground vegetation sampling. Disturbance surveys will be conducted immediately before or after small mammal sampling. Digital photos taken at trap sites will be geo-referenced to their true geographic coordinates in the Geographic Information System program ArcMap **(**ESRI, Redlands California). Features visible in photos will be digitized to estimate military vehicle training disturbance. Calculated indices of disturbance will include percent of plot tracked and percent bare ground on plot. Ground vegetation sampling will be conducted using a modified point-intercept method to measure the affects of military vehicle training maneuvers on vegetative cover, vertical and horizontal vegetative structure.

Range and Training Land Assessment on Fort Riley (RTLA) on Fort Riley Military Installation, Kansas

Investigators
Dr. Philip S. Gipson
Dr. Donald P. Althoff
Dr. Carol Blocksome
Mr. Kevin Blecha

Project Supervisor
Dr. Philip S. Gipson

Funding
U.S. Department of Defense, Ft. Riley ITAM Program

Objectives
Assess the impacts of repeated military vehicle disturbances on plant, animal, and soil communities to determine indicators of non-intervention sustainability and develop ecological models at the local ecosystem level.

Develop statistical models of impacts by military disturbance and verify those models with monitoring data.

Assess the use of low-level aerial photography to evaluate bare ground conditions. Evaluate seasonal variation and the minimum area on which bare ground measurement can be made with precision, as determined from these photos.

Explore other potential methods (including non-invasive data collections that do not require handling) to rapidly assess small mammal communities with the goal of reducing monitoring costs and health risk to field researchers.

Location
Fort Riley Military Reservation, Kansas

Expected Completion
September 2011

Status
In progress

Progress and Results
Established 35, 1-ha-sized special use plots (distributed across 5 sites) on Ft. Riley to investigate the impact of tracked military vehicle training on animals, plants, and soils. During 2007, baseline data (i.e., pre-treatment) was collected on plant community composition, small mammal community composition, small grassland bird presence, grasshopper community composition, and soil physical (bulk density), chemical (Total N and C), and biological (nematode) properties along with low-level aerial photography assessments of bare ground conditions. Starting spring 2008, disturbance treatments will be applied with an Abrams tank traveling a pre-established tracking pattern on 4-6 plots per site as part of a long-term experiment. In subsequent years, some of those same plots will again receive tank-applied disturbance. The sampling methods and schedule used in 2007 will also be used in 2008.

Monitoring on training lands with respect to bare ground areas, non-woody vegetation, and vehicle traffic was conducted on 42 randomly assigned 1-ha sized plots within maneuver areas on Ft. Riley during summer 2007. Low-level aerial photographs were obtained and ground-truthed. In 2008, over 100, 1-ha sized plots are scheduled to be photographed and analyzed to continue this long-term assessment effort.

The annual breeding bird survey was conducted (for the 15th consecutive year) on 60 permanently established plots during early summer 2007 and is scheduled to be conducted again in 2008.

Products
Project investigators assisted the Ft. Riley RTLA program with development of their RTLA Plan that documents the justification for, protocols used, and reporting of metrics to assess training lands on the installation on an annual basis. A final report for the previous research work order (2002-2007) was submitted to the Ft. Riley Integrated Training Area Management (ITAM) coordinator; that report included recommendations for protocols to be used for assessments of small mammal, small landbird, soil, and vegetation communities based on evaluations done from 2000-2005. A presentation was given at the Society of Range Management. Four peer-reviewed publications related to this research effort were accepted and/or published in the last year on birds, small mammals, and soils.

Vegetation and Small Mammal Community Response to Military Track Vehicle Disturbance at Smoky Hills Air National Guard Bombing Range, Kansas

Investigators
Dr. Philip S. Gipson
Dr. David Engle (Iowa State)
Mr. Ryan Limb (Ph.D. Student, Oklahoma State)
Mr. Kevin Blecha

Project Supervisors
Dr. Philip S. Gipson
Dr. David Engle
Dr. Donald P. Althoff

Collaborators
Galen Wiens, Smoky Hill Air National Guard Natural Resources Department

Funding
U.S. Army Corps of Engineers, Construction Engineering Research Lab (CERL)

Objectives
Does grazing by livestock have a positive, negative, or neutral effect on the capacity of land to sustain military training?

Does haying have a positive, negative, or neutral effect on the capacity of the land to sustain military training? If the effect is not neutral, what is the size of the difference?

Location
Smoky Hills Air National Guard Range, Kansas

Expected Completion
December 2008

Status
In progress

Progress and Results
The third and final year of this field experiment investigating responses of vegetation and small mammal communities to anthropogenic-induced disturbances was completed in 2007. The study design involved pre- (2005), same-year as- (2006), and post-treatment (2007) assessments at 6 annually cattle grazed and 6 annually hayed sites (4, 1-ha plots per site). At each of the 12 sites, two plots were randomly assigned simulated-military tracked vehicle treatment using a 40,000 lb. dozer in 2006. This combined with establishment of electric fences at grazed sites resulted in an experimental block design of a control, a grazed or hayed-only, a grazed or hayed plus military tracked, and a military-tracked suite of plots.

