

Science to Solutions

LPCI Conservation Practices Boost Prairie-Chicken Occupancy



In Brief: Since 2010, the Lesser Prairie-Chicken Initiative and partner organizations have teamed up on landscape-scale habitat improvement efforts to increase lesser prairie-chicken populations. Scientific monitoring helps determine if conservation practices are making a difference, but data analysis can be challenging with uncommon, widely dispersed species like the lesser prairie-chicken. A recent study—the first part of a multi-year study—identified a new model for assessing lesser prairie-chicken populations, and it shows encouraging evidence of conservation success. The findings provide initial insights that LPCI conservation practices appear beneficial to lesser prairie-chickens and that large blocks of intact prairie are important to prairie-chicken conservation.

Study Assesses Link between Practices and Occupancy

Lesser prairie-chicken populations face many threats, including habitat loss and fragmentation (Fischer and Lindenmayer 2007) from row-crop agriculture, fire suppression, unmanaged grazing, development and drought (Van Pelt et. al 2013). The species currently occupies just 16 percent of its historical range (Hagen and Giesen 2005, Van Pelt et al. 2013). Within that range, high-quality habitat for nesting and brood-rearing remains limited.

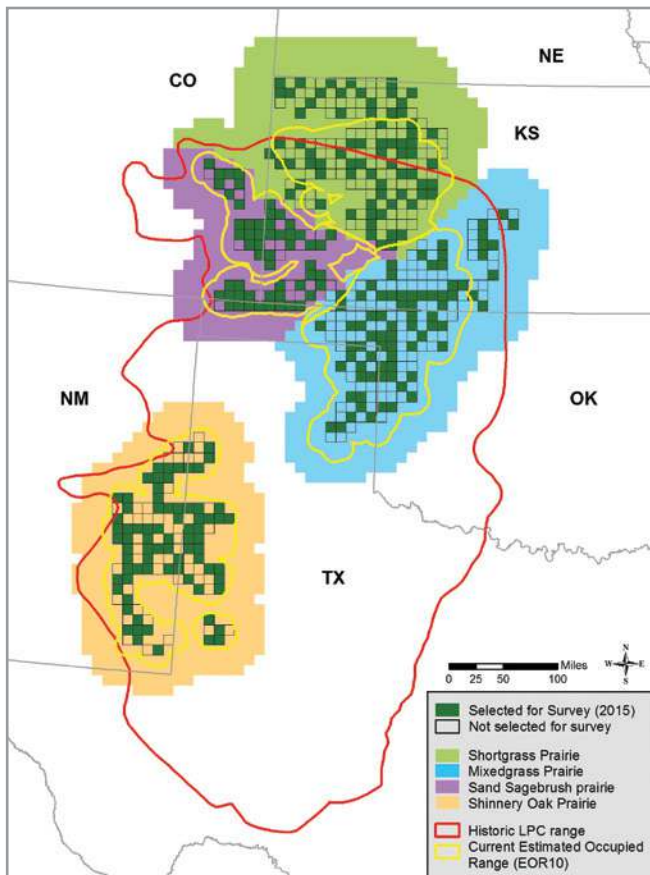
However, in western Kansas, lesser prairie-chickens have reoccupied portions of their historical range, and have moved into areas outside that historical range (Hagen and Giesen 2005, Van Pelt et al. 2013; Figure 1). This range expansion coincides with former croplands enrolled and maintained as grasslands through the USDA's Conservation Reserve Program (CRP), as well as native grasslands managed using conservation practices recommended by the Lesser Prairie-Chicken Initiative (LPCI), a partnership led by the Natural Resources Conservation Service.

A team of researchers tested whether there was a quantifiable link between land managed using LPCI conservation practices or enrolled in CRP and the probability of prairie-chickens occupying a landscape. Their answer? In a word, yes.

After developing an expanded model for assessing lesser prairie-chicken populations, the team found that occupancy increases as prairie patch-size increases, as well as in landscapes with ongoing conservation practices. Specifically, the results show that when lands are managed using LPCI prescribed grazing or enrolled in CRP, the probability of lesser prairie-chickens occupying that habitat increases considerably.



