USDA United States Department of Agriculture

Conservation Effects Assessment Project (CEAP)

Conservation Insight

Conservation Reserve Program Benefits Lesser Prairie-Chickens

Key Takeaways

- Habitat loss and fragmentation are primary factors in lesser prairie-chicken (LEPC) population declines.
- Land enrolled in the Conservation Reserve Program (CRP) provides large areas of grasslands and grassland connectivity that directly influence habitat suitability for and space use by LEPCs.
- At the county scale, the presence of CRP appears to highly influence habitat suitability and roost-site selection for LEPCs.
- At the pasture scale, managed grazing of CRP land does not negatively influence LEPC movement or habitat selection.
- Consideration of spatial arrangement and proximity to CRP patches can lead to maximum habitat benefits for LEPC, given that individual birds rarely traveled more than 0.3 miles to or from roost sites.
- A patchwork mixture of CRP, native range, and cropland areas may best provide for the needs of LEPC.

Photo by Ashley Tanner

A lesser prairie-chicken outfitted with a satellite telemetry harness on its back in CRP grass cover.

The population of lesser prairie-chickens has declined 90% from its highest levels. This study investigates the role that land enrolled in the Conservation Reserve Program (CRP) may play in helping the species.

Background

Human-driven land cover change over the past two centuries has transformed previously extensive grasslands in the Great Plains into a mosaic of croplands, woodlands, industrial infrastructure, and remnant grasslands. These changes have resulted in North American grasslands being considered some of the most altered and threatened ecosystems in the world. As a result of this fragmentation of the landscape, the lesser prairie-chicken (LEPC) has experienced population declines of greater than 90% from its historic abundance.

Conservation programs such as the Conservation Reserve Program (CRP) address multiple resource concerns (e.g., soil erosion, water quality, and wildlife habitat) on private lands. The enrollment of land in CRP in recent decades has significantly altered land cover patterns throughout the Great Plains (Tanner and Fuhlendorf 2018), providing benefits to wildlife and other ecosystem services (Hagen et al. 2016, Sullins et al. 2019). More than 4.9 million acres are enrolled in CRP on over 43,000 individual properties within the current range of the LEPC.

In this study, Oklahoma State University (OSU) researchers investigated how CRP acreage influences LEPC habitat suitability and space-use at multiple spatial extents, from a distribution-wide level to a pasture level. Understanding nocturnal roost site selection is critical for comprehending LEPC habitat requirements, since they spend about half of their lives at these sites and may be more vulnerable to predation while roosting. The influence of CRP on roost-site selection was evaluated at the county level, while commonly applied mid-contract management through prescribed grazing

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was assessed at the pasture level to determine if these activities influenced LEPC use of CRP.

Study Procedures

Location data were collected from 104 LEPCs, each outfitted with a satellite telemetry harness (see photo at right), from 2013 to 2016 throughout Beaver County, Oklahoma, to assess how the birds used space and moved in relation to CRP-enrolled land. Multiple spatial extents (i.e., pasture level, county level, and distribution-wide) surrounding three communal breeding areas (leks) were evaluated. LEPC locations collated from GPS and citizen science (i.e., eBird data sets) were used to determine habitat suitability at both distribution-wide and county extents, while GPS locations and bird movement patterns (i.e., movements between consecutive locations) were used to assess space-use in relation to CRP land at county and pasture levels.

Findings

At the distribution-wide and county scales, breeding season species distribution modeling showed that landscapes with greater proportions of CRP tended to provide higher LEPC habitat suitability (Figure 1). This suggests that CRP is playing a key role in providing habitat for LEPC throughout parts of its distribution by maintaining grassland connectivity in the pre-CRP more fragmented landscape.

At the distribution-wide scale, modeling revealed that a patchwork of land cover types appears more beneficial to LEPC than a landscape comprised of all idled land enrolled in CRP. While the suitability rating for LEPC achieved by increasing CRP acreage reached a maximum at approximately 70% (Figure 1A), additional modeling indicated that it was possible to increase the probability of LEPC habitat suitability to near 100% by mixing in a patchwork of cropland and native range. Likewise, when at the county scale, the chance that individual sites provide suitable LEPC habitat is approximately three times greater when lands are enrolled in CRP than other land uses (Figure 1B).

At local scales, CRP largely determined LEPC space-use patterns during nocturnal roost-site selection—an important and often understudied period of the LEPC life cycle. LEPCs were found to rarely travel more than 0.3 miles to or from important areas (such as roost sites) throughout the year. The distance to a CRP field

Photo by Ashley Tanner

Releasing a GPS-tagged lesser prairie-chicken in Beaver County, Oklahoma.