Vegetation sampling was again conducted in 2007 for cool (early summer) and warm season (late summer-early fall) species. Small mammal community assessments based on live-trapping were conducted again in 2008 during pre- (March-April) and post-growing (November-December) season conditions. Preliminary analysis of vegetation response suggest a single year of disturbance by a tracked vehicle regardless of being grazed or hayed may result in minimal changes to species composition and vegetative cover 12-18 months later. However, small mammal community composition as indicated by species richness suggest tracked vehicle disturbance can result—at least on a short-term basis-- in more diversity than areas impacted by a combination of tracked vehicle disturbance and grazing if above normal precipitation occurs during the growing season.

Three years of data collection was concluded Fall 2007 in an experimental design aimed at assessing the small-mammal community response to controlled levels of disturbance by mechanized tracked vehicles, disturbance by cattle grazing, and a combination of the two treatments. Vegetation, soils, and arthropod data were collected concurrently on the same sites by Oklahoma State University.

Final data analysis and interpretation is underway. R. Limb is preparing his Ph.D. dissertation to address the vegetation response. D. Althoff, K. Blecha, and P. Gipson are evaluating the small mammal data. A final report combining the vegetation and small mammal response is be completed and submitted to ERDC-CERL in 2008.

Occupancy and Interspecies Relationships of River Otters in Eastern Kansas

Investigators
Dr. Philip Gipson
Kevin Blecha
Mackenzie Shardlow, M.S. student

Project Supervisor
Dr. Philip Gipson

Funding
Kansas Department of Wildlife and Parks

Cooperators
Kansas Department of Wildlife and Parks

Objectives
Estimate occupancy and detection probabilities of river otters in the eastern third of Kansas.

Compare fur-harvester questionnaires regarding river otter occurrence with estimates achieved through sign surveys.

Examine the occurrence of river otters and beaver to determine the feasibility of multi-species occupancy modeling and to evaluate interspecies relationships.

Location
Eastern Kansas

Completion
December 2009

Status
The first season of field sampling began early February and will continue through April.

Progress and Results
Fifty to 100 sites are being surveyed from randomly selected watersheds. Each site consists of a 3600-meter survey of a stream, river, or reservoir shoreline documenting otter and beaver sign as well as vegetation and shore characteristics. These relatively long survey segments will allow for spatial replication to account for false-absences.

A questionnaire is being developed to mail to fur harvesters in order to obtain information on specific locations of river otter sightings during the past three years. The data from these questionnaires will be compared to both the sign surveys and otter location data collected in the 2004-2005 Kansas Department of Wildlife and Parks Furbearer Harvest Survey to determine if detectable changes in otter distribution occurred.

A final report will be prepared for Kansas Department of Wildlife and Parks to better understand and manage the state's river otter population.

Products
Blecha, K.A., P.S. Gipson, and M. Peek. 2007. Occupancy Modeling of River Otter (*Lontra canadensis*) in Eastern Kansas. Midwest Furbearer Workshop. Lincoln, Nebraska. 11 Sept 2007.

Shardlow, M., P. S. Gipson, K. A. Blecha, and M. Peek. 2008. River otter distribution and population status in eastern Kansas. Information Brochure, Kansas Department of Wildlife and Parks.

Deer Density, Movement Patterns, and Group Dynamics on Quivira National Wildlife Refuge: Assessing Potential Risk for Disease Transmission

Investigators
Kevin Blecha
Jonathan Conard
Dr. Philip S. Gipson

Project Supervisor
Dr. Philip S. Gipson

Funding
US Fish and Wildlife Service
Kansas Department of Wildlife and Parks
U.S. Army Corps of Engineers Environmental Research Laboratory

Cooperators
Quivira National Wildlife Refuge
Kansas Department of Wildlife and Parks

Objectives
Identify factors contributing to direct and indirect contact rates among deer.

Background on density, movements, and social structure to develop testable hypothesis for future research on white-tailed deer of QNWR

Location
Quivira National Wildlife Refuge

Completion
2009

Status

Data collection initiated

Progress and Results
Starting in March 2007, preliminary distance sampling surveys indicated that a significant difference existed in the density of deer on Quivira National Wildlife Refuge compared to sites off of the refuge with comparable size and habitat. These surveys also indicated that group sizes of deer on the refuge were higher than the mean size of groups off of the refuge.

In November 2007, bi-weekly distance sampling surveys on the refuge were initiated to collect information to quantify the temporal variations in deer density as well as the localized spatial variations in deer density.

In November 2007, the placement of GPS and VHF radio collars on captured deer was initiated and is anticipated to be completed by April 2008. Marked deer will be studied until March 2009.

Products
Blecha, K.A., P. S. Gipson, J. M. Conard and J. Sellers. 2008. Deer of Quivira. Information Brochure, U.S. Fish and Wildlife Service, Quivira National Wildlife Refuge.

