



Oklahoma State



# WILDLIFE CHAIRS

Division of Agricultural Sciences and Natural Resources  
Department of Natural Resource Ecology and Management

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## Does the Chicken Cross the Road?

By: Ashley Tanner



A male lesser prairie-chicken peers through the fog from a trap site in western Oklahoma.

How animals respond to the landscape is important to understand for wildlife conservation. Human activities such as energy development and roads affect landscape patterns, and animal responses to these features can vary across scales. For example, an animal may choose to avoid certain landscape features seasonally or across long-time periods, but not during other seasons or shorter time periods. To provide an understanding of how the lesser prairie-chicken (hereafter LPC; *Tympanuchus pallidicinctus*) perceives landscapes, we evaluated telemetry locations and movements at multiple scales (from 1 hour to 168 hours between telemetry locations).



We found that LPC responded negatively to cropland at every scale measured. While LPC are known to sometimes use crop fields, our data indicated that they generally avoid them. However, they strongly Conservation Reserve Program (CRP) fields at every scale we measured. CRP is on land that was formerly cropped and is now permanently vegetated with grass and forb cover, and has clearly become an important component of habitat. Additionally, LPC minimized time spent crossing roads and power lines. These linear features were not absolute barriers, meaning birds did cross them, but our data suggest that they do act as a filter, minimizing movement. This has implications to landscape connectivity for LPC populations. However, CRP facilitated movement across roads, meaning that birds tended to cross roads more when CRP was adjacent to the road. Finally, we did not find evidence that LPC avoided residential areas (e.g., houses) or oil or gas wells. Previous research has found avoidance of these structures, but our data does not indicate avoidance.

Humans have significantly altered the landscape for LPCs by changing land cover and use and by fragmenting the landscape with roads and power lines. Our research demonstrates that not all development has the same affect on LPC. Conservation efforts should engage with policymakers to ensure that human development and LPC can both thrive on the prairie. Additionally, it is clear that CRP has become a major part of what constitutes habitat for LPC and maintaining this land in permanent vegetation cover will be important for future LPC conservation.



LPC require open spaces of grassland and shrubland. We have significantly altered these rangelands, which has implications to how LPC move and use the landscape.

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Donor support of research and outreach programs is welcomed. We are always eager to hear from land owners, land managers, and donors regarding research ideas, concerns, and management questions.

To make a donation to the Wildlife Chairs at OSU:

- Go to <http://secure.osugiving.com>, click on the search box.
- Type “wildlife chairs” in the search box.
- When the results appear, choose either “Bollenbach Chair in Wildlife Management” or “Wildlife Conservation Chair” (Groendyke).





# Management of Roosting Cover for Rio Grande Wild Turkey

By: Dwayne Elmore



Trees for roosting are an important habitat component for Rio Grande wild turkey. This riparian area provides excellent roost cover as it has multiple large trees with horizontal branches. Note that the understory is open and there is a large forest opening that facilitates turkeys flying into and out of the roost trees.

Large open crowned trees such as cottonwood are important to wild turkeys throughout the year. Roost sites should have an open understory to increase use. Periodic prescribed fire, mechanical thinning, or herbicide application can be used to keep the understory free of shrub and midstory trees. If visibility is limited within the understory, thinning the midstory or understory will increase use of roosting and loafing by wild turkeys. When using prescribed fire, care should be taken to not damage roost trees, particularly when they are limited on the property. In cases where large amounts of coarse fuels are present (e.g., eastern red cedar, saltcedar, woody debris), the understory trees and woody debris should be removed before fire is used. Cottonwood are particularly vulnerable to damage from fire. Therefore, before conducting a prescribed fire, pull coarse woody fuel (anything larger than your arm in diameter) away from the base of the trees. Where adequate roost trees exist this may be irrelevant, but in much of western Oklahoma, it is a concern as trees are often confined to riparian areas and are limited.



Where adequate roost or loafing cover does not exist, it can be established. Establishing roost cover is often difficult and takes many years for the trees to reach an adequate size. Therefore, roost tree management should be planned well in advance. Landowners managing for wild turkeys should have a long-term plan to ensure that roost cover will be available in future decades. A few old declining trees with no younger age classes of roost trees establishing is a limitation for wild turkey on many properties. Carefully evaluate roost cover and determine if tree regeneration is present in or near the roost site such that replacement trees will be available as older trees decline and die. If not, encourage regeneration.

