

# 2013 Annual Report



## Executive Summary

This report documents the highlights and accomplishments of the Great Plains Landscape Conservation Cooperative (Great Plains LCC) in 2013. In our fourth year, the Great Plains LCC has increased on-the-ground research efforts, established and expanded working relationships with partners, funded relevant and important science research projects, and endorsed landscape conservation design.

In 2013, we identified two of our seven priority habitats to focus research, *playa wetlands* and *prairie rivers and streams*. Eleven new scientific research projects were initiated in 2013 to address key species and habitat management uncertainties within *playa wetlands* (5 projects) and *prairie rivers and streams* (6 projects).

We completed four science research projects focused on science priorities identified in previous years. These projects included work focused on understanding the habitat and resource needs of two species, the Arkansas River shiner and the lesser prairie-chicken.

Our Steering Committee endorsed a landscape conservation design approach for the Great Plains geographic area, and work has begun on a pilot effort focused on *temperate grasslands*, a high priority habitat for 2014.

In 2013, we hired a permanent LCC Coordinator, Nicole Athearn, and partnered with Rainwater Basin Joint Venture to create a Data Steward position, filled by Roger Grosse.

We added a new member to our Steering Committee in 2013, Ken Mabery of the National Park Service. Brian Trusty, Executive Director of Audubon Texas joined the GPLCC Steering Committee in December 2013. He replaced Karyn Stockdale (Executive Director - Audubon New Mexico) who was previously Audubon's sitting member on the Steering Committee.

We strengthened our relationships with the South Central and North Central Climate Science Centers, and we increased communication with partners and others through newsletters, webinars, and by co-locating our LCC Coordinator with the Oklahoma University South Central Climate Science Center.

## **Introduction**

The Great Plains Landscape Conservation Cooperative (Great Plains LCC) formed in 2010 as a multi-agency, self-directed conservation partnership to lead strategic natural resource conservation on the southern Great Plains of the United States. The geographic area of the Great Plains LCC covers more than 200 million acres in the central United States and includes parts of eight states from South Dakota to Texas. We are one of 22 such cooperatives, diverse partnerships of federal, state, tribal, and NGO resource managers; natural and cultural resource decision-makers; and conservation practitioners functioning as a conservation network. While our individual LCC missions differ, our common goal is to foster sustainability and long-term, large-scale resource conservation in the face of landscape-scale challenges and scientific uncertainties. We work together to develop a coordinated, science-based response to climate change and other landscape-scale stressors on land, water, and human, cultural, and wildlife resources.

**Great Plains LCC Goal** The fundamental goal of the Great Plains LCC is to maximize stakeholder conservation effectiveness across the southern Great Plains by providing a forum and resources for collaboration among partners around shared priorities; and through the development and application of scientific information. Specifically, the Great Plains LCC optimizes data collection, use, and management and provides applied science and decision support tools to assist natural resource managers in conserving plants, fish, and wildlife in the short- and mixed-grass prairie region of the southern Great Plains. Some of the most imperiled habitats in the United States are found in this area, along with a number of imperiled species. Our LCC partners are vital to this endeavor because it is through them that on-the-ground conservation is carried out. The Great Plains LCC provides the framework and tools for partners to identify their highest priority landscape-scale ecological conservation objectives and the most significant scientific uncertainties that hinder progress so that those areas of uncertainty can be targeted for research.

## **Our Priority Habitats**

The Great Plains LCC has identified seven habitats and several wildlife species as high priorities for conservation. These priorities were developed largely from information in the Wildlife Action Plans of our State partners within the Great Plains LCC boundary, as well as regional planning documents of the U.S. Fish and Wildlife Service and The Nature Conservancy and other partners.

# Priority Habitats and Species

- **Playa Wetlands** - *Northern pintail, sandhill crane, least sandpiper, western sandpiper, dowitcher*
- **Prairie Rivers, Streams and Riparian Corridors** - **Arkansas River shiner**, *piping plover, interior least tern, sandhill crane, whooping crane, Bell's vireo, Arkansas darter, Topeka shiner, pallid and shovelnose sturgeon, paddlefish, snowy plover*
- **Grasslands** - *Burrowing owl, black-tailed prairie dog, American bison, American burying beetle, black-footed ferret, mountain plover, ferruginous hawk, long-billed curlew, lesser prairie-chicken, grasshopper sparrow, Cassin's sparrow, lark bunting, Harris' sparrow, prairie falcon*
- **Non-playa Wetlands** - *Whooping crane, snowy plover*
- **Saline Lakes** - **Snowy plover**, *sandhill crane, Wilson's phalarope, least sandpiper*
- **Cross-timbers** - *Black-capped vireo*
- **Savannahs, Shrub Lands, and Sand Dunes** - **Lesser prairie-chicken**, *sand dune lizard, blowout penstemon, American burying beetle*

