



Oklahoma State



WILDLIFE CHAIRS

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

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By: Kent Andersson, Senior Research Specialist



Northern bobwhite require shrub cover, but how much do they need and how should it be distributed?

Northern bobwhite numbers have been declining across most of their distribution over the past half century. While several factors have contributed to this decline, habitat loss and degradation are a major reason. Obvious changes in bobwhite habitat such as urbanization and conversion of native plant communities to agriculture often result in complete, or near complete, loss of bobwhite habitat. However, habitat degradation can be more subtle and therefore more difficult to observe. For example, in Oklahoma, shrublands can provide excellent bobwhite habitat, but when shrubland cover exceeds a certain threshold, it may not be used by bobwhite.



We recently initiated a research project funded by the Oklahoma Department of Wildlife Conservation to investigate the influence of shrub (brush) cover on habitat use and density of bobwhites. During 2018, we collected information on shrub cover and bird numbers at four different Wildlife Management Areas (Beaver River, Cross Timbers, Packsaddle, and Sandy Sanders). As part of this project, we also established research plots at each WMA, in collaboration with Laura Goodman and John Weir of the Natural Resource Ecology and Management Department, to evaluate the effectiveness of prescribed fire and herbicide application in controlling and manipulating shrub cover. Together, these two components should allow us to link direct management actions with potential effects on quail.

We will be using GPS transmitters which are capable of collecting data on a finer time scale than traditional radio telemetry with less disturbance to the birds. The use of GPS transmitters will also allow us to analyze long-distance movements, another poorly understood aspect of bobwhite ecology.

In collaboration with Shawn Wilder of the Integrative Biology Department, we are also examining how bobwhite food resources and their nutritional quality vary among existing vegetation types and how they are impacted by prescribed fire.

The final component of this study will focus on the impact of hunter harvest on bobwhite population dynamics. Data on hunter harvest via wing collections are currently being collected.

Additionally, we will be surveying bobwhite hunters at each WMA to better understand hunter influence on harvest.



GPS transmitters provide a finer scale of monitoring than previously possible.

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

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- 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).



Disking for Wildlife?

By: Dwayne Elmore, Extension Wildlife Specialist



Disking the soil can increase the amount of annual food-producing plants that quail use. In wetter, more productive areas, disking during the dormant season (October through March) will generally result in a more desirable plant response as opposed to disking during the growing season. However, based on our research results, disking may not be that valuable to quail in more arid regions.

Disking is a practice used to disturb the soil and promote growth of desirable plants that produce wildlife food and attract insects. It is commonly used for bobwhite, mourning dove, wild turkey, and white-tailed deer management. Limited data in the southeastern US indicate that it can increase desirable food producing plants (mostly annuals) and can decrease the amount of litter making the areas potentially more useable by quail and turkey poults. The results are usually short-lived – perhaps 1-2 years. Also, the plant species response can be highly variable depending on the season of the year and even between years. In general, fall and winter disking seems to produce a more desirable plant response for game species than does spring or summer disking. Desirable plants such as common ragweed, annual sunflowers, croton (dove weed), and marehail often dominate areas that were disked during the dormant season.

Despite the potential positives associated with disking, if the site has never experienced a significant soil disturbance, disking can alter the soil structure and potentially create open areas for establishment of invasive plants. For this reason, it is typically a practice best suited for land that was previously cultivated (old fields and go back land). There is also some unpredictability in the plant response from year to year due to weather variation. Despite this, in wetter areas of the country, such as eastern Oklahoma, disking often can temporarily improve habitat for game species. As you move into the drier parts of western Oklahoma, there is less known about the effects of disking although it is still commonly practiced there for quail management.

To address this, we conducted a two-year disking study at Beaver River Wildlife Management Area, comparing disking in late winter, early summer, and late summer in regards to quail management. Results indicated that there were no differences in the ratio of desirable and undesirable quail plants between season of disking and control plots where no disking occurred. While there were certain species of plants favored by disking (such as annual sunflowers), overall the benefits for quail appeared neutral. Similarly, there were no differences in the insect community between the three seasons of disking or the control plots that were not disked. However, there may still be application for disking if specific species of plants are desired. For example, disking in the dormant season in the west often favors annual sunflowers. Therefore, if you were managing for mourning dove hunting, this practice might be useful.



