Lesser Prairie-Chicken Research
By: Ashley Unger

The March 2014 listing of the lesser prairie-chicken as a threatened species has put a spotlight on the conservation needs of this declining bird. Oklahoma State University researchers are focused on filling in gaps in lesser prairie-chicken research to better inform future conservation efforts. Research objectives include determining how anthropogenic development, such as oil and gas development, impact lesser prairie-chickens and studying the effects of landscape features on habitat selection, survival, and nesting at different scales.

To investigate these objectives, graduate student Ashley Unger and many technicians have trapped and fitted 69 individual birds (51 males, 18 females) with GPS transmitters in the panhandle region of Oklahoma over the past 3 years. These GPS transmitters are solar-powered and record up to 15 locations per day at hourly intervals, resulting in the collection of over 100,000 locations thus far. Preliminary analysis of these data showed a peak in daily movement and mortality from March – May and November-December. Our crude analysis of habitat use revealed an avoidance of anthropogenic features including oil and gas wells, transmission lines, and roads; however, a more comprehensive analysis is needed to determine what characteristics of development may have caused this behavior. Increasing energy development will impact large portions of current lesser prairie-chicken habitat, therefore, we hope the results of our analyses will help agencies and landowners improve management and inform future conservation plans.
Greater Prairie-Chicken Ecology in Oklahoma

By: Torre Hovick

Over the past five years we have examined greater prairie-chicken thermal environments, habitat use, and nest survival at The Nature Conservancy’s Tallgrass Prairie Preserve. Prairie-chicken populations have undergone declines in Oklahoma over the last half century, and throughout the Flint Hills region prairie-chicken populations have been reduced by nearly 25% over the last two decades. While many different factors are likely interacting to cause these declines, many suspect the timing and distribution of disturbance (fire and grazing) are responsible. Therefore, we investigated how interacting fire and grazing affects prairie-chicken survival and habitat use.

We found that prairie-chicken survival was higher in a landscape managed for vegetation structural variation than previous research reported for other areas in the Flint Hills that were managed more intensively and lacked structural variation. Prairie-chicken nest survival increased with increasing vegetation height and we found that greater levels of solar radiation decreased nest survival. In other words, prairie-chicken nests have the greatest survival when weather conditions are relatively cooler and cloudier as opposed to hotter and sunnier. We found that prairie-chicken selection of sites to nest was primarily influenced by three main factors: fire, trees, and lek locations. Prairie-chickens selected nest sites in areas that had been unburned for multiple years, areas with relatively less tree cover, and sites that were closer to lek locations.

We also assessed how managing for variation in vegetation structure influenced temperature and prairie-chicken habitat use. We found that structurally-varying grasslands have high temperature variability with operative (a metric that incorporates air temperature and solar radiation) temperature ranging as much as 73°F across the landscape when air temperatures are >86°F. Operative temperatures in all environments increased linearly with air temperature, but the rate of increase varied among patches, micro-sites, and nests. On average, prairie-chicken landscape when air temperatures are >86°F. Operative temperatures in all environments increased linearly with air temperature, but the rate of increase varied among patches, micro-sites, and nests. On average, prairie-chicken

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These results elevate our understanding of the importance of managing grasslands for variation in vegeta-

Studying Bobwhite and the Ecology of Smell on the McFarlin-Ingersoll Ranch

By Scott Loss and Dillon Fogarty

Wildlife management efforts and studies of wildlife habitat selection have traditionally focused on how visual characteristics of habitat conceal animals from predators. But just like a trusty bird dog, most predators rely on smell, not sight, to locate their prey. Therefore, wildlife may partly select habitat to reduce the chances that predators detect their scent, and wildlife ecologists might be overlooking important components of habitat that could be managed to reduce predation on declining wildlife species.

We are studying whether concealment of scent contributes to where Northern Bobwhite place their nests and to whether nests are found by scent-based predators like oppossums, raccoons, and armadillos. This work, made possible by a donation to NREM by Mr. Win Ingersoll and Mrs. Kay Ingersoll, is being conducted on the 11,000 acre McFarlin-Ingersoll Ranch near Inola, Oklahoma. The ranch is known nationally for hosting state, regional, and national-qualifying bird dog field trials.

To locate nests, we capture bobwhite using funnel traps, radio-collar them, and track them through the breeding season. Once we locate the nest locations, we monitor nests regularly to determine whether they are depredated or successfully hatch chicks. After nests fledge or fail, we take many traditional measures of visual concealment, such as vegetation height and percent cover of different plant groups. We measure olfactory concealment by using a sonic anemometer that measures air flow in three dimensions. This 3D information is used to calculate air velocity, turbulence, and updraft, three factors that are crucial to whether bird scent stays near the ground and is easily detectable by predators or is carried up and out of the reach of predator noses.

