OKLAHOMA COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT

BIENNIAL REPORT 2010|11

Celebrating Our 7th Decade

IN COOPERATION WITH
Oklahoma State University
Oklahoma Department of Wildlife Conservation
Wildlife Management Institute
U.S. Geological Survey
U.S. Fish and Wildlife Service

welcome

OPPORTUNITIES FOR GRADUATE STUDY

NATURAL RESOURCE ECOLOGY AND MANAGEMENT AND BEYOND!



COVER

Diversity of crayfish in Oklahoma is very high. At least 30 species and many subspecies occur in streams and rivers throughout the state. The brilliant western painted crayfish *(Orconectus palermi longimanus)* is featured on the cover, and two Unit projects are assessing flow alterations and habitat conditions relative to conservation of crayfish, including the uncommon mena crayfish *(O. menae)*, and other aquatic species. Brandon Brown with the Oklahoma Department of Wildlife Conservation took the cover photograph, used with permission.

Biennial Report designed by the Marketing Services at Oklahoma State University.

It is our great pleasure to circulate the **Biennial Report of the Oklahoma Cooperative Fish and Wildlife Research Unit**, which highlights graduate research and scholarship for 2010–2011.

The Oklahoma Unit of the U.S. Geological Survey's Cooperative Research Units Program has been an integral part of graduate-level research and post-graduate training in natural resources, particularly fisheries and wildlife conservation, at Oklahoma State University since 1948.

With direction from our Coordinating Committee, research is conducted on a wide variety of natural resource conservation topics in cooperation with federal and state agencies, the University, the Oklahoma Department of Wildlife Conservation, the U.S. Fish and Wildlife Service, the Wildlife Management Institute, and various private entities. Most of our research projects are problem oriented and designed to provide cooperators with useful information on time-sensitive natural resource issues.

From its establishment in 1948 to 2006, the Unit was affiliated most closely with OSU's Department of Zoology in the College of Arts and Sciences. In 2006, the Unit's primary affiliation moved to the new Department of Natural Resource Ecology and Management in the Division of Agricultural Sciences and Natural Resources. Such changes have expanded cooperative research and enhanced the Unit's ability to assist faculties and students of both colleges and departments and beyond.

Research through the Oklahoma Unit is conducted mainly by M.S. and Ph.D. candidates. Almost 400 theses and dissertations have resulted from their persistence and scholarship. Unit students have conducted research on fisheries management in reservoirs, ponds, and rivers; stream ecology; species of special concern including the Arkansas river shiner and Ozark big-eared bat; toxicology; and management of bobwhite quail, black bears, and spotted bass. While many of our research projects occur in Oklahoma, the Unit's reach includes activities in Texas, New Mexico, Nebraska, and beyond. As we continue in our 7th decade, future projects will continue to emphasize applied research on the natural resources of Oklahoma and the nation.

The Oklahoma Unit and its Cooperators would be pleased to share additional information on any project summarized herein. You are welcome to contact any of the investigators listed by project through the Unit Office.

Additional information about our cooperators can be found at www.coopunits.org, www.okstate.edu, www.wildlifedepartment.com, www.wildlifemanagementinstitute.org, and www.fws.gov.

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Richard Hatcher
Director, Oklahoma Department of Wildlife Conservation

Byron K. Williams
Chief, Cooperative Research Units, U.S. Geological Survey

Steve A. Williams
President, Wildlife Management Institute

CONTENTS

2010 2011

The **UNIT BIENNIAL REPORT** is a publication of the Oklahoma Cooperative Fish and Wildlife Research Unit to disseminate information about Unit research and scholarly activities at Oklahoma State University. It is intended to encourage communications among interested parties. Please contact the Unit for further information and dialog.

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Biennial Report 2010 2011

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U.S. FISH AND WILDLIFE SERVICE

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U.S. DEPARTMENT OF DEFENSE

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U.S. DEPARTMENT OF AGRICULTURE

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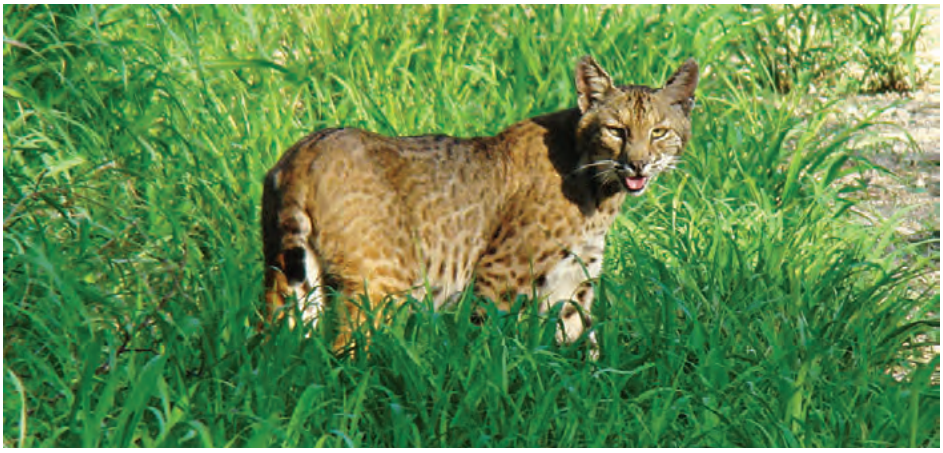
Graduated in FY10–11
* Unit-based project
** Non-Unit-based project

V. CAVALEIRI



BOBCAT IN LOWER RIO GRANDE VALLEY

Aquatic Resources

COMPLETED PROJECTS

Macroinvertebrate and fish assemblages in tallgrass prairie streams

We surveyed macroinvertebrates and fish in the Caney, Verdigris and Neosho rivers in the Tallgrass Prairie region of Oklahoma to determine relative abundance and diversity, used stable isotopes of nitrogen to assess spatial variation among trophic levels and determined the range and density of invading zebra mussels in the Verdigris, Neosho, and Arkansas rivers. Thirty-nine species of fish were identified from the three rivers, with the Caney River having the most diverse assemblage with 26 species. Macroinvertebrate abundance was positively correlated with mussel abundance and richness in the Verdigris River. Stable isotope concentrations of representative biota indicated three trophic levels in the Caney River and four in the Verdigris River. Zebra mussel numbers were low to non-existent in the three rivers.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Chad Boeckman, Ph.D. Candidate

FACULTY SUPPORT
Joseph R. Bidwell and William L. Fisher

COMPLETED
May 2011

Serving the Digital Atlas of Oklahoma Fishes

Information on the distribution of fishes in Oklahoma was compiled in the Digital Atlas of Oklahoma Fishes (DAOF). The DAOF is comprised of four interconnected user interfaces: an information based website, a database management system, an interactive map and a database query module that interacts with the interactive map and database management system. We migrated data from the DAOF to a server hosted by the ODWC. ODWC will maintain the DAOF and distribute information about the fishes of Oklahoma through a dedicated website. This will benefit ODWC fishery biologists and other interested professionals and laypersons.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
William L. Fisher and Greg Summers, ODWC

COMPLETED
March 2010

B. BROWN

CARDINAL SHINERS

Blue catfish gut passage as a vector for the dispersal of invasive bivalves

We investigated the potential for survival of zebra mussel and Asian clam through the gut of blue catfish as a dispersal mechanism for these invasive bivalves. Blue catfish sampled from Sooner Lake, Oklahoma, were transported to a wet laboratory and placed into individual tanks. After 48 hours, fish were removed and all fecal material was collected and inspected for live mussels. Most fish had zebra mussels and Asian clams in their feces and many were alive. Mussel survival was significantly related to water temperature, with no mussels surviving above 21.1 C°. We found that 12% of zebra mussels (N = 939) and 39% of Asian clams (N = 408) consumed in cool water survived gut passage.