This disked plot resulted in annual ragweed and sunflower. Both are excellent white-tailed deer forages. The plot also provides good brood cover for wild turkey poults.

Scaled quail and temperature: finding a little shade

By: Kiera Kauffman, MS Graduate Student

Temperature is an important part of wildlife habitat. Changes in soil, moisture, plant cover, direct sunlight, and other factors create unique microclimates. Microclimates can provide shade or warmth for wildlife during hot and cold weather, and this type of shelter is known as thermal cover. Wildlife movement and survival may depend on having enough thermal cover. Vegetation is one important source of thermal cover, but in open landscapes with few tall plants for shade, extreme weather may lead wildlife to seek cover from other sources.

To better understand what features on the landscape create thermal cover and how wildlife use them, we attached radio collars to scaled quail in southeastern New Mexico. These quail live in a shortgrass prairie managed with prescribed fire to control honey mesquite, a shady shrub that scaled quail often use for food and cover. We located collared quail throughout the breeding season and deployed button-sized temperature loggers to determine how vegetation and topography affect temperature at different times of day, both at quail locations and at random locations. During our first year of research, we found that during the hottest part of the day, locations used by quail stayed cooler than what was generally available to them. Similarly, quail nests moderated temperature by several degrees compared to locations only a few feet away.

Nests also had more shrub and grass cover than paired locations, suggesting that vegetation is important for keeping nests cool. Topography also appears to provide a temperature refuge, as afternoon temperatures stayed slightly cooler in areas where sand dunes and hummocks formed slopes that blocked the sun.

Although this study is ongoing, our preliminary findings indicate that scaled quail respond to very small changes in temperature on the landscape. Even short hummocks and clumps of grass may be important for sheltering scaled quail during extreme heat. It is already apparent that management practices such as prescribed fire, brush spraying, and grazing can alter thermal cover for scaled quail.



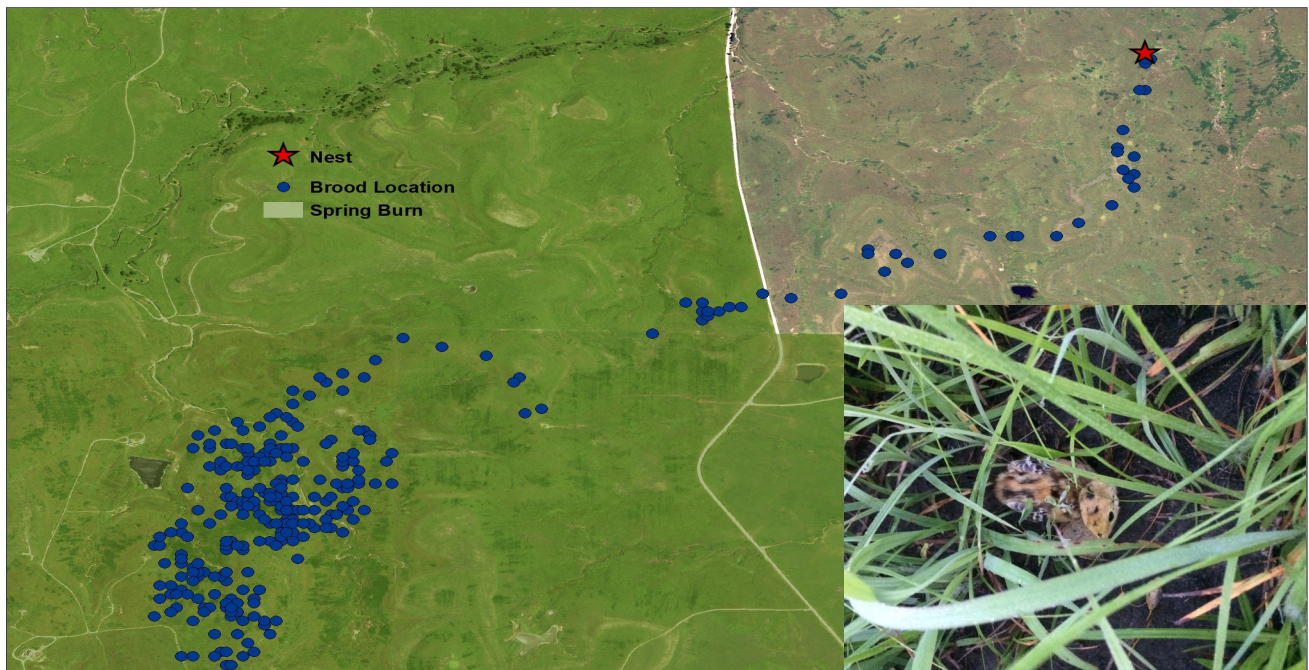
Kiera Kauffman with a captured scaled quail in southeastern New Mexico.

