

OKLAHOMA  
COOPERATIVE  
FISH AND WILDLIFE  
RESEARCH UNIT

**BIENNIAL  
REPORT 2008  
2009**

*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 U.S.

# Welcome

## OPPORTUNITIES FOR GRADUATE STUDY

## NATURAL RESOURCE ECOLOGY AND MANAGEMENT AND BEYOND!

### COVER

Oklahoma is among of the most ecologically rich states in the America with ecoregions that range from low-elevation cypress swamps in the southeast to cross timbers of post and black jack oaks centrally to short-grass prairies and mid-elevation mesas in west. In the western part of Oklahoma, plants such as cacti, mesquite, and yucca are common. Dustin G. Loftis, Unit-affiliated Ph.D. student, took the cover photograph at the Canton Wildlife Management Area in western Oklahoma.

Biennial Report designed by Austin Hillard with Oklahoma State University's Marketing Services.

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 2008–2009.

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 concerns. 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. About 370 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 alligator gar and Cerulean

warblers; toxicology; and management of river otters, black bears, and black bass. While many of our research projects occur in Oklahoma, the Unit's reach includes activities in Texas, New Mexico, Arkansas, and beyond. As we begin 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](http://www.coopunits.org), [www.okstate.edu](http://www.okstate.edu), [www.wildlifedepartment.com](http://www.wildlifedepartment.com), [www.wildlifemanagementinstitute.org](http://www.wildlifemanagementinstitute.org), and [www.fws.gov](http://www.fws.gov).

**David M. Leslie, Jr.**  
Unit Leader/Wildlife

**William L. Fisher\***  
Assistant Unit Leader/Ecology

**James M. Long**  
Assistant Unit Leader/Fisheries

### **Coordinating Committee (Voting Members)**

**Robert E. Whitson**  
Vice President of the Division of Agricultural Sciences and Natural Resources, Oklahoma State University

**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

\* Effective October 2008, Unit Leader, New York Cooperative Fish and Wildlife Research Unit

# Contents

2



4



12



21



## Cooperators and Research Personnel

Cooperating faculty from the University, resource professionals from many agencies and affiliated universities, post-doctoral researchers, graduate students, research associates and technicians, and volunteers are the lifeblood of Unit operations and opportunity.

## Aquatic Resources

From blue catfish to black bass and with clear applications of Geographic Information System technologies, completed and ongoing Unit projects in aquatic resources explore complex resource issues focusing on recreation, recovery, and human dimensions.

## Terrestrial Resources

From river otters to avian assessments in prairies and forest and from conservation genetics of bears and snapping turtles to a variety of management issues, completed and ongoing Unit projects in terrestrial resources encompass most topics in contemporary wildlife conservation.

## Scholarship

The spirit of scientific contribution and scholarship of Unit participants in 2008–2009 is clear: 7 student awards, 15 theses/dissertations, 51 peer-reviewed and technical publications, and 64 presentations at professional state, regional, national, and international meetings.

# Biennial Report

2008  
2009

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.

## Oklahoma Cooperative Fish and Wildlife Research Unit

404 Life Sciences West  
Oklahoma State University  
Stillwater, OK 74078-3051  
405.744.6342 P  
405.744.5006 F

# Biennial Report

2008  
2009

## Current Unit Staff

### Dr. David M. Leslie, Jr.

Unit Leader and Adjunct Professor. Ph.D., Oregon State University, 1982. Terrestrial vertebrate ecology; endangered species. cleslie@usgs.gov

### Dr. James M. Long

Assistant Unit Leader and Adjunct Assistant Professor. Ph.D., Oklahoma State University, 2000. Conservation ecology and fisheries science. longjm@okstate.edu

### Sheryl L. Lyon

Senior Administrative Support Specialist sheryl.lyon@okstate.edu

### Joyce Hufford

Administrative Support Specialist joyce.hufford@okstate.edu

## Cooperators

### OKLAHOMA STATE UNIVERSITY

**Agricultural Economics:** Tracy Boyer, David Shideler; **Entomology and Plant Pathology:** Tom Royer; **Geography:** Allan Finchum; **Natural Resource Ecology and Management:** Terry Bidwell, Tracy Carter, Craig Davis, Dwayne Elmore, Dave Engle, Sam Fuhlendorf, Steve Hallgren, Karen Hickman, Tim O'Connell, Keith Owens (Head), Dan Shoup, Larry Talent, Don Turton, Rod Will; **Zoology:** Jason Belden, Joe Bidwell, Tony Echelle, Stanley Fox, Meredith Hamilton, Matt Lovern, Karen McBee, Scott McMurry, David Schmidly, Loren Smith (Head), Ron Van Den Bussche.

### OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

**Administration:** Greg Duffy (former Director, retired), Richard Hatcher (Director), John Stafford; **Fisheries:** Barry Bolton (Chief), Jeff Boxrucker, Larry Cofer, Gene Gilliland, Kurt Kuklinski, Greg Summers, Buck Wray, Curtis Tacket, James Vincent; **Wildlife:** Bruce Burton, Bill Dinkines, Joe Hemphill, Melinda Hickman, Dick Hoar (retired), Russ Horton, Mark Howery, Ron Justice, Mike O'Meilia, Alan Peoples (Chief), Mike Sams, Rex Umber.

### U.S. GEOLOGICAL SURVEY

**Cooperative Research Units:** Suzanne Cartagirone, Shana Coulby, Brenda Croston, Jim Fleming, Terry Linton, Rita Raines, Kevin Walen, Shari Weant (retired); **Midcontinental Science Center:** Susan Skagen; **Northern Prairie Science Center:** Ned Euliss

### U.S. FISH AND WILDLIFE SERVICE

**Region 2:** Dave Britton, David Haukos; **Tulsa Ecological Services:** Dixie Birch (Supervisor), Jerry Brabander (retired), Ken Collins, Daniel Fenner, Ken Frasier, Richard Stark, Kevin Stubbs; **Oklahoma Fisheries Resource Office:** Brent Bristow; **Bosque del Apache National Wildlife Refuge:** John Vradenburg; **Lower Rio Grande National Wildlife Refuge:** Bryan Winton and staff; **Ozark Plateau National Wildlife Refuge:** Steve Hensley and staff; **Wichita Mountains Wildlife Refuge:** Ralph Godfrey.

### U.S. NATIONAL PARK SERVICE

**Chattahoochee River National Recreation Area:** Rich Slade

### U.S. DEPARTMENT OF DEFENSE

**Arkansas District Office:** Johnny McLean; **Corps of Engineers, Construction Engineering Research and Development Laboratory:** Kurt Gust, Tim Hayden; **Fort Hood, Texas:** John Cornelius.

### U.S. DEPARTMENT OF AGRICULTURE

**Natural Resource Conservation Service:** Diane Eckles, Bill Efland

### OKLAHOMA WATER RESOURCES BOARD

Derek Smithee.

### OKLAHOMA CHAPTER OF THE NATURE CONSERVANCY

Ellen Tejan

### GRAND RIVER DAM AUTHORITY

Darrell Townsend

### SOUTHEASTERN OKLAHOMA STATE UNIVERSITY

Tim Patton

### SOUTH DAKOTA STATE UNIVERSITY

Jonathan Jenks

### SOUTHERN ILLINOIS UNIVERSITY

Eric Hellgren

## RESEARCH PERSONNEL

### POST-DOCTORAL ASSOCIATES

Nicholas Lang  
Zac Roehrs  
Titus Seilheimer

### PH.D. CANDIDATES

Eugene Albanese  
Chad Boeckman  
Brandi Coyner  
Elizabeth Doxon\*  
Claudia Glass  
Donald Glass  
Kimberly Hays  
Dana Lee  
Justin Lack  
P. Mahasuweerachai  
Zac Roehrs\*\*  
Michael Schwemm  
Randy Stewart  
Stephen Winter

### M.S. CANDIDATES

Dane Balsman\*  
Dominic Barrett\*  
Anita Barstow  
Kristopher Bodine\*  
Eric Brinkman\*  
Angela Brown\*  
Kevin Burgess\*  
Jesse Burton\*  
Vincent Cavalieri\*  
Nathan Copeland  
Phillip Cravatt\*  
Andrew Crosby  
Andrew George\*  
Jacob Hagen  
Robert Hamm

Z. ROEHRS

### M.S. CANDIDATES CONTINUED

Glen Hensley  
Eric Johansen  
Justin Lack  
Jared Lorensen\*  
Dustin Lynch  
Meredith Magnuson\*\*  
Micah Meyer  
Sabrina Negus\*  
Chas Patterson\*  
John Polo  
Mike Porta  
Scott Robertson\*  
Ryan Ryswyk  
Shruti Palasmudram Ramesh  
Siewe Siewe  
Rhonda Spinks

### RESEARCH ASSOCIATES

Vincent Cavalieri  
Kent Andersson

### RESEARCH TECHNICIANS

Kent Andersson  
Sean Ball  
Seth Ball  
Judith Barkstedt  
Benjamin Beale  
Jesse Burton  
Vincent Cavalieri  
Bradley Compton  
Nathan Copeland  
Kyle Cothorn  
Chase Ehlo  
Peter Einsig  
John English  
Brandon Fulton  
Mary Gard  
Ashley Grace

### RESEARCH TECHNICIANS CONTINUED

Jason Heinen  
Kody Jorgensen  
Drew Lane  
Will Lowry  
Meredith Magnuson  
Kody Moore  
Karen Ray  
Scott Robertson  
Christopher Roy  
Ryan Ryswyk  
Holly Simanson  
Craig Stanley, Jr.  
Loren Stearman  
Shawn Sullivan  
Troy Talent  
Vaskar Thapa  
Alaina Thomas  
Ricardo Torres-Cervantes  
Matthew Wade  
Kyle Winders  
Brent Wilson  
Mohamed Zendah

### VOLUNTEERS

Nathan Bradford  
Jim Bradford  
Mark Cunningham  
Nathan Evans  
Richard W. Dolman  
Benjamin Fisher  
Michael R. Harvey  
Codi Lorensen  
Christopher Peck  
Kenneth Nelson  
Christopher J. Seiden  
Trevor Watts  
Jeremy Wilkinson  
Dana Lee

Graduated in FY08-09

\* Unit-based project

\*\* Non-Unit-based project



# Aquatic Resources

## COMPLETED PROJECTS

### Ecology of reintroduced paddlefish in Lake Texoma

Historically occurring paddlefish were reintroduced into Lake Texoma beginning in 1999, but population levels have been below similar reintroductions elsewhere in Oklahoma. To assess status, distribution, and movements of the Texoma paddlefish population, 30 individuals were implanted with ultrasonic transmitters in 2007–2008. Paddlefish preferred the Red River arm over the Washita River arm and the main lake. Tracked fish had linear home ranges of 6–61 km that did not vary by season or year. Paddlefish in Lake Texoma had similar growth to other populations but about 40% greater mortality. No naturally occurring reproduction was detected. Success of this reintroduction may be constrained by inadequate flow to support reproduction.