In 2013, Great Plains LCC partners identified two of these seven habitats (playa wetlands, and prairie rivers and streams) as priority habitats due to their ecological importance and susceptibility to threats. These habitats, while not inclusive of all fish, wildlife, and plants within the Great Plains LCC geographic area, are important for a variety of reasons:

**Playa Wetlands** are one of the most unique wetland ecosystems in the United States. These shallow lakes attract and provide habitat for a variety of wildlife species. It is estimated that more than 90 percent of wintering waterfowl in the Texas Panhandle use playas as their primary habitat. Throughout the year, playas serve as biodiversity centers, hosting more than 200 species of birds and other wildlife.

Playa wetlands in the southern Great Plains are also important because they recharge the High Plains (Ogallala) Aquifer, the world's largest aquifer. It is the single most important water source in the Great Plains region and is critical to the health and survival of both human populations and wildlife in the heartland of America.

**Prairie Rivers and Streams** support unique aquatic and riparian species assemblages and are threatened by drought, water diversions, watershed alterations, and fragmentation of streams and riparian habitats. Hydrologic connectivity in rivers and streams is important for a variety of ecological processes as well as for water availability for wildlife and people.



## 2013 Accomplishments and Highlights

In the past year, the Great Plains LCC identified three habitats as high priorities for addressing key information gaps to inform conservation action. The Steering Committee endorsed the Science Committee's recommendation to focus Fiscal Year 2013 science and research funding on two of these priority habitats, *playa wetlands* and *prairie rivers and streams*, and for the species that occupy them. The following specific science needs for each priority habitat formed the basis for the Great Plains LCC 2013 funding opportunity announced in March 2013:

### Playa Wetlands:

- 📖 An analysis of the socioeconomic impediments to playa conservation.
- 📖 Grass plantings and buffers – Which are most effective in relation to: a) native grasses being effectively established in the semi-arid Great Plains, b) facilitating natural inundation of playas, c) preventing sedimentation of playas, and, d) how current buffers can be altered or managed to function optimally.
- 📖 Number and distribution – What number of playas, and in what spatial arrangement, is necessary to support migrating and wintering wetland birds and/or other playa-dependent species?

### Prairie Rivers and Streams:

- 📖 The need for applied research to fill critical knowledge gaps on the status and trends of priority species and habitats in prairie rivers and streams of the Great Plains.
- 📖 The need to fill critical knowledge gaps that support the development of water conservation and management strategies consistent with the ecological requirements of priority species.
- 📖 The need to fill critical knowledge gaps related to the effects of watershed alteration and fragmentation on the long-term sustainability of populations of priority species.

### Research Projects Funded in 2013:

#### Playa Wetlands

1. Evaluating the long-term impacts of land cover, climate, and buffer condition change on sediment delivery and playa storage volume

*Mark Bowen and William Johnson*

This project addresses uncertainties about how recent land cover change from native grassland to cropland has affected the ability of playas to perform ecological functions such as groundwater recharge, surface water storage, and sediment filtering; and how changing

climate conditions may affect playa wetlands in the long term. Results of this study will be used to inform conservation and management decision-making to maximize the effectiveness of playa conservation and management efforts.

2. Use of LiDAR to assess the effectiveness of grass plantings and buffers on playa natural inundation and sedimentation control in the Rainwater Basin

*Zhenghong Tang*

The Rainwater Basin in south-central Nebraska includes a complex of seasonally shallow playa wetlands that attract millions of migratory water birds. The main objective of this project is to build Light Detection And Ranging (LiDAR)-derived 3D models to assess the effectiveness of grass plantings and buffers on natural inundation and sedimentation control of playas in the Rainwater Basin. Results of this study will be used to help managers adapt conservation designs to best meet species habitat needs.

3. Current and future projected distributions of wetland-dependent birds across the Great Plains in response to climate change.