FUNDING
Oklahoma Cooperative Fish and Wildlife Research Unit; Department of Natural Resource Ecology and Management

INVESTIGATOR
Michael Gatlin, Lab Technician

FACULTY SUPPORT
James M. Long and Daniel E. Shoup

COMPLETED
December 2011

Black bass abundance and management in eastern Oklahoma streams

Effective management of stream fisheries requires, among other things, information on habitat and fish populations. Since the late 1980s, the ODWC has conducted and supported research on stream fisheries in eastern Oklahoma. Using data from those efforts, the objectives of this project were to model distribution and abundance of black bass populations in eastern Oklahoma streams using existing survey data and spatial data analyses and to develop a black bass management plan for those streams based on the modeled distribution and abundance and habitat and angler survey information. Using classification and regression tree analysis, sites with and without smallmouth bass were discriminated using four geomorphic variables: downstream link of tributaries, watershed, geologic formation and stream order. These findings and those from recent studies on black bass populations in eastern Oklahoma should provide a basis for future black bass management.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
William L. Fisher

COMPLETED
February 2010

Bioaccumulative contaminants in turtles of eastern Oklahoma

As a companion study to our survey of turtles in eastern Oklahoma, we assessed the contaminant load present in turtles from eastern Oklahoma. Knowledge of the contaminant load is important because turtles from this region are used as a food source. We focused on three species of turtles, *Chelydra serpentine*, *Apalone spinifera* and *Trachemys scripta*. Persistent organic pollutants (PCBs, PBDEs, DDE and trans-nonachlor) were only found at very low concentrations. However, mercury concentrations in all three species of turtles, especially *Chelydra serpentine* and *Apalone spinifera*, were high enough that development of food consumption guidelines is warranted.

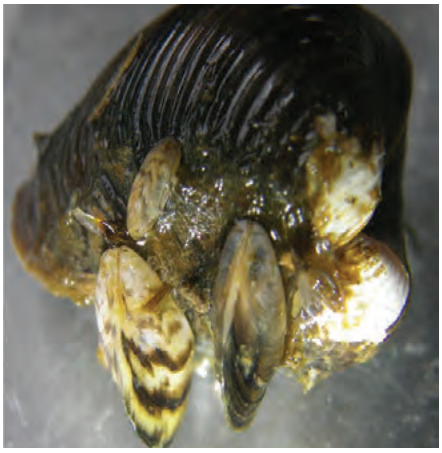
FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Alisha Powell, M.S. Candidate

FACULTY SUPPORT
Jason Belden and Joe Bidwell

COMPLETED
January 2012

M. GATLIN



INVASIVE BIVALVES AFTER GUT PASSAGE

J. LONG

SPOTTED BASS

E. JOHANSEN

TURTLE

Evaluation of shoal bass restoration in the Chattahoochee River, Georgia

In 2003, Georgia Department of Natural Resources and the National Park Service initiated a 5-year stocking program to restore native shoal bass to the Chattahoochee River below Morgan Falls Dam. Shoal bass were marked with oxytetracycline (OTC) to differentiate them from naturally occurring fish. Sampling for juvenile and adult fish was conducted during the restoration period and this project assessed the effectiveness of the stocking. Stocked shoal bass dominated the total sample of adult fish collected (62%) and most of these fish (41%) were stocked at the larger size class. Based on results from multiple regression modeling, age-3 shoal bass catch-per-unit-effort was positively related to mean size at stocking and spring water temperatures.

FUNDING
U.S. National Park Service, U.S. Fish and Wildlife Service, Georgia Power, Georgia Department of Natural Resources

INVESTIGATOR
Mike Porta, M.S. Candidate

FACULTY SUPPORT
James M. Long

COMPLETED
December 2011

Rainbow trout reproduction in a southern tailwater trout fishery

Electrofishing surveys in small (1st- and 2nd-order), warm-water tributaries of the Chattahoochee River below Morgan Falls Dam have documented spawning of stocked rainbow trout, which were presumed to be unsuitable. From samples of seven spawning adults and 28 naturally reproduced juveniles, we estimated that 24 individuals were spawning to produce the amount of genetic variation observed, although none of the mature males we sampled were indicated as sires. Analysis of the mitochondrial D-loop region identified four distinct haplotypes, suggesting that individuals representing four maternal lineages contributed to the offspring. Our analyses indicated that many more adults were spawning in this system than previously estimated with direct count methods and provided insight into rainbow trout spawning behavior.

FUNDING
Oklahoma Cooperative Fish and Wildlife Research Unit

INVESTIGATOR
Dana Lee and Justin Lack, Ph.D. Candidates

FACULTY SUPPORT
James M. Long and Ronald Van Den Bussche

COMPLETED
June 2011

Pesticide deposition in High Plains wetlands

Depressional wetlands (e.g., playas, potholes) throughout the High Plains provide a number of important ecological services. However, because such wetlands are a collection point for watershed runoff, the potential for pesticide deposition is high. We assessed the effects of land-use (cropland, native grassland and conservation resource program [CRP]) on pesticide input into wetlands by conducting analysis on sediments collected from 270 wetlands across five states. Moderately persistent herbicides, including atrazine, metolachlor and trifluralin, were the most commonly detected. Wetlands embedded in native grassland and CRP have significantly less pesticide input as compared with those embedded in cropland.

FUNDING
USDA Natural Resources Conservation Service

INVESTIGATOR
Brittany Holzer, M.S. Candidate

FACULTY SUPPORT
Jason Belden, Scott McMurry, Joe Bidwell, Loren Smith, Ned Euliss and David Haukos

COMPLETED
March 2011

J. LONG

SHOAL BASS FROM BIG CREEK, GA

J. LONG

JUVENILE TROUT FROM CABIN CREEK, GA

L. SMITH

PLAYA WETLAND

Conservation genetics of Blue River fishes

The Blue River is a minimally-altered, spring-fed stream originating from the Arbuckle-Simpson aquifer in southcentral Oklahoma. Four fish populations in the Blue River (red spot chub, least darter, logperch and orangebelly darter) are geographically isolated from other populations of their respective species. We used mitochondrial DNA (mtDNA) phylograms and a phylogentic diversity/genetic history approach to assess degrees of divergence from other populations. The results show that the four Blue River populations have had different histories in Blue River. The orangebelly darter in Blue River is the most distinctive member of its species and the least darter in Blue River is part of a complex of equally divergent Ozark populations. The redspot chub and logperch in Blue River are weakly divergent from populations in eastern Oklahoma. These results were interpreted with respect to conservation issues for Blue River fishes.

FUNDING
U.S. Geological Survey

INVESTIGATOR
Nick Lang, Postdoctoral Fellow

FACULTY SUPPORT
Anthony E. Echelle, Ron A. Van Den Bussche and William L. Fisher

COMPLETED
September 2010

B. BROWN

ORANGETHROAT DARTER

Aquatic Resources

ONGOING PROJECTS

Survey of freshwater turtles in eastern Oklahoma

Due to conservation concerns, the Oklahoma Department of Wildlife Conservation enacted a three-year moratorium on commercial turtle harvest from public waters of Oklahoma in 2008. Eastern Oklahoma harbors 14 species of freshwater turtle species, two of which (alligator snapping turtle and map turtle) are listed as species of special concern in the state. We conducted surveys to assess the freshwater turtle populations of eastern Oklahoma, compared our results to earlier surveys in the late 1990s, compared turtle communities in presumptive harvested sites to non-harvested sites and conducted a field experiment to assess the short-term effect of commercial turtle harvest.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Eric P. Johansen, M.S. Candidate

FACULTY SUPPORT
Stanley Fox, Jason Belden and David M. Leslie, Jr.

EXPECTED COMPLETION
December 2012

E. JOHANSEN

COMMON SNAPPING TURTLE

USDA programs effects on High Plains playa wetlands

This research is assessing the influence of USDA conservation practices on playa wetland ecosystems in the High Plains. We are evaluating ecosystem services for playa wetlands in three land treatment groups: cropland, lands enrolled in USDA conservation programs (e.g., CRP and WRP) and grassland. Results include the development of predictive functional condition indicator models that include multiple-scale factors that contribute to differences in ecosystem service estimates. The work has received additional USDA funding to develop models for a USGS Integrated Landscape Modeling effort. One PhD student completed her degree in December 2011.