#### FUNDING

Oklahoma Department of Wildlife Conservation

#### INVESTIGATOR

Chas Patterson, M. S. Candidate

#### FACULTY SUPPORT

William L. Fisher

#### COMPLETED

December 2009

E. BRINKMAN



### Electrofishing sampling bias for blue catfish

Blue catfish are popular among anglers because of their potential to produce trophy-sized fish. Conventional sampling methods such as electrofishing appear to be heavily biased toward small blue catfish, often omitting larger fish that many anglers target. To understand this potential bias, we conducted seasonal and habitat-specific sampling in 3 reservoirs for 2 years. Catch rates for various sizes of blue catfish were higher at temperature > 18°C, but variability increased when temperatures exceeded 28°C. Length-specific bias of electrofishing was assessed in an “artificial” population of 300 catfish of known length and size. No difference in catch rate was detected for any length class, and mean total catch was < 10 % of the total population.

#### FUNDING

Oklahoma Department of Wildlife Conservation

#### INVESTIGATOR

Kris Bodine, M. S. Candidate

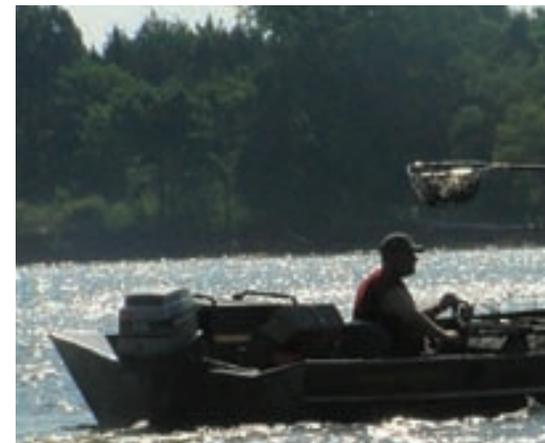
#### FACULTY SUPPORT

Daniel E. Shoup

#### COMPLETED

June 2009

D. SHOUP



### Fish stocks and angler attitudes in close-to-home fishing lakes

The close-to-home fishing program (CTHFP) was developed in 2002 by the Oklahoma Department of Wildlife Conservation to provide anglers fishing opportunities close to where they live. Municipal ponds and small lakes are stocked with channel catfish and hybrid bluegill. We assessed fishing pressure, angler satisfaction, and angler demographics in 3 Oklahoma City metropolitan lakes, Dolesse Youth Park Pond, Kid's Lake North, and South Lake Park East. Users of the CTHFP during the non-trout season tended to be young anglers or families, traveling short distances and fishing primarily for recreation/sport. Channel catfish were an important aspect of the program with 66–88% of anglers pursuing them. Stocking larger channel catfish may be advantageous because fishing pressure was high and growth rates of channel catfish were slow.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATOR**

Dane Balsman, M. S. Candidate

**FACULTY SUPPORT**

Daniel E. Shoup

**COMPLETED**

June 2009

### Distribution and ecology of alligator gar in Oklahoma

Alligator gar populations are declining in the southeastern United States and Mexico. We assessed the life history of the alligator gar in the Red River drainage of Oklahoma. Catch rates were highest using multifilament trammel nets during cold-water periods, and mini-fyke nets were effective for capturing young gar during warm-water periods. Linear home ranges of 6 alligator gar marked with ultrasonic transmitters were 5.8–49.7 km. Ages of captured gar ranged from < 1 to 28 years, indicating successful spawning in 2006 and 2007. The sustainability of the alligator gar population in the Red River depends on availability of shallow habitats of flooded herbaceous vegetation needed for reproduction and proper management of angler exploitation.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATOR**

Eric L. Brinkman, M.S. Candidate

**FACULTY SUPPORT**

William L. Fisher

**COMPLETED**

July 2008

### Economic Impact of the lower Illinois River trout fishery

An economic impact analysis of the trout fishery on the Lower Illinois River, Oklahoma, was conducted to 1) compile general demographic and economic data and determine trends for Sequoyah County, 2) estimate direct spending in the county by visitors to the Lower Illinois River using expenditure data from a previous survey, 3) estimate total expenditure impacts from visitor spending, and 4) summarize county sales tax collections resulting from expenditure impacts. Total economic impact of trout fishing on the Lower Illinois River in 2004 was \$1.78–4.53 million. Nearly two-thirds (64.16%) of all sales tax collections in Sequoyah County took place in the city of Sallisaw. Given that percentage and Sallisaw's 2004 tax rate of 3.5%, the city collected an estimated \$18,402 in sales tax in 2004 as a result of trout fishing in the Lower Illinois River.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATORS**

Tracy Boyer and William L. Fisher

**COMPLETED**

January 2009

E. BRINKMAN



### **Investigations of an ammonia-dominated industrial effluent**

Laboratory-based toxicity tests are commonly used to evaluate wastewater discharges, but effluents like ammonia may induce different effects in the laboratory versus the field. We compared results of acute laboratory toxicity tests of an effluent containing elevated levels of ammonia with in-stream monitoring adjacent to the point at which effluent was released into the Verdigris River, Oklahoma. The field study included surveys of macroinvertebrate and fish assemblages and an in situ growth study with zebra mussels. The laboratory tests were conducted with fathead minnow larvae. The laboratory study indicated the other constituents in the effluent actually reduced the toxicity of ammonia. The field study indicated that fish were attracted to the effluent outfall, but no adverse effects on other organisms were apparent.

**FUNDING**

Terra Industries

**INVESTIGATOR**

Phillip Cravatt, M.S. Candidate

**FACULTY SUPPORT**

Joseph R. Bidwell and William L. Fisher

**COMPLETED**

August 2008

C. BOECKMAN



### **Pathways and water-quality impacts of septic systems on Grand Lake**

Pensacola Dam impounds the Neosho and Spring rivers to form Grand Lake in northeastern Oklahoma, which is recreationally important with extensive shoreline development. Some local communities rely on septic systems for waste treatment, which could release nutrients and harmful bacteria into the lake. We used GIS analyses to identify shoreline developments on Grand Lake with the greatest potential for septic system failure and evaluated water-quality parameters to determine if septic leachate was present in the near-shore zone. No clear associations between water-quality parameters and variables that increase the potential for septic system failure were apparent although significant longitudinal gradients of some variables were detected. The rivers that feed into Grand Lake may be more important sources of nutrients and wastewater contaminants than on-site septic systems.

**FUNDING**

Grand River Dam Authority

**INVESTIGATOR**

Kevin Burgess, M.S. Candidate

**FACULTY SUPPORT**

Joseph R. Bidwell

**COMPLETED**

August 2008

### **Instream flow assessment of streams draining the Arbuckle-Simpson Aquifer**

The State of Oklahoma placed a moratorium on issuing groundwater permits for municipal and public water supplies in counties that do not overlay the Arbuckle-Simpson aquifer until studies of groundwater yield and effects of groundwater pumping on streams were conducted. We used the Instream Flow Incremental Methodology to assess instream flow requirements of 4 spring-dependent fish species in the Blue River and Pennington Creek, Oklahoma and the Indicators of Hydrologic Alteration (IHA) to characterize the natural flow regime of the Blue River, Pennington Creek, and several smaller spring-fed creeks. A small proportion (10%) of the total available area in each spring was classified as preferred habitat by the 4 species, and it dropped to as little as 3% with simulated decreased flows. Groundwater removal from the aquifer near springs may have adverse impacts on fish habitat availability for spring-dependent fish populations.

**FUNDING**

Oklahoma Water Resources Board

**INVESTIGATOR**

Titus Seilheimer, Postdoctoral Fellow

**FACULTY SUPPORT**

William L. Fisher

**COMPLETED**

June 2008

J. LONG



## Fisheries and habitat monitoring in the Arkansas River navigation channel

The U. S. Army Corps of Engineers has proposed to deepen the Arkansas River navigation channel and dredge barriers to backwater lakes and side channels to improve river boat navigation and safety and enhance fisheries habitat. We compared fish populations and assemblages, water quality, and habitat in permanently-connected side channels in the lower Verdigris River, which is the uppermost portion of the Arkansas River navigation system. Fish assemblages in main channel borders and cutoff channels differed among all seasons. Fish abundance in cutoff channels was not influenced by site, season, or year, but 46% of all fishes captured there were young-of-the-year, suggesting that cutoff channels are important nursery habitat for fishes in the Arkansas River navigation system.

### FUNDING

U. S. Army Corps of Engineers, Oklahoma Cooperative Fish and Wildlife Research Unit

### INVESTIGATOR

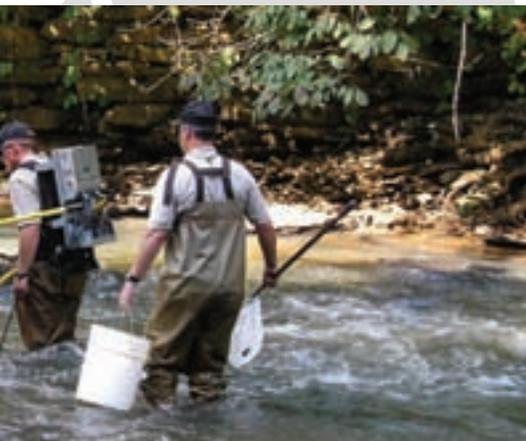
Jared Lorensen, M. S. Candidate

### FACULTY SUPPORT

William L. Fisher and Joseph R. Bidwell

### COMPLETED

May 2009



# Aquatic Resources

## ONGOING PROJECTS

## Economic impact of a 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 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 are conducting an on-site creel and conjoint choice survey as well as follow-up telephone surveys to determine the economic impact of the trout fishery to the local area. This research will help the ODWC allocate appropriate resources toward this fishery.