Addressing the above objectives will require two full years of research, but we have already found that vegetation features – both right at the nest and in the nest’s larger “neighborhood” – create a large amount of variation in air currents. The information generated from this project will not only provide basic understanding of the ecology of scent, but will also be an important piece to the puzzle of understanding, halting, and reversing the range-wide decline of Northern Bobwhite populations.
Bobwhite and Scaled Quail Ecology
By: Evan Tanner

In Oklahoma, northern bobwhite is a species associated with a rich hunting legacy that is steeped in tradition. Although less severe in Oklahoma, bobwhite populations have been declining across much of North America for at least the past 40-50 years.

In affiliation with Oklahoma State University and with funding by the Oklahoma Department of Wildlife Conservation, we are currently conducting a long-term research project aimed at addressing the bobwhite decline and providing knowledge to improve future management prescriptions. Over the past 3 years, data has been collected on a wide range of topics at the Packsaddle WMA in western Oklahoma including habitat use, movement, survival, and nest success of bobwhite. To date, we have attached radio-collars to over 600 bobwhite, collected more than 30,000 radio locations, and have monitored 125 nests. Simultaneously, we are also striving to examine previously unstudied aspects of bobwhite ecology which confer direct management implications. For example, by quantifying thermal environments, we have found that bobwhite rely heavily on fine scale landscape components (e.g., vegetation structure) that mitigate temperature extremes at both nesting sites and brood rearing sites during summer heat. These findings contribute to a better understanding of the drivers of bobwhite population declines, which are often attributed to high heat and drought on the western edge of their distribution. Furthermore, our results emphasize that temperature may be as critical as traditionally studied habitat components such as forage and cover.

To make a donation to the Wildlife Chairs at OSU:
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Researchers trapped a scaled quail in western Oklahoma, and are attaching a radio transmitter.

With northern bobwhite and scaled quail experiencing distribution-wide population declines in recent decades, a cooperative research effort focused on gaining a better understanding of quail ecology and management has been established between Oklahoma State University and the Oklahoma Department of Wildlife Conservation (ODWC).

We are currently researching the ecology of bobwhite and scaled quail within distribution extremes at Beaver River WMA within the framework of this long-term research project. Since 2012, we have collected data for both species via radio-telemetry, and are focusing on documenting habitat selection, seasonal movement patterns, adult survival, nest success, and nest site selection. More specifically, research goals at Beaver River WMA focus on 1) modeling the ecological niches of both quail species on distribution extremes, 2) documenting how anthropogenic features and hunting pressure affect quail ecology, and 3) comparing a new fall quail covey survey technique to a traditional survey technique. To date, we have radio-collared over 850 bobwhite and scaled quail combined, resulting in over 25,000 quail locations and 117 monitored quail nests.

Preliminary analysis indicates quail select for areas closer to anthropogenic surface water sources, while exhibiting an increase in survival when closer to water during drought years. Furthermore, though density estimates have not yet been compared between quail survey techniques, our newer survey technique has proven to be less time-intensive while yielding similar population index trends. Data collection is finished for this portion of the research, and efforts are now being focused on the completion of data analysis and writing manuscripts.

Addressing Bobwhite Declines
By: Matt Carroll

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Our research at the tallgrass prairie preserve is ongoing and we have begun a second phase where we are investigating fine-scale habitat use through the use of GPS transmitters that give us 12 locations a day. This information will better inform land managers on the effects of oil and gas infrastructure on prairie-chicken habitat use and it will provide new insights into aspects of prairie-chicken ecology that have mostly been unattainable until this new technology was developed. As an example, we are now able to gather information on overnight roosting habitat that would have been very logistically challenging with previous technology. This phase of the research is intended to continue until 2017 at which time we hope to be able to make informed recommendations to land managers on the effects of oil and gas on prairie-chickens.

Quail Breeding Behavior and Brooding Success

By: Jeremy Orange

One of the keys to understanding any species is a thorough knowledge of its breeding ecology and behavior. Until recently, little research has been conducted to understand the breeding behavior and brooding success of many quail species. Reproductive and brood rearing strategies utilized during the nesting and brood rearing periods will influence the ability of individuals to pass on their genes to subsequent generations.

We have been conducting research at Beaver River and Packsaddle Wildlife Management Areas in western Oklahoma. Primary research objectives included: 1) investigate the survival, habitat use, and movement of northern bobwhite and scaled quail during the first 9 weeks of their life and 2) to estimate the rates of occurrence of alternative breeding and brooding behaviors along with the environmental factors that may be influencing them. Over the last two field seasons, we collected and genetically analyzed over 1,100 eggshell and feather samples. Throughout the 2013 and 2014 field seasons, we have found that 29.3% of bobwhite and 2.2% of scaled quail offspring result from extra-pair copulations with males that are not the primary mate. Additionally, in order to better understand brood and chick survival, we attached radio-transmitters to over 353 quail chicks and used these transmitters to estimate survival along with the influences that environmental variables may have on survival. We are currently in the process of analyzing and interpreting this data. We hope that information gained from this project will help researchers to better understand aspects of quail ecology that have not been well studied until now, enabling researchers to effectively manage quail populations throughout the region.