Prescribed fire, wildfire, and large flood events will often stimulate cottonwood regeneration. Trees can also be planted where regeneration is limited due to lack of seed source or lack of disturbance such as flood events which prepare the seed bed. If planting trees, remember that you may need to do this over several years as drought conditions will reduce survival or entirely eliminate plantings in some years. Planting in areas where the water table is close to the surface such as riparian areas will increase the likelihood of establishment, particularly of cottonwood plantings. Tree survival is typically higher when planted during the dormant season. However, the dormant season is often very dry in Oklahoma, which may limit survival in some years emphasizing the need for repeated plantings to ensure success. Once established, young cottonwood trees will be vulnerable to fire and care should be used during prescribed fires to prevent loss of establishing trees. Contact your local Oklahoma Cooperative Extension Service educator, the Natural Resource Conservation Service, or the Oklahoma Forestry Services for technical assistance and best management practices for tree planting.

If regenerating oaks, remember that they require sunlight for regeneration. Therefore, forest thinning can help with oak stand replacement. Plan a forest thinning during a year with a large mast crop of acorns to increase oak regeneration. Oak seedlings will often resprout following fire once they have an adequate root system established, but this will increase the time it takes for the trees to reach an adequate size for use by roosting wild turkeys. However, under low to moderate intensity fires, some oak seedlings will typically survive the fire.



Encroachment of eastern redcedar under roosting trees is a common problem in Oklahoma. These trees inhibit use of the overstory by roosting wild turkey. Use mechanical methods or fire to prevent this from happening.

Elm and hackberry regeneration is typically not limited as these plants produce abundant seed that is either wind deposited (elm) or carried by wildlife and rain events (hackberry) to sites with adequate sunlight for germination and growth. Once established, both elm and hackberry will resprout following fire, but young seedlings are susceptible to being killed by fire.

One final consideration regarding managing roost cover is that some other species of wildlife avoid trees. Prairie-chickens for example, strongly avoid tree cover. Establishing trees in open prairies where prairie-chickens occur is not recommended. A landowner can simultaneously manage for wild turkeys and sensitive species such as prairie-chickens by strategically limiting where tree cover occurs. Prairie-chickens typically do not use rugged topography such as steep canyons and riparian areas. These are excellent places to manage for wild turkey roosting cover. The flatter uplands could be managed for the open conditions that prairie-chickens require. Additionally, wild turkeys will forage into the adjacent open prairies near established roosting and loafing cover.

## New Bobwhite Project to be Initiated

By: Craig Davis

Last year, we completed a 6-year bobwhite research project funded by the Oklahoma Department of Wildlife Conservation (ODWC) that examined a variety of research topics including affects of oil and gas development on bobwhite, influence of thermal environments on bobwhite, reproductive strategies of bobwhite and scaled quail, and influence of extreme climatic events on bobwhite and scaled quail space use and survival. The results from the 6-year study provided us with a greater understanding of bobwhite and scale quail ecology and how to better manage them.



Northern bobwhite are a popular gamebird in Oklahoma. Research conducted at OSU aims to better understand and manage this species throughout the Southern Great Plains.

Photo by Rachel Beyke



Some of the highlights from the first 6 years of quail research include: understanding how temperature extremes affect movement, habitat selection, and survival of quail; determining that the presence of surface water affects quail habitat selection, but not quail survival; and recognizing the amount of brood mixing that takes place amongst quail chicks and how this can bias our estimates of brood survival.

