

31st Meeting of the **Prairie Grouse Technical Council**

September 22 - 24, 2015 • Nevada, Missouri

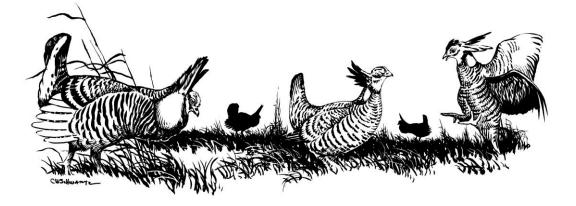
Welcome to the 31st Prairie Grouse Technical Council!

Every other year we gather from across the Great Plains and beyond, to socialize and share what we are learning about the conservation of the handful of iconic prairie grouse species. 2015 marks the third time Missouri has had the honor of hosting the Prairie Grouse Technical Council since it was formed in 1957; we're very glad that you're here!

Regardless where we come from or the species in which we happily invest our efforts, we are united by concerns about dwindling habitat and ever-expanding challenges. Whether we work with isolated populations on the edge of a species' range or in the relative stability of the heart of the range, whether we administer an Endangered Species listing or a closely-managed hunting season, we share well-justified concerns. We are bound by common efforts to sustain habitat and buffer the impacts of agricultural policy, energy development and other factors beyond our control.

It is increasingly important to gather to recount successes and share new ideas. It is inspiring to take part in the collective experience of our group and welcome new members of the profession. Your Missouri hosts sincerely hope you have an enjoyable and informative conference. Thanks for coming!

Max Alleger, Chair, 31st Prairie Grouse Technical Council



Acknowledgements

Thanks to fellow members of Missouri's Greater Prairie-Chicken Recovery Team who led the charge to plan this meeting; Aimee Coy, Dave Niebruegge, Frank Loncarich, Matt Hill, Steve Cooper, Tom Thompson, Len Gilmore, and Steve Clubine.

A special thank-you goes to Lana Wilson and Gina Allison who worked behind the scenes to arrange our meals, breaks and field trip logistics. We also want to thank Jason Cobden, Yvonne Heerlein, Liz Leeman, Kathy Cooper, Sharron Gough, Loel Wilson, Stasia Whitaker, Mike Longhofer, Mike Larsen, Joe Coy, Kathy Hetherington, Betty Elkins and Andy Carmack for their work behind the scenes.

Missouri Department of Conservation staff also thank the North American Grouse Partnership, and especially Steve Riley and Greg Hoch, for bringing PGTC registration and payment processes into the internet age for the first time.

Finally, thanks to the organizations and businesses listed on the back of this program, for their generous donations to the silent auction. The following individuals donated auction items and we appreciate their generosity as well: Glenn Chambers, Noppadol Paothong, Jim Rathert, Sharron Gough, Steve and Kathy Cooper, Len Gilmore and the Pettis County Beekeepers.



Program

Tuesday, September 22nd

5:30 – 9:00 p.m. **Social and registration**, food and drinks provided

Wednesday, September 23rd

8:00 a.m.	Opening remarks – Max Alleger (Moderator)
8:10 a.m.	Welcome to Missouri – MDC Deputy Director Tim Ripperger
8:20 a.m.	From the Heart of the Range to the Edge of the Range: History of Greater Prairie-Chickens in North American True Prairie – Steve Clubine
9:00 a.m.	Update – Interstate Working Group for Greater Prairie-Chicken and Sharp-tailed Grouse – Jon Haufler and Keith Sexson
9:20 a.m.	The LPCH Range-Wide Conservation Plan: A New Model for Conserving Threatened and Endangered Species – Cal Baca
9:40 a.m.	LPCI: A Path Forward Threatened Species Recovery and Agricultural Communities – Jon Ungerer
10:00 a.m.	Break
10:20 a.m.	Conservation Banking for Prairie Grouse: Promising Future or Wishful Thinking – Stephanie Manes
10:40 a.m.	Effectiveness of Landscape Management Practices for a Landscape Species: Are Core Areas Working to Protect Sage-Grouse? – Emma Suzuki Spence
11:00 a.m.	Missouri's Translocation Efforts – Tom Thompson
11:20 a.m.	Translocation of Greater Prairie-Chickens from Kansas to Missouri Increased Genetic Diversity in Missouri and Results in Introgression – Andrew Gregory
11:40 a.m.	Missouri State Historical Archive – Severin Roberts
11:50 a.m.	Great Plains Fire Science Exchange – Sherry Leis
12:00 p.m.	Lunch

1:00 p.m.	Board Buses for Wah'Kon-Tah (WKT) Prairie Field Trip
2:00 p.m.	WKT Field Trip Begins – refer to detailed field trip agenda
6:30 p.m.	Social and Fish/Chicken Fry on the Prairie
9:00 p.m.	Buses return to hotels at 30-minute intervals