Technical Assistance

Summary of 5-Year Review for the Endangered Topeka Shiner

Investigators
Dr. Kevin Pope
Dr. Charles Berry
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
Cooperative Fish and Wildlife Research Units

Cooperators
U.S. Fish and Wildlife Service
Topeka shiner recovery team

Objectives
Summarize status of Topeka shiners and provide summary of 5 year review

Location
DeSoto National Wildlife Refuge, IA

Completion
May 2007

Status
Complete

Progress and Results
The federally endangered Topeka shiner has been diminished to about 20% of its native range and there is a need to identify the current status and threats to the species. The US Fish and Wildlife Service initiated a 5-year review of the status of the Topeka shiner as well as the current threats to help in the recovery of the species. In April 2007 the Topeka shiner recovery team and other scientists convened at DeSoto National Wildlife Refuge for a two-day workshop on the status of the Topeka shiner. The results of this workshop were summarized by Cooperative Fish and Wildlife Unit researchers from Kansas (Craig Paukert), South Dakota (Charles Berry) and Nebraska (Kevin Pope). These results were provided to the US Fish and Wildlife Service to distribute to the recovery team to aid in the recovery of the Topeka shiner.

Products since 2007
Paukert, C. P., C. Berry, and K. Pope. 2007. Topeka shiner 5-year review and workshop. Summary report provided to the US Fish and Wildlife Service, Manhattan KS. 90 pages.

Comparison of Shovelnose Sturgeon Lengths Collected in Monofilament and Multifilament Gill Nets

Investigators
Josh Schloesser, M.S. Student
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
Kansas Cooperative Fish and Wildlife Research Unit

Cooperators
U.S. Fish and Wildlife Service, Columbia, MO

Missouri Department of Conservation

Objectives
Determine if lengths of shovelnose sturgeon collected in multifilament gill nets different from fish collected in monofilament gill nets.

Location
Missouri River, MO

Expected Completion
July 2009

Status
Field work was completed by US Fish and Wildlife Service and Missouri Department of Conservation (MDC); data analysis and manuscript preparation are ongoing at KSU and MDC.

Progress and Results
There is an increased concern about the population dynamics of shovelnose sturgeon throughout the Mississippi and Missouri river basins due to commercial harvest and because the fish is sympatric with the federally endangered pallid sturgeon. Because these fish can migrate and travel across interjuristictional boundaries, population assessments need to be comparable among agencies. However, both monofilament and multifilament gill nets are used and there is a need to determine if the two twine materials collect different sizes of shovelnose sturgeon. Sampling with both monofilament and multifilament gill nets were used from 2002 to 2004 in the Missouri River from river miles 183 to 193.8 with 1.5, 2.0, 3.0, and 4.0-inch mesh. A total of 1,554 shovelnose sturgeon were collected in winter 2002 and spring 2003, 2004 with monofilament gill nets and 1,741 were collected with multifilament gillnets. Mean length for fish collected in monofilament nets was 585 mm (range: 210-820) whereas mean length from the multifilament nets was 578 (204-751). Mean length differed between twine materials for 1.5 and 2.0 inch mesh, but not 3.0 or 4.0 inch mesh. The mean difference in length from monofilament and multifilament nets were 14 mm for 1.5 inch mesh and 10 mm for 2.0 inch mesh. Although subtle differences may occur in the length distribution of fish collected with different twine material, there may be limited biological differences from the assessment of shovelnose sturgeon populations collected by different twine materials.

Products
Paukert, C. P., and J. T. Schloesser. 2007. Comparison of shovelnose sturgeon lengths collected in monofilament and multifilament gill nets. Draft report submitted to the US Fish and Wildlife Service, Columbia, MO.

Impacts of Big Game Browse and Drought on the Mountain Shrub Community in Southwestern Colorado

Investigators
Russ Japuntich, BLM
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
Kansas Cooperative Fish and Wildlife Research Unit

Cooperators
U.S. Bureau of Land Management, Gunnison Colorado

Objectives
Determine the impacts of elk browsing on vegetation.

Determine how drought impacts grazing of elk on vegetation.

Location
Gunnison, CO

Expected Completion
December 2009

Status
Field work was completed by Bureau of Land Management (BLM). Data analysis and manuscript preparation are ongoing at KSU and BLM.

Progress and Results
High populations of wintering game can have detrimental impacts on the growth and survival of browsed shrubs. Severely browsed shrubs can have stunted growth, smaller crowns, and this can lead to increased death. Even species such as bitterbrush, which has growth that is stimulated by browse, will reduce the number of buds produced under heavy browsing. Mountain mahogany shows good tolerance to winter browsing but may have reduced growth and be unproductive by repeated browsing. Serviceberry can withstand moderate to strong levels of browsing and defoliation. However, continued browsing will increase twig production and keep the shrubs from growing out of reach of big game. Under herbivory, shrubs will expend the most energy into increased leader growth, although this energy is lost if the new leaders are repeatedly browsed. The objectives of this study are to determine if elk browsing effects shrubland growth and if drought can also play a part on reduced shrubland vegetation. A total of 37 permanent transects were established in key browse areas. During April/May of 2001 and 2006, the extensive browse method was conducted on the transects. This study focuses on age class, form class, and size on three key browse species; Utah serviceberry, mountain mahogany, and antelope bitterbrush. Results indicate that browsing did differ among species but not necessarily between years, suggesting responses to elk browsing do differ by shrubland species.