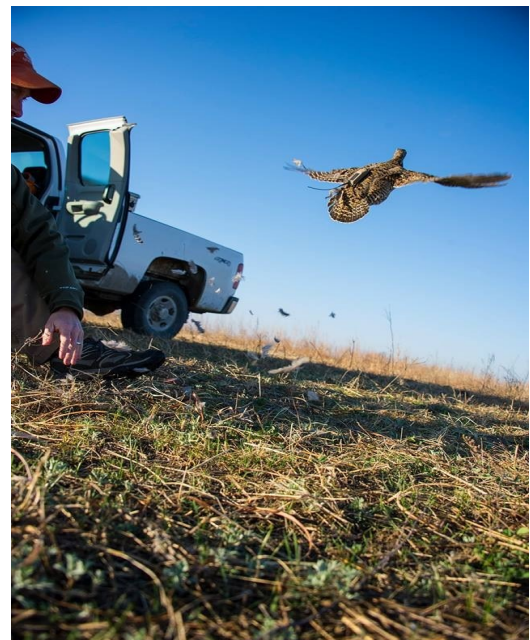
Building on what we learned from the first project, we will be initiating a new 3-year bobwhite project funded by ODWC in collaboration with Laura Goodman and John Weir of the Natural Resource Ecology and Management Department and Shawn Wilder of the Integrative Biology Department. This new project explores several management questions that will assist ODWC with development of an effective and impactful conservation plan for bobwhites (on both public and private lands). We will be conducting research at Packsaddle, Beaver, Cross Timbers, and Sandy Sanders Wildlife Management Areas .

The purpose of this project is to examine the influence of harvest and habitat management on bobwhite populations. Specifically, we will explore the role harvest plays in influencing bobwhite populations and the relationship between bobwhite and shrub cover at both the landscape and local scale. Additionally, we will determine the relationship between various habitat management practices and bobwhite food resources and their nutritional quality. Finally, we will examine long-range movements of bobwhites. Overall, this research will expand on our knowledge about bobwhite harvest and habitat management at two critical scales that will guide future bobwhite conservation efforts.

## Greater Prairie-Chickens and Energy Development

By: Dave Londe

The potential effects of energy development on grassland grouse has gained increased attention recently due to the spread of wind and oil development in grassland ecosystems. Like other grouse species, greater prairie-chickens have been suggested to be sensitive to development due to their strict habitat requirements and sensitivity to fragmentation, but currently there is limited evidence of greater prairie-chicken responding negatively to development. However, most research has focused on a relatively narrow portion of greater prairie-chicken's life cycle, primarily nesting and lekking.



A greater prairie-chicken is released with a transmitter. Photo by Todd Johnson

This has resulted in a considerable gap in our knowledge on how these birds respond to energy development during the majority of the year.

To investigate how oil development may affect greater prairie-chickens through the entire year, OSU researchers have been deploying GPS transmitters on female prairie-chickens in Osage County, Oklahoma. GPS transmitters collect multiple locations on each individual every day, allowing for a more in depth investigation of individual prairie-chicken's response to development. Similar to previous research, we found habitat selection was not strongly affected by oil and gas infrastructure during the lekking and nesting seasons. However, greater prairie-chickens avoided power lines and areas of high oil well densities during the post nesting (late summer and fall) season and the nonbreeding (winter) season.

These results help fill a considerable gap in our knowledge about how development may affect wildlife, and also emphasizes the importance of considering all parts of a species' lifecycle. Understanding a species' response to fragmentation during all parts of its life cycle is a crucial step towards effective conservation and will enable energy providers with a more holistic understanding of prairie-chicken response to development in prairie landscapes.



Prairie-chickens require large areas of relatively unfragmented prairie. Human development has the potential to affect prairie-chickens, but this is context specific for prairie-chickens depending on the type of structure and the season of the year.