*Susan K. Skagen, John F. Stamm, and David A. Haukos*

Playa wetlands are important wintering and migration habitat for migratory water birds along the Central Flyway, but they are threatened by land use changes exacerbated by the effects of climate change. This study will project distribution shifts and/or range reductions of several focal water bird species in response to climate change and addresses the key management question, “What number of playas, and in what spatial arrangement, is necessary to support migrating and wintering wetland birds and/or other playa-dependent species?”

4. Spatial and temporal habitat suitability of ephemeral playas for migratory water-birds

*Ted LaGrange, Joel Jorgensen, Mark Vrtiska, Andy Bishop, Chris Jorgensen, Elisabeth B Webb, Joseph J Fontaine, and Caitlyn Gillespie*

This study addresses information gaps about key water bird habitat needs in playa wetlands. Through the use of ecologically relevant species distribution models that incorporate food resource availability, vegetation characteristics, and management activities, this study will develop a suite of decision support tools identifying key constraints and potential management solutions for focal migratory water bird species. Through regional surveys, this study will identify barriers to playa conservation by evaluating stakeholder perceptions of wetland values and conservation limitations, information that can then shape future conservation approaches.

5. Understanding landowner attitudes, opinions and willingness to participate in playa conservation

*Phil Seng, Misti Vazquez, and Barth Crouch*

This study will develop, conduct, and analyze 14 focus groups with key landowners in six states within the Great Plains LCC. Focus groups allow for open-ended discussions and follow-on questioning that will reveal the key socioeconomic realities and hurdles that discourage landowners from enrolling in conservation programs or restoring playas. After the research has been completed, a strategic communications planning session will be held to help partners apply specific research results to current efforts and resources to improve outreach efforts to landowners and encourage more playa conservation.

*Prairie Rivers and Streams*

1. Mapping and predicting groundwater-mediated hydrologic connectivity for Great Plains rivers and streams

*Keith Gido, Joshuah Perkin, Jeffrey A Falke, Harry Crockett, John Sanderson, Eric Johnson, and Kurt Fausch*

Groundwater pumping for irrigated agriculture has depleted regional aquifers that sustain habitat for native fishes in the western Great Plains. Species declines are likely to continue as water demands increase, but improved knowledge of how and where water demands are causing streams to become fragmented will help managers to prioritize areas for native fish conservation. This project will map the distribution of flowing and intermittent stream reaches in two Great Plains river basins and project future habitat for priority fish species. The products developed through this study will help managers to direct their efforts where they have the greatest effect and lowest cost.

2. Conservation assessment and mapping products for Great Plains LCC priority fish taxa

*Dean Hendrickson and Ben Labay*

This project will initiate a strategic conservation area assessment for fishes of the Great Plains LCC. Results of this study will help managers to use fish diversity information to help prioritize watersheds for conservation and restoration efforts. Implementation of this broad-scale, multi-species approach will inform collaborative management by encouraging cooperation and coordination among stakeholders and partners, increasing efficiency of future monitoring and management efforts.

3. Improving rock ramp fish ways for small-bodied plains fishes

*Christopher Myrick and Ryan Fitzpatrick*

River systems in the Great Plains region are heavily fragmented by potential instream barriers to movement, such as low-head diversion dams. Fish passage structures are

designed to allow passage of native fishes, but data on appropriate design requirements are lacking. This project will evaluate the passage success of three focal species of Great Plains fishes and inform the most effective design to allow passage of these species. This project will provide managers with recommendations for effective fishway designs that can be used to improve connectivity of Great Plains streams and rivers by mitigating the barriers to movement.

4. Implications for connectivity and movement of lotic Great Plains fishes in the face of climate change

*Mark Pegg*

Climate change could adversely affect fishes in Great Plains rivers and streams, causing drastic range shifts or even extirpation. Although climate change is often associated with northward shifts in species distribution, rivers in the southern Great Plains tend to flow west-east, preventing northward movement of river species. This study will provide critical information to assist managers of these species, including: 1) potential water temperature and flow changes within the Great Plains based on extant regional climate models; 2) stream connectivity to potential refugia; 3) a database of thermal tolerances of Great Plains stream fishes; and 4) map of anticipated changes in distribution as a result of climate change.