Products
A manuscript is in preparation for the Journal of Range Management.

An Assessment of Neosho Madtom and Gravel Harvest from the Neosho River, Kansas

Investigators
Nate Davis, KDWP
Dr. Craig Paukert

Project Supervisor
Dr. Craig Paukert

Funding
Kansas Cooperative Fish and Wildlife Research Unit

Cooperators
Kansas Department of Wildlife and Parks (KDWP)

Objectives
Evaluate the effects of gravel mining on Neosho madtom abundance.

Determine if other factors (flows) have an effect on Neosho madtom abundance.

Location
Neosho River in Southeastern Kansas

Expected Completion
June 2009

Status
Field work was completed by KDWP; data analysis and manuscript preparation is ongoing at KSU and KDWP

Progress and Results
Annual monitoring of the Neosho madtom has occurred at numerous gravel harvest locations in the Neosho River since 1996. The Neosho madtom only occurs in the Neosho, Cottonwood, and Spring Rivers upstream from Grand Lake O' the Cherokees (Oklahoma) and is listed as Threatened under both Federal and State endangered species legislation. Various state laws regulate gravel harvest from point bars in the Neosho River, and regulatory permit conditions require annual monitoring to determine potential impacts and develop effective protection strategies to sustain the species in Kansas. Our objective was to assess fish populations and habitat use from both harvested and non-harvested gravel bars in the Neosho River from 1996 - 2007. Data collection from 16 different gravel bars included species density for benthic insectivores, substrate classification, mid-column velocity, and depth. This study will focus on the effects of commercial gravel harvest on Neosho Madtom populations, differences in habitat at harvested versus non-harvested sites, and a discussion on the role hydrologic patterns have on variations in annual Neosho madtom densities.

Products
Davis, N. and C. Paukert. 2008. An assessment of Neosho madtom related to gravel harvest from the Neosho River, Kansas. Kansas Natural Resources Conference, Wichita, KS.

List of Scientific, Peer Reviewed Publications: 2007-present

Althoff, D. P., P. S. Althoff, N. D. Lambrecht, P. S. Gipson, J. S. Pontius, and P. B. Woodford. 2007. Soil properties and perceived disturbance of grasslands subjected to mechanized military training: evaluation of an index. Land Degradation & Development 18:269-288.

Augustine, D. J., M. R. Matchett, T. P. Toombs, J. F. Cully, Jr., T. L. Johnson, J. D. Sidle. 2007. Spatiotemporal dynamics of black-tailed prairie dog colonies affected by plague. Landscape Ecology DOI 10-1007/s10980-007-9175-6.

Augustine, D. J., J. F. Cully, Jr., and T. L. Johnson. 2007. Influence of fire on black-tailed prairie dog colony expansion in shortgrass steppe. Rangeland Ecosystem Management 60:538-542.

Bai, Y., M. J. Kosoy, J. F. Cully, Jr., T. Bala, C. Ray, S. K. Collinge. 2007. Acquisition of nonspecific *Bartonella* strains by the northern grasshopper mouse (*Onychomys leucogaster*). FEMS Microbiol Ecol 61:438-448.

Collinge, S. K., C. Ray, and J. F. Cully, Jr. 2008. Effects of disease on keystone species, dominant species, and their communities. Pps 129-144. In: Ostfeld, Evener, and Keesing (eds.) Effects of Ecosystems on Disease and of Diseases on Ecosystems. Princeton University Press.

Conard, J. M., J. A. Baumgardt, P. S. Gipson, and D. P. Althoff. In Press. The influence of trap density and duration of sampling on the detection of small mammal species richness. Acta Theriologica.

Eitzmann, J. L., A. S. Makinster, and C. P. Paukert. 2007. Distribution and growth of blue sucker in a Great Plains, USA river. Fisheries Management and Ecology 14:255-262.

Fischer, J. R., and C. P. Paukert. 2008. Historical and current environmental influences of an endemic Great Plains fish. American Midland Naturalist 159:364-377.

Kamler, J. F., W. B. Ballard, M. C. Wallace, R. L. Gilliland, and P. S. Gipson. 2007. Dietary overlap of swift foxes and coyotes in northwestern Texas. American Midland Naturalist 158:140-147.

Kamler, J. F., W. B. Ballard, M. C. Wallace, and P. S. Gipson. 2007. Diets of swift foxes (*Vulpes velox*) in continuous and fragmented prairie in northwestern Texas. Southwestern Naturalist 52:504-510.

Kostelnick, J. C., D. L. Peterson, S. L. Egbert, K. M. McNyset, and J. F. Cully. 2007. Ecological niche modeling of black-tailed prairie dog habitats in Kansas using geographic information systems (GIS), remote sensing, and the genetic algorithm for rule-set prediction (GARP). Transactions of the Kansas Academy of Sciences 110:187-200.

Makinster, A.S., and C. P. Paukert. 2008. Effects and utility of minimum length limits and mortality caps for flathead catfish in discrete reaches of a large prairie river. North American Journal of Fisheries Management 28:97-108.

Paukert, C. P., and A. S. Makinster. In press. Longitudinal patterns in flathead catfish relative abundance and length at age within a large river: effects of an urban gradient. River Research and Applications.