Thursday, September 24th

8:00 a.m.	Orientation to 2 nd Day – Max Alleger
	Morning Moderator – Frank Loncarich
8:05 a.m.	Iowa Prairie-Chicken Translocations – Chad Paup
8:25 a.m.	Update on Captive Breeding and Raising of Attwater's Prairie- Chickens and Their Release into and Survival in the Wild, with Comments on Experimental Breeding Methodologies – Mike Morrow / Steve Sherrod
8:45 a.m.	Rangewide Genetic Analysis of Lesser Prairie-Chicken Reveals Population Structure, Range Expansion, and Possible Introgression – Lena Larsson
9:05 a.m.	Factors Affecting Female Space Use in Ten Populations of Prairie Chickens – Virginia Winder
9:25 a.m.	Lesser Prairie-Chicken Space use Response to Anthropogenic Structures – Reid Plumb
9:45 a.m.	Attributing Landscape Characteristics to Lesser Prairie- Chicken Survival in Kansas and Colorado – Samantha Robinson
10:05 a.m.	Break
10:20 a.m.	Regional Demographic Variability for Lesser Prairie-Chickens in Kansas and Colorado – Dan Sullins
10:40 a.m.	Demographic and Movement Responses of Greater Prairie- Chickens to Patch-Burn Grazing on Private Lands – Virginia Winder
11:00 a.m.	Female Lesser Prairie-Chicken Response to Grazing in Western Kansas Grasslands – John Kraft
11:20 a.m.	Effect of Pyric Herbivory on Vegetation Composition with Management Implications for Lesser Prairie-Chickens – Jonathan Lautenbach

11:40 a.m.	Weather Constrains the Influence of Fire and Grazing on Nesting Greater Prairie-Chickens – Dwayne Elmore
12:00 p.m.	Lunch
1:00 p.m.	Business Meeting: Max Alleger (Chair)
1:40 p.m.	Afternoon Moderator – Matt Hill
	Hierarchical Modeling of Lesser Prairie-Chicken Lek Attendance, Survival, and Recruitment in Response to Grazing and Weather – Sarah Fritts
2:00 p.m.	Environmental Factors Associated with Lesser Prairie-Chicken Use of Surface Water – Clint Boal
2:20 p.m.	An Assessment of Lesser Prairie-Chicken Nest Microclimate and Nest Survival Among Three Ecoregions – Blake Grisham
2:40 p.m.	Greater Prairie-Chicken Movements and Production in Nebraska and Minnesota – John Toepfer
3:00 p.m.	Break
3:20 p.m.	Modeling Range-Wide Habitat Suitability for Lesser Prairie- Chickens Using Aerial Surveys and Citizen Science – Ashley Unger
3:40 p.m.	Are Boom Vocalizations Used to Recognize Individuals in Greater Prairie-Chickens? – Jackie Augustine
4:00 p.m.	Evaluating the Influence of Habitat Structure on the Movement Rates of Gallinaceous Chicks – Mandy Orth
4:20 p.m.	Adjourn afternoon session
	Optional meeting to discuss range-wide prairie grouse management planning / Haufler
5:30 p.m.	Silent Auction/Poster Session
7:00 p.m.	Banquet and Awards

Friday, September 25th

Dispersal

31st Prairie Grouse Technical Council Field Trip

Wah'Kon-Tah Prairie September 23, 2015

We will tour Wah'Kon-Tah Prairie, located about 20 miles east of Nevada. As we head east on Highway 54 we will travel through a relatively flat landscape with fertile soils that was once tallgrass prairie but is now intensively cropped. As we approach the town of El Dorado Springs you will notice that crop fields give way to cattle pastures. When we arrive at Wah'Kon-Tah you will see why we consider ourselves at the edge of the range for prairie grouse.

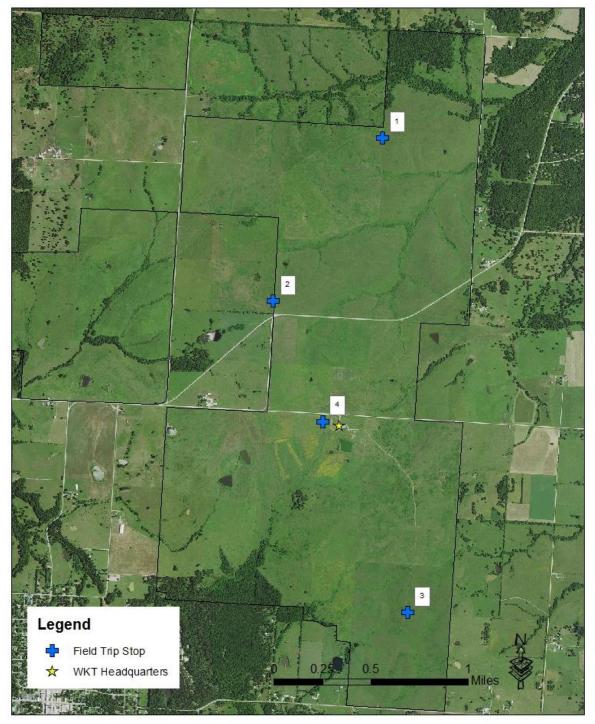
Named for the "Great Spirit" or "Great Mystery" of the Osage tribe, Wah'Kon-Tah Prairie was purchased by The Nature Conservancy in the 70s and 80s. It is the largest example of non-glaciated Tallgrass prairie remaining in Missouri; these and the glaciated prairies lying north of the Missouri River once covered over one-quarter of the state. Wah'Kon-Tah escaped the plow because of its thin, rocky soils and poor soil fertility. The ridges are nearly flat with moderate to steep side slopes that lead to many swales and prairie headwater streams.