### FUNDING

Oklahoma Department of Wildlife Conservation

### INVESTIGATOR

Michael Reilley, M.S. Candidate

### FACULTY SUPPORT

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

### EXPECTED COMPLETION

December 2011

D. BALSAMAN



### **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. Thirty-nine species of fish were identified from the 3 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; macroinvertebrate richness was correlated with mussel richness. Stable isotope concentrations of representative biota indicated 3 trophic levels in the Caney River and 4 in the Verdigris River. Zebra mussel numbers were low to non-existent in the 3 rivers.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATOR**

Chad Boeckman, Ph. D. Candidate

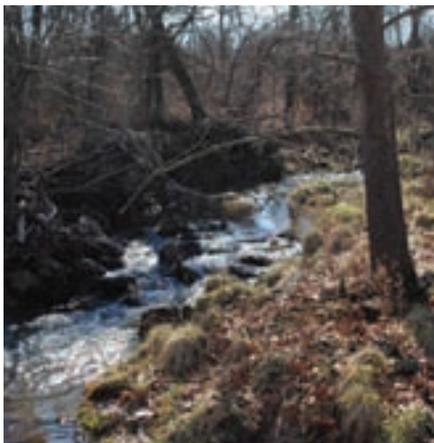
**FACULTY SUPPORT**

Joseph R. Bidwell and William L. Fisher

**EXPECTED COMPLETION**

February 2010

N. COOPER



### **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 6 medium-sized reservoirs. We are using hoop nets to capture channel catfish for population assessments and daytime roving creel surveys 4 months before and 4 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; Nathan Evans and Michael Gatlin, Field Technicians

**FACULTY SUPPORT**

James M. Long

**EXPECTED COMPLETION**

June 2013

R. STEWART



### **Mortality of blue catfish caught by jug fishing**

Angling for blue catfish is becoming increasingly popular. While the majority (69%) of catfish anglers in Oklahoma fish with rod and reel, a significant proportion (29%) use juglines, trotlines, or limblines. These passive angling methods have a catch rate that is more than double the rate for traditional rod and reel methods and may be associated with higher mortality because fish can be hooked for up to 24 h before being released. We are assessing delayed mortality rates of blue catfish caught by jug fishing in a wet laboratory at 3 temperatures and testing predictions from our wet laboratory experiments using seasonal jug fishing trails in the field. Assessment of post-release mortality from jug fishing will allow managers to determine if proposed harvest restrictions for large blue catfish will be effective at reducing angling mortality.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATOR**

Joe Schmitt, M.S. Candidate

**FACULTY SUPPORT**

Daniel Shoup

**EXPECTED COMPLETION**

June 2012

### Blue catfish gut passage in the dispersal of invasive bivalves

We are investigating 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 h, 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. Additional lakes will be sampled for blue catfish to investigate inter-lake differences in invasive mussel ingestion and survival through the gut.

**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

**EXPECTED COMPLETION**

December 2010

### Serving the Digital Atlas of Oklahoma Fishes

Information on the distribution of fishes in Oklahoma was recently compiled in the Digital Atlas of Oklahoma Fishes (DAOF). The DAOF is comprised of 4 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, who 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

**EXPECTED COMPLETION**

March 2010

### Black bass abundance and management in eastern Oklahoma streams

Effective management of stream fisheries requires, among other things, current information and clearly defined goals. For over 20 years, the ODWC has conducted and supported research on stream fisheries in eastern Oklahoma. Using data from those efforts, our objectives 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 4 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 management planning.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATOR**

William L. Fisher

**EXPECTED COMPLETION**

February 2010

D. SHOUP



### Survey of freshwater turtles in eastern Oklahoma

Because of concerns from conservation and health groups, the Oklahoma Department of Wildlife Conservation enacted a 3-year moratorium on commercial harvest of turtles from public waters in May 2008. The eastern one-third of Oklahoma harbors 14 species of freshwater turtle species, and 2 of them (alligator snapping turtle and map turtle) are listed as species of special concern in Oklahoma. We are assessing the freshwater turtle populations of eastern Oklahoma during the moratorium and comparing our results to our earlier studies in the late 1990s and to those from a companion study by colleagues at Southeastern Oklahoma State University. We plan a removal experiment to simulate turtle harvest and assess its impact.

**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 COLMPLETION**

March 2012

E. JOHANSEN



### Bioaccumulative contaminants in turtles in eastern Oklahoma

As a companion study to our survey of turtles relative to commercial harvest, we are assessing 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 and turtles are long-lived so the potential of chronic effects due to these contaminants may be higher than in many other species. We are focusing on 2 species of turtles, snapping turtle and a species of softshell turtle. We will determine concentrations of PCBs (polychlorinated biphenyls), PBDEs (polybrominated diphenyl ethers), and mercury in turtles collected in eastern Oklahoma and determine if concentrations of these anthropogenic contaminants vary based on the species of the turtle.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATOR**

Alisha Powell, M.S. Candidate

**FACULTY SUPPORT**

Jason Belden and Joe Bidwell

**EXPECTED COMPLETION**

March 2012

E. JOHANSEN



### 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) appear to have had long histories of isolation from their closest relatives in the eastern Oklahoma. We are using mitochondrial DNA (mtDNA) phylograms and a phylogentic diversity/genetic history approach to examine the added diversity represented by the 4 fish populations in Blue River to compare their contribution with other geographically defined units in Oklahoma.

**FUNDING**

U.S. Geological Survey

**INVESTIGATOR**

Nick Lang, Postdoctoral Fellow

**FACULTY SUPPORT**

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

**EXPECTED COMPLETION**

March 2010

## 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, but an overall assessment of the effectiveness of the stocking has not been conducted. We are evaluating timing of reproduction, based on otolith microstructure analysis of juvenile fish, and contribution of stocked fish to wild fish, based on detection of OTC marks in otoliths of adult fish. We also are comparing these results in the Chattahoochee River with a population in a tributary that has a more natural thermal regime.

### FUNDING

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

### INVESTIGATOR

Mike Porta, M.S. Candidate

### FACULTY SUPPORT

James M. Long

### EXPECTED COMPLETION

December 2011

J. LONG



## 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 documented spawning of stocked rainbow trout, in areas presumed to be unsuitable. From samples of adults and subsequent offspring collected in Cabin Creek in 2006, we are using microsatellites and mitochondrial DNA to assess parentage and degree of relatedness among juveniles. This work will help determine the scale of reproductive success of stocked trout in these small unique habitats.

### 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

### EXPECTED COMPLETION

December 2010

J. LONG



## USDA programs effects on High Plains playa wetlands

In concert with a companion project through the Texas Cooperative Fish and Wildlife Research Unit, 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 3 land treatment groups: cropland, lands enrolled in USDA conservation programs (e.g., CRP and WRP), and grassland. Results will include the development of predictive functional condition indicator models that include multiple-scale factors that contribute to differences in ecosystem service estimates.

### FUNDING

USDA Natural Resources Conservation Service

### INVESTIGATOR

Pam Truman and Jessica O'Connell, Ph.D. Candidates

### FACULTY SUPPORT

Loren Smith and Scott McMurry

### EXPECTED COMPLETION

August 2011

**Pesticide deposition in High Plains wetlands**

Depressional wetlands (e.g., playas, potholes) throughout the High Plains provide a number of ecological services, including critical habitat for vertebrate and invertebrate fauna, water storage, and aquifer recharge. Because such wetlands are a collection point for watershed runoff, the potential for pesticide deposition is high, but very little is known about the existing chemical residue levels in wetlands of the High Plains. We are assessing effects of various land uses on pesticide input into wetlands. Pesticide analyses are being conducted on sediments from about 300 sites throughout the High Plains and will provide a baseline appraisal on residual contaminant levels.

**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

**EXPECTED COMPLETION**

March 2011

Z. ROEHRS



**Terrestrial Resources**

**COMPLETED PROJECTS**

**Survey of small mammals of special concern**

Using a variety of methods, we surveyed small mammals in the 14 western-most Wildlife Management Areas in Oklahoma. To maximize surveying a diversity of taxa over the 3-year study, we varied the time of year that each WMA was surveyed between March and August. During the 3-year study, we surveyed all 14 management areas resulting in 50,400 trap nights and 6,879 captures of small mammals. We established new county records for 24 species of mammals, including, for example, the eastern mole in Texas County, the Brazilian free-tailed Bat in Tillman County, the eastern red bat in Caddo and Ellis counties, Townsend's big-eared bat in Beckham County, and the Yuman myotis in Cimarron County.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATORS**

Brandi Coyner and Zachary Roehrs, Ph.D. Candidates; Deanna Martinez, M.S. Candidate

**FACULTY SUPPORT**

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

**COMPLETED**

September 2008



## Herpetological survey of the Black Mesa ecoregion

We used drift fences in 12 arrays with 4 pit falls and 6 funnel traps, 4 fixed-route road routes of ca. 40 km, visual surveys, nocturnal anuran call surveys, and opportunistic encounters to survey the herpetofauna in the Black Mesa ecoregion in the Oklahoma Panhandle. A total of 26 reptile species (16 snake, 7 lizard, and 3 turtle species) and 9 amphibian species (8 frog and 1 salamander species) were captured or heard, and 1,919 individual animals were captured or observed, including 1,248 amphibians (1,246 frogs and 2 salamanders) and 672 reptiles (167 snakes, 470 lizards, and 35 turtles). Particular study of the Texas horned lizard resulted in enhanced understanding of its life history in the Black Mesa area.

### FUNDING

Oklahoma Department of Wildlife Conservation

### INVESTIGATORS

Timothy S. Periard, M.S. Candidate;  
Cybil Smith, Field Technician

### FACULTY SUPPORT

Stanley F. Fox and David M. Leslie, Jr.

### COMPLETED

August 2008

T. PERIARD



## Distribution and status of river otters in eastern and central Oklahoma

We used sign surveys, mail surveys, and selected trapping to evaluate the distribution of northern river otters in central and eastern Oklahoma. We also evaluated the utility of indices of isotopic carbon and nitrogen from various tissues to identify otters by watershed, relative to their diet and water conditions. We visited 340 bridge sites within 28 watersheds in 2006–2007 and located otter sign in 11 counties where the species had never been observed before. Seventy-two specimens from incidental trapping or roads suggested a female-biased sex ratio and 1-year-olds representing the largest age classes. Isotopic signatures in tissue samples may be useful, with further investigation, to identify watershed(s) of occupation by individual otters.

### FUNDING

Oklahoma Department of Wildlife Conservation

### INVESTIGATORS

Dominic A. Barrett, M.S. Candidate;  
Stacey K. Davis, Research Associate

### FACULTY SUPPORT

David M. Leslie, Jr.