Paukert, C. P., and J. H. Petersen. 2007. Simulated effects of temperature warming on rainbow trout and humpback chub in the Colorado River, Grand Canyon. Southwestern Naturalist 52:234-242.

Paukert, C. P., M. McInerny, and R. Schultz. 2007. Current and historical black bass regulations in North America. Fisheries (Bethesda): 32(2):62-72.

Petersen, J. H., D. L. DeAngelis, and C. P. Paukert. 2008. Developing bioenergetics and life history models for rare and endangered species. Transactions of the American Fisheries Society. 137:244-253.

Winter, S.L., and J. F. Cully, Jr. 2007. Burrowing owl associations with black-tailed prairie dog colonies in southwestern Kansas and southeastern Colorado. Prairie Naturalist 39:69-75.

List of Popular Publications

Bouska, W. W. 2007. Stream crossings and fish conservation. Fisheries 32 (12): 609.

Paukert, C. P. 2007. Kaw River's big cats. Kansas Department Wildlife and Parks Magazine 64 (4):16-24.

VanNimwegen, R. 2007. Award-winning commitment. Nature 447:610.

List of Technical Papers

Paukert, C. P., and J. T. Schloesser. 2007. Comparison of shovelnose sturgeon lengths collected in monofilament and multifilament gill nets. Report submitted to the US Fish and Wildlife Service, Columbia, MO.

Paukert, C. P., C. Berry, and K. Pope. 2007. Topeka shiner 5-year review and workshop. Summary report provided to the US Fish and Wildlife Service, Manhattan KS. 90 pages.

Schloesser, J. T., and C. P. Paukert. 2007. Walleye harvest restrictions to minimize gizzard shad impingement. Final report submitted to Wolf Creek Nuclear Operating Corporation. 27 January 2007.

Theses and Dissertations

Eitzmann, J. L. 2008. Effects of anthropogenic disturbance on the fish assemblage and food web structure in a Great Plains river. M.S. Thesis, Kansas State University.

Fischer, J. R. 2007. Structural organization of Great Plains stream fish assemblages: implications for sampling and conservation. M.S. Thesis, Kansas State University.

List of Presentations

Bala, T., J. F. Cully, T. M. Loughin, Y. Bai, M. Kosoy, and K. L. Gage. 2007. Prevalence of Bartonella species in rodents and fleas associated with black-tailed prairie dogs. 62nd Annual Meeting, International Conference on Diseases in Nature Communicable to Man, Madison, WI.

Blecha, K. A., P. S. Gipson, and M. Peek. 2007. Distribution and population status of river otters in eastern Kansas. Annual Midwest Furbearer Workshop, Omaha, NE.

Bouska, W. W. and C. P. Paukert. 2008. Effects of road crossing design on movement and species composition of Great Plains stream fishes. Kansas Natural Resources Conference, Wichita, KS.

Bouska, W., and C. P. Paukert. 2007. Impacts of Road Crossings on Prairie Stream Fishes. Midwest Fish and Wildlife Conference, Madison, WI.

Conard, J.M., M. J. Statham, S. M. Wisely, and P. S. Gipson. 2007. Genetic structure of a reintroduced elk population. Midwest Fish and Wildlife Conference, Madison, WI.

Conard, J. M., and P. S. Gipson. 2007. Status and distribution of elk in Kansas. Kansas Chapter of The Wildlife Society Spring Meeting, Pittsburg, KS.

Cully, J. F., and T. L. Johnson. 2007. Spatial dynamics of plague in three black-tailed prairie dog complexes. Annual Meeting of the Wildlife Disease Association, Estes Park, CO.

Davis, N. and C. Paukert. 2008. An assessment of Neosho madtom related to gravel harvest from the Neosho River, Kansas. Kansas Natural Resources Conference, Wichita, KS.

Eitzmann, J. L., and C. P. Paukert. 2007. Evaluation of multiple gears to assess a Great Plains river fish community. American Fisheries Society Annual Meeting, San Francisco, CA.

Eitzmann, J. L., and C. P. Paukert. 2008. Effects of anthropogenic changes on food web dynamics in a Great Plains river. Kansas Natural Resources Conference, Wichita, KS.

Eitzmann, J., and C. Paukert. 2007. Electrofishing and hoopnetting gear comparisons for fish communities in the Kansas River, Kansas. Kansas, Nebraska, Iowa Tri-State American Fisheries Society Meeting, Council Bluffs, IA.

Fischer, J. R., and C. P. Paukert. 2007. Spatial scale of stream fish assemblages and abundance estimates: effects of sampling effort, community structure, and habitat heterogeneity. American Fisheries Society Annual Meeting, San Francisco, CA.

Fischer, J., and C. Paukert. 2007. Historical and current environmental influences on an endemic great plains fish. Kansas, Nebraska, Iowa Tri-State American Fisheries Society Meeting, Council Bluffs, IA.

Fischer, J., and C. Paukert. 2007. Sampling effort required to estimate species richness in wadeable Great Plains streams with a towed electrofishing. Kansas, Nebraska, Iowa Tri-State American Fisheries Society Meeting, Council Bluffs, IA.

