Quail News
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Lesser Prairie-Chicken Research

By: Ashley Unger

Graduate student Ashley Unger is holding a male lesser prairie-chicken that was fitted with a GPS transmitter in Beaver County, Oklahoma.

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.

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WILDLIFE CHAIRS
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INSIDE THIS ISSUE

Welcome to the inaugural wildlife chairs newsletter from Oklahoma State University. This newsletter is an expanded version of the Bollenbach newsletter that many of you had received in the past. It includes information from both the Bollenbach chair and the newly created Groendyke chair for wildlife conservation, which is discussed below. We have created a new website http://wildlifechairs.okstate.edu that encompasses the three chairs and includes information on the chairs, research projects, fact sheets, publications, and videos. If you would like to receive this newsletter and future correspondence electronically please send your name and email address to blayr.gourley@okstate.edu. We plan on sending two newsletters each year. Additionally, periodic blogs will be made available electronically. If you wish to no longer receive this newsletter please let us know. Finally, we would love to hear your feedback on research ideas, concerns, field observations, or news.

As many of you are aware, Dr. Fred Guthery retired in December 2012, and the Bollenbach Chair was unoccupied until July 2014. During this time, it was decided to create a second Bollenbach Chair position. The separation of the Bollenbach Chair into two chair positions provides a unique opportunity to elevate the influence of our research on wildlife conservation and management in the state and beyond. In July 2014, Dr. Davis and Dr. Elmore were selected as the new Bollenbach Chairs. Dr. Davis holds the Bollenbach Chair with a primary focus on upland gamebird research and Dr. Elmore holds the Bollenbach Chair with a primary focus upon outreach and extension for upland gamebirds. One of the central goals of the Bollenbach Chair is to build on the successful research program that Dr. Guthery began as well as to expand the upland game research program at OSU to other upland game birds such prairie-chicken, wild turkey, scaled quail, and ring-necked pheasant. We intend to actively pursue funding to further build the upland gamebird research program and to use our chair positions to strengthen multi-disciplinary teams to address issues in wildlife conservation and management.

Additionally, a new chair in wildlife conservation has been created at OSU. Dr. Sam Fuhlendorf is the first person to hold the Groendyke Chair for Wildlife Conservation. He was appointed to the position in 2014, with his primary responsibility being to provide research-based information, instruction and outreach on the conservation, management and/or restoration of native plant communities as it relates to wildlife populations and habitat. Dr. Fuhlendorf is a Regents Professor and has been conducting this type of research since he started his appointment at OSU in 1997.

Greater Prairie-Chicken Ecology in Oklahoma

By: Torre Hovick

A male Greater Prairie-Chicken with a VHF necklace-style transmitter on a lek at the Tallgrass Prairie Preserve.

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 nests were in patches that averaged 21.4 (SE ± 1.8) months post fire and were 39-42°F cooler than the surrounding landscape. Measurements of vegetation at nest sites and the micro-sites were similar with the exception of vegetation height, which was significantly taller at nests than micro-sites and suggests that shading from vegetation could be driving operative temperatures at nest sites. Additionally, thermal environments were significantly cooler at successful nests than failed nests with successful nests being up to 42°F cooler.

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

continued on page 3

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

By Scott Loss and Dillon Fogarty

Graduate student Dillon Fogarty holding a hen bobwhite with a radio transmitter.

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 opossums, 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 measurements 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 3-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.

Wildlife technicians setting up equipment to collect data on the movement of scent.

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.

Addressing Bobwhite Declines

By: Matt Carroll

Researcher Matt Carroll attaches a radio transmitter to a male bobwhite at the Packsaddle WMA during winter 2014.

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:

- go to http://secure.osugiving.com, click “search here”
- type “wildlife chairs” in the search box
- when the results appear, choose either “Bollenbach Chair for Wildlife Management” or “Wildlife Conservation Chair” (Groendyke).

Bobwhite and Scaled Quail Ecology

By: Evan Tanner

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.

Distribution of Coyotes at the Tallgrass Prairie Preserve in Relation to Anthropogenic Factors

By: Shelby Fraser and Sam Fuhlendorf

Researchers trapped a coyoted and are fitting it with a GPS collar.

To address the lack of knowledge on carnivore behavior related to land use and land cover, Oklahoma State University has initiated a telemetry project in Osage County, Oklahoma. Over the next two years, we will be investigating the distribution of coyotes in The Nature Conservancy's Tallgrass Prairie Preserve in relation to anthropogenic factors such as oil and gas development and prescribed fire. The Tallgrass Prairie preserve is the largest remaining remnant of tallgrass prairie left in the United States. The goal of the preserve is to manage the ecosystem in such a way that it mimics pre European settlement. This includes seasonal burning of the grassland and grazing by domestic cattle and American bison. There is ample data on how small mammals, bison, and birds react to prescribed fire, but little information on how this alters coyote behavior. The coyote is currently the largest and most common predator of the tallgrass prairie. For this reason it is important to understand how the coyotes use the landscape. Our study will involve trapping 10 coyotes and fitting them with GPS collars that track their movements for a year a half.

The GPS collars will allow us to determine what affects the movements of coyotes. We predict that coyotes will alter their behavior due to prescribed fire and energy development on the preserve. This research is important to understand how this apex predator is altering their behavior due to human related factors on the preserve. The data is also relevant for other prairie ecosystems and other carnivores around the world.

tion structure and demonstrate the importance of weather in prairie-chicken ecology. Despite the dramatic and frequent changes in weather in the southern Southern Great Plains, it appears that managing rangelands in a way that creates a variety of patches that vary in vegetation structure can make prairie-chickens populations more resilient to extreme weather.

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

A pair of roosting scaled quail, the bird on the left is fitted with a transmitter.

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.