### COMPLETED

May 2008

## Distribution and abundance of black bears in southeastern Oklahoma

We obtained DNA from black bears noninvasively from 1,166 hair samples collected in 128 hair snares from June to August 2004–2006 in the Ouachita Mountains of southeastern Oklahoma. We were able to genetically identify 161 individual bears in the study area, and mark-recapture techniques suggested a population of about 450 black bears in the area. We also examined several characteristics of the population of black bears occupying the study area by capturing and releasing 38 bears, 43 times during 906 trapnights. The population had an equal sex ratio and a relatively young age structure, suggesting it was expanding. Results of this study permitted the establishment of a limited hunting season for black bears in autumn 2009; 19 bears were harvested.

### FUNDING

Oklahoma Department of Wildlife Conservation

### INVESTIGATORS

Lynne C. Gardner-Santana and Angela G. Brown, M.S. Candidates

### FACULTY SUPPORT

David M. Leslie, Jr., Ronald A. Van Den Bussche, and Eric C. Hellgren

### COMPLETED

June 2008

A. BROWN



### Golden-cheeked warbler tolerance of non-consumptive recreation

We examined effects of mountain biking on daily activity budgets, nesting behavior, productivity, and territory size of the golden-cheeked warbler, an endangered Neotropical migrant that breeds exclusively in central Texas. Territories of male golden-cheeked warblers were nearly twice as large in biking sites (2.2 ha) than non-biking sites (1.4 ha). Mayfield nest success in biking sites ( $n = 33$ ) was 35% compared to 70% in non-biking sites ( $n = 22$ ). Nest abandonment was three times greater in biking areas (15%) as in non-biking areas (5%). Seven nests were depredated in biking sites, but only 2 nests were depredated in non-biking sites. Minimizing construction of new mountain biking trails in golden-cheeked warbler habitat and reducing the amount of forest open edge habitat created by existing mountain biking trails would promote recovery objectives.

**FUNDING**

Fort Hood and U.S. Army Corps of Engineers, Construction Engineering Research Laboratory

**INVESTIGATORS**

Craig A. Davis and David M. Leslie, Jr.

**COMPLETED**

September 2008

### Status of Cerulean Warbler in Oklahoma

We evaluated breeding populations of the rare Cerulean warbler and other forest birds in deciduous forests in eastern Oklahoma. We conducted point counts at 150 sites in the Ozark Highlands and the Ouachita Mountains in 2006–2007. Cerulean warblers were found at only 5 of the 150 sites, all on north-facing slopes of the Ouachita Mountains, near ridge tops between 641 and 721 m in elevation. Breeding by Cerulean warblers was confirmed at only 2 sites in LeFlore County in 2006 and 2007. Seventy-three other species of forest birds were observed during the point counts, and multivariate analyses of the 37 most abundant species suggested that the amount of forest cover in the landscape matrix, canopy height, and elevation were the most important affecting the avian community in eastern Oklahoma forests.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATOR**

Vincent Cavalieri, M.S. Candidate

**FACULTY**

Timothy J. O’Connell and David M. Leslie, Jr.

**COMPLETED**

December 2008

J. HEINEN



### Effects of patch-burning on sand sagebrush vegetation

We evaluated effects of patch-burning on sand sagebrush vegetation at Cooper Wildlife Management Area in Woodward County, northwestern Oklahoma. Both vegetation structure and species composition were quantified as well as density of the dominant shrub, sand sagebrush. Recently burned patches were characterized by higher amounts of bare ground and lower amounts of litter compared with patches in control pastures. Cover of live vegetation was lower in recently burned patches compared with patches in the control pastures but higher in treatment patches that had been burned 3–5 years before. Sagebrush height was reduced by burning but returned to pre-burn levels within 5 years; burning had little effect on sagebrush density.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATORS**

Stephen Winter, Ph.D. Candidate

**FACULTY SUPPORT**

Samuel D. Fuhlendorf, Craig A. Davis, and David M. Leslie, Jr.

**COMPLETED**

August 2008

S. WINTER



## Patch-burn management for imperiled grassland bird species

We assessed avian and invertebrate communities in mixed-grass prairie and sagebrush communities in western Oklahoma relative to patch-burning. We detected 55 species of birds in summers 2006–2008. We monitored 333 nests of 24 species and sampled nest vegetation for 229 of those nests. Lark sparrow densities were highest in the most recently disturbed patches (< 1 year post-burn), Cassin’s sparrow densities were highest in patches 2–3 years post-burn, and field sparrow densities increased as the time since burn increased, with densities being the highest in the unburned patches. Overall avian diversity peaked at 3 years post-burn and then declined suggesting the need for frequent disturbance to prevent senescence in vegetation. Patch-burn management in sand sagebrush ecosystems can be beneficial to avian and invertebrate communities.

### FUNDING

Oklahoma Department of Wildlife Conservation

### INVESTIGATORS

Elizabeth D. Doxon, Ph.D. Candidate

### FACULTY SUPPORT

Craig A. Davis, Samuel D. Fuhlendorf, and David M. Leslie, Jr.

### COMPLETED

August 2008

E. DOXON



## Habitat-use of migrant shorebirds in the mixed-grass prairie

We examined the influence of local and landscape-level variables on migrant shorebirds in the Mixed-grass Prairie Region of Oklahoma in 2007–2009. Twenty-nine species were encountered during surveys: American avocet, least sandpiper, and white-rumped sandpiper were the most abundant species during spring and American Avocet, and Lesser Yellowlegs, were the most abundant species during autumn. Shorebird abundance was negatively related to increasing distance and dispersion among temporary habitat patches within broad scale units and increased when the ratio of shallow water was greater than saturated substrate within habitat patches. Areas containing abundant and aggregated complexes of temporary wetlands are important during migration of shorebirds through north-central Oklahoma.

### FUNDING

Oklahoma Department of Wildlife Conservation

### INVESTIGATORS

Gene Albanese, Ph.D. Candidate

### FACULTY SUPPORT

Craig A. Davis, Joe Bidwell, Samuel D. Fuhlendorf, Mike Palmer, and Susan Skagen

### COMPLETED

November 2009

G. ALBANESE



## Avian response to Old World bluestem monocultures in mixed grass prairie

Despite persistent and widespread declines of grassland birds in North America, few studies have assessed differences between native grasslands and seeded monocultures as avian habitat. We assessed the influence of Old World bluestem (OWB) monocultures on the abundance and community composition of grassland birds during breeding and winter in 2007–2009. Although the OWB habitats supported a higher abundance of some birds, native grasslands supported more complex bird communities during breeding and winter that included avian species of conservation priority. Programs focused on grassland birds should promote native grassland conservation.

### FUNDING

Oklahoma Department of Wildlife Conservation

### INVESTIGATORS

Andrew D. George, M.S. Candidate

### FACULTY SUPPORT

Timothy J. O’Connell, Karen R. Hickman, and David M. Leslie, Jr.

### COMPLETED

June 2009

### Conversion of Old World bluestem monocultures to native plant communities

We evaluated methods for restoring native plant communities important to grassland birds that have been invaded by exotic Old World bluestem (OWB). We used combinations of single-, double-, and triple-herbicide applications of glyphosate; fire; variable timing of both; and mowing to assess their effectiveness in eradicating OWB. Generally, a rigorous combination of treatments was required to control OWB; the burn-and-mow double herbicide treatment was most effective. Burning and mowing likely improved herbicide effectiveness by altering OWB structure so that plants were shorter with active regrowth and clear of standing dead material, enhancing herbicide deposition and translocation and improving overall control.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATORS**

Scott Robertson, MS Candidate

**FACULTY SUPPORT**

Karen R. Hickman, Timothy O'Connell, Curtis Bensch, and David M. Leslie, Jr.

**COMPLETED**

December 2008

J. BURTON



### Digital Atlas of Oklahoma mammals

We converted collection records in the Oklahoma State University Collection of Vertebrates, compiled over the past century, into the Digital Atlas of Mammals (DAOM), a complement to the ongoing Digital Atlas of Oklahoma Fishes project. Quality-control procedures assured that identification, taxonomy, and georeferencing were accurate and standardized. The DAOM will provide accessible information on Oklahoma mammals for managing critical habitat and making informed decisions about species of greatest conservation need and a ready resource for Oklahoma citizens interested in wildlife.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATORS**

Kimberly Hays, Ph.D. Candidate; Meredith Magnusson, M.S. Candidate

**FACULTY SUPPORT**

Karen McBee, William L. Fisher, and Allen Finchum

**COMPLETED**

December 2009



### Evaluation of Oklahoma EQIP-Quail Habitat Restoration Initiative

We are evaluating the effectiveness of the EQIP-Quail Habitat Restoration Initiative in increasing northern bobwhite and other avian grassland obligate populations in Central Hardwoods, West Gulf Coastal Plane, Oaks and Prairies, and the Mixed-grass Prairie in central and eastern Oklahoma. During the 1st year of study, we detected a total of 75 avian species over the entire sampling area. Species richness was similar for the Central Hardwoods and the West Gulf Coastal Plane with each area having 53 species detected. We detected 43 avian species in the Oaks and Prairies and 37 avian species in the Mixed-grass Prairie. Comparisons of vegetation also are being conducted.

**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**

May 2011

E. DOXON



### Fire frequency and vegetation change in the Cross Timbers

The Cross Timbers vegetation type is a mosaic of tallgrass prairie, oak woodland, and oak forest covering almost 5 million hectares from southeastern Kansas across Oklahoma to north-central Texas. Fire has played 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. We are evaluating effects of prescribed fires over the past 25 years at 3 Wildlife Management Areas in central and eastern Oklahoma. Fire frequency is being assessed relative to its effects on woody plant regeneration, species richness, coarse woody debris, etc. Initial results suggest fire enhances availabilities of various herbaceous plants important to wildlife.

**FUNDING**

Oklahoma Department of Wildlife Conservation

**INVESTIGATOR**

Jesse Burton and John Polo, M.S. Candidates

**FACULTY SUPPORT**

Steve Hallgren and David M. Leslie, Jr.

**EXPECTED COMPLETION**

June 2012

J. BURTON



### Fire frequency and deer nutrition in the Cross Timbers

Fire has played 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 are evaluating effects of prescribed fires at various intervals over the past 25 years at 3 Wildlife Management Areas in central and eastern Oklahoma relative to nutrition of white-tailed deer. Indices of isotopic carbon and nitrogen from tissue and fecal samples are being used to compare deer from areas that differ in their cover of cross timbers forest and in their frequencies of prescribed fire. GIS assessments will be used to map the nutritional landscape and provide management options for enhancing deer habitat.