Gipson, P.S., C. D. Lee, and S. Wilson. 2008. Feral hogs in Kansas and Nebraska: an exotic species undergoing rapid change. Kansas Natural Resources Conference. Wichita, KS. 22 February 2008.

Paukert, C. P., and A. S. Makinster. 2007. Flathead catfish population dynamics in the Kansas River: implications for management. Kansas, Nebraska, Iowa Tri-State American Fisheries Society Meeting, Council Bluffs, IA.

Paukert, C. P., and J. Eitzmann. 2008. Food web dynamics of a Great Plains river: effects of habitat alteration. Arizona/New Mexico Joint Annual Meeting, Prescott, AZ.

Paukert, C. P. 2007. Kansas River fishes: what do we know? Friends of the Kaw Annual Board Meeting, Lawrence, KS.

Paukert, C. P. 2007. You can't always get what you want: sampling challenges for rivers in the Great Plains. University of Kansas Field Station and Ecological Reserves Seminar Series, Lawrence, KS.

Paukert, C. P. 2007. Are the Kansas River fishes in peril? Lower Kansas River basin Watershed Restoration and Protection Strategy Meeting, Lawrence, KS.

Paukert, C. P., J. Eitzmann, J. Fischer, K. Pitts, J. Schloesser, and D. Thornbrugh. 2007. Fish community and habitat differences in dredges and undredged sites on the Lower Kansas River. Kansas, Nebraska, Iowa Tri-State American Fisheries Society Meeting, Council Bluffs, IA.

Pitts, K. L., C. P. Paukert, and J. B. Whittier. 2007. Development and Assessment of an Ecological Risk Index for Fishes in the Verde River Basin, Arizona. Midwest Fish and Wildlife Conference, Madison, WI.

Pitts, K. L., C. P. Paukert, and J. W. Whittier. 2007. Hydrologic variability in the Lower Colorado River Basin: implications for fish conservation. American Fisheries Society Annual Meeting, San Francisco, CA.

Pitts, K.L., C. Paukert, and J. Whittier. 2008. Alteration of flow regime and its influence on fish assemblages within the Lower Colorado River Basin. Arizona/New Mexico Joint Annual Meeting, Prescott, AZ.

Pitts, K.L., C. Paukert, and J. Whittier. 2008. Evaluation of an ecological risk index in quantifying threats to fishes. Arizona/New Mexico Joint Annual Meeting, Prescott, AZ.

Pitts, K.L., C. Paukert, and J. Whittier. 2008. Utility of an ecological risk index to assess threats to native fishes: insights from the Verde River Basin, Arizona. Kansas Natural Resources Conference, Wichita, KS.

Schloesser, J. T., and C. P. Paukert. 2008. The use of occupancy modeling to aid the Missouri River pallid sturgeon monitoring program. Missouri River Natural Resources Conference, Nebraska City, NE.

Schloesser, J. T., C. P. Paukert, W. Doyle, T. Hill, G. Mestl, and V. Travnichek. 2007. Probability of detection and catch rate variability by gear type for Missouri River fishes. Midwest Fish and Wildlife Conference, Madison, WI.

Schloesser, J. T., C. Paukert, W. Doyle, T. Hill, G. Mestl, and V. Travnichek. 2008. Comparison of sampling gear detection probabilities and variability for Missouri River fishes. Kansas Natural Resources Conference, Wichita, KS.

Schloesser, J. T., D. E. Haines, and C. P. Paukert. 2007. Walleye harvest restrictions to reduce gizzard shad impingement. Kansas, Nebraska, Iowa Tri-State American Fisheries Society Meeting, Council Bluffs, IA.

Schloesser, J., J. Finley, C. Paukert, W. Doyle, and T. Hill. 2007. Comparison between push trawl and mini fyke nets to sample shallow water fish communities. American Fisheries Society Annual Meeting, San Francisco, CA.

Schloesser, J., J. Finley, C. Paukert, W. Doyle, and T. Hill. 2007. Comparison between push trawl and mini fyke nets to sample shallow water fish communities. Missouri River Natural Resource Conference, Nebraska City, NE.

Severson, A. 2007. High-water habitat: fish populations in two Kansas River backwaters. Research Experience For Undergraduates Student Research Symposium, Manhattan, KS.

Severson, A., J. Schloesser, K. Pitts, J. Eitzmann, and C. Paukert. 2008. Abundance and Growth of Fishes in Main and Secondary Channels of the Kansas River. Kansas Natural Resources Conference, Wichita, KS.

VanNimwegen, R., J. F. Cully**,** and J. Kretzer, 2007. Ecosystem Engineering by a colonial mammal: How black-tailed prairie dogs small mammal communities. 87th Annual Meeting of the American Society of Mammalogists, Albuquerque, NM.

Whittier, J. B., C. P. Paukert, K. L. Pitts, and J. D. Olden. 2007. The Lower Colorado River aquatic GAP project-an update. Arizona-New Mexico American Fisheries Society Annual Meeting, Albuquerque, NM.

Whittier, J. W., C. P. Paukert, K. L. Pitts, and J. D. Olden. 2007. Lower Colorado River aquatic GAP: meeting the needs of stakeholders. National GAP Meeting, Asheville, NC.