FUNDING
USDA Natural Resources Conservation Service

INVESTIGATOR
Jessica O'Connell, Ph.D. Candidate

FACULTY SUPPORT
Loren Smith and Scott McMurry

EXPECTED COMPLETION
December 2013

Economic impact of the cold-water trout fishery

The Lower Mountain Fork River below Broken Bow Lake has been managed by the Oklahoma Department of Wildlife Conservation (ODWC) as a put-and-take trout fishery since 1988. Studies conducted recently after the establishment of this fishery indicated that additional license sales more than paid for the cost of stocking fish. However, in recent years, management of the tailwater trout fishery has evolved, giving anglers more options regarding the type of fishing they want to experience. We have completed an on-site creel and conjoint choice survey as well as follow-up telephone surveys to estimate the use value of the site to anglers. The travel cost expenditure information was also used to estimate the economic impact of the trout fishery to the local area at roughly $25 million in 2011. This research shows that the fishery functions as a significant contributor to the local economy.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Michael Reilley and JoeDee Schmidt, M.S. Candidates

FACULTY SUPPORT
Tracy A. Boyer, David Shideler and James M. Long

EXPECTED COMPLETION
June 2012

Channel catfish stocking in Oklahoma reservoirs

Catfish is the third most sought-after species by recreational anglers nationwide, and Oklahoma anglers pursue catfish proportionally more than the national average. Raising and stocking 7-inch channel catfish into medium-sized reservoirs are commonly practiced in Oklahoma, but they have not been sufficiently evaluated. We are determining the contribution of stocked 7-inch channel catfish to angler catch and harvest and to overall population structure in six medium-sized reservoirs. We are using hoop nets to capture channel catfish for population assessments and daytime access-point creel surveys four months before and four months after stocking to assess harvest and angler satisfaction. Results should help refine ODWC stocking protocols and hatchery needs.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Randy Stewart, Ph.D. Candidate; Jeremy Duck and Nate Gonsoulin, Field Technicians

FACULTY SUPPORT
James M. Long

EXPECTED COMPLETION
December 2013

L. SMITH

PLAYA WETLANDS

T. BOYER

FLY FISHING THE LOWER MOUNTAIN FORK

J. LONG

SETTING HOOP NETS

Mortality of blue catfish caught by jug fishing

Angling for blue catfish is becoming increasingly popular. Given their slow growth, harvest restrictions on large fish have been implemented to avoid overharvest of rare, large fish. We are assessing delayed mortality rates of blue catfish caught by jug fishing to ensure that fish released under this new regulation will survive, thus making the regulation effective. In field trials, overall mortality was low (8.5%) and mortality of fish over 30 inches was consistently near 0%. These preliminary results suggest the new regulation should be effective at protecting large blue catfish.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Joseph Schmitt, M.S. Candidate

FACULTY SUPPORT
Daniel Shoup

EXPECTED COMPLETION
June 2012

Modeling freshwater mussel distribution in southeastern Oklahoma

The small rivers in the Ouachita Mountains, Arkansas Valley and Western Gulf Mid-Coastal Plain Region and the Southern Cross Timbers Region are listed in the Oklahoma Comprehensive Wildlife Conservation Strategy as very high priority conservation landscapes. Among the organisms found in these rivers are native unionid mussels that as a group are highly imperiled throughout the world. A lack of basic data on the location and composition of mussel assemblages in many Oklahoma rivers represents a significant impediment for conservation planning and implementation. Our efforts will focus on the Muddy and Clear Boggy rivers where there are limited data about freshwater mussels. We will sample these rivers to identify bed locations and species composition and build models to predict landscape and in-channel habitat and geomorphic features that relate to bed locations and species abundance.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Jarrod Powers, M.S. Candidate

FACULTY SUPPORT
Shannon Brewer and Tim O'Connell

EXPECTED COMPLETION
June 2014

Impact of flow alterations on crayfishes in southeastern Oklahoma

Crayfish contribute significantly to aquatic diversity worldwide, especially in North America. Approximately half of the crayfish fauna in Canada and the United States are of conservation concern. Despite their obvious imperilment, large data gaps exist that prevent our understanding of basic life-history requirements and the responses of populations to anthropogenic changes (e.g., water withdrawals). This lack of knowledge is especially problematic given crayfish are such an important component of stream ecosystems. This study will determine the distribution and abundance of *Orconectes mena* and sympatric species that are endemic to the Ouachita Mountains. In addition, *O. mena* will be tagged and tracked during the base-flow period to examine behavioral responses to stream drying.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Joey Dyer, M.S. Candidate

FACULTY SUPPORT
Shannon Brewer and Michael Tobler

EXPECTED COMPLETION
December 2013

D. SHOUP

LARGE BLUE CATFISH

S. BREWER

MUSSEL FROM BOGGY RIVER

B. BROWN

CRAYFISH FROM SOUTHEAST OKLAHOMA

Reproductive success of Arkansas River shiner

This study evaluates changes within the native distribution of the Arkansas River shiner (*Notropis girardi*), a species once common throughout Oklahoma, southern Kansas, western Arkansas, northern Texas and northwestern New Mexico. The Arkansas River shiner represents a reproductive ecotype that is threatened by the effects of river fragmentation and changes to flow regimes in the Great Plains region. Presence data from museum collections, published and grey literature, will be combined with information on geomorphology and hydrology to construct a time-series of the species' historical range and elucidate causes of its decline at the landscape scale. We will also assess effects of environmental factors on early life stages of Arkansas River shiner and determine how habitat complexity influences the transport of the species' semi-buoyant eggs. The research will provide information essential to designing suitable management strategies for this and other similar Great Plains cyprinids.

FUNDING
U.S. Fish and Wildlife Service, Great Plains Landscape Conservation Cooperative

INVESTIGATOR
Tom Worthington, Postdoctoral Fellow

FACULTY SUPPORT
Shannon Brewer and Tim Grabowski

EXPECTED COMPLETION
May 2013

Habitat use and movement by fishes in shallow water

Rivers in Oklahoma present potential management problems because, currently, no instream-flow guidelines exist. Recognition of the importance of instream flow in water laws has increased substantially in recent years, particularly where unappropriated water still exists, or reallocation might be possible. An important aspect of instream-flow decisions is ensuring the appropriate quantity of water is requested at biologically-significant periods (i.e., spawning, juvenile rearing). The goal of this study is to provide Oklahoma with ecologically relevant minimum flow recommendations. Relations between habitat and flow will be assessed using a modified wetted-perimeter method and paired with habitat use, movement patterns and survival of fishes.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Chris Musselman, M.S. Candidate

FACULTY SUPPORT
Shannon Brewer

EXPECTED COMPLETION
December 2013

Effects of hydrologic alteration on fish in Lee Creek

Lee Creek is one of six scenic rivers in Oklahoma, but it was dammed at the lower end in 1992 (Lee Creek Dam) and proposed for damming on the upper end (Pine Mountain Dam). Lee Creek contained five species of fish considered as species of greatest conservation need including the last known population of longnose darter (*Percina nasuta*) in the state. We are conducting the first fish inventory since Lee Creek Dam was constructed to determine the status of the fish community, focusing on the species of greatest conservation need. We are investigating how land-use, precipitation patterns and hydrology have changed since dam construction and how these factors might have influenced the fish community. To date, we have captured 39 fish species including four of the five species of greatest conservation need and mapped all underwater habitat via side-scan sonar.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Michael Gatlin, M.S. Candidate; Steven Maichak, Field Technician

FACULTY SUPPORT
James M. Long and Don Turton

EXPECTED COMPLETION
June 2013

S. BREWER

ARTIFICIAL EGGS

M. GATLIN

LEE CREEK

Characteristics of reservoir populations of paddlefish

Paddlefish (*Polyodon spathula*) were historically abundant in the large rivers of Oklahoma, but reservoir construction, over-exploitation and pollution have limited their abundance. Two reservoirs in Oklahoma, Grand Lake and Keystone Lake, have maintained self-sustaining populations of paddlefish, but several differences exist. In Grand Lake, paddlefish are numerous, but smaller in body size than those in Keystone Lake. Moreover, the snag fishery at Grand Lake is much more popular than that at Keystone Lake. This research is quantifying the differences between the two reservoirs and their resident paddlefish populations. To date, relative abundance of the two populations are similar based on gill net surveys, but fish from Keystone are much heavier per length than fish in Grand. Approximately 60% of all paddlefish anglers in Oklahoma fish at Grand compared to less than 10% at Keystone.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Ashley Nealis, M.S. Candidate

FACULTY SUPPORT
James M. Long

EXPECTED COMPLETION
May 2013

Factors affecting the distribution of endangered fish and crayfish

The Oklahoma Comprehensive Wildlife Conservation Strategy (OCWCS) indicates that small rivers (Spring and Illinois), gravel bottom streams (Spavinaw Creek) and large rivers (Grand-Neosho River) in the Ozark Region represent priority conservation landscapes. These habitats historically and currently support a number of fish and crayfish species of concern. We are evaluating the population biology and conservation status of state-listed fish and crayfish in the northeastern portion of Oklahoma through field surveys to assess distribution and habitat requirements of the listed species. We are also evaluating current and historical ranges of the listed species using ecological niche modeling to identify landscape level environmental factors shaping species distributions.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Reid Morehouse, Ph.D. Candidate

FACULTY SUPPORT
Michael Tobler

EXPECTED COMPLETION
May 2014

Water quality and fish communities in the upper Cimarron River

The Cimarron River in Oklahoma is largely undammed except for a 23-km long irrigation canal (Old Settler's Irrigation Canal) built between 1893 and 1905. Water from the Cimarron River is diverted into the canal by bulldozing a sand dam in the river, which is destroyed periodically by high flows and then re-built. As a result, much of the river is de-watered in this stretch for much of the year, altering habitat for fishes. We are examining how fish communities respond to the altered habitat by surveying above, below and within the altered reach as well as within the canal. We hypothesize that as water quantity is reduced, water quality (temperature, dissolved oxygen and conductivity) will be affected and in turn alter the fish community.