**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

**EXPECTED COMPLETION**

June 2012

### Reptile stressors induced by habitat degradation and climate change

We are using the western fence lizard as a model to characterize effects of multiple-stressors on sensitivity to the explosive trinitrotoluene (TNT). Assessing multiple-stressor effects that result from habitat degradation and climate change is crucial to maintain viable populations of reptiles and ecosystem health. Habitat change due to global warming may increase frequency of parasitism (malarial infection) and decrease basic resource (food) availability for reptiles. We established a captive breeding colony of western fence lizards from collections in Fresno and Tulare counties, California. Malaria parasites were obtained from wild western fence lizards to inoculate some captive-reared lizards. Experiments are being conducted to determine the effects on western fence lizards of malaria parasite infection and/or food restriction on genomic, physiological, and toxicological impacts relative to exposure to TNT.

**FUNDING**

U.S. Army Corps of Engineers, Vicksburg

**INVESTIGATOR**

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

**FACULTY SUPPORT**

Larry Talent

**EXPECTED COMPLETION**

January 2012

J. BURTON



### Conservation status of the Lower Rio Grande Valley

Twenty-two years ago, Jahrsdoerfer and Leslie synthesized existing data and literature for the Tamaulipan brushlands of extreme south 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 Lower Rio Grande Valley of south Texas, and conservation of critical habitats and species has been an ongoing challenge in the past 22 years relative to expanded urbanization, homeland security, and escalating land prices. We are updating the original report with scientific and managerial insights gained in the past 22 years to enhance understanding and conservation needs of these unique resources.

**FUNDING**

U.S. Fish and Wildlife Service

**INVESTIGATORS**

Vince Cavaliere and Jesse Burton, Research Associates

**FACULTY SUPPORT**

David M. Leslie, Jr.

**EXPECTED COMPLETION**

June 2012

D. LESLIE



### 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 be affecting waterfowl populations in the Central Flyway.

**FUNDING**

U.S. Fish and Wildlife Service

**INVESTIGATORS**

Kent Andersson, Research Associate

**FACULTY SUPPORT**

Craig A. Davis

**EXPECTED COMPLETION**

September 2011



## 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 is focused on the effect of non-consumptive human disturbance on wintering waterfowl at Bosque del Apache. Body condition, time-budget assessments, and corticosterone levels are being assessed, with primary focus on northern pintail because of its international importance. Field and laboratory aspects of the study are complete.

### FUNDING

U.S. Fish and Wildlife Service

### INVESTIGATOR

Dustin Taylor, M.S. Candidate

### FACULTY SUPPORT

Loren Smith, Matt Lovern, and Scott McMurry

### EXPECTED COMPLETION

September 2010

W. MEINZER



## 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 is investigating biological control of salt cedar at Salt Plains National Wildlife Refuge in north-central Oklahoma with the salt cedar beetle, a known herbivore of salt cedar. Assessments include 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.

### FUNDING

U.S. Fish and Wildlife Service

### INVESTIGATOR

Alissa Berro, M.S. Candidate

### FACULTY SUPPORT

Tom A. Royer

### EXPECTED COMPLETION

May 2010

T. ROYER



## 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 concern 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 are conducting a thorough inventory of non-game small mammals at Red Slough in the Ouachita National Forest in southeastern Oklahoma. We are using a variety of methods to document presence, distribution, habitat affinities, and natural history of rodents, shrews, and bats, in particular.

### FUNDING

U.S. Forest Service

### INVESTIGATORS

Zachery Roehrs, Post-doctoral Associate; Justin Lack, Ph.D. Candidate; Craig Stanley, M.S. Candidate

### FACULTY SUPPORT

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

### EXPECTED COMPLETION

December 2010

### Assessing impacts of communication towers on avian species

This study is evaluating effects of various lighting schemes (color, height, and number) of communications towers on avian mortality and effects of scavenging-rate bias while assessing avian mortalities. Towers with red-flashing and white-flashing lights have been identified for study in northeastern Oklahoma and are being evaluated to estimate 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.

#### FUNDING

Rogers State University and Oklahoma Cooperative Fish and Wildlife Research Unit

#### INVESTIGATORS

Claudia Glass and Don Glass, Ph.D. Candidates

#### FACULTY SUPPORT

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

#### EXPECTED COMPLETION

August 2010

### 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 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

#### INVESTIGATORS

Anita Barstow, M.S. Candidate

#### FACULTY SUPPORT

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

#### EXPECTED COMPLETION

May 2010

### 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 Asia, 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 4 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 focus 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 2013

A. CROSBY



G. B. SCHALLER



# Scholarly Activities

2008–2009

## HONORS AND AWARDS

**Gene Albanese** (Unit Ph.D. student; advisor, Davis) received the Robert L. Lochmiller II Endowed Scholarship in Wildlife Ecology, Department of Natural Resources Ecology and Management, Oklahoma State University, April 2008.

**Dominic Barrett** (Unit M.S. student; advisor, Leslie) received the Robert L. Lochmiller II Endowed Scholarship in Wildlife Ecology, Department of Natural Resources Ecology and Management, Oklahoma State University, April 2008.

**Elizabeth Doxon** (Unit Ph.D. student; advisor, Davis) received the Best Paper Award, Fish & Wildlife Conservation Section, Oklahoma Academy of Science, November 2008, and the Bryon Moser Best Paper Award, Oklahoma Chapter of The Wildlife Society, December 2008.

**Elizabeth Doxon** (Unit Ph.D. student; advisor, Davis) received the Sally Jo Bible Graduate Student Award, Department of Natural Resource Ecology and Management, Oklahoma State University, April 2009.

**William L. Fisher** (former Assistant Unit Leader) received the Murray-Gray Unit Service Award, Oklahoma Cooperative Fish and Wildlife Research Unit and Department of Natural Resource Ecology and Management, October 2008.

**Andrew George** (Unit M.S. student; advisor, O'Connell) received the Robert L. Lochmiller II Endowed Scholarship in Wildlife Ecology, Department of Natural Resources Ecology and Management, Oklahoma State University, April 2009.

**Jared Lørsensen** (Unit M.S. student; advisor, Fisher) received the Murray-Gray Unit Service Award, Oklahoma Cooperative Fish and Wildlife Research Unit and Department of Natural Resource Ecology and Management, April 2009.

**Harold Namminga** (former Federal Aid/Research Coordinator, Oklahoma Department of Wildlife Conservation) received the Murray-Gray Unit Service Award, Oklahoma Cooperative Fish and Wildlife Research Unit, April 2007.

**Stephen Winter** (Unit Ph.D. student; advisor, Fuhlendorf) received the Robert L. Lochmiller II Endowed Scholarship in Wildlife Ecology, Department of Natural Resources Ecology and Management, Oklahoma State University, April 2009.

J. BURTON



## THESES AND DISSERTATIONS

**Balsman, Dane M.** 2009. An evaluation of Oklahoma's Close-to-Home-Fishing-Program. M.S. Thesis, Oklahoma State University, Stillwater. 108 pp. (Natural Resource Ecology & Management: advisor, Shoup)

**Barrett, Dominic A.** 2008. Status and population characteristics of the northern river otter (*Lontra canadensis*) in central and eastern Oklahoma. M.S. Thesis, Oklahoma State University, Stillwater. 114 pp. (Natural Resource Ecology & Management: advisor, Leslie)

**Bodine, Kristopher A.** 2009. Temperature- and habitat-specific length bias and catch rate of electrofishing for blue catfish (*Ictalurus furcatus*). M.S. Thesis, Oklahoma State University, Stillwater. 51 pp. (Natural Resource Ecology & Management: advisor, Shoup)

**Brinkman, Eric.** 2008. Contributions to the life history of the alligator gar (*Atractosteus spatula*, *Lacépède*) in Oklahoma. M.S. Thesis, Oklahoma State University, Stillwater. 37 pp. (Natural Resource Ecology & Management: advisor, Fisher)

**Brown, Angela G.** 2008. Demographic characteristics and habitat associations of an expanding black bear (*Ursus americanus*) population in Oklahoma. M.S. Thesis, Oklahoma State University, Stillwater. 55 pp. (Natural Resource Ecology & Management: advisor, Leslie)

**Burgess, Kevin.** 2008. Use of water quality measurements to detect potential septic system input on Grand Lake, Oklahoma. M.S. Thesis, Oklahoma State University, Stillwater. 114 pp. (Zoology: advisor, J. Bidwell)

**Burton, Jesse A.** 2009. The effect of fire frequency on the vegetation of an upland old-growth forest in eastern Oklahoma. M.S. Thesis, Oklahoma State University, Stillwater. 82 pp. (Natural Resource Ecology & Management: advisor, Hallgren)

**Cavalieri, Vincent S.** 2008. The status of Cerulean Warbler and other forest birds in Oklahoma. M.S. Thesis, Oklahoma State University, Stillwater. 159 pp. (Natural Resource Ecology & Management: advisor, O'Connell)

**Cravatt, Phillip L.** 2009. Field and laboratory evaluation of an industrial effluent containing elevated levels of ammonia. M.S. Thesis, Oklahoma State University, Stillwater. 82 pp. (Zoology: advisor, J. Bidwell)

## THESES AND DISSERTATIONS CONTINUED

**Doxon, Elizabeth.** 2009. Nesting and feeding ecology of grassland in mixed-grass prairie managed with patch-burn techniques. Ph.D. Dissertation, Oklahoma State University, Stillwater. 273 pp. (Natural Resource Ecology & Management: advisor, Davis)

**George, Andrew D.** 2009. Avian response to Old World bluestem (*Bothriochloa ischaemum*) monocultures in mixed grass prairie. M.S. Thesis, Oklahoma State University, Stillwater. 62 pp. (Natural Resource Ecology & Management: advisor, O'Connell)

**Lorensen, Jared.** 2009. Use of cutoff channels by fishes in the Verdigris River, Oklahoma. M.S. Thesis, Oklahoma State University, Stillwater. 109 pp. (Natural Resource Ecology & Management: advisor, Fisher)

**Negus, Sabrina.** 2008. The role of fluvial geomorphology in the distribution of freshwater mussels (Bivalvia: Unionidae) in the Kiamichi River, Oklahoma. M.S. Thesis, Oklahoma State University, Stillwater. 60 pp. (Zoology: advisor, Fisher)

**Patterson, Chas P.** 2009. Ecology of a reintroduced population of paddlefish, *Polyodon spathula*, in Lake Texoma. M.S. Thesis, Oklahoma State University, Stillwater. 47 pp. (Natural Resource Ecology & Management: advisor, Fisher)

**Robertson, Scott.** 2009. Herbicide control and seed bank dynamics of Old World Bluestem. M.S. Thesis, Oklahoma State University, Stillwater. 72 pp. (Natural Resource Ecology & Management: advisor, Hickman)

## SCIENTIFIC PUBLICATIONS

**Balsman, D. M., and D. E. Shoup.** 2008. Opportunities for urban fishing: developing urban fishing programs to recruit and retain urban anglers. Pages 31–40 in *Urban and community fisheries programs: development, management, and evaluation* (R. T. Eades, J. W. Neal, T. J. Lang, K. M. Hunt, and P. Pajak, eds.). American Fisheries Society, Symposium 67, Bethesda, MD.