Whittier, J.B., C.P. Paukert, K.L. Pitts, and J. Olden. 2008. Building a classification hierarchy for the Lower Colorado River Basin to provide an ecological basis for selecting conservation areas. Arizona/New Mexico Joint Annual Meeting, Prescott, AZ.

Committees and Other Professional Assignments

Wes Bouska
- Co-Chair, Raffle Committee, Kansas Chapter of the American Fisheries Society

Jack Cully
- Member, Kansas Black-footed ferret reintroduction committee
- EPA STAR Grant Review Panel

Jeff Eitzmann
- Co-Chair, Raffle Committee, Kansas Chapter of the American Fisheries Society

Philip Gipson
- Rocky Mountain Elk Foundation Kansas Research and Special Project Advisory Board
- Adjunct Professor, Texas Tech University
- Walnut Council Advisory Board

Craig Paukert
- President Elect, Kansas Chapter of the American Fisheries Society
- Associate Editor, North American Journal of Fisheries Management
- AFS Board of Professional Certification
- Chair, Skinner Memorial Award, American Fisheries Society
- AFS Farm Bill Advisory Committee
- Faculty Advisor, KSU Student Subunit of the American Fisheries Society
- Steering Committee, Kansas Natural Resources Conference
- Chair, Breakout Session, Kansas Natural Resources Conference
- Mark Enloe Memorial Scholarship, KSU Division of Biology
- Adjunct Professor, University of Arizona
- Science Committee, National Fish Habitat Initiative
- Leadership Development Program, USGS Cooperative Research Units
- Invited team member for a workshop on developing new paradigms to aid Aquatic GAP programs at the National Center for Ecological Analysis and Synthesis

Kristen Pitts
- Chair, Audio Visual Committee, Arizona/New Mexico AFS/TWS Meeting

Josh Schloesser
- President, KSU Student Subunit of the American Fisheries Society
- Audio Visual Committee, Kansas Natural Resources Conference

Joanna Whittier
- Publicity Committee, Kansas Natural Resources Conference
- Webpage Editor, Kansas Chapter of the American Fisheries Society
- Listserve Manager, Kansas Chapter of the American Fisheries Society
- Invited team member for a workshop on developing new paradigms to aid Aquatic GAP programs at the National Center for Ecological Analysis and Synthesis.

Awards and Recognition

Wes Bouska was runner up for the American Fisheries Society Best Student Writing Contest, 2007

Jeff Eitzmann was awarded the American Fisheries Society Skinner Memorial Award, 2007.

Jeff Eitzmann was awarded the Outstanding Unit Student for the Kansas Cooperative Fish and Wildlife Research Unit, 2007.

Jesse Fischer was awarded the American Fisheries Society Skinner Memorial Award, 2007.

Jesse Fischer was awarded the Kansas Chapter AFS Tiemeier-Cross Award, 2007.

Jesse Fischer won the best student presentation at the Kansas Chapter of the AFS, 2007.

Jesse Fischer won the best student poster at the Kansas Chapter of the AFS, 2007.

Josh Schloesser was a finalist for the Janice Lee Fenske Memorial Award, 2007.

Josh Schloesser was runner up for the Joan Duffy Travel Award, 2007.

Josh Schloesser was awarded fourth place for the best poster award at the Missouri River Natural Resources Conference, 2007.

Craig Paukert was awarded a USGS Performance Award in the Cooperative Research Units, 2007.

Craig Paukert won the best professional presentation at the Kansas Chapter of the AFS, 2007.

Degrees Completed 1996 - 2008

2008

Jeffrey L. Eitzmann. (M.S., 2008; Advisor: Paukert) Effects of anthropogenic disturbance on the fish assemblage and food web structure in a Great Plains river.

2007

Jesse R. Fischer (M.S., 2007; Advisor: Paukert) Structural organization of Great Plains stream fish assemblages: Implications for sampling and conservation.

2006

Jeremy Baumgardt (M.S., 2006; Advisor: Gipson) The effects of trapping methods on estimation of population parameters for small mammals.

Brian E. Flock (Ph.D., 2006; Advisor: Gipson) The effects of landscape configuration on northern bobwhite in southeastern Kansas .

Tracey N. Johnson (M.S., 2006; Advisor: Brett K. Sandercock) Ecological restoration of tallgrass prairie: grazing management benefits plant and bird communities in upland and riparian habitats.

Andrew S. Makinster (M.S., 2006; Advisor: Paukert) Flathead catfish population dynamics in the Kansas River.

Timothy R. Strakosh (Ph.D., 2006; Advisor: Keith Gido) Effects of water willow establishment on littoral assemblages in Kansas reservoirs: Focus on Age-0 largemouth bass.

Bala Thiagarajan (Ph.D., 2006; Advisor: Cully) Community dynamics of rodents, fleas and plague associated with black-tailed prairie dogs.

2005

Tammi L. Johnson (M.S., 2005; Advisor: Cully) Spatial dynamics of a bacterial pathogen: Sylvatic plague in Black-tailed prairie dogs.