FUNDING
U.S. Fish and Wildlife Service, Oklahoma Cooperative Fish and Wildlife Research Unit

INVESTIGATOR
Chris Tanner, M.S. Candidate

FACULTY SUPPORT
James M. Long

EXPECTED COMPLETION
July 2013

A. NEALIS

MEASURING PADDLEFISH ON BOAT

C. TANNER

BLOCK NET ON UPPER CIMARRON RIVER

Microbial water-quality impacts of migratory birds in the Central Platte River Basin

In 2009 and 2010, the US Geological Survey in Nebraska completed sampling for a study to investigate the impacts of migratory birds such as sandhill cranes and geese on the microbial water quality of the Platte River during the spring migration period. Sampling was completed from a period starting before the spring migration (January) until after the spring migration (May). The interpretation of these data began in 2010 as a cooperative project between the USGS and OSU. Preliminary results indicate that the migratory birds significantly increase the concentration of pathogens and pathogen indicators in the Platte River during the period when the birds are present.

FUNDING
USGS Nebraska Water Science Center

INVESTIGATOR
Hayat Azawi and Katie Beitz, Ph.D. Candidates; Jessica Lay, M.S. Candidate

FACULTY SUPPORT
Jason R. Vogel

EXPECTED COMPLETION
September 2012

J. VOGEL

CENTRAL PLATTE RIVER BASIN

Terrestrial Resources

COMPLETED PROJECTS

Fire frequency and deer nutrition in the cross timbers

Fire plays a dominant role in determining the vegetation composition and structure of the Cross Timbers, but its exclusion over many decades has led to changes in the vegetation and its quality to white-tailed deer. We evaluated effects of prescribed fires at various intervals over the past 25 years at three Wildlife Management Areas in central and eastern Oklahoma relative to nutrition of white-tailed deer. Indices of isotopic carbon and nitrogen from tissue (muscle, hoof, liver, bone) and fecal samples were used to compare deer from areas that differ in their cover of cross timbers forest and their frequencies of prescribed fire. Overall, isotopes values in most tissue types suggested annual diets dominated by C_3 plants and isotopes values in muscle, in particular, suggested an increase in dietary nitrogen in areas that had been recently burned. Based on isotope analyses of feces collected in late winter, all deer, regardless of the frequency of prescribed fire, consumed diets likely low in nitrogen.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Glen Hensley, M.S. Candidate

FACULTY SUPPORT
David M. Leslie, Jr., Steve Hallgren, Jim Shaw, and Terry Bidwell

COMPLETED
May 2011

W. J. BERG — USFWS

WHITE-TAILED DEER FAWN

Human disturbance and wintering waterfowl at Bosque del Apache

Bosque del Apache National Wildlife Refuge in the Middle Rio Grande Valley of New Mexico provides wintering habitat to thousands of migratory waterfowl and sandhill cranes. This research was focused on the effect of non-consumptive human disturbance on wintering waterfowl at Bosque del Apache. Body condition, time-budget assessments and corticosterone levels were assessed, with primary focus on northern pintails because of its international importance. The study has been completed and one student finished his MS degree on the project.

FUNDING
U.S. Fish and Wildlife Service

INVESTIGATOR
Dustin Taylor, M.S. Candidate

FACULTY SUPPORT
Loren Smith, Matt Lovern and Scott McMurry

COMPLETED
September 2010

Control of exotic salt cedar at Salt Plains National Wildlife Refuge

Salt cedar was introduced in the U.S. in the 1880s; it spread rapidly thereafter. It grows aggressively and can rapidly deplete ground water. This project investigated biological control of salt cedar at Salt Plains National Wildlife Refuge in north-central Oklahoma with the salt cedar beetle (*Diorhabda carinulata*), a known herbivore of salt cedar. Assessments included documenting the genetic status of salt cedar at the refuge, evaluating strains of salt cedar beetle and their potential natural enemies and evaluating vegetative succession following defoliation. Three releases of *Diorhabda carinulata* were made in 2009-2010 in a confined cage and while beetle populations within the cage occurred, subsequent overwintering of beetles was not successful.

FUNDING
U.S. Fish and Wildlife Service

INVESTIGATOR
Alissa Berro, M.S. Candidate

FACULTY SUPPORT
Tom A. Royer

COMPLETED
May 2010

Survey of small mammals at Red Slough in southeastern Oklahoma

Public and scientific interest in small mammals has increased in recent years because of their association with various human health issues and concerns over species that may be in need of special conservation attention. Nevertheless, relatively little is known about the status and habitat affinities of small mammals in Oklahoma, particularly in the southeastern part of the state. We conducted an inventory of non-game small mammals at Red Slough in the Ouachita National Forest in southeastern Oklahoma. Rodent trapping and mist netting resulted in 576 captures representing four species of bats, 13 species of rodents, two species of shrews and a squirrel. Additionally, staff personnel provided us with four beavers, an opossum and a nutria. Documentation of the Least Shrew, Little Brown Myotis and Deer Mouse are new records for McCurtain Co. Many other species are new records for the Red Slough Wildlife Management Area.

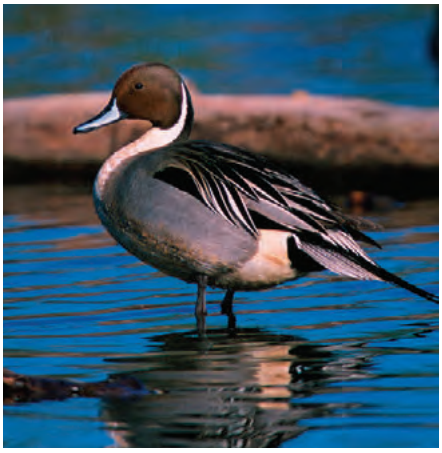
FUNDING
U.S. Forest Service

INVESTIGATORS
Zachery Roehrs, Postdoctoral Fellow; Justin Lack, Ph.D. Candidate; Craig Stanely, M.S. Candidate

FACULTY SUPPORT
Ronald A. Van Den Bussche, Meredith J. Hamilton and David M. Leslie, Jr.

COMPLETED
December 2011

G. CRAMER



NORTHERN PINTAIL

T. ROYER

SALT CEDAR BEETLE

E. JOHANSEN

RACOON IN TURTLE TRAP!

Ecology and conservation status of the Pantanal cat

Pampas cats in the genus *Leopardus* are a difficult group taxonomically and offer considerable conservation challenges in South America because of their uncertain status relative to geographic distribution and population status. We undertook a review of the extant literature on this group of small felids, with a particularly focus on the Pantanal cat (*L. braccatus*) of central South America. It is clear from this review that considerably more research is required to clearly delimit specific and subspecific status in this group and to have enough ecological and behavioral information to guide conservation efforts.

FUNDING
Oklahoma Cooperative Fish and Wildlife Research Unit

U.S. Fish and Wildlife Service

INVESTIGATORS
Anita Barstow, M.S. Candidate

FACULTY SUPPORT
David M. Leslie, Jr., Craig A. Davis and James H. Shaw

COMPLETED
May 2010

M. MOTTA

PANTANAL CAT OF SOUTH AMERICA

Terrestrial Resources

ONGOING PROJECTS

Evaluation of Oklahoma EQIP-Quail Habitat Restoration Initiative

We are evaluating the effectiveness of the EQIP-Quail Habitat Restoration Initiative in increasing populations of Northern Bobwhite and other early–successional bird species in four focal areas throughout Oklahoma. From 2009–2011, we detected 93 bird species. Bobwhite populations were highest in western Oklahoma, while bird species richness was highest in eastern Oklahoma. Bobwhite populations and bird community composition changed along a gradient of overstory canopy cover, with herbaceous vegetation height having a secondary, but still important, effect. Although bobwhite populations did not increase significantly, restoration showed the potential to positively affect declining grassland birds.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Andrew Crosby, M.S. Candidate

FACULTY SUPPORT
Dwayne Elmore, Rodney Will and David M. Leslie, Jr.