**Bales-Lyda, S., E. C. Hellgren, and D. M. Leslie, Jr.** 2008. Diurnal habitat selection and home-range size of female black bears in the Ouachita Mountains of Oklahoma. *Proceedings of the Oklahoma Academy of Science* 87:55–64.

**Bidwell, J. R.** 2009. Chapter 6: Range expansion of the zebra mussel, *Dreissena polymorpha*: a review of major dispersal vectors in Europe and North America. Pp. 73–83 in *Zebra Mussels in*

Europe (G. van der Velde, S. Rajagopal, and A. Bij de Vaate, eds.). Backhuys Publishers, Leiden and Margraf Publishers, Weikersheim, Germany. 555 pp.

**Boeckman, C. J., and J. R. Bidwell.** 2008. Status of freshwater native mussels (Unionidae) in the Oklahoma section of the Verdigris River after introduction of the zebra mussel (*Dreissena polymorpha*). *American Malacological Bulletin* 25:1–8.

**Cavaliere, V. S., T. J. O'Connell, and D. M. Leslie, Jr.** 2009. A bird community on the edge: habitat use of forest songbirds in eastern Oklahoma. *Fourth International Partners in Flight Conference: Tundra to Tropics* 4:118–127.

**Churchwell, R. T., C. A. Davis, S. D. Fuhlendorf, and D. M. Engle.** 2008. Effects of patch-burn management on dickcissel nest success in a tallgrass prairie. *Journal of Wildlife Management* 72:1596–1604.

**Criffield, M. A., M. V. Reichard, E. C. Hellgren, D. M. Leslie, Jr., and K. Freel.** 2009. Parasites of swift foxes (*Vulpes velox*) in the Oklahoma Panhandle. *Southwestern Naturalist* 54:492–498.

**Disney, M. R., E. C. Hellgren, C. A. Davis, D. M. Leslie, Jr., and D. M. Engle.** 2008. Relative abundance of mesopredator and size of oak patches in the cross-timbers ecoregion. *Southwestern Naturalist* 53:214–223.

**Dauwalter, D. C., and W. L. Fisher.** 2008. Ontogenetic and seasonal diet shifts of smallmouth bass in an Ozark streams. *Journal of Freshwater Ecology* 23:113–121.

**Dauwalter, D. C., and W. L. Fisher.** 2008. Spatial and temporal patterns in stream habitat and smallmouth bass populations in eastern Oklahoma. *Transactions of the American Fisheries Society* 137:1072–1088.

**Dauwalter, D. C., D. K. Splinter, W. L. Fisher, and R. A. Marston.** 2008. Biogeography, ecoregions, and geomorphology affect fish species composition in streams of eastern Oklahoma, USA. *Environmental Biology of Fishes* 82:237–249.

**Echelle, A. A., J. C. Hackler, J. B. Lack, S. R. Ballard, J. Roman, S. F. Fox, D. M. Leslie, Jr., and R. A. Van Den Bussche.** 2009. Conservation genetics of the alligator snapping turtle: cytonuclear evidence of range-wide bottlenecks and unusually pronounced geographic structure. *Conservation Genetics*, published OnlineFirst, 7 August.

**Engle, D. M., S. D. Fuhlendorf, A. Roper, and D. M. Leslie, Jr.** 2008. Invertebrate community response to a shifting mosaic of habitat. *Rangeland Ecology and Management* 61:55–62.

**Fisher, W. L.** 2007. Recent trends in fisheries geographic information systems. Pages 3–26 in *GIS/spatial analyses in fishery and aquatic sciences, Volume 3* (T. Nishida, P. J. Kailola, and A. E. Canton, eds.). Fishery-Aquatic GIS Research Group, Saitama, Japan.

**George, A. D., and T. J. O'Connell.** 2009. Breeding burrowing owls in north central Oklahoma. *Bulletin of the Oklahoma Ornithological Society* 42:1–3.

**George, A. D., T. J. O'Connell, K. R. Hickman, and D. M. Leslie, Jr.** 2009. Influence of Old World bluestem (*Bothriochloa ischaemum*) monocultures on breeding density of three grassland songbirds in Oklahoma. *Fourth International Partners in Flight Conference: Tundra to Tropics* 4:691–697.

**Heinen, J. R. and T. J. O'Connell.** 2009. The influence of invasive eastern redcedar on densities of breeding warblers in cross timbers forest. *Fourth International Partners in Flight Conference: Tundra to Tropics* 4:698–704.

**Koike, H., A. A. Echelle, D. G. Loftis, and R. A. Van Den Bussche.** 2008. Microsatellite DNA analysis of success in conserving genetic diversity after 33 years of refuge management for the desert pupfish complex (Cyprinodontidae: Cyprinodon). *Animal Conservation* 11:321–329.

**Leslie, D. M., Jr.** 2008. *Boselaphus tragocamelus* (Artiodactyla: Bovidae). *Mammalian Species* 813:1–16.

**Leslie, D. M., Jr.** 2009. An unusual northern cardinal nest: cooperative breeding or nesting sharing? *Bulletin of the Oklahoma Ornithological Society* 42:5–8.

**Leslie, D. M., Jr., R. T. Bowyer, and J. A. Jenks.** 2008. Facts from feces: nitrogen still measures up as a nutritional index for mammalian herbivores. *Journal of Wildlife Management* 72:1420–1433.

**Leslie, D. M., Jr., and G. B. Schaller.** 2008. *Pantholops hodgsonii* (Artiodactyla: Bovidae). *Mammalian Species* 817:1–13.

**Leslie, D. M., Jr., and G. B. Schaller.** 2009. *Bos grunniens* and *Bos mutus* (Artiodactyla: Bovidae). *Mammalian Species* 836: 1–17.

**Leslie, D. M., Jr., and K. Sharma.** 2009. *Tetracerus quadricornis* (Artiodactyla: Bovidae). *Mammalian Species* 843:1–11.

**Loftis, D. G., A. A. Echelle, H. Koike, R. A. Van Den Bussche, and C. O. Minckley.** 2009. Genetic structure of wild populations of the endangered desert pupfish complex (Cyprinodontidae: Cyprinodon). *Conservation Genetics* 10:453–463.

V. CAVALIERE



T. SEILHEIMER



**McConnell, S.** 2008. Mississippi kite found impaled on yucca plant. *Bulletin of the Oklahoma Ornithological Bulletin* 41:9–10.

**McConnell, S., T. J. O'Connell, D. M. Leslie, Jr., and J. S. Shackford.** 2009. Mountain Plovers in Oklahoma: distribution, abundance, and habitat use. *Journal of Field Ornithology* 80:27–34.

**McConnell, S., T. J. O'Connell, and D. M. Leslie, Jr.** 2008. Land cover associations of breeding habitat for three sympatric buteos in shortgrass prairie. *Wilson Journal of Ornithology* 120:708–716.

**Perry, R. W., R. E. Thill, and D. M. Leslie, Jr.** 2008. Scale-dependent effects of landscape structure and composition on diurnal roost selection by forest bats. *Journal of Wildlife Management* 72:913–925.

**Riedle, J. D., P. A. Shipman, S. F. Fox, J. C. Hackler, and D. M. Leslie, Jr.** 2008. Population structure of the alligator snapping turtle, *Macrochelys teminckii*, on the western edge of its distribution. *Chelonian Conservation and Biology* 7:100–104.

**Remshardt, W. J., and W. L. Fisher.** 2009. Effects of variation in streamflow and channel structure on smallmouth bass habitat in an alluvial streams. *River Research and Applications* 25:661–674.

**Roehrs, A. P., B. S. Coyner, K. N. King, D. L. Martinez, J. K. Braun, M. J. Hamilton, M. Leslie, Jr., and R. A. Van Den Bussche.** 2008. New records of mammals from western Oklahoma. *Occasional Papers of the Museum of Texas Tech University* 273:1–16.

**Schaffler, J. J., and D. L. Winkelman.** 2008. Temporal and spatial variability in otolith trace-element signatures of juvenile striped bass from spawning location in Lake Texoma, Oklahoma-Texas. *Transactions of the American Fisheries Society* 131:818–829.

**Smith, S. J., D. M. Leslie, Jr., M. J. Hamilton, J. B. Lack, and R. A. Van Den Bussche.** 2008. Subspecific affinities and conservation genetics of western big-eared bats (*Corynorhinus townsendii pallascens*) at the edge of their distributional range. *Journal of Mammalogy* 89:799–814.

**Van Den Bussche, R. A., J. B. Lack, D. P. Onorato, L. C. Gardner-Santana, B. R. McKinney, J. D. Villalobos, M. J. Chamberlain, D. Hite, Jr., and E. C. Hellgren.** 2009. Mitochondrial DNA phylogeography of black bears (*Ursus americanus*) in central and southern North America: conservation implications. *Journal of Mammalogy* 90:1075–1082.

**Walter, W. D., and D. M. Leslie, Jr.** 2009. Stable isotope ratio analysis to differentiate temporal diets of a free-ranging herbivore. *Rapid Communications in Mass Spectrometry* 23:2190–2194.

**Walter, W. D., T. J. Zimmerman, and D. M. Leslie, Jr., and J. A. Jenks.** 2009. Dietary response of sympatric deer to fire using stable isotope analysis of liver tissue. *Wildlife Biology in Practice* 5:128–135.

**Whittier, J. B., and D. M. Leslie, Jr.** 2009. Survival and movement of chicks of the least tern (*Sterna antillarum*) on an alkaline flat. *Southwestern Naturalist* 54:176–181.

**Zimmerman, T. J., J. A. Jenks, D. M. Leslie, Jr., and R. D. Neiger.** 2008. Hepatic minerals of white-tailed deer in the southern Black Hills, South Dakota. *Journal of Wildlife Diseases* 44:341–350.

## TECHNICAL PUBLICATION

**Albanese, G., and C. A. Davis.** 2009. Migrant shorebirds and habitat quality of isolated wetlands in the mixed-grass prairie region. Final Report, State Wildlife Grant Project T-37-P, Oklahoma Department of Wildlife Conservation, Oklahoma City, OK. 46 pp.