Habitat Selection of Greater Prairie-Chicken Broods

By: Dave Londe, PhD Graduate Student

The brood-rearing period can be one of the most challenging portions of a ground-dwelling bird's life-cycle, but we know little about this life-stage for many grassland birds. Further, there is relatively little information on how grassland management practices such as prescribed fire and grazing influence the availability of important resources for broods. This is particularly true for the greater prairie-chicken. To address this, we are studying brood ecology in Osage County, Oklahoma in a grassland managed with fire and grazing.

Preliminary results from our first year of data collection showed that broods selected for areas that had been burned and grazed in the previous 12 months, and within these patches, broods used areas with a mixture of grasses and exposed bare ground. However, afternoon locations (sites used by the broods during the hottest part of the day) had greater grass cover, less bare ground, and denser vegetation, which may offer greater protection from extreme temperatures. This was supported by temperature data collected at these sites which showed that these afternoon locations experienced fewer temperature extremes compared to areas used by broods in the mornings. These results underline the importance of patchy grasslands that result from fire and grazing.



A greater prairie-chicken brood path as determined by a GPS transmitter on the hen. Note that the hen nested in an unburned pasture (pasture on the right) and after hatch took the brood to a recently burned pasture (pasture on the left) where they spent the remainder of the summer. Inset shows a newly hatched greater prairie-chicken chick.

Wildlife Chairs' 2018 Research and Extension Highlights

2018 Research Publications

- Andersson K., CA Davis, G Harris, DA Haukos. 2018. Nonbreeding duck use at Central Flyway National Wildlife Refuges. *Journal of Fish and Wildlife Management* 9:45-64.
- Bielski CH, D Twidwell, SD Fuhlendorf, CL Wonkka, BW Allred, TE Ochsner, ES Krueger, JD Carlson, DM Engle. 2018. Pyric herbivory, scales of heterogeneity and drought. *Functional Ecology* 6:1599-1608.
- Carroll RL, CA Davis, SD Fuhlendorf, RD Elmore, SE DuRant, and JM Carroll. 2018. Avian parental behavior and nest success influenced by temperature fluctuations. *Journal of Thermal Biology* 74:140-148.
- Fogarty DT, RD Elmore, SD Fuhlendorf, and SR Loss. 2018. Variation and drivers of airflow patterns associated with olfactory concealment and habitat selection. *Ecology* 99:289-299.
- Fuhlendorf SD, Davis CA, Elmore RD, Goodman LE, Hamilton RG. 2018. Perspectives on grassland conservation efforts: should we rewild to the past or conserve for the future? *Philosophical Transactions of the Royal Society B* 373: 20170438. <http://dx.doi.org/10.1098/rstb.2017.0438>
- Houlahan JE, DJ Currie, K Cottenie, GS Cumming, CS Findlay, SD Fuhlendorf, P Legendre, EH Muldavin, D Noble, R Russell, RD Stevens, TJ Willis, SM Wondzell. 2018. Negative relationships between species richness and temporal variability are common but weak in natural systems. *Ecology* 99:2592-2604.
- Jenkins T, WW Hoback, P Mulder, D Leasure, and CA Davis. 2018. Distribution of the endangered American burying beetle at the northwestern limit of its range. *Insect Systematics and Diversity* 2:1-8.
- Leverkus SR, SD Fuhlendorf, M Geertsema, BW Allred, M Gregory, AR Bevington, DM Engle, JD Scasta. 2018. Resource selection of free-ranging horses influenced by fire in northern Canada. *Human–Wildlife Interactions* 12:10-18
- McGranahan DA, TJ Hovick, RD Elmore, DM Engle, SD Fuhlendorf. 2018. Moderate patchiness optimizes heterogeneity, stability, and beta diversity in mesic grassland. *Ecology and Evolution* 8:5008-5015.
- Scholtz, R. SD Fuhlendorf, SR Archer. 2018. Climate-fire interactions constrain potential woody plant cover and stature in North American Great Plains grasslands. *Global Ecology and Biogeography* 27:936-945.
- Scholtz R, SD Fuhlendorf, SA Leis, JJ Picotte, D Twidwell. 2018. Quantifying variance across spatial scales as part of fire regime classifications *Ecosphere* 9:e02343
- Scholtz R, JA Polo, SD Fuhlendorf, DM Engle, JR Weir. 2018. Woody plant encroachment mitigated differentially by fire and herbicide. *Rangeland Ecology & Management* 71:239-244.