# Wildlife Chairs' 2017 Research and Extension Highlights

## 2017 Research Publications

- Andersson, K., C. A. Davis, and B. F. Blackwell. 2017. Wetland bird abundance and safety implications for military aircraft operations. *Wildlife Society Bulletin* 41:424-433.
- Becerra, T.A., D.M. Engle, S.D. Fuhlendorf, and R.D. Elmore. 2017. Preference for grassland heterogeneity: Implications for biodiversity in the Great Plains. *Society & Natural Resources* 30:601-612.
- Carroll, J. M., C. A. Davis, R. D. Elmore, and S. D. Fuhlendorf. 2017. Response of northern bobwhite movements to management-driven disturbance in a shrub dominated ecosystem. *Rangeland Ecology and Management* 70:175-182.
- Carroll, J. M., C. A. Davis, R. D. Elmore, and S. D. Fuhlendorf. 2017. Using a historic drought and high-heat event to validate thermal exposure predictions for ground-dwelling birds. *Ecology and Evolution* 10.1002/ece3.3185.
- Carroll, J. M., R. L. Hamm, J. M. Hagen, C. A. Davis, and F. S. Guthery. 2017. Evaluation of leg banding and attachment of radio-transmitters on ring-necked pheasant chicks. *Wildlife Biology* 23:wlb.00263.
- Carroll, J. M., Hovick, T., C. A. Davis, R. D. Elmore, and S. D. Fuhlendorf. 2017. Reproductive plasticity and landscape heterogeneity benefit a ground-nesting bird in a fire-prone ecosystem. *Ecological Applications* 27:2234-2244.
- Davis, C. A., J. P. Orange, R. D. Van Den Bussche, R. D. Elmore, S. D. Fuhlendorf, J. M. Carroll, E. P. Tanner, and D. M. Leslie, Jr. 2017. Extrapair paternity and nest parasitism in two sympatric quail. *Auk* 134:811-820.
- Elmore, R.D., J.M. Carroll, E.P. Tanner, T.J. Hovick, B.A. Grisham, S.D. Fuhlendorf, and S.K. Windels. 2017. Implications of the thermal environment for terrestrial wildlife management. *Wildlife Society Bulletin* 41:183-193.
- Fogarty, D.T., R.D. Elmore, S.D. Fuhlendorf, and S.R. Loss. 2017. Influence of olfactory and visual cover on nest site selection and nest success for grassland-nesting birds. *Ecology and Evolution* 7:6413-6422.
- Fuhlendorf S.D., R.W. Fynn, D.A. McGranahan, and D. Twidwell. 2017. Heterogeneity as the Basis for Rangeland Management. In: Briske D. (eds) *Rangeland Systems*. Springer Series on Environmental Management. Springer, Cham.
- Fuhlendorf, S. D., T. J. Hovick, R. D. Elmore, A. M. Tanner, D. M. Engle, and C. A. Davis. 2017. A hierarchical perspective to woody plant encroachment for conservation of prairie chickens. *Rangeland Ecology and Management* 70:9-14.
- Hovick, T., M. Carroll, R. D. Elmore, S. Fuhlendorf, and C. A. Davis. 2017. Restoring fire to grasslands is critical for migrating shorebird populations. *Ecological Applications* 27:1805-1814.
- Hovick, T.J., D. A. McGranahan, R.D. Elmore, J.R. Weir, and S.D. Fuhlendorf. 2017. Pyric-carnivory: Raptor use of prescribed fires. *Ecology and Evolution* DOI:10.1002/ece3.3401.



- Joshi, O., T.A. Becerra, D.M. Engle, S.D. Fuhlendorf, and R.D. Elmore. 2017. Factors affecting public preferences for grassland landscape heterogeneity in the Great Plains. *Environmental Management* DOI 10.1007/s00267-017-0921-5.
- Krueger, E.S., T.E. Oschner, S.M. Quiring, D.M. Engle, J.D. Carlson, D. Twidwell, and S.D. Fuhlendorf. 2017. Measured soil moisture is a better predictor of large growing season wildfires than the Keetch-Byram drought index. *Soil Science Society of America Journal* 81:490-502.
- Leis, S.A., C.E. Blocksom, D. Twidwell, S.D. Fuhlendorf, J.M. Briggs, and L.D. Sanders. 2017. Juniper invasions in grasslands: Research needs and intervention strategies. *Rangelands* 39:64-72.
- Leverkus, S.E.R., S.D. Fuhlendorf, M. Geertsema, R.D. Elmore, D.M. Engle, and K.A. Baum. 2017. A landscape disturbance matrix for conserving biodiversity. *Journal of Ecosystems and Management* 17:1-26.
- Scholtz, R., J.A. Polo, S.D. Fuhlendorf, and G.D. Duckworth. 2017. Land cover dynamics influence distribution of breeding birds in the Great Plains, USA. *Biological Conservation* 209:323-331.
- Tanner, E. P., R. D. Elmore, C. A. Davis, and S. D. Fuhlendorf. 2017. Evidence of nest tenacity in Scaled Quail (*Callipepla squamata*) following an anthropogenic disturbance. *Wilson Journal of Ornithology* 129:354-359.
- Tanner, E. P., R. D. Elmore, C. A. Davis, and S. D. Fuhlendorf. 2017. Wintering bird responses to the presence of artificial surface water in a semi-arid rangeland. *Wildlife Biology* 23:wlb.00315.
- Tanner E. P., M. Papeş R. D. Elmore, S. D. Fuhlendorf, and C. A. Davis. 2017. Incorporating abundance information and guiding variable selection for climate-based ensemble forecasting of species' distributional shifts. *PLoS ONE* 12:e0184316.