**Barrett, D. A., and D. M. Leslie, Jr.** 2008. Status and population characteristics of the northern river otter (*Lontra canadensis*) in central and eastern Oklahoma. Final Report, Federal Aid Project W-158-R, Oklahoma Department of Wildlife Conservation, Oklahoma City, OK. 114 pp.

**Cavaliere, V. S., T. J. O'Connell, and D. M. Leslie, Jr.** 2008. Status and habitat affinity for Cerulean Warbler and other forest birds in Oklahoma. Final Report, State Wildlife Grant Project T-31-P, Oklahoma Department of Wildlife Conservation, Oklahoma City, OK. 146 pp.

**Davis, C. A., and D. M. Leslie, Jr.** 2008. Effects of mountain biking activity of foraging and nesting behavior of golden-cheeked warblers. Final Report, U.S. Army Engineer and Research and Development Center, Construction Engineering and Research Laboratory, Champaign, IL. 57 pp.

**Doxon, E. D., S. L. Winter, C. A. Davis, and S. D. Fuhlendorf.** 2008. Patch-burn management: enhancing habitat for imperiled grassland bird species. Final Report, State Wildlife Grant Project T-30-P-1, Oklahoma Department of Wildlife Conservation, Oklahoma City. 63 pp.

**Fisher, W. L., E. C. Tejan, T. S. Seilheimer, and C. S. Haase.** 2008. Instream flow assessment of streams draining the Arbuckle-Simpson Aquifer. Final Report, Oklahoma Water Resources Board, Oklahoma City. 165 pp.

**Gardner-Santana, L., A. G. Brown, E. C. Hellgren, R. A. Van Den Bussche, and D. M. Leslie, Jr.** 2008. Distribution and abundance of black bears in southeastern Oklahoma. Final Report, Federal Project W-155-R, Oklahoma Department of Wildlife Conservation, Oklahoma City, OK. 126 pp.

**Hickman, K. R., T. J. O'Connell, S. G. Robertson, A. D. George, C. Bensch, and D. M. Leslie, Jr.** 2009. Evaluating conversion of Old World bluestem monocultures to native plant communities. Final Report, State Wildlife Grant Project T-36-P-1, Oklahoma Department of Wildlife Conservation, Oklahoma City, OK. 71 pp.

**Lorensen, J., W. L. Fisher, and J. R. Bidwell.** 2008. Effects of dredging and dike notching on the aquatic biota, habitat, and water quality of the McClellan-Kerr Arkansas River Navigation System. Final Report, U.S. Army Corps of Engineers, Little Rock, AR. 17 pp.

**Shoup, D. E., and D. M. Balsman.** 2009. Relationship between fish stocks and angler attitudes in Oklahoma Close-To-Home-Fishing-Program. Final Report, Sportfish Restoration Project F-73-R, Oklahoma Department of Wildlife Conservation, Oklahoma City.

**Shoup, D. E. and K. A. Bodine.** 2009. Seasonal and habitat-specific length bias of electrofishing for blue catfish. Final Report, Sportfish Restoration Project F-74-R, Oklahoma Department of Wildlife Conservation, Oklahoma City, OK.

**Turton, D. J., W. L. Fisher, T. Seilheimer, and R. Esralew.** 2009. An assessment of environmental flows for Oklahoma. Final Report, Oklahoma Water Resources Research Institute, Stillwater, OK. 59 pp.

## SCIENTIFIC PRESENTATIONS

**Balsman, D. M., and D. E. Shoup.** 2007. Angler attitudes, harvest rates, and channel catfish population sizes at close-to-home-fishing-program ponds. 96th Annual Meeting of the Oklahoma Academy of Science, Tulsa, OK.

**Balsman, D. M., and D. E. Shoup.** 2008. Angler attitudes, harvest rates, and channel catfish population sizes at close-to-home fishing program ponds. 28th Annual Meeting of the Oklahoma Chapter of American Fisheries Society, Oklahoma City, OK.

**Balsman, D. M., and D. E. Shoup.** 2009. Angler attitudes, harvest rates, and channel catfish population sizes at close-to-home fishing program ponds. 29th Annual Meeting of the Oklahoma Chapter of the American Fisheries Society, Ardmore, OK.

V. CAVALIERI



Z. ROEHRS



## SCIENTIFIC PRESENTATIONS CONTINUED

- Balsman, D. M., and D. E. Shoup.** 2009. Angler attitudes, harvest rates, and channel catfish population sizes at close-to-home fishing program ponds. Southern Division of the American Fisheries Society Spring Meeting, New Orleans, LA.
- Barrett, D. A., and D. M. Leslie, Jr.** 2007. Spatiotemporal age structure of expanding river otter populations. 87th Annual Meeting of the American Society of Mammalogists, Albuquerque, NM.
- Belden, J. B., B. Holzer, E. Hintzen, and M. J. Lydy.** 2009. Occurrence and potential toxicity of pyrethroids and other insecticides in bed sediments of urban streams and wetlands. American Chemical Society—Division of Environmental Chemistry, Salt Lake City, UT.
- Berro, A. M. T. A. Royer, and K. Giles.** 2009. The suitability of *Diorhabda elongata* (Coleoptera: Chrysomelidae) as a food source for *Coccinella septempunctata* (Coleoptera: Coccinellidae). Annual Meeting of the Entomological Society of America, Indianapolis, IN.
- Bodine, K. A., and D. E. Shoup.** 2008. Evaluation of length bias associated with electrofishing for blue catfish. 28th Annual Meeting of the Oklahoma Chapter of American Fisheries Society, Oklahoma City, OK.
- Bodine, K.A., and D. E. Shoup.** 2008. Seasonal and habitat-specific length bias of electrofishing for blue catfish. 28th Annual Meeting of the Oklahoma American Fisheries Society, Oklahoma City, OK.
- Bodine, K.A., and D. E. Shoup.** 2008. Seasonal and habitat-specific catch rate and length bias of electrofishing for blue catfish. Annual Spring Meeting of the Southern Division of the American Fisheries Society, Wheeling, WV.
- Bodine, K. A., and D. E. Shoup.** 2009. Catch efficiency and length bias associated with electrofishing for blue catfish. 29th Annual Meeting of the Oklahoma Chapter of American Fisheries Society, Oklahoma City, OK.
- Bodine, K. A., and D. E. Shoup.** 2009. Catch efficiency and length bias of electrofishing for blue catfish. Southern Division of the American Fisheries Society Spring Meeting, New Orleans, LA.
- Boeckman, C.** 2009. Zebra mussel population dynamics in Oologah and Sooner reservoirs and the effects of temperature on growth and physiological condition. 29th Annual Meeting of the Oklahoma Chapter of the American Fisheries Society, Ardmore, OK.

G. HENSLEY



**Brinkman, E. L., and W. L. Fisher.** 2009. Life history and management of alligator gar in the Red River, Oklahoma-Texas. Southern Division of the American Fisheries Society Spring Meeting, New Orleans, LA.

**Brown, A. G., E. C. Hellgren, and D. M. Leslie, Jr.** 2007. Age structure and morphometrics of recolonizing black bears. 87th Annual Meeting of the American Society of Mammalogists, Albuquerque, NM.

**Brown, A. G., D. M. Leslie, Jr., and E. C. Hellgren.** 2007. Landscape characteristics influencing a recolonizing black bear population. International Association for Bear Research and Management, Annual Meeting, Monterrey, Mexico.

**Brown, A. G., D. M. Leslie, Jr., and E. C. Hellgren.** 2007. Landscape characteristics influencing a recolonizing black bear population in southeastern Oklahoma. 96th Annual Meeting of the Oklahoma Academy of Science, Tulsa, OK.

**Burton, J. A.** 2009. The effects of fire frequency on the vegetation of an upland old-growth forest. 84th Annual Meeting of the American Association for the Advancement of Science, Southwestern and Rocky Mountain Division, Tulsa, OK.

**Burton, J.** 2009. Effect of fire frequency on vegetation structure and composition in the Okmulgee Wildlife Management Area. Oklahoma Academy of Science Spring Field Meeting, Okmulgee State Park, OK

**Cavaliere, V., T. O'Connell, and D. M. Leslie, Jr.** 2008. Status and habitat affinity for Cerulean Warbler (*Dendroica cerulea*) in Oklahoma. Annual Meeting of the Oklahoma Ornithological Society, Tulsa, OK.

**Cavaliere, V., T. O'Connell, and D. M. Leslie, Jr.** 2008. Scale effects on occurrence and relative abundance of forest songbirds in eastern Oklahoma. Fourth International Partners in Flight Conference, McAllen, TX.

**Cavaliere, V., T. O'Connell, and D. M. Leslie, Jr.** 2008. Scale effects on occurrence and relative abundance of forest songbirds in eastern Oklahoma. Joint Annual Meeting of the Wilson Ornithological Society and Association of Field Ornithologists, Mobile, AL.

**Davis, C. A., D. M. Leslie, Jr., and W. D. Walter.** 2008. Effects of mountain biking activity on foraging and nesting behavior of golden-cheeked warblers. 15th Annual Conference of The Wildlife Society, Miami, FL.

V. CAVALIERE



**Doxon, E. D., C. A. Davis, and S. D. Fuhlendorf.** 2008. Macroinvertebrate diversity and abundance responses in mixed-grass prairie managed with patch-burn techniques. Joint Meeting of the Oklahoma Chapter of The Wildlife Society and Society of Range Management, Lawton, OK.

**Doxon, E. D., M. B. Lovern, C. A. Davis, and S. D. Fuhlendorf.** 2008. Fire and grazing effects on corticosterone levels of breeding female grassland sparrows in western Oklahoma. 15th Annual Conference of The Wildlife Society, Miami, FL.

**Euliss, N., Jr., and L. M. Smith.** 2008. Beyond CEAP: integrating delivery of concurrent goods and services attributable to conservation programs into models for decision makers to evaluate ecological change. Annual Meeting of the Society of Wetland Scientists, Washington, D.C.

**Euliss, N., Jr., and L. M. Smith.** 2009. Perspectives on wetland management for wildlife: conservation at a crossroads. Annual Meeting of the Society of Wetland Scientists. Madison, WI.

**George, A., T. O'Connell, K. Hickman, and D. M. Leslie, Jr.** 2008. Influence of Old World bluestem monocultures on breeding songbirds in mixed-grass prairie. Annual Meeting of the Oklahoma Ornithological Society, Tulsa, OK.