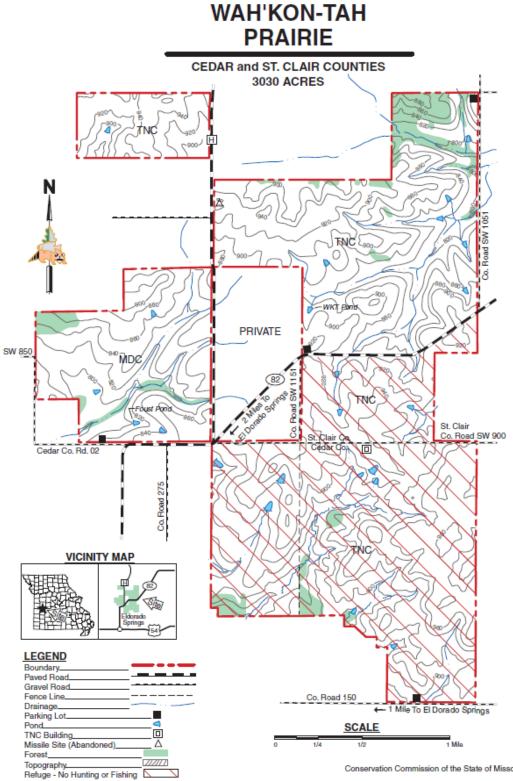
Wah'Kon-Tah Prairie lies within the transition zone between the Osage Plains and the Ozark Highlands. Depending on climate, fire frequency and intensity this site would have shifted between open prairie and savanna / woodland plant communities.

Managers use prescribed burning, grazing and other practices to simulate historic disturbances that maintain healthy grasslands and limit negative impacts of invasive plants, including trees. Management priorities include providing nesting and brood rearing habitat for Greater prairie-chickens, Northern bobwhite, and other grassland birds such as Henslow's sparrow and upland sandpiper. Monitoring and management for a number of lesser known species is also important. Examples include: Mead's milkweed, prairie mole crickets, Regal fritillary butterflies, pink katydid, northern crawfish frog, slender glass lizard and Northern harrier.

We have planned four stops for the field trip where we will talk about public and private land management efforts to benefit greater prairie-chickens.

PGTC Field Trip Wah'Kon-Tah Prairie





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Conservation Commission of the State of Missouri @ 05/13 🛕

Presentation Abstracts

FROM THE HEART OF THE RANGE TO THE EDGE OF THE RANGE: HISTORY OF GREATER PRAIRIE-CHICKENS IN NORTH AMERICAN TRUE PRAIRIE.

S. E. CLUBINE, Missouri Department of Conservation, retired, 703 S. Main, Windsor, Missouri, 65360, USA

Greater prairie-chickens (GPC), were common in the true (tallgrass) prairie region of North America prior to EuroAmerican settlement. The region (Missouri to Ohio and Tennessee to Minnesota) was grazed by small herds of bison that followed fresh burns from Indian origin or lightning, ensuring usable GPC habitat in this high rainfall region. After the demise of Indians and bison but before EuroAmerican settlement, GPC were reported as scarce because the prairie became too tall and rank for them without the impact of a large herbivore. A few decades before dense EuroAmerican settlement, cattlemen brought in herds of cattle and prairie-chicken populations exploded. Accounts from this period report extensive pastures and use of fire to control excess grass. Thus, the earliest patch-burn grazing with livestock was practiced by early cattlemen, not unlike Indians had done for centuries to manage native grazers. Increased settlement and breaking of the sod for crops required huge numbers of draft animals; two acres of forage was required for every acre farmed. The result was an even greater patchwork of better nesting and brood-rearing habitat for prairie grouse. While grouse used cereal grains when available, it had little to do with the exploding grouse populations. It was the dramatic increase in usability of the tallgrass prairie that produced the great numbers of prairie grouse and other grassland wildlife. Failure to recognize and replicate habitat that produced the remarkable abundance is a recipe for failure. No present-day 'Edge of the Range' state has come close to replicating these conditions at the appropriate scale. Without more acquired acreage and appropriate management with light to moderately grazing, remnant prairie grouse populations can only persist through periodic translocations to maintain genetic diversity.

IMPLEMENTING INTERSTATE WORKING GROUPS FOR GREATER PRAIRIE-CHICKENS AND SHARP-TAILED GROUSE: FLAGSHIP SPECIES FOR GRASSLAND RESTORATION

J. HAUFLER, Ecosystem Management Research Institute Keith Sexson, Kansas Department of Wildlife and Parks, Kansas, USA

Despite various on-going programs to restore grasslands in northern mixed grass and tall grass ecosystems, species of concern continue to decline. Reasons include the inability to restore large blocks of grasslands, inadequate incentives to engage enough landowners in crucial areas, insufficiently detailed descriptions of desired conditions for specific locations, and inadequate engagement of industries, especially energy development, in conservation efforts. At its summer meeting, WAFWA's Directors approved a new initiative to initiate interstate working groups for greater prairie-chickens and sharp-tailed grouse as flagship species for prairie restoration to address these concerns. The initiative will be coordinated under WAFWA's Grassland Initiative with the North American Grouse Partnership providing administration, communication, and coordination assistance and the Ecosystem Management Research Institute providing planning and technical assistance. The working groups will include involvement of interested federal and state agencies, conservation and landowner organizations, academia, industries, and others. Meeting the needs of these flagship species should support a large number of additional species of concern. Possible tasks for the working groups include developing range-wide monitoring programs, setting population and habitat goals, developing crucial habitat assessment tools, delineating a system of conservation focus areas, coordinating conservation delivery within these focus areas, engaging energy and other industries in conservation efforts, identifying a mitigation framework, and producing a range-wide plan for each species.