EXPECTED COMPLETION
July 2012

A. CROSBY

MEASURING CANOPY COVER

Bobwhite population and habitat studies

Bobwhite populations have experienced a general decline of about 3.0% per year across most of their range over the last 40–50 years. Our objective is to determine the major factors driving long-term changes in western Oklahoma bobwhite populations, relative to the interaction of fire and grazing. Because the distribution-wide decline is often attributed to widespread loss of nesting and brood-rearing habitat, we will focus attention on habitat changes as they affect this critical habitat requirement. The experimental design involves a complex application of fire and grazing over a 6-year period. We plan to assess the relationship between weather and bobwhite population change; use radiotelemetry to assess nesting and brood-rearing; model the thermal landscape relative to nest initiation, nest success and brood and adult survival; monitor vegetation change relative to habitat manipulations; and evaluate and establish repeatable standardized methods for measuring abundance of bobwhites.

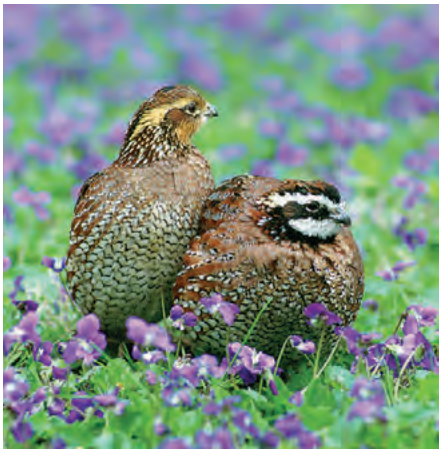
FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATORS
Eric Thacker, Postdoctoral Fellow, Matt Carroll and Evan Tanner, Ph.D. Candidates

FACULTY SUPPORT
Craig Davis, Dwayne Elmore, Sam Fuhlendorf, Fred Guthery and David M. Leslie, Jr.

EXPECTED COMPLETION
July 2017

S. MASLOWSKI — USFWS



NORTHERN BOBWHITE

Arthropod availability and bobwhite nesting success

Bobwhite feed increasingly on arthropods beginning in early spring and chicks rely almost exclusively on insects and other terrestrial invertebrates until at least four weeks of age. Hens may use available arthropod prey in assessing potential nesting sites, because arthropod prey of appropriate type and size near nesting sites is critical to survival of chicks in their vulnerable first weeks of life. Vegetation and landscape structure associated with nesting, brooding and chick foraging must ultimately maximize preferred arthropod abundance, which is a determinate of brood habitat quality. Spring and summer arthropod sampling will be coordinated with habitat manipulation and radiotelemetry studies mentioned in the previous study. We also will collect chick feces from overnight brooding/roosting sites that have been located by radiotelemetry to assess chick diets; molecular methods will be used to identify invertebrates that would not normally be detectable in feces.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATORS
Valerie O'Brien, Postdoctoral Fellow; Alli Giguere and Kenneth Masloski, M.S. Candidates

FACULTY SUPPORT
Michael Reiskind and Carmen Greenwood

EXPECTED COMPLETION
July 2015

R. GRANTHAM

A FAVORITE QUAIL FOOD

Aerial and terrestrial predators and bobwhite usable space

During the nesting phase, in particular, bobwhites are susceptible to predation from a wide variety of predators including raccoons, bobcats, opossums, skunks and crows. At other times of the year, they are susceptible to aerial predators such as raptors. For example, predation by raptors was the most important contributor to average annual mortality in a study of more than 2,600 bobwhites tracked via radio telemetry in western Oklahoma. We plan to survey diurnal raptors seasonally to determine their abundance and preferred habitats and perching sites. Terrestrial predators also will be surveyed. We will conduct a GIS analysis that will model usable space for quail, modified with overlays of important habitat use features selected by diurnal raptors and terrestrial predators.

FUNDING
Oklahoma Department of Wildlife Conservation

FACULTY SUPPORT
Tim O'Connell and David M. Leslie, Jr.

EXPECTED COMPLETION
July 2015

M. BOHN — USFWS

RED-TAILED HAWK

Aflatoxin and bobwhite use of supplemental feeders

Aflatoxin is produced by a fungus (*Aspergillus flavus*) that infects stored plant matter. Material that is vulnerable to aflatoxin contamination includes corn and milo, often used in supplemental feeders intended for other wildlife but accessible to bobwhite quail. Virtually any bird or mammal can suffer from acute aflatoxicosis and death may result. Among other objectives, we plan to assess aflatoxin contamination levels in two study areas that use deer corn (10 feeders/area) and quail feed (10 feeders/area) to supplement local populations. We also will use a survey method to question landowners, primarily in western Oklahoma, regarding their use of supplemental feeding, prevalence and density of feeders, knowledge of aflatoxin, procedures for limiting aflatoxin contamination and attitudes toward supplemental feeding in general.

FUNDING
Oklahoma Department of Wildlife Conservation

FACULTY SUPPORT
Tim O'Connell, Craig Davis, Dwayne Elmore, Fred Guthery, David M. Leslie, Jr.

EXPECTED COMPLETION
July 2015

Reptile stressors induced by habitat degradation and climate change

We are conducting a collaborative research project with researchers from the U.S. Army Public Health Command and Preventive Medicine and the U.S. Army Corps of Engineers using the western fence lizard, *Sceloporus occidentalis*, as a model to characterize effects of multiple-stressors on reptiles. Contamination of the soil with the explosive 2, 4, 6-trinitrotoluene (TNT) has been found at military munitions ranges and industrial waste sites where valued reptile species occur. In addition, malarial parasites (*Plasmodium spp.*) are common in most lizard families and can also cause anemia. Diet restriction can exacerbate this condition. Experiments with TNT exposure demonstrated changes in most of the measured endpoints. Malaria infection affected cricket consumption, spleen and testes weight and total white blood cell (WBC) counts. Limited cricket intake was associated with a loss in body weight, testes and inguinal fat organ weights, albumin and cholesterol blood levels and total WBC counts.

FUNDING
U.S. Army Corps of Engineers, Vicksburg

INVESTIGATOR
Anissa Delecki, Ph.D. Candidate; Sean Ball and Troy Talent, Lab Technicians

FACULTY SUPPORT
Larry Talent

EXPECTED COMPLETION
September 2012

Fire frequency and vegetation change in the cross-timbers

The Cross Timbers is a mosaic of tallgrass prairie, oak woodland and oak forest covering almost five million hectares from southeastern Kansas to north-central Texas. Fire has played a dominant role in determining the vegetation composition and structure, but its exclusion over many decades has led to vegetation changes. We are evaluating effects of prescribed fires over the past 25 years at three Wildlife Management Areas in Oklahoma. Fire frequency is being assessed relative to effects on woody plant regeneration, species richness, course woody debris and soil structure and chemistry. Initial results suggest fire enhances the availability of various herbaceous plants important to wildlife.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Dustin Logan and John Polo, M.S. Candidates

FACULTY SUPPORT
Steve Hallgren and David M. Leslie, Jr.

EXPECTED COMPLETION
June 2012

C. DAVIS

QUAIL RESEARCH IN WESTERN OKLAHOMA

L. TALENT

WESTERN FENCE LIZARDS

Conservation status of the Lower Rio Grande Valley, Texas

Twenty-four years ago, Jahrsdoerfer and Leslie synthesized existing data and literature for the Lower Rio Grande Valley (LRGV) of extreme southern Texas, providing natural-history descriptions of plant and animal communities with a focus on human impacts and management options. The U.S. Fish and Wildlife Service (USFWS) maintains 3 national wildlife refuges in the LRGV and conservation of critical habitats and species has been an ongoing challenge in the past 24 years relative to greatly expanded urbanization, homeland security and escalating land prices. We have identified nearly 400 peer-reviewed publications, published since 1988, that focus on some aspect of the ecology, management and conservation of the LRGV. We are updating the original report with scientific and managerial insights gained in the past 24 years to enhance understanding and conservation needs of these unique resources.