- Scholtz, R, JA Polo, EP Tanner, SD Fuhlendorf. 2018. Grassland fragmentation and its influence on woody plant cover in the southern Great Plains, USA. *Landscape Ecology* 33:1785-1797.
- Sharma S, TE Ochsner, D Twidwell, JD Carlson, ES Krueger, DM Engle, SD Fuhlendorf. 2018. Nondestructive estimation of standing crop and fuel moisture content in tallgrass prairie. *Rangeland Ecology & Management* 71:356-362.
- Tanner EP, SD Fuhlendorf. 2018. Impact of an agri-environmental scheme on landscape patterns. *Ecological Indicators* 85:956-965.
- Wilcox, BP, A Birt, SR Archer, SD Fuhlendorf, UP Kreuter, MG Sorice, WJD van Leeuwen, CB Zou. 2018. Viewing woody-plant encroachment through a social-ecological lens. *Bioscience* 68:691-705.
- Wilcox BP, A Birt, SD Fuhlendorf, SR Archer. 2018. Emerging frameworks for understanding and mitigating woody plant encroachment in grassy biomes. *Current Opinion in Environmental Sustainability* 32:46-52.

2018 Extension Publications

- Andersson, K., ET Thacker, MJ Carroll, EP Tanner, JP Orange, R Carroll, C Duquette, CA Davis, SD Fuhlendorf, and RD Elmore. 2018. Research summary: evaluation of northern bobwhite and scaled quail in western Oklahoma. Oklahoma Cooperative Extension Service P-1054.
- Dahlgren, DK, S Farnsworth, ET Thacker, and RD Elmore. 2018. Dusky grouse at dawn: in pursuit of a montane umbrella species. *The Wildlife Professional* March/April 2018:36-39.
- Elmore, RD 2018. Frequently asked wildlife management questions. Oklahoma Cooperative Extension Service. NREM-9025.
- Elmore, RD 2018. Frequently asked wildlife damage and disease questions. Oklahoma Cooperative Extension Service. NREM-9026.
- Elmore, RD, L Goodman, and D Wolf. 2018. Lesser-prairie chicken habitat evaluation guide (revision). Oklahoma Cooperative Extension Service. E-1014.
- Hickman, KH, L Goodman, RD Elmore, A Buthod, E Duell, and JN Craun. 2018. Oklahoma's dirty dozen. Oklahoma Cooperative Extension Service. E-1050.
- Hovick, TJ DA McGranahan, RD Elmore, JR Weir, SD Fuhlendorf. 2018. Pryic-carniovry: raptor use of prescribed fires. Oak Woodlands and Forests Fire Consortium Research Brief.

2018 Extension Activity Highlights

- 24 presentations at professional meetings
- 8 presentations at landowner events
- 7 field days and workshops
- 12 television segments
- 1 international grouse symposium

2018 Awards and Honors

- The Oklahoma Chapter of The Wildlife Society presented the 'Publication Award for Outstanding Peer-reviewed Publication' to *Fogarty, D.T., R.D. Elmore, S.D. Fuhlendorf, and S.R. Loss. 2018. Variation and drivers of airflow patterns associated with olfactory concealment and habitat selection. Ecology*
- The Wildlife Society presented the Scientific Publication Award-Edited Book to *Ecology and Conservation of Lesser Prairie-Chickens. Ecology 99:289-299.*
- Sam Fuhlendorf received the Sustained Lifetime Achievement Award from the Society for Range Management.
- Dwayne Elmore received the James A. Whatley Award for Meritorious Service in Agricultural Sciences from Oklahoma State University Division of Agricultural Sciences and Natural Resources and the Southern Region Excellence in Extension Award from the National Cooperative Extension Section and USDA NIFA.

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 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 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 or 405-744-9646.

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