Prescribed grazing is one of several LPCI conservation practices designed to improve lesser prairie-chicken habitat. Other such practices include drought contingency planning, redcedar and mesquite removal, prescribed fire, and transitioning expired CRP grasslands to grazing lands. Photo: Jeremy Roberts, Conservation Media.



Map of current and historical range of the lesser prairie-chicken, showing sites surveyed during the 2015 range-wide aerial survey. The data from this survey were repurposed to assess LEPC habitat occupancy.

Measuring Occupancy Fine-tunes Population Assessment

Since 2012, an annual range-wide aerial survey conducted by the Western Association of Fish and Wildlife Agencies (WAFWA) has estimated the number of lesser prairie-chickens in the southern Great Plains. Simply put, the survey involves observers in helicopters flying over randomly selected locations in early spring, when both male and female lesser prairie-chickens gather on leks (display grounds) to court and mate. The resulting head-count offers an estimate of population numbers that scientists can compare year to year.

Abundance is a useful measure for assessing overall population trends, but the abundance yardstick only tells part of the story. For example, imagine a given population of lesser prairie-chickens that shows level or even declining numbers from one year to the next. Bad news, right? Well, what if, during the same time period, this population of

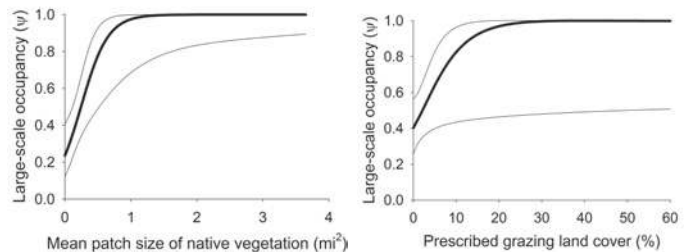
prairie-chickens spread out over a larger range, covering 10% more ground than the previous year? That means they're finding more habitat that suits their needs, a sign of conservation progress not captured by a simple abundance count.

"Monitoring both abundance and occupancy is important for a comprehensive understanding of the status of wildlife populations," says Dr. David Pavlacky, member of the research team and biometrician with Bird Conservancy of the Rockies. What's more, occupancy can offer a more precise measure than abundance for rare species with sparse populations.

As described in their published study, the research team repurposed the data gathered during the 2015 WAFWA aerial survey to determine the factors driving the presence or absence (in other words, occupancy) of lesser prairie-chickens on the landscape.

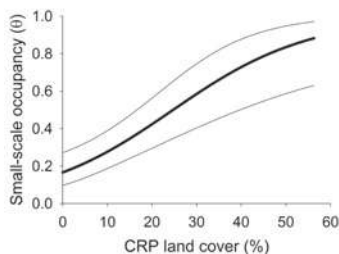
For this initial study, they assessed four factors that might impact site occupancy—patch size of native vegetation, percent of land cover enrolled in prescribed grazing; percent of land cover in CRP; and density of primary roads. They conducted their assessment at both large and small scales.

"Lesser prairie-chickens choose habitats at multiple scales," says lead researcher Christian Hagen. "On the broadest scale, they need prairie—that is, they choose grassland habitat over, say, prairie that has been encroached upon by redcedar. On a smaller scale, they choose particular sites within that grassland habitat for other characteristics. For example, females select sites with dense herbaceous cover for nesting, sites with plentiful forbs for brood rearing, and so on."



As native prairie patch size exceeds 250 acres (0.3 mi²), the likelihood that lesser prairie-chickens will occupy that landscape increases. Additionally, as the percent of each sample grid (88 mi²) enrolled in prescribed grazing exceeds 5% (4.5 mi²), the likelihood that lesser prairie-chickens will occupy that landscape increases.