FUNDING
U.S. Fish and Wildlife Service

INVESTIGATORS
Vince Cavalieri and Jesse Burton, Research Specialists and David M. Leslie, Jr.

EXPECTED COMPLETION
July 2012

Fragmentation and small mammals in the Lower Rio Grande Valley, Texas

The Lower Rio Grande Valley National Wildlife Refuge (LRGVNWR) includes >138 tracts with a combined area of 31,697 ha, many of them in the Rio Grande's threatened riparian corridor. Our objectives are to (1) determine the response of small mammals to habitat fragmentation, (2) measure functional connectivity among small mammal use of the native-agricultural matrix surrounding refuge tracts and (3) use landscape genetic methods to determine the potential for long-term persistence of small mammal species in tracts of varying size and quality. Fifteen tracts of varying size and extant riparian brush and trees are being sampled for small mammals. A pilot study including 350 trap nights at two locations had a trap success of 76%. Twenty-four of the 266 individuals captured were Coues' rice rats (*Oryzomys couesi*), a species considered threatened in Texas.

FUNDING
U.S. Fish and Wildlife Service

Oklahoma Cooperative Fish and Wildlife Research Unit

INVESTIGATOR
Richard Dolman, Ph.D. Candidate

FACULTY SUPPORT
David M. Leslie, Jr., Monica Papes, Tim O'Connell and Ron Van Den Bussche

EXPECTED COMPLETION
December 2013

Impact of fragmentation and habitat heterogeneity on lesser prairie-chickens

The lesser prairie-chicken (LPC) is known to alter its behavior in relation to anthropogenic structures such as power lines, roads and oil/gas wells. Thus, in an effort to understand the relationships between fragmentation and lesser prairie-chickens, we will attach GPS satellite transmitters to LPCs starting in 2013. For three years we will collect locations and calculate home ranges, habitat use and potential avoidance data. We will also collaborate with similar studies throughout Oklahoma, Kansas and Colorado to provide for a more complete understanding of the status of the LPC. This information will be critical in the recovery of this sensitive species.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATORS
Dwayne Elmore, Sam Fuhlendorf, Craig Davis and Mark Gregory

EXPECTED COMPLETION
May 2016

C. LESLIE

ALUM BRYAN WINTON, LRGV

R.B. FORBES

WHITE-FOOTED MOUSE

D. ELMORE

PRAIRIE FRAGMENTATION

Assessing impacts of communication towers on avian species

We are evaluating effects of various communications tower lighting schemes (color, height and number) on avian mortality and effects of scavenging-rate bias while assessing avian mortalities. Towers with red-flashing and white-strobe lights are being studied in northeastern Oklahoma relative to avian mortality during spring and autumn migration. Scavenging bias is being assessed experimentally by enumerating removal of bird carcasses placed generally under support wires of selected towers and reference areas. Savanna sparrows experienced the highest overall mortality, particularly during autumn migration. Avian mortality did not vary between years and preliminary results do not suggest that light color or type (flashing vs. strobe) affect avian mortality at the selected towers.

FUNDING
Rogers State University and Oklahoma Cooperative Fish and Wildlife Research Unit

INVESTIGATORS
Claudia R. Glass and Don G. Glass, Ph.D. Candidates

FACULTY SUPPORT
David M. Leslie, Jr., Craig A. Davis, Tim O'Connell and Meredith J. Hamilton

EXPECTED COMPLETION
December 2012

Range expansion of black bears in eastern Oklahoma

Populations of black bears are expanding in eastern Oklahoma, but the extent of this expansion is unknown. We are assessing the status and distribution of black bears in east-central and northeastern Oklahoma with satellite radio-tracking technology, with the goal of marking eight females and two males in Sequoyah, Cherokee and Adair counties. Hair-snare surveys are being conducted in association with new bait-station surveys conducted by the Oklahoma Department of Wildlife Conservation. Camera traps are being deployed in a broad area with assistance from private landowners who often use cameras in association with their bait stations for other game species. To date, satellite collars have been put on four females and one male; up to four locational fixes/day have been obtained for each bear. Den sites of females will be visited to obtain general condition and reproductive information.

FUNDING
Oklahoma Department of Wildlife Conservation

INVESTIGATOR
Sara Lyda, Research Specialist

FACULTY SUPPORT
David M. Leslie, Jr.

EXPECTED COMPLETION
June 2014

Conservation status of Tibetan and Southeast Asian large mammals

Populations of many Asian ungulates are declining at alarming rates. We are preparing comprehensive syntheses on large ungulates in southeastern Asian, particularly in Tibet: to date, nilgai, Tibetan antelope, yak, four-horned antelope, white-lipped deer, Tibetan gazelle, Przewalski's gazelle, sambar and Javan rhino. Syntheses of six species of musk deer that range from the Indian Himalayas and western Asian to Siberia and the tufted deer are in progress. Each synthesis is an encyclopedic summary of the species, starting with thorough nomenclatural synonymies, representing original research, and ending with conservation needs and directives. Such focused attention on these imperiled species is intended to draw critical attention to ongoing and still needed international conservation efforts.

FUNDING
Oklahoma Cooperative Fish and Wildlife Research Unit

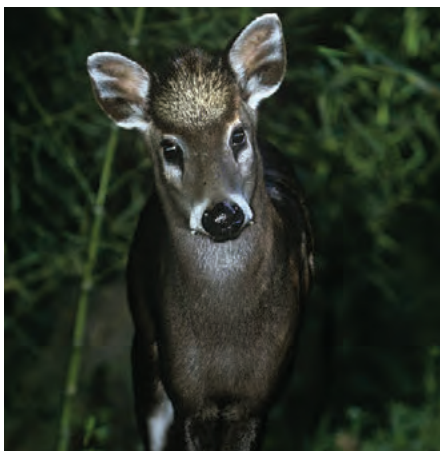
INVESTIGATORS
David M. Leslie, Jr. and Zachery Roehrs, Postdoctoral Fellow

EXPECTED COMPLETION
June 2014

C. ENDICOTT

REMOVING CUB FROM DEN

B. HUFFMAN



TUFTED DEER OF TIBET

Waterfowl use of Central Flyway National Wildlife Refuges

The National Wildlife Refuge system provides habitat for a wide variety of waterfowl and wetland dependent migratory birds in the Central Flyway. Since 1985, migratory and wintering waterfowl surveys have been conducted on refuges to document waterfowl use and abundance. We are analyzing these long-term data sets to provide greater insight on the magnitude of population, spatial and temporal changes of waterfowl distributions in the Central Flyway. This information will allow the Service to better understand how waterfowl use refuge lands and how changes in land-use practices and environmental conditions may affect waterfowl populations in the Central Flyway.

FUNDING
U.S. Fish and Wildlife Service

INVESTIGATORS
Kent Andersson, Research Specialist

FACULTY SUPPORT
Craig A. Davis

EXPECTED COMPLETION
December 2012

Genetic structure of Ozark Big-eared bat populations

Historically, Ozark big-eared bats occurred in eastern Oklahoma, southeastern Missouri and northeastern Arkansas. However, this species has been reduced to approximately 1,900 individuals and their range is now restricted to eastern Oklahoma and northwestern Arkansas. This study will be the most comprehensive genetic study conducted to date on Ozark big-eared bats. Moreover, the final stage of this project will be the development of an unobtrusive genetic monitoring protocol for Ozark big-eared bats that not only will provide an estimate of individuals at a particular cave but will also allow for an evaluation of the genetic health of the population. We are using nuclear loci specifically developed from Ozark big-eared bats and mitochondrial loci. We are also developing and perfecting the procedures to be able to estimate number of individuals and overall genetic health of the population by sampling guano.

FUNDING
U.S. Fish and Wildlife

INVESTIGATOR
Dana Lee, Ph.D. Candidate

FACULTY SUPPORT
Ronald A. Van Den Bussche, Meredith J. Hamilton and David M. Leslie, Jr.

EXPECTED COMPLETION
October 2013

Oklahoma bats and climate change

Species richness of bats in Oklahoma is high, with at least 22 species known to reside in the state. Three species/subspecies are federally listed as endangered: the Ozark big-eared bat, the gray bat and the less common Indiana bat. Some climate models predict that parts of eastern Oklahoma where these endangered taxa occur will become drier and warmer, which could cause significant changes to the ecology of the area. The Ozark big-eared bat, in particular, could experience negative effects from such a change in their habitat because they are nonmigratory and nearly exclusively dependent on forest moths for food. We are conducting a detailed review of the literature to assess the effects of such climate-induced habitat change on these bat species.