THE LESSER PRAIRIE-CHICKEN RANGE-WIDE CONSERVATION PLAN: A NEW MODEL FOR CONSERVING THREATENED AND ENDANGERED SPECIES

C. BACA, LPC Program Manager, Western Association of Fish & Wildlife Agencies, 73 Camino Bajo, Santa Fe, New Mexico, 87508, USA

On May 12, 2014, the U.S. Fish and Wildlife Service (USFWS) listed the Lesser Prairie Chicken (LPC) as threatened under the Endangered Species Act of 1973 (ESA). In addition, the USFWS published a final special rule under §4(d) of the ESA that provides for incidental take of a LPC by a participant operating in compliance with the LPC Range-wide Plan (RWP) which is administered by the Western Association of Fish & Wildlife Agencies (WAFWA). This was an unprecedented use of Section §4(d) of the ESA that leaves most of the management authority for the species with the state fish and wildlife agencies through the governance structure established by the RWP. Industry participation in the RWP is voluntary and occurred via a Candidate Conservation Agreement with Assurances (CCAA) prior to listing and now through a WAFWA Certificate of Participation (WCP). To date, there have been 181 companies (energy, electric, oil & gas) enrolled in the RWP that have contributed >\$42 million for perpetual off-site mitigation activities. Eighty-seven and one-half percent of that revenue is directed into a non-wasting endowment for conservation offsets and 12.5% is reserved for administrative expenses. Seventy-five percent of the conservation offsets will occur through 5-10 year term contracts that move around the landscape and 25% of the offsets will be permanent conservation sites consistent with the standards set forth by the USFWS in their conservation banking guidelines. To date, the WAFWA has secured 10 term contracts with private landowners and one permanent conservation site encompassing nearly 98,000 acres in term contracts and 1600 acres in permanent conservation by fee title acquisition across LPC range which is more than sufficient to offset all of the current participant impacts. More than 8,000 acres contained in those agreements are scheduled for brush management activities that will restore their utility for LPC. Through those agreements the WAFWA has committed >\$15 million over the next 10-years to private landowners. The WAFWA is annually reporting upon the success of the program and the progress toward the USFWS-endorsed goals established by the RWP (i.e. population size, habitat acreage, and impact acreage).

LPCI: A PATH FORWARD FOR THREATENED SPECIES RECOVERY AND AGRICULTURAL COMMUNITIES

J. L. UNGERER*, Natural Resources Conservation Service, Lesser Prairie-Chicken Initiative Coordinator, 1133 Pony Express HWY, Marysville, Kansas, 66508, USA C. A. HAGEN, Oregon State University, Dept. of Fisheries & Wildlife, Bend, Oregon, 97702, USA

The lesser prairie-chicken is a listed threatened species. The Lesser Prairie Chicken Initiative (LPCI) was initiated by the Natural Resources Conservation Service (NRCS) in 2010 in an effort to retain expired CRP acres in Kansas in grass cover and transform these acres into working grazing lands. The Initiative though is not limited to this goal and has conditioned 27 NRCS practices to provide an overall positive benefit to LEPC conservation with three overriding goals: retention of expired CRP as working grazing lands; control of invasive woody species; and grazing management to improve LEPC habitat and sustainability of grazing lands. This is accomplished through a new means of doing business for NRCS. By ensuring the inclusion of targeting, current science, new research, and evaluation of progress the LPCI provides a legitimate opportunity for LEPC conservation. This presentation discusses this approach to benefiting a listed species through a voluntary and science supported approach which has proved successful to getting conservation on the ground.



CONSERVATION BANKING FOR PRAIRIE GROUSE: PROMISING FUTURE, OR WISHFUL THINKING?

S. A. MANES, Grassland Conservation Services, LLC., 36512 Hwy K99, Wamego, Kansas, 66547, USA

Conservation Banking is a private real estate transaction with willing landowners to conserve and manage habitat for T&E species in perpetuity. Conservation Banking is well-accepted and serves as a primary funding source for conservation easements in many states. Conservation Banks have rigorous standards and must be approved by the U.S. Fish and Wildlife Service to provide mitigation credits to developers. In 2014 the first Programmatic Conservation Banking Instrument in the U.S. was approved for use with the Lesser Prairie-chicken (LPC) (*Tympanuchus pallidicinctus*). Two ranches totaling 29,000 ac were recently approved as LPC conservation banks. However, no permanent mitigation credits have been sold through these banks due to a multitude of interrelated socio-economic factors both intrinsic and extrinsic to the wildlife management profession. I present lessons learned from setting up the first conservation banks for prairie grouse, and describe how federal policies can better coordinate to support this important conservation tool.



EFFECTIVNESS OF LANDSCAPE MANAGEMENT PRACTICES FOR A LANDSCAPE SPECIES: ARE CORE AREAS WORKING TO PROTECT SAGE-GROUSE?

E. S. SPENCE*, School of Earth Environment and Society, Bowling Green State University; Bowling Green, Ohio, 43403, USA

J. BECK, Department of Ecosystem Science and Management, University of Wyoming, Laramie, Wyoming, 82071, USA

A. GREGORY, School of Earth Environment and Society, Bowling Green State University, Bowling Green, Ohio, 43403, USA

Sage-Grouse (*Centrocercus urophasianus*) have been nominated for ESA listing 7 times and their 8th listing attempt is currently pending. In 2008, in response to possible ESA listing of sage-grouse, Wyoming designated large tracts of sage-brush shrub-steppe as "core area" and limited human disturbance. We investigated the effectiveness of core areas on sage-grouse persistence in Wyoming using Wyoming Game and Fish Department lek count data and oil and gas development data from Wyoming Oil and Gas Conservation Commission. In 2013, core areas contained ~77% of the Wyoming sage-grouse population and ~64% of active leks. Using a Bayesian binomial probability analysis of lek extinction conditioned on the lek being in a core area or not, we observed a 10.9% probability of lek extinction in core areas and a 20.4% probability going extinct outside core areas. We found the difference in extinction probabilities was correlated to oil and gas development density within 1.6 km of the core area (R²= 0.83, p=0.01). From these observations, we conclude that the core area management plan is effective at reducing the risk of sage-grouse lek extinction in Wyoming.