5. Population management of prairie-river minnows

*Christopher Hoagstrom, Stephen Davenport, Susan Oetker, and James Brooks*

This study will assess population dynamics of imperiled prairie-river minnows, including the Arkansas River shiner. Results of this study will inform 1) whether population regulation is density dependent or flow-regime dependent; and 2) which prairie-minnow species and life stages are most sensitive to climatic variability and water-resource management activities. This work will help explain historical declines of prairie-river fishes and guide conservation, restoration, and recovery efforts.

6. Sandhill cranes and waterfowl of the North Platte River Valley: Evaluation of habitat selection to guide conservation delivery

*Jonas Davis, Chris Jorgensen, Kirk Schroeder, and Mark Vrtiska*

Multiple priority bird species use the North Platte River, but little information or monitoring efforts on the North Platte River exist. This study will provide critical information needs and a decision support tool to increase the effectiveness of conservation delivery and inform restoration and management strategies. Products of this work will include: 1) survey data documenting the distribution and abundance of sandhill cranes and waterfowl roosting in the North Platte River Valley; 2) a high resolution vegetation map characterizing crane and waterfowl habitat; 3) species distribution models describing habitat and habitat selection; and 4) decision support tools to prioritize conservation actions for cranes and waterfowl.

## Research Projects Completed in 2013:

Four scientific and research projects funded by the Great Plains LCC to address identified science priorities in previous years were completed in 2013:

1. Historic and current habitat use by Arkansas River shiner in the South Canadian River in central Oklahoma as affected by river flow: Predictions for habitat under future climate scenarios

*Edie Marsh-Matthews and William J. Matthews*

The results of this study provide important information for river management and recovery efforts for the Arkansas River shiner and other pelagic spawning fishes in Great Plains rivers.

*Report available in full-text at [www.sciencebase.gov](http://www.sciencebase.gov)*

2. Lesser prairie-chicken nest site selection, microclimate, and nest survival in association with vegetation responses to a grassland restoration program

*Boal, C.W., Grisham, B.G., Hankos, D.A., Zavaleta, J.C., and Dixon, Charles, 2014, Lesser prairie-chicken nest site selection, microclimate, and nest survival in association with vegetation response to a grassland restoration program: U.S. Geological Survey Open-File Report 2013-1235, 35 p., <http://dx.doi.org/10.3133/ofr20131235>.*

The objectives of this study were to conduct (1) a literature review of lesser prairie-chicken nesting phenology and ecology, (2) an analysis of thermal aspects of lesser prairie-chicken nest microclimate data, and (3) an analysis of nest site selection, nest survival, and vegetation response to 10 years of tebuthiuron and/or grazing treatments.

*Report available in full-text at [www.sciencebase.gov](http://www.sciencebase.gov)*

3. Evaluating the reproductive success of Arkansas River shiner by assessing early life-history stage dispersal and survival at landscape level

*Shannon K. Brewer and Timothy B. Grabowski*

This project had two main goals: 1) build a predictive model at the landscape scale to assess the probability of Arkansas River shiner occurrence given a suite of landscape metrics and 2) assess the effects and interactions of environmental factors, e.g., temperature, suspended solids, channel geometry, and flow, on egg buoyancy and early life-history stage survival through laboratory and field experiments.

*Report available in full-text at [www.sciencebase.gov](http://www.sciencebase.gov)*

#### 4. The Lesser Prairie-Chicken Range-wide Conservation Plan

*Van Pelt, W.E., S. Kyle, J. Pitman, D. Klute, G. Beauprez, D. Schoeling, A. Janus, J. Haufler, 2013. The Lesser Prairie-Chicken Range-wide Conservation Plan. Western Association of Fish and Wildlife Agencies. Cheyenne, Wyoming, pp.302*

This work provides a five-state plan for conservation, adaptation and mitigation for one of the Great Plains LCC's priority species. The plan was endorsed and supported by Colorado, Kansas, New Mexico, Oklahoma and Texas.

*Report available in full-text at [www.gplcc.org](http://www.gplcc.org)*

### **Additional 2013 Highlights and Accomplishments**

- 📅 The Great Plains LCC held two meetings with the Steering Committee in January and June 2013. Additionally, the LCC organized six Steering Committee conference calls during the year.
- 📅 The Science Committee communicated monthly, while maintaining close contact by telephone and email.

### **Landscape Conservation Design**

- 📅 The Steering Committee endorsed using a landscape conservation design approach for the Great Plains LCC in planning efforts associated with grassland ecosystems of the Great Plains for FY2014 and beyond.
- 📅 The Great Plains LCC *Grasslands Working Group* began the process of identifying a suitable region for a landscape conservation design pilot design.