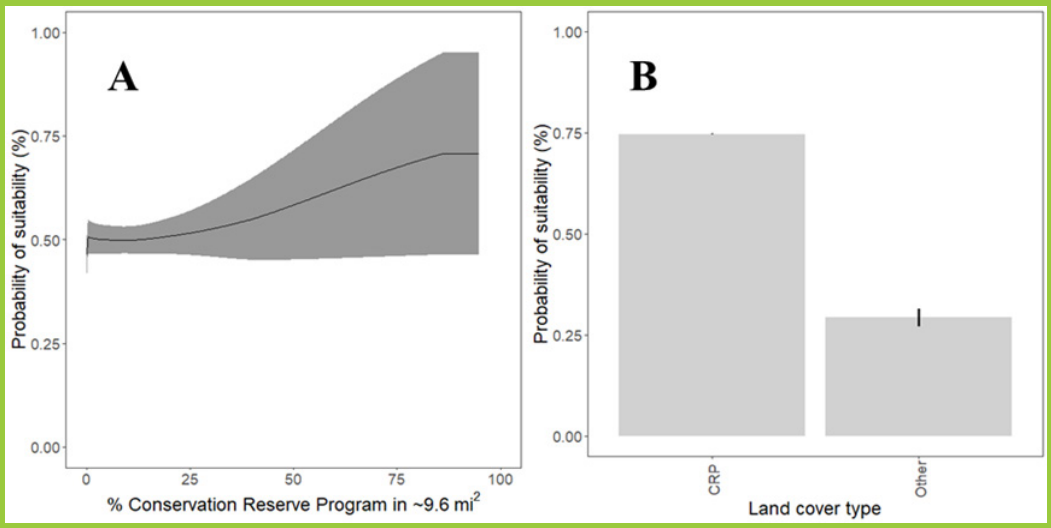

Figure 1. Relationships between the probability of suitable lesser prairie-chicken habitat and the prevalence of CRP cover at the distribution-wide (A) (gray area represents modeled standard error) and county (B) scales.

determined how likely LEPCs were to select a roost site within that CRP cover patch. As the distance to a CRP patch decreased by ~118 feet, the probability of a LEPC roosting in that location increased by 15%. Moreover, LEPCs located within CRP patches before sunset traveled shorter distances to get to their respective roosts, suggesting a tendency to remain within or near CRP cover for roosting. These patterns may help reduce stress and energy requirements needed to locate adequate roosting sites.

Finally, at a pasture level, managed grazing (30 cow/calf pairs on ~300 acres), a mid-contract management practice in CRP, did not affect LEPC use of CRP patches, as LEPC movement patterns in grazed CRP patches did not significantly differ from movements in ungrazed CRP enrollments.

Conservation Implications

CRP provides benefits to both grassland species and producers throughout the Great Plains by promoting grassland connectivity, reducing soil erosion, providing forage during managed grazing practices, and providing critical habitat for grassland wildlife. The benefits of CRP cover combined with healthier rangeland conditions coming from practices recommended in the NRCS Lesser Prairie-Chicken Initiative are helping to sustain and improve LEPC populations in the Great Plains.

CRP significantly contributes to LEPC habitat suitability across spatial scales. Moreover, CRP plays an important role by providing suitable nocturnal roost sites, which reduces the distance LEPCs need to travel to find safe roosting habitat patches. Specifically, individual birds were observed traveling greater distances from non-CRP patches to CRP patches to find safe roosting sites, while those birds already within CRP patches prior to roosting typically stayed within CRP cover and traveled little to find safe roosting sites. Given the limited movement of LEPCs around important areas such as roost sites, consideration of the spatial arrangement and nearest CRP patches can help landscape planners maximize LEPC habitat benefits.

This study shows that the presence of CRP cover interspersed with other diverse cover types (native range and cropland) is an important component in meeting the habitat needs of LEPC. At both the local and distribution-wide scales, the LEPC conservation framework used by planners in the future must be based on a good understanding of the temporal and spatial dynamics of LEPCs on CRP lands.

Finally, managed grazing within CRP areas appears to be compatible with LEPC ecology, and other mid-contract management practices (e.g., haying) should be further evaluated for compatibility.

References

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Conservation Effects Assessment Project: Translating Science Into Practice

The Conservation Effects Assessment Project (CEAP) is a multiagency effort to build the science base for conservation. Project findings help guide USDA conservation policy and program development and help farmers and ranchers make informed conservation choices.

One of CEAP's objectives is to quantify the environmental benefits of conservation practices for reporting at national and regional levels. Because wildlife is affected by conservation actions taken on a variety of landscapes, the CEAP-Wildlife National Component complements the CEAP National Assessments for cropland, wetlands, and grazing lands. The Wildlife National Assessment works through numerous partnerships to support relevant assessments and focuses on regional scientific priorities.

This project was conducted through a collaborative effort by private landowners, Oklahoma State University, the Oklahoma Department of Wildlife Conservation, NRCS's Lesser Prairie-Chicken Initiative and the Conservation Effects Assessment Project, Oregon State University, USDA's Farm Service Agency, and the Western Association of Fish and Wildlife Agencies.

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