OPTIMIZING HABITAT IN LIMITED SPACE: AN UPDATE ON GREATER PRAIRIE-CHICKEN HABITAT MANAGEMENT EFFORTS ON PUBLIC LAND IN MISSOURI.

T. THOMPSON*, L. GILMORE, Missouri Department of Conservation, Missouri, USA D. KESLER, K. KEMINK University of Missouri-Columbia, Missouri, USA

The greater prairie-chicken (*Tympanuchus cupido*) is a state-threatened species in Missouri and now exists as a critically small statewide population (< 200 birds) separated into 3 geographically isolated populations. Population decline has largely been due to the conversion of over 99% of the once 15 million acres of native prairie in Missouri to fescue for livestock forage, or cropland. Currently, the remaining populations are focused in and around a small set of the largest remaining publicly owned remnant prairie in Missouri. In response to these declines, the Missouri Department of Conservation (MDC) formed a greater prairie-chicken recovery team in 2006 to develop a 5-year action plan to address these declines and to develop a set of best management practices to create and optimize habitat needs for prairie-chickens. Between 2008-2012, MDC translocated 425 individuals (178 males, 175 females, 72 juveniles) from Kansas to Wah'Kon-Tah (WKT) Prairie (3,033 acres) jointly owned by the Nature Conservancy and MDC. In addition, the team began a telemetry study on these translocated prairie-chickens with the eventual objective of evaluating the impact of management practices, namely patch-burn grazing (PBG) and high-clipping, on habitat use. Results indicate that areas on WKT managed with PBG received disproportionately higher use during the breeding season compared to other management practices. However, nest placement was related more to elevation, often on or near ridge tops, and distance from trees and riparian areas, although equivalent among management practices. Management implications, recommendations, and lessons learned for optimizing habitat in such systems will be presented.

TRANSLOCATION OF GREATER PRAIRIE-CHICKENS FROM KANSAS TO MISSOURI INCREASED GENETIC DIVERSITY IN MISSOURI AND RESULTS IN INTROGRESSION

A. J. GREGORY*, Director, Genetic Research in Applied Spatial Ecology Lab, Bowling Green State University., Bowling Green, Ohio, 43403, USA
T. THOMPSON, Missouri Department of Conservation, Clinton, Missouri, 64735, USA

From 2008-2009, 261 adult Greater Prairie-Chickens were translocated from Kansas to the Taberville and Wah'Kon-Tah Prairies, in Missouri as part of an ongoing prairiechicken restoration program. A genetic sample was taken from each individual at capture, and each sample was screened at 10 polymorphic microsatellite loci. In addition, in 2008 13 adult prairie-chickens were sampled at Taberville Prairie prior to the addition of Kansas birds. Prior to translocation, genetic diversity was high in both populations (KS_H₀=0.78; MO_H₀=0.65), but the Missouri population was significantly more inbred (KS_F_{IS}=0.0006; MO_F_{IS}= 0.06). Analysis of genetic structure indicated that prior to translocation each populations had been completely isolated from the other for many generations. In addition, there were 47 alleles unique to either the Kansas or the Missouri population. In 2012-2103, Missouri Department of Conservation collected 71 prairie-chicken eggs shells and 145 prairie-chicken feathers from Taberville and Wah'Kon-Tah Prairies. From these, we obtained 118 multi-locus genetic profiles using the same 10-microsatellites previously used in 2008-2009. Following translocation, genetic diversity increased and inbreeding decreased (MO_H₀=0.80; MO_F_{IS}= 0.019). Population genetic structure analysis reveals the expected genetic soup, indicative of a partially admixed recipient population following a severe population perturbation associated with a successful translocation.

IOWA PRAIRIE-CHICKEN TRANSLOCATIONS

C. PAUP*, Iowa DNR

J. RUSK, Iowa DNR

Greater Prairie-chickens were one of the most abundant game birds in Iowa during the late nineteenth century. By the 1950's, the only known nesting prairie chickens were in Appanoose, Wayne, and Ringgold Counties in southern Iowa. The last verified nesting prior to reintroduction attempts was in Appanoose County in 1952. In the 1980's a restoration project was initiated. From 1987to89, 254 prairie chickens were translocated from Kansas to the Ringgold Wildlife Area in Ringgold County. By 1991, only a small lek of 6 males remained near the release site but a flock of prairie chickens had been established on a historic lek site at the Dunn Ranch in Missouri, 15 km south of the release site. Between 1992 and 1994, an additional 304 prairie chickens from Kansas were released in several southern lowa locations. Since 2009, extensive lek surveys conducted at 200 plus sites in an 8 county area of southern lowa, have identified two extant leks; one at the Kellerton WMA and one on private land1.7 km northwest of the Kellerton WMA. The maximum bird count in 2011 was 13 males. Genetic analysis was performed on the lowa population of GPCs in 2008. Genetic diversity was found to be low, with a mean of 6.3 alleles/locus. With our justifications in place in 2012 the lowa DNR again embarked on a 4 year translocation effort. This time the goal was to go bring 350 GPC's from Nebraska to the Kellerton WMA and the Dunn Ranch. Chad Paup IDNR Wildlife Biologist will share with us the details of the effort, management issues, and how the lowa population is doing.