### **Steering Committee Changes**

- 📅 Great Plains LCC is now coordinating with its newest member of the Steering Committee, Ken Mabery of the National Park Service. Ken is the Park Superintendent of Scotts Bluff National Monument in Gering, Nebraska and brings an important National Park Service perspective to the Steering Committee.
- 📅 Brian Trusty, Executive Director of Audubon Texas, joined the Great Plains LCC Steering Committee in December 2013. He replaced Karyn Stockdale (Executive Director of Audubon New Mexico) who was previously Audubon's sitting member on the Steering Committee.

## North Central and South Central Climate Science Centers

- 📄 Great Plains LCC is actively coordinating with the South Central and North Central Climate Science Centers through participation in workshops and advisory committees.
  - 📄 LCC Science Coordinator James Broska sits on the North Central Climate Science Center Stakeholder Advisory Committee and regularly communicates with the South Central Climate Science Center Advisory Committee.
  - 📄 LCC Coordinator Nicole Athearn is co-located with the South Central Climate Science Center in Norman, OK and also sits on its Stakeholder Advisory Committee.

## Communication and Information Sharing

- 📄 The Great Plains LCC designed and distributed two newsletters to more than 670 partners and stakeholders, highlighting key accomplishments, partnerships, and research in 2013.
- 📄 The Great Plains LCC hosted two webinars, one specifically designed for our Steering Committee and one for all partners. The Steering Committee webinar focused on lesser prairie-chicken issues and helped keep the Great Plains LCC partners abreast of ongoing research and planning developments. The second webinar focused on a web-based decision support tool developed by New Mexico Game and Fish and New Mexico State University with Great Plains LCC funds.
- 📄 The Great Plains LCC provided current research, documents and new partnerships and outreach via our updated Great Plains LCC website: [www.GPLCC.org](http://www.GPLCC.org)

## Staffing and Capacity Updates

- 📄 A Data Steward position (Roger Grosse) was created in conjunction with the Rainwater Basin Joint Venture to provide capacity to manage the Great Plains LCC data portal housed in the U.S. Geological Survey (USGS) Landscape Conservation Management and Analysis Portal (LC MAP) and ScienceBase Catalog ([www.sciencebase.gov](http://www.sciencebase.gov)) at the USGS Science Center in Ft. Collins, CO. The data portal currently houses all completed research reports, data sets, maps and other information funded by the Great Plains LCC since 2010.
- 📄 A new, permanent LCC Coordinator, Nicole Athearn, was hired and will begin in February 2014.

## Our Partners and Staff

Great Plains LCC staff members facilitate effective collaboration among partners. One goal of the Great Plains LCC is to evaluate staff and capacity needs to identify the most efficient and cost-effective ways to enhance the value of our partnerships. That value comes through collaboratively identifying and addressing priority science information and analysis needs and identifying the most efficient ways to promote data and information sharing. Communication is critical for effective collaboration both within and outside of the partnership: It is a tool for building support and expanding partnerships, as well as for sharing knowledge and resources within the greater LCC network.

### Great Plains LCC Partners

#### Federal Agencies

Bureau of Indian Affairs  
Bureau of Land Management  
Bureau of Reclamation  
National Park Service  
Natural Resource Conservation Service  
U.S. Fish and Wildlife Service  
U.S. Forest Service  
U.S. Geological Survey

#### State Agencies

Colorado Parks & Wildlife  
Kansas Department of Wildlife, Parks & Tourism  
Nebraska Game & Parks Commission  
New Mexico Department of Game & Fish  
Oklahoma Department of Wildlife Conservation  
Texas Parks & Wildlife Department

#### Other Organizations

Ducks Unlimited  
National Audubon Society  
Pheasants Forever/Quail Forever  
Playa Lakes Joint Venture  
Rainwater Basin Joint Venture  
The Nature Conservancy

### Great Plains LCC Staff

Nicole Athearn, LCC Coordinator  
Nicole\_Athearn@fws.gov  
Tel. 405- 325-6609

James Broska, Science Coordinator  
James\_Broska@fws.gov  
Tel. 505-761-4768

Roger Grosse, Data Steward  
Roger\_Gross@fws.gov  
Tel. 308- 382-6468