Hagen’s team wanted to understand the factors driving lesser prairie-chicken site occupation at both large and smaller scales to identify effective conservation actions. In designing their study, they quantified the presence of prairie-chickens at two scales: the larger scale of the aerial survey sampling grid cell (9.3 mi²) and the smaller scale of 4 quadrants of each cell (4.7 mi²). That allowed them to assess occupancy from a “sum-of-all-the-parts” perspective to better understand why prairie-chickens occur in some parts of the large grid cells and not others.



At the smaller scale, as the percentage of CRP enrolled in a 22 mi² area exceeds 20%, the likelihood that LEPC will occupy that landscape increases.

The results indicate that when lands are enrolled in LPCI prescribed grazing or the Conservation Reserve Program, the likelihood of lesser prairie-chickens occupying that habitat increases considerably.

Just the Beginning: Launching a Multi-Year Monitoring Model

The results from the occupancy modeling described in the study are just the beginning of a multi-year monitoring model. Because this was an exploratory analysis to evaluate the effectiveness of this modeling approach, the research team assessed just four factors (patch size of native vegetation, percent of land cover enrolled in prescribed grazing; percent of land cover in CRP; and density of primary roads (as a surrogate for human footprint) to explain LEPC occupancy.

“We believe occupancy is a more complicated story than that,” says Pavlacky. “We will be examining a wider array of land use variables and how they interact with weather patterns over time to examine why lesser prairie-chickens occupy some regions of the Southern Great Plains and not others.

Management Implications, In brief:

Crucial practices for benefiting lesser prairie-chickens while adding value to agricultural operations include:

- Enrolling acreage within the LEPC active range in prescribed grazing or CRP.
- Maintaining large blocks of native prairie across the range through sustainable ranching.
- Identifying potential landscapes with willing landowners to develop conservation easements, particularly if combined with prescribed grazing and other proven habitat conservation practices.
- Implementing prescribed grazing on dispersed patches throughout large blocks of rangeland.
- Cultivating diverse stands of CRP-enrolled grasslands that serve as connective tissue to larger patches of native prairie.
- Retaining CRP acreage as grasslands after contract expiration.



CRP fields provide nesting cover for lesser prairie-chickens. Nests on CRP lands are often located close to neighboring stands of native vegetation that offer higher-quality brood habitat (Fields et al. 2006). Variation in vegetation structure is a key factor in maintaining or improving lesser prairie-chicken population growth rates (Hagen et al. 2009, 2013, Hovick et al. 2014). Photo: Jeremy Roberts, Conservation Media.



Lesser prairie-chickens benefit from LPCI prescribed grazing. The study showed strong positive relationship between percent prescribed grazing and probability of occupancy. Photo: Nick Richter.

Source

Hagen, C.A., D.C. Pavlacky, Jr., K. Adachi, F.E. Hornsby, T. J. Rintz, and L.L. McDonald. 2016. Multiscale occupancy modeling provides insights into range-wide conservation needs of Lesser Prairie-Chicken (*Tympanuchus pallidicinctus*). *The Condor* 118: 597-612.

Additional Resources

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Fischer, J., and D. B. Lindenmayer (2007). Landscape modification and habitat fragmentation: A synthesis. *Global Ecology and Biogeography* 16:265-280.

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Hagen, C. A., B. A. Grisham, C. W. Boal, and D. A. Haukos (2013). A meta-analysis of Lesser Prairie-Chicken nesting and broodrearing habitats: Implications for habitat management. *Wildlife Society Bulletin* 37:750-758.

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Van Pelt, W. E., S. Kyle, J. Pitman, D. Klute, G. Beauprez, D. Schoeling, A. Janus, and J. B. Haufler (2013). The Lesser Prairie-Chicken Range-Wide Conservation Plan. Western Association of Fish and Wildlife Agencies, Cheyenne, WY, USA.

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Contacts

Christian Hagen, Lesser Prairie-Chicken Initiative Science Advisor. Christian.Hagen@oregonstate.edu.

David Pavlacky, Bird Conservancy of the Rockies. david.pavlacky@birdconservancy.org.



Helping landowners convert expired CRP acreage to grazing can perpetuate the benefits of CRP grasslands for lesser prairie-chickens. Photo by: Jeremy Roberts, Conservation Media.