UPDATE ON CAPTIVE BREEDING AND RAISING OF ATTWATER'S PRAIRIE-CHICKENS AND THEIR RELEASE INTO AND SURVIVAL IN THE WILD, WITH COMMENTS ON EXPERIMENTAL BREEDING METHODOLOGIES.

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S. K. SHERROD*, L. LARSSON, J. TOEPFER, R. VANZANT, D. WOLFE, Sutton Avian Research Center, Oklahoma Biological Survey, University of Oklahoma, P.O. Box 2007, Bartlesville, Oklahoma, 74005, USA

One of three extant prairie-chickens in the world, Attwater's Prairie-chicken (APC; Tympanuchus cupido attwateri), historically found on the coastal plains of southern Texas and Louisiana, is one of the most endangered birds in North America. Numbers in the wild exist primarily at the Attwater Prairie Chicken National Wildlife Refuge and vary from approximately 60-200 birds, depending on time of year. Annual post-release survival (0-43%) averages 17-19%, compared to 50% for wild produced prairiechickens. Teetering on extinction, this bird survives as a result of captive breeding by wildlife parks and zoos and annual releases of offspring, but significant wild population growth has not resulted. Red imported fire ants have adversely impacted insect communities on which APC chicks feed, but viruses, protozoans, and phorid flies parasitic on the ants may provide help. Overall, mass propagation of captive Galliformes has proven to be complicated and difficult, and production of birds that show high survival and significant reproduction in the wild is a challenge. Annual releases of larger numbers of high quality young is the goal. Utilizing original as well as a combination of techniques for breeding and managing captive ring-necked pheasants (Beaver's Game Farm), Houbara bustards (Emirates' Center for Wildlife Propagation), and APC (Fossil Rim Wildlife Center; Houston Zoo), the Sutton Avian Research Center is currently building a dedicated facility in Oklahoma focused on breeding APC for release. Experimental methods will include: 1) natural breeding in pairs and trios; 2) breeding of both human imprinted male and female APC; 3) female mate choice of copulating males. Other management methods include use of "home grown" greens, sprouts, and insects, and hopefully wild grouse "gut flora." Greater prairie-chickens (GPC) are serving as surrogates initially to test efficacy of prospective designs and methodology.

RANGEWIDE GENETIC ANALYSIS OF LESSER PRAIRIE-CHICKEN REVEALS POPULATION STRUCTURE, RANGE EXPANSION, AND POSSIBLE INTROGRESSION

L. C. LARSSON*, Sutton Avian Research Center, University of Oklahoma, Bartlesville, Oklahoma, 74005, USA S. J. OYLER-MCCANCE, U. S. Geological Survey, Fort Collins Science Center, 2150 Centre Avenue, Building C, Fort Collins, Colorado, 80526, USA *Additional citations available upon request*

Effective management of Lesser Prairie-Chickens requires information about population connectivity and structure. Populations are declining due to habitat loss and fragmentation. Portions of the historic range, however, have recently been recolonized and even expanded; most likely due to the planting and maintenance of Conservation Reserve Program (CRP) fields that provide necessary vegetation structure. Our goals were to characterize connectivity and genetic diversity among populations, identify source population(s) of recent range expansion, and determine the level of introgression with Greater Prairie-Chicken. We analyzed 240 samples from across the range using 13 microsatellite loci. We identified three or four distinct populations that were largely defined by ecoregion boundaries. Genetic diversity was similar among ecoregions and Ne ranged from 142 for the shortgrass/CRP mosaic to 296 in the mixed grass prairie. No recent migration was detected among most ecoregions, except from the mixed grass prairie north into the shortgrass/CRP mosaic (m = 0.207, 95% CI = 0.116 - 0.298). A STRUCTURE analysis investigating the area of Lesser and Greater Prairie-Chicken geographic overlap revealed K = 2 corresponding to the two species. Several hybrids and presumed "pure" individuals based on morphology were "misassigned" or admixed suggesting hybridization between the two species. Further, asymmetric migration rates confirm that both Lesser and Greater Prairie-chicken populations in the Shortgrass/CRP ecoregion were the source populations for the hybrid group. As significant structure exists among ecoregions despite close geographic proximity, continued monitoring of diversity within and among ecoregions is warranted. Management actions that promote genetic connectivity and range expansion may be critical to the long term viability of the species.

FACTORS AFFECTING FEMALE SPACE USE IN TEN POPULATIONS OF PRAIRIE CHICKENS

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Additional citations available upon request

Conservation of wildlife depends on an understanding of the interactions between animal movements and key landscape factors. Habitat requirements of wide-ranging species often vary spatially, but quantitative assessment of variation among replicated studies at multiple sites is rare. We investigated patterns of space use for ten populations of two closely related species of prairie grouse: Greater Prairie-Chickens (Tympanuchus cupido) and Lesser Prairie-Chickens (T. pallidicinctus). We used resource utilization functions to investigate space use by female prairie chickens during the 6-month breeding season from March through August in relation to lek sites, habitat conditions, and anthropogenic development. Median home range size of females varied ~10-fold across ten sites (3.6 to 36.7 km²), and home ranges tended to be larger at sites with higher annual precipitation. Proximity to lek sites was a strong and consistent predictor of space use for female prairie chickens at all ten sites. The relative importance of other predictors of space use varied among sites, indicating that generalized habitat management guidelines may not be appropriate for these two species. Prairie chickens actively selected for prairie habitats, even at sites where ~90% of the land cover within the study area was prairie. A majority of the females monitored in our study (>95%) had activity centers within 5 km of leks, suggesting that conservation efforts can be effectively concentrated near active lek sites. Lek monitoring and surveys for new leks provide information on population trends, but can also guide management actions aimed at improving nesting and brood-rearing habitats.