## 2017 Extension Publications

- Elmore, R.D., L. Goodman, K. Hickman, and J. Alspach. 2017. Options for expiring Conservation Reserve Program (CRP) land (revision). Oklahoma Cooperative Extension Service. NREM 9016.
- Dahlgren, D.K., E.T. Thacker, and R.D. Elmore. 2017. Utah forest grouse research project. *Grouse News* 53:15-16.
- Johnson, K., R.D. Elmore, and L. Goodman. 2017. A guide to plants important to quail in Oklahoma. Oklahoma Cooperative Extension Service. E-1047.
- Rakowski, A.E. and R.D. Elmore. 2017. Ecology and management of the Rio Grande Wild turkey in Oklahoma. E-1045.
- Starns, H.D., S.D. Fuhlendorf, R.D. Elmore, T.J. Hovick, D. Twidwell, and E.T. Thacker. 2017. Patch-burning reduces fuels and is compatible with prairie-chicken conservation. Great Plains Fire Science Exchange, Research Brief 2017-01.

## 2017 Extension Activities

- 36 presentations given at professional meetings.
- 12 presentations given at landowner events.
- 3 field days organized.
- 8 television segments filmed.
- 8 popular press articles created.

## 2017 Awards and Honors

- The Oklahoma Chapter of The Wildlife Society presented the 'Publication Award for Outstanding Peer-reviewed Publication' to Tanner, E.P., R.D. Elmore, S.D. Fuhlendorf, C.A. Davis, D.K. Dahlgren, and J.P. Orange. 2016. Extreme climatic events contain space use and survival of a ground-nesting bird. Global Change Biology DOI: 10.1111/gcb.13505.
- Sam Fuhlendorf received the 'Oklahoma Award' from the Oklahoma Chapter of the Wildlife Society. (TWS) This is the highest award given by OK TWS and recognizes a career of excellence in the wildlife profession.
- Congratulations to Mr. John Groendyke for being named a 2017 'Division of Agricultural Sciences and Natural Resources (DASNR) Champion' at Oklahoma State University. The DASNR Champion award recognizes those who have brought distinction to DASNR and have demonstrated a continuing interest and commitment in agricultural sciences and natural resources.

## Oklahoma State University Wildlife Chairs

**Craig Davis** holds the Bollenbach Endowed Chair in Wildlife Management with both research and teaching responsibilities. He works on a variety of research projects including upland gamebirds, avian ecology and management, and wetland ecology and management. He can be contacted at [craig.a.davis@okstate.edu](mailto:craig.a.davis@okstate.edu) or 405-744-6859.

**Dwayne Elmore** holds the Bollenbach Endowed Chair in Wildlife Management with a focus on extension and research. He works on a variety of projects including upland gamebirds, prescribed fire, and wildlife habitat management. He can be contacted at [dwayne.elmore@okstate.edu](mailto:dwayne.elmore@okstate.edu) or 405-744-9636.

**Sam Fuhlendorf** is a Regents Professor and holds the Groendyke Endowed Chair in Wildlife Conservation. He has both research and teaching responsibilities and works on a variety of research projects including patch burn grazing, prescribed fire, and wildlife management. He can be contacted at [sam.fuhlendorf@okstate.edu](mailto:sam.fuhlendorf@okstate.edu) or 405-744-9646.

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