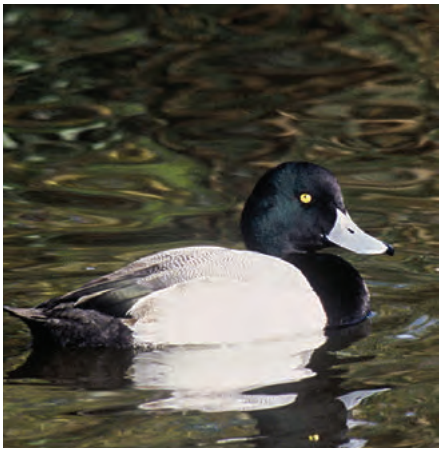
FUNDING
U.S. Fish and Wildlife Service and Oklahoma Cooperative Fish and Wildlife Research Unit

INVESTIGATORS
Rhonda Spinks, M.S. Candidate

FACULTY SUPPORT
David M. Leslie, Jr., Karen Hickman and James H. Shaw

EXPECTED COMPLETION
December 2013

L. KARNEY — USFWS



GREATER SCAUP

R. VAN DEN BUSSCHE

CLOSE UP OF AN OZARK BIG-EARED BAT

Honors And Awards

Brady Allred (Ph.D. student, advisor Fuhlendorf) received the Robert L. Lochmiller II Endowed Scholarship in Wildlife Ecology, Department of Natural Resource Ecology and Management, Oklahoma State University (April 2011).

Chad J. Boeckman (Ph.D. student, advisor J. Bidwell, Zoology) received the Outstanding Zoology Doctoral Student Award and the Zoology Graduate Student Society Outstanding Doctoral Student, Department of Zoology, Oklahoma State University (March 2011).

Shannon Brewer (Assistant Unit Leader) received the Graduate of the Last Decade (GOLD) Award, Missouri Western University (October 2011).

Andrew Crosby (Unit M.S. student, advisor Elmore) received the Unit Robert L. Lochmiller II Endowed Scholarship in Wildlife Ecology, Department of Natural Resource Ecology and Management, Oklahoma State University (April 2011).

Craig A. Davis (OSU Cooperating Faculty, Associate Professor) received the James A. Whatley Award of Merit for Excellence in Agricultural Research, Oklahoma State University, Division of Agricultural Sciences and Natural Resources (2011).

Michael R. Gatlin (Unit M.S. student; advisor, Long) received the Dr. James K. Schooley Award, Oklahoma Chapter of the American Fisheries Society (February 2011), the Jimmie Pigg Travel Award, Oklahoma Chapter of the American Fisheries Society (February 2011), the Skinner Memorial Award, American Fisheries Society (September 2010), and the Native Peoples Undergraduate Travel Award, American Fisheries Society (September 2010).

Fred Guthery (OSU Cooperating Faculty, Professor and Bollenbach Chair) received the Oklahoma Award, Oklahoma Chapter of the Wildlife Society (September 2011).

Glen M. Hensley (Unit M.S. Student, advisor Leslie) received the 2010 Murray-Gray Unit Service Award (April 2010).

Jonathan A. Jenks (Former Unit student, Ph.D. 1991) was named the 2011 Outstanding Alumni in the Department of Wildlife (M.S. 1986) at the University of Maine, Orono (April 2011).

David (Chip) M. Leslie, Jr. (Unit Leader) received the Oklahoma Award, Oklahoma Chapter of The Wildlife Society (September 2011).

James M. Long (Assistant Unit Leader) received a STAR Award, U.S. Geological Survey, Cooperative Research Units (May 2011).

Michael J. Porta (Unit M.S. student; advisor, Long) received the Outstanding Fisheries Graduate Student Award, Department of Natural Resource Ecology and Management, Oklahoma State University (April 2011), Best Student Poster Presentation, 140th American Fisheries Society Meeting, American Fisheries Society (September 2010), and the Jimmie Pigg Travel Scholarship, American Fisheries Society, Oklahoma Chapter (February 2010).

James H. Shaw (OSU Cooperating Faculty, Professor) and **Tracy S. Carter** (OSU Cooperating Faculty, Adjunct Professor) received the 2011 Murray-Gray Unit Service Award for their near 40-year support of the Oklahoma Cooperative Fish and Wildlife Research Unit (April 2011).

Daniel E. Shoup (OSU Cooperating Faculty, Associate Professor) received the Best Professional Presentation, Oklahoma /Arkansas Joint Chapter Meeting of the American Fisheries Society, Fort Smith, AR, 2010 for the paper "Age-0 gizzard shad prey supply and predator demand: analysis of the trophic support capacity of southern U.S. reservoirs."

David R. (Randy) Stewart (Unit Ph.D. Student; advisor, Long) received a Sitlington Enriched Graduate Student Award, Oklahoma State University (August 2010).

Theses and Dissertations

Gene Albanese. 2011. A multi-scale examination of stopover habitat use by migrant shorebirds. Ph.D. Dissertation, Oklahoma State University, Stillwater (Advisor, Davis).

Anita L. Barstow. 2010. Ecology and conservation of the Pantanal Cat, *Leopardus braccatus* (Cope, 1889): a species account. M.S. Report Option, Oklahoma State University, Stillwater. 38 pp. (Advisor, Leslie).

Alissa M. Berro. 2011. A classical biological control of saltcedar (*Tamarix* spp) in Oklahoma. M.S. Thesis, Oklahoma State University, Stillwater. (Advisor, Royer).

B. GOURLEY

TWS OKLAHOMA AWARD WINNERS: FRED GUTHERY (LEFT) AND CHIP LESLIE (RIGHT) WITH KEITH OWENS.

Chad J. Boeckman. 2011. Characterizing zebra mussel (*Dreissena polymorpha*) conditions, populations, and community effects in Oklahoma habitats. Ph.D. Dissertation, Oklahoma State University, Stillwater. 187 pp. (Advisor, Bidwell).

Brandi Coyner. 2010. Phylogenetic relationships and historical biogeography of the genus *Akodon* (Rodentia: Cricetidae). Ph.D. Dissertation, Oklahoma State University, Stillwater. 134 pp. (Advisor, Van Den Bussche).

Glen M. Hensley. 2010. Fire effects on habitat quality for white-tailed deer (*Odocoileus virginianus*) within the Cross Timbers Ecoregion. M.S. Thesis, Oklahoma State University, Stillwater. 74 pp. (Advisor, Leslie).

Brittany R. Holzer. 2011. Determination of critical body residue values in three current-use pesticides in *Hayalella azteca*: predictive techniques versus direct tissue residue measurement. M.S. Thesis, Oklahoma State University, Stillwater. (Advisor, Belden).

Eric P. Johansen. 2011. A survey of the freshwater turtles of eastern Oklahoma. M.S. Thesis, Oklahoma State University, Stillwater. (Advisor, Fox).

Jessica O'Connell. 2011. Influences of plant species distributions and soil organic carbon in playa catchments of the High Plains. Ph.D. Dissertation, Oklahoma State University, Stillwater. (Advisor, Smith).

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T. BOYER

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S. WINTER

CONTROLLED BURN AT COOPER WMA

Long, J.M. 2010. Inventory of fishes at a small national park in North Carolina: Guilford Courthouse National Military Park. Journal of the North Carolina Academy of Science 126: 77-83.

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Bodine, K. A., D.L. Buckmeier, J.W. Schlechte, and D.E. Shoup. 2010 Bias of size-related metrics for blue catfish in reservoirs and implications for sampling. Catfish 2010 Conservation, Ecology, and Management of Catfish: The 2nd International Catfish Symposium, St. Louis, MO.

Brewer, S.K. 2010. Restoring America's Streams, Missouri Western State University

Brewer, S.K. 2010. Sustaining Oklahoma Fishes Under Increasing Water Demands, Oklahoma Governor's water conference: A Shared Resource, A Shared Responsibility, Norman, OK.

Brewer, S.K. 2010. Using fish life-history models to guide management decisions in river restoration programs, University of CA, Monterey

Brewer, S.K. 2011. A watershed-based approach to smallmouth bass management.