LESSER PRAIRIE-CHICKEN SPACE USE RESPONSE TO ANTHROPOGENIC STRUCTURES

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Landscapes of the southern Great Plains have been altered extensively due to conversion of native grasslands to row-crop agriculture, which is considered the primary causes of precipitous declines in Lesser Prairie-Chicken (Tympanuchus pallidicintus) populations; prompting its recent listing as a federally threatened species. Understanding the spatial ecology of lesser prairie-chickens in relation to anthropogenic structures is critical for conservation planning, management, and development mitigation. We investigated the relationship between space use of radio-marked female (N = 201) lesser prairie-chickens and multiple anthropogenic structures between two ecoregions in Kansas during 2013 and 2014. We examined behavioral avoidance of anthropogenic structures at two scales of selection using Resource Utilization Functions and Resource Selection Functions. Females avoided all investigated anthropogenic features with distance to distribution power lines being a significant predictor of space use. We found no difference in behavioral avoidance of structures among different periods of the breeding season. Females selected areas with lower densities of anthropogenic features than those available at random. Evidence from our study suggests that behavioral avoidance of anthropogenic structures may result in functional habitat loss and continued fragmentation of remaining grassland habitat.

ATTRIBUTING LANDSCAPE CHARACTERISTICS TO LESSER PRAIRIE-CHICKEN SURVIVAL IN KANSAS AND COLORADO

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The lesser prairie-chicken (Tympanuchus pallidicinctus) was recently listed as threatened under the Endangered Species Act. Declines have been linked to changes in large-scale ecological drivers such as land use change, loss of natural fire and change in grazing regimes. Linking ecological drivers to adult female survival can clarify what landscape change or mitigation may be necessary for prairie-chicken persistence. Individual female lesser prairie-chickens were trapped on leks across three different ecoregions in Kansas and Colorado and outfitted with either a GPS, or VHF transmitter. Hazard rates were estimated for distance to anthropogenic features, including roads, powerlines, fences and oil wells, as well as for landscape composition (grassland, CRP, crop), using Anderson-Gill models for encounter-specific continuous variables. Lifetime ranges were estimated using Brownian bridge movement models for SAT-PTT individuals, and kernel density estimators for VHF individuals. Functional relationships were developed in Program Mark for fragmentation and configuration metrics derived from FRAGSTATS. Estimated annual survival rates of lesser prairie-chickens in Kansas and Colorado were low (0.37±0.05) but increased nearly 30% in contiguous grasslands with low road and fence density (0.48±0.07). Understanding risk factors to prairiechicken survival can assist in developing management plans to increase prairie-chicken populations in Kansas and Colorado.

REGIONAL DEMOGRAPHIC VARIABILITY FOR LESSER PRAIRIE-CHICKENS IN KANSAS AND COLORADO

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Population declines have led to the recent listing of the lesser prairie-chicken (Tympanuchus pallidicinctus, LPC) as a threatened species under the Endangered Species Act. Recovering LPC to population goals will require strategic conservation efforts potentially addressing an array of limiting factors that vary throughout the range of the species. Factors causing the decline likely differ throughout their distribution which spans a ~40 cm precipitation gradient, varied growing season duration, and a diverse array of soils and associated vegetation. Therefore, we examined differences in LPC population growth rates and vital rates among 4 study sites in Kansas and Colorado. We captured, marked, and estimated vital rates (e.g., nest survival, brood survival, adult survival) from 182 female LPC and their offspring during 2013-2015. We estimated the finite rate of population growth (λ) for each site using a deterministic matrix model and examined vital rate contributions to differences in growth rates among sites using a fixed-effects life-table response experiment. Finite rate of population growth estimates for each site ranged from 0.49 ± 0.06 to 0.55 ± 0.07 and adult survival contributed the most to differences among sites. Sites with increased fragmented grassland landscapes had lower adult survival. The LPC population, when pooled among sites and years of study, was projected to continue to decline ($\lambda = 0.53 \pm 0.06$). Continued measurements of vital rates and population response to changing environmental conditions are needed.

DEMOGRAPHIC AND MOVEMENT RESPONSES OF GREATER PRAIRIE-CHICKENS TO PATCH-BURN GRAZING ON PRIVATE LANDS

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Greater Prairie-Chicken (*Tympanuchus cupido*) populations have decreased as much as 50% over the last 30 years, paralleling losses of tallgrass prairie and implementation of intensive rangeland management strategies. Patch-burn grazing has been introduced as an alternative management technique, mimicking historically heterogeneous fire and grazing regimes and providing the mosaic of habitats required by prairie chickens for successful reproduction and survival. We conducted a 3-year field study (2011-2013) to investigate responses of female prairie chickens to patch-burn grazing compared to intensive management in the central Flint Hills of Kansas. We explored the effects of fire and grazing practices on habitat selection using resource utilization functions. Rangeland management practices influenced space use during both breeding and nonbreeding seasons, and female prairie-chickens disproportionately used areas stocked at lower densities and managed with longer fire return intervals. We used Andersen-Gill survival models to examine the effect of fire and grazing practices on predator-specific mortality risk (avian vs. mammalian). Mortality risk to avian predators was high and dependent upon rangeland management practices, with highest hazard levels in densely stocked and recently burned areas. Subsequently, annual survival estimates were nearly two times higher for females captured at leks on properties managed with patch-burn grazing compared to intensive management. Our results support a growing body of evidence that rangeland management strategies that mimic historical heterogeneous fire and grazing regimes benefit native prairie wildlife and ecosystem health.