Lorri A. Newby (M.S., 2005; Advisor: Cully) Effects of experimental manipulation of coterie size on demography of Black-tailed prairie dogs in South Dakota.

2004

No degrees granted

2003

Christopher D. Anderson (M.S.; 2003; Advisor: Gipson) Recreational pressure at Fort Niobrara National Wildlife Refuge: Potential impacts on avian use and seasonal productivity along the Niobrara River.

Jonathan M. Conard (M.S., 2003; Advisor: Gipson) Responses of small mammals and their predators to military disturbance in tallgrass prairie.

William E. Jensen (Ph.D., 2003; Advisor: Cully) Spatial variation in Brown-headed Cowbird (*Molothrus ater*) abundance and brood parasitism in Flint Hills Tallgrass Prairie.

Mayee Wong (M.S., 2003; Advisor: Cully) High spatial homogeneity in a sex-biased mating system: The genetic population structure of greater prairie chickens (*Tympanuchus cupido pinnatus*) in Kansas, Missouri, and Nebraska.

Stanley L. Proboszcz (M.S., 2003; Advisor: Guy) Evaluation of habitat enhancement structure use by spotted bass in natural and experimental streams.

2002

Michael C. Quist (Ph.D., 2002, Advisor: Guy) Abiotic factors and species interactions that influence recruitment of walleyes in Kansas reservoirs.

2001

Troy R. Livingston (M.S., 2001; Advisor: Gipson) Coprophagy: An ecological investigation of the consumption of mammalian carnivore feces.

Amber D. Rucker (M.S., 2001; Advisor: Cully) Conversion of tall fescue pastures to tallgrass prairie in southeastern Kansas: Small mammal responses.

Gerald L. Zuercher (Ph.D., 2001; Advisor: Gipson) The ecological role of the Bush Dog, *Speothos venaticus*, as part of the mammalian predator community in the Interior Atlantic Forest of Paraguay.

2000

Patrick J. Braaten (Ph.D., 2000; Advisor: Guy) Growth of fishes in the Missouri River and Lower Yellowstone River, and factors influencing recruitment of freshwater drum in the lower channelized Missouri River.

Travis B. Horton (M.S., 2000; Advisor: Guy) Habitat use and movement of spotted bass in Otter Creek, Kansas.

Sally J. Schrank (M.S., 2000; Advisor: Guy) Population characteristics of bighead carp *Hypophthalmichthys nobilis* larvae and adults in the Missouri River and interspecific dynamics with paddlefish *Polyodon spathula*.

Patricia R. Snyder (M.S., 2000; Advisor: Gipson) Assessment of activity transmitters based on behavioral observations of coyotes, bobcats, and raccoons.

Jeffry A. Tripe (M.S., 2000; Advisor: Guy) Density, growth, mortality, food habits, and lipid content of age-0 largemouth bass in El Dorado Reservoir, Kansas.

1999

Justin E. Kretzer (M.S., 1999; Advisor: Cully) Herpetological and coleopteran communities of black-tailed prairie dog colonies and non-colonized areas in southwest Kansas.

Michael C. Quist (M.S., 1999; Advisor: Gipson) Structure and function of fish communities in streams on Fort Riley Military Reservation.

James W. Rivers (M.S., 1999; Advisor: Gipson) Seasonal avian use patterns of farmed wetlands and nest predation dynamics in riparian grasslands dominated by reed canary grass (*Phalaris arundinacea*).

Stephen L. Winter (M.S., 1999; Advisor: Cully) Plant and breeding bird communities of black-tailed prairie dog colonies and non-colonized areas in southwest Kansas and southeast Colorado.

1998

Jan F. Kamler (M.S., 1998; Advisor: Gipson) Ecology and interspecific relationships of mammalian predators on Fort Riley Military Reservation, Kansas.

1997

Matthew N. Burlingame (M.S., 1997; Advisor: Guy) 1995 Kansas licensed angler use and preference survey and attitudes towards angling by secondary education students.

Greg A. Hoch (M.S., 1997; Advisor: Cully) Mapping and monitoring of disturbance from military training at Fort Riley, Kansas and an investigations into the stability of grassland ecotones using satellite remote sensing.

David E. Hoover (M.S., 1997; Advisor: Gipson) Vegetation and breeding bird assemblages in grazed and ungrazed riparian habitats in southeastern Kansas.

Raymond S. Matlack (M.S., 1997; Advisor: Gipson) The swift fox in rangeland and cropland in western Kansas: Relative abundance, mortality, and body size.

Heidi L. Michaels (M.S., 1997; Advisor: Cully) Landscape and fine scale habitat of the Loggerhead Shrike and Henslow's Sparrow on Fort Riley Military Reservation, Kansas.

Jeff S. Tillma (M.S., 1997; Advisor: Guy) Characteristics of spotted bass in southeast Kansas streams.

1996

William K. Smith (M.S., 1996; Advisor: Gipson) Responses of Ring-necked Pheasants to Conservation Reserve Program fields during courtship and brood rearing in the high plains.

Jennifer R. Wiens (M.S., 1996; Advisor: Guy) Effects of tree revetments on the abiotic and biotic components in two Kansas streams.