Brewer, S.K. 2011. Career paths: Strategically managing your choice, Missouri Western State University

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Davis, C. A. 2011. Role of fire and grazing in conserving grassland and shrubland birds in the Southern Great Plains. Society of Rangeland Management Annual Meeting, Billings, MT.

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T. ROYER

ALISSA BERRO AT SALT PLAINS NWR

R. STEWART

JEREMY DUCK WITH FLATHEAD CATFISH

R. VAN DEN BUSSCHE

MIST NETTING BATS

Gatlin, M. R., D. E. Shoup, J. M. Long. 2011. Blue catfish *(Ictalurus furcatus)* gut passage as a vector for the dispersal of invasive bivalves. 18th Annual Wentz Scholar Research Day, Oklahoma State University, Stillwater, OK.

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Gatlin, M. R., D. E. Shoup, J. M. Long. 2011. Blue catfish *(Ictalurus furcatus)* gut passage as a vector for the dispersal of invasive bivalves. Department of Natural Resources Ecology and Management Graduate Seminar, Oklahoma State University, Stillwater, OK.

Gatlin, M.G., D.E. Shoup, and J.M. Long. 2010. Blue catfish *(Ictalurus furcatus)* gut passage as a vector for the dispersal of invasive bivalves. American Fisheries Society 2nd International Catfish Symposium, St. Louis, MO.

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Johansen, E., S. F. Fox, D. M. Leslie Jr., and T. Patton. 2011. Are the freshwater turtle populations of eastern Oklahoma in decline? Turtle Survival Alliance, Orlando, FL.

Johansen, E., S. F. Fox, D. M. Leslie, Jr. 2010. A Survey of the freshwater turtles of eastern Oklahoma/un muestreo de las tortugas de agua dulce de Oklahoma oriental. 57th Annual Meeting of the Southwestern Association of Naturalists Llano River Field Station, Texas Tech University, Junction, TX.

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J. LONG

BLUFFS OF UPPER CIMARRON RIVER VALEY

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Long, J.M., N.P. Nibbelink, K.T. McAbee, and J. Stahli. 2011. Assessment of freshwater assemblages and their habitats in the National Park Service system of the southeastern United States. Southeastern Fishes Council Annual Meeting, Chattanooga, TN.

McMurry, S. et al. 2011. Sedimentation and volume loss in crop s. land, grassland, and CRP playas. Annual Meeting of the Waterbird Society, Grand Island, NE.

Musselman, W.C. and S.K. Brewer. 2011. The importance of shallow-water habitats to the movement and survival of fishes in Oklahoma streams. Oklahoma Scenic Rivers Commission Business Meeting, Tahlequah, OK.

O'Connell, J. et al. 2010. The Influence of land-use and conservation programs on playa wetland plant communities in the U.S. High Plains. Society of Wetland Scientists, Salt Lake City, UT.

Polo, J.A., S.W. Hallgren, and D.M. Leslie, Jr. 2011. Effects of prescribed burning on standing and down dead woody material in upland oak forests. North American Forest Ecology Workshop, Roanoke, VA.

Porta, M.J. and J.M. Long. 2011. Effects of a cold tailwater on age and growth of two warm water black bass species. Oklahoma Chapter of the American Fisheries Society Meeting, Wagoner, OK.

Porta, M.J. and J.M. Long. 2011. Stocking contribution of shoal bass in the Morgan Falls Dam tailwater of the Chattahoochee River, Georgia. Southern Division of the American Fisheries Society Meeting, Tampa Bay, FL.

Porta, M.J., J.M. Long, and C.R. Martin. 2010. Length, age, and growth of juvenile shoal bass reintroduced into a trout tailwater. American Fisheries Society Annual Meeting, Pittsburgh, PA.

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Rettig, A.V. and S.K. Brewer. 2011. Seasonal habitat shifts by benthic fishes in headwater streams. Annual Conference of the Southeastern Association of Fish and Wildlife Agencies, Nashville, TN.

Ryswyk, R.G., and Shoup, D.E. 2011. Correcting for length bias of common warmwater sport fish sampled with standardized experimental gill nets. 19th Annual Spring Meeting of the Southern Division of the American Fisheries Society, Tampa, FL.

Ryswyk, R.G., and D.E. Shoup. 2011. Correcting for length bias of common warmwater sport fish sampled with standardized experimental gill nets. 31st Annual Meeting of the Oklahoma Chapter of the American Fisheries Society, Wagoner, OK.

Schmitt, J.D., and D.E. Shoup. 2011. Post hooking mortality of blue catfish caught by jugfishing. 141st Annual Meeting of the American Fisheries Society, Seattle, WA.

Schmitt, J.D., and D.E. Shoup. 2011. Post hooking mortality of blue catfish caught by jugfishing. 31st Annual Meeting of the Oklahoma Chapter of the American Fisheries Society, Wagoner, OK.

Seilheimer, T. S., R. A. Esralew, W. L. Fisher, and D. J. Turton. 14 September 2010. Classification of Oklahoma streams using the hydroecological integrity assessment process. 140th Annual Meeting of the American Fisheries Society, Pittsburgh, PA.

Smith, L. 2011. Ecosystem services and playas of the Great Plains. Annual Meeting of the Waterbird Society, Grand Island, NE.

Smith, L. 2011. Ecosystem services, policy implications, and playas of the Great Plains. National Wetlands Month. Environmental Protection Agency and National Webinar, Kansas City, KS.

Smith, L. et al. 2011. Ecosystem services and playas of the U.S. Great Plains. Society of Wetland Scientists Annual Meeting, Prague, Czech Republic.

Smith, L. et al. 2011. Ecosystem services provided by High Plains playas; status and needs. Soil and Water Conservation Society Annual Meeting, Washington, DC.

Stewart, D.R. and J. M. Long. 2010. A survey of catfish anglers from six Oklahoma reservoirs. Oklahoma Chapter Meeting of the American Fisheries Society, Wagoner, OK.

Stewart, D.R. and J. M. Long. 2010. Population dynamics of channel catfish from six Oklahoma reservoirs. Oklahoma Chapter Meeting of the American Fisheries Society, Wagoner, OK.

Stewart, D.R. and J.M. Long. 2010. Verification of otolith origin used for aging channel catfish by fisheries managers. American Fisheries Society 2nd International Catfish Symposium, St. Louis, MO.

Stewart, D.R. and J.M. Long. 2010. Verification of otolith origin used for aging channel catfish by fisheries managers. American Fisheries Society Annual Meeting, Pittsburgh, PA,

Stewart, D.R., G.W. Benz, and G.D. Scholten. 2010. Weight-length relationships and growth data for blue catfish, *Ictalurus furcatus,* among four Tennessee waterbodies. Catfish 2010: Conservation, Ecology, and Management of catfish: The second international symposium, St. Louis, MO.

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Willliams, R.J. and S.W. Hallgren. 2011. Prescribed burning an upland oak forest reduced litter N, soil organic C, and gram negative bacteria. 4th Fire in Eastern Oak Forests Conference, Springfield, MO.

Winkelman, D.L. 2010. Evaluation of the flathead catfish population and fishery in Lake Carl Blackwell, OK, with emphasis on the effects of noodling. Conservation, Ecology, and Management of Catfish: The Second International Symposium, St. Louis, MO.

Winter, S., S. Fuhlendorf, C. Goad, C. Davis, K. Hickman, and D. Leslie, Jr. 2011. Pyric herbivory in *Artemisia* shrubland of the southern Great Plains, North America. Ecological Society of America Annual Meeting, Austin, TX.

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64 YEARS OF SERVICE

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Walter P. Taylor, 1948–51
Adolph M. Stebler, 1951–67
John A. Morrison, 1967–75
Paul A. Vohs, Jr., 1976–79
Frank Schitoskey, Jr., 1980–83
O. Eugene Maughan, 1983–84 (acting)

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George A. Moore, 1953–65
Robert I. Smith, 1965–67
James C. Lewis, 1967–77
John A. Bissonette, 1977–81

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UNIT LEADERS
Bradford E. Brown, 1965–66 (acting)
Robert C. Summerfelt, 1966–76
O. Eugene Maughan, 1977–84

ASSISTANT UNIT LEADERS
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Michael D. Clady, 1976–81

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UNIT LEADERS
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Phillip J. Zwank, 1987–89
David M. Leslie, Jr., 1989–present

ASSISTANT UNIT LEADERS
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James M. Long, 2009–present
Shannon K. Brewer, 2010–present