**George, A., T. O'Connell, K. Hickman, and D. M. Leslie, Jr.** 2008. Avian response to Old World bluestem (*Bothriochloa ischaemum*) monocultures in mixed grass prairie. Fourth International Partners in Flight Conference, McAllen, TX.

**George, A., T. O'Connell, K. Hickman, and D. M. Leslie, Jr.** 2008. Avian response to Old World bluestem (*Bothriochloa ischaemum*) monocultures in mixed grass prairie. Joint Annual Meeting of the Wilson Ornithological Society and Association of Field Ornithologists, Mobile, AL.

**Hallgren, S.** 2009. Fire ecology of the Cross Timbers. Oklahoma Academy of Science Fall Field Meeting, Osage Hills State Park, OK.

**Heinen, J., and T. O'Connell.** 2008. Influence of eastern redcedar and exurban development on breeding warblers in crosstimbbers forest. Annual meeting of the Oklahoma Ornithological Society, Tulsa, OK.

**Heinen, J. and T. O'Connell.** 2008. Influence of eastern redcedar on breeding warblers in cross timbers forest. Fourth International Partners in Flight Conference, McAllen, TX.

**Hickman, K.** 2008. Ecology of Old World bluestems: invasive forages. South Dakota State University Colloquium, Brookings, SD.

**Hickman, K.** 2009. Control and management of exotic grasses. Caesar Kleberg Wildlife Research Institute, Kingsville, TX.

**Hickman, K.** 2009. Ecological characteristics and effects of invasive species. 29th Annual Meeting of the Oklahoma Chapter of the American Fisheries Society, Ardmore, OK.

**Hickman, K., G. W. T. Wilson, S. Robertson, M. M. Williamson, and S. Grischkowsky.** 2009. Restoration efforts in sites invaded by exotic grasses: improved by native soil amendment. Annual Meeting of the Ecological Society of America, Albuquerque, NM.

**Holzer B. R., S. T. McMurry, L. M. Smith, J. B. Bidwell, D. A. Haukos, and J. B. Belden.** 2009. Determination of current-use pesticides in wetland sediment in the southern High Plains. SETAC North America Annual Meeting, New Orleans, LA.

**Holzer, B. R., S. T. McMurry, L. M. Smith, J. B. Bidwell, D. A. Haukos, and J. B. Belden.** 2009. Determination of current-use pesticides in wetland sediment in the southern High Plains. SETAC South Central Regional Meeting, Gray Summit, MO.

**Johnson, L., D. Haukos, L. M. Smith, and S. T. McMurry.** 2009. Reclassifying playa hydric soils and vanishing wetlands. Annual Meeting of the Society of Wetland Scientists. Madison, WI.

**Johnson, L., D. Haukos, L. M. Smith, and S. T. McMurry.** 2009. Effect of reclassification of soils on jurisdictional status of playa wetlands. Texas Chapter of The Wildlife Society. Lubbock, TX.

**Leslie, D. M., Jr.** 2007. A publishing partnership for the digital age. Adapting to change: best practice and new technologies, Allen Press Editorial Seminar, Lawrence, KS.

**Leslie, D. M., Jr., and M. J. Hamilton.** 2008. Mammalian Species: monographs with impact. 88th Annual Meeting of the American Society of Mammalogists, Brookings, SD.

**Lorensen, J., and W. L. Fisher.** 2009. Lateral migration of fishes in the lower Verdigris River, Oklahoma. Annual Meeting of the Oklahoma Chapter of the American Fisheries Society, Ardmore, OK.

**Lorensen, J., and W. L. Fisher.** 2009. Lateral migration of fishes in the Lower Verdigris River, Oklahoma. Southern Division of the American Fisheries Society Spring Meeting, New Orleans, LA.

**Lynch, D. T., A. A. Echelle, and R. A. Van Den Bussche.** 2009. Phylogeography of a widespread species of darter, the Logperch (*Percina caprodes*). Southwestern Association of Naturalists, Universidad Autonoma de Nuevo Leon, Monterey, Mexico.

**Monteith, K. B., K. L. Monteith, J. A. Jenks, T. R. Bowyer, and D. M. Leslie, Jr.** 2009. Fecal nitrogen as an index to diet quality: sex-specific effects. 89th Annual Meeting of American Society of Mammalogists, Fairbanks, AK.

**Patterson, C. P. and W. L. Fisher.** Movements and distribution of a reintroduced population of paddlefish in Lake Texoma. 29th Annual Meeting of the Oklahoma Chapter of the American Fisheries Society, Ardmore, OK.

**Patterson, C. P. and W. L. Fisher.** 2009. Movements and distribution of a reintroduced population of paddlefish in Lake Texoma. Southern Division of the American Fisheries Society Annual Meeting, New Orleans, LA.

**Robertson, S., K. R. Hickman, C. Bensch, and K. Harmoney.** 2008. Methods for controlling invasive Old World bluestem. Annual Meeting of the Society for Range Management, Louisville, KY.

**Robertson, S., K.R. Hickman, C. Bensch, and K. Harmoney.** 2008. Controlling Old World bluestem, *Bothriochloa ischaemum*, with fire and herbicide. Joint Meeting of the Oklahoma Section of the Society for Range Management and Oklahoma Chapter of The Wildlife Society, Lawton, OK.

**Schwemm, M. R., A. A. Echelle, R. A. Van Den Bussche, and W. L. Fisher.** 2009. Phylogeographic structure of rocky shiner in southeastern Oklahoma. Southwestern Association of Naturalists, Universidad Autonoma de Nuevo Leon, Monterey, Mexico.

**Seilheimer, T. S., and W. L. Fisher.** 2008. Instream flow assessment of a groundwater dependent ecosystem in southern Oklahoma. Flow 2008 Conference, San Antonio, TX.

**Seilheimer, T. S., and W. L. Fisher.** 2009. Habitat use by fish species in groundwater dependent ecosystems of southern Oklahoma. Southern Division of the American Fisheries Society Spring Meeting, New Orleans, LA.

**Smith, L. M., D. Haukos, S. T. McMurry, K. Rainwater, and D. Gitz.** 2008. Influence of conservation practices on ecosystem services provided by playas in the High Plains. Annual Meeting of the Society of Wetland Scientists, Washington, D.C.

**Taylor, D., J. Vradenburg, L. M. Smith, L., M. Lovern, and S. T. McMurry.** 2009. Behavioral and physiological stress responses of northern pintails (*Anas acuta*) to tourism disturbance. Annual Meeting of the Society of Wetland Scientists, Madison, WI.

**Thapa, V., M. Allen, and M. W. Palmer.** 2009. Influence of fire and tornado damage on dynamics of a crosstimbers stand, Tallgrass Prairie Preserve, Oklahoma. 84th Annual Meeting of the American Association for the Advancement of Science, Southwestern and Rocky Mountain Division, Tulsa, OK.

**Turton, D, W. L. Fisher, T. Seilheimer, and R. Esralew.** 2009. An assessment of environmental flows for Oklahoma. 2009 Governor's Water Conference and Water Research Symposium, Midwest City, OK.

**Walter, W. D., and D. M. Leslie, Jr.** 2008. Can mapping of stable isotopes supplant radiotelemetry to identify nutritional sinks for large generalist herbivores? 88th Annual Meeting of the American Society of Mammalogists, Brookings, SD.

**Wilson, G., K. Hickman, S. Robertson, and M. Williamson.** 2008. Alteration of soil function and biota by an invasive, non-native C4 grass. Annual Meeting of the Ecological Society of America, Milwaukee, WI.

**Winter, S., E. Doxon, S. Fuhlendorf, C. A. Davis, and D. M. Leslie, Jr.** 2008. Patch-burn grazing research in sand sagebrush prairie of northwestern Oklahoma. Joint Meeting of the Oklahoma Chapters of The Wildlife Society and Society for Range Management, Lawton, OK.

**Winter, S. L., S. D. Fuhlendorf, C. A. Davis, and D. M. Leslie, Jr.** 2008. Heterogeneity in sand sage prairie: the influence of fire and grazing in an already heterogeneous landscape. Joint Meeting of the Society of Range Management and the American Forage and Grassland Council, Louisville, KY.

**Zartman, R., K. Rainwater, D. Gitz, and L. M. Smith.** 2009. Estimating High Plains Aquifer recharge: land use influences on playas. Annual Southern Regional Soil Physics Meeting, Fayetteville, AR.

**Zimmerman, T. J., J. A. Jenks, R. W. Klaver, and D. M. Leslie, Jr.** 2008. Evaluation of an augmentation of bighorn sheep in Badlands National Park, South Dakota. 88th Annual Meeting of the American Society of Mammalogists, Brookings, SD.

UNIT STAFF – LESLIE, LONG, LYON, & HUFFORD BY M. HAMILTON



Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, sex, age, religion, disability, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services. Title IX of the Education Amendments and Oklahoma State University policy prohibit discrimination in the provision of services or benefits offered by the University based on gender. Any person (student, faculty or staff) who believes that discriminatory practices have been engaged in based upon gender may discuss their concerns and file informal or formal complaints of possible violations of Title IX with the OSU Title IX Coordinator, Mackenzie Wilfong, J.D., Director of Affirmative Action, 408 Whitehurst, Oklahoma State University, Stillwater, OK 74078, (405) 744-5371 or (405) 744-5576 (fax). This publication, Job# 3257 issued by Oklahoma State University as authorized by the Unit Leader – Fish & Wildlife, was printed by Southwestern at a cost of \$1955.00. 0.4M/July/10.

# 62 YEARS OF SERVICE

## Oklahoma Cooperative Wildlife Research Unit (est. 1948)

### UNIT LEADERS

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)

### ASSISTANT UNIT LEADERS

Fred Baumgartner, 1948-65  
George A. Moore, 1953-65  
Robert I. Smith, 1965-67  
James C. Lewis, 1967-77  
John A. Bissonette, 1977-81

## Oklahoma Cooperative Fishery Research Unit (est. 1965)

### UNIT LEADERS

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

### ASSISTANT UNIT LEADERS

Bradford E. Brown, 1966-70  
Austin K. Andrews, 1970-75  
Michael D. Clady, 1976-81

## Oklahoma Cooperative Fish and Wildlife Research Unit (combined 1984)

### UNIT LEADERS

O. Eugene Maughan, 1984-87  
Phillip J. Zwank, 1987-89  
David M. Leslie, Jr., 1989-present

### ASSISTANT UNIT LEADERS

David M. Leslie, Jr., 1985-89  
Alexander V. Zale, 1985-93  
William L. Fisher, 1991-08  
Dana L. Winkelman, 1998-03  
James M. Long, 2009-present