FEMALE LESSER PRAIRIE-CHICKEN RESPONSE TO GRAZING IN WESTERN KANSAS GRASSLANDS

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The Lesser Prairie-Chicken (Tympanuchus pallidicinctus; hereafter LPC) is a grouse species endemic to the grasslands of the southern Great Plains. In May 2014, cumulative habitat degradation and subsequent population decline led to the listing of this species as "Threatened" under the Endangered Species Act. The vast majority of the species range occurs on private grazed lands. Therefore, knowledge of LPC population responses to livestock grazing strategies would aid in conservation planning. We investigated the effects of various grazing pressures on reproductive success and habitat use within Kansas grazed lands. During the springs of 2013, 2014, and 2015, individuals were captured on breeding/display grounds (leks) and fitted with either a 17g VHF bib-style transmitter or a 22-g model 100 GPS Platform Transmitting Terminal (PTT). Locations of tagged birds, nest sites, and broods were recorded. Grazing data were collected via producer correspondence and vegetation surveys. Initial results indicate that functional grasslands are an important resource for LPC populations during all seasons. Furthermore, measures of LPC habitat use and reproductive success were positively related with lower values of grazing intensity (AUM and percent forage utilization rates), larger pasture sizes, and greater values of above-ground biomass. Analyses indicated loamy upland, limy upland, red clay prairie and saline subirrigated ecological sites were used more than other available range sites. Relating measures of livestock production with LPC population demography can provide additional information for LPC conservation and management.

EFFECT OF PYRIC HERBIVORY ON VEGETATION COMPOSITION WITH MANAGEMENT IMPLICATIONS FOR LESSER PRAIRIE-CHICKENS

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The lesser prairie-chicken was recently listed as threatened under the Endangered Species Act due to declining population abundance and occupied range. Loss of natural ecological drivers, including fire, has been cited as a primary cause for population reductions. We evaluated the effects of pyric herbivory on the habitat of lesser prairie-chickens during the nesting and brooding periods on private land in the eastern portion of their range. We measured vegetation characteristics using a modified Daubenmire frame and Robel pole to assess the effects of pyric herbivory on vegetation composition as well as female lesser prairie-chicken habitat use during the nesting and brooding seasons. We found that areas burned in year zero had greater litter and bare ground and less grass and forbs than areas that were burned 1-4 years previous. Areas burned 2-4 years prior had the most grass coverage and the least bare ground coverage. Areas burned 1 year prior had intermediate grass and forb cover. We compared these results to known nest and brood points and found that areas burned 2-4 years prior had vegetation characteristics similar to nest sites and areas that were burned 1 year prior were similar to brood sites. Our research shows that pyric herbivory can be an effective management tool for lesser prairie-chickens in the eastern portion of their range.

WEATHER CONSTRAINS THE INFLUENCE OF FIRE AND GRAZING ON NESTING GREATER PRAIRIE-CHICKENS

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We assessed Greater Prairie-Chicken (*Tympanuchus cupido*) survival and nest site selection in tallgrass prairie characterized by interacting fire and grazing disturbance and oil and gas infrastructure. We found that Greater Prairie-Chicken nest survival was most affected by solar radiation. Disturbance (fire and grazing) did not affect survival directly, but vegetation height, which is greatly influenced by disturbance, was positively associated with nest survival. Greater Prairie-Chickens chose nesting locations that maximized time post fire while minimizing tree cover and distance to leks. Future conservation efforts for Greater Prairie-Chickens should focus on variable fire regimes that create areas of residual biomass to increase herbaceous vegetation height to mitigate solar radiation while minimizing tree cover through periodic fire.

HIEARCHICAL MODELING OF LESSER PRAIRIE-CHICKEN LEK ATTENDANCE, SURVIVAL, AND RECRUITMENT IN RESPONSE TO GRAZING AND WEATHER

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We examined impacts of grazing and weather on lesser prairie-chicken lek attendance, survival, and recruitment while simultaneously accounting for imperfect detection from 2004–2014 in New Mexico. We used maximum number of males per lek as the response variable and number of graze days/ha per pasture, rainfall, annual maximum daily temperature (AMT), and number of days with maximum temperature > 90th percentile (MAX90) as site-level covariates. We modeled effects of weather parameters on survival and recruitment from the same year of sampling and up to three years before to account for potential time lags in population response. Grazing did not affect lek attendance. Weather parameters did not directly influence survival. Effects of AMT varied by time lag, but typically negatively affected recruitment and appeared to have a greater impact than rainfall or MAX90. Results suggest that lek attendance is not affected by grazing up to 0.023 days/ha per year. Weather appears to affect reproduction efforts more greatly than adult male survival during lekking.

ENVIRONMENTAL FACTORS ASSOCIATED WITH LESSER PRAIRIE-CHICKEN USE OF SURFACE WATER

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Free surface water is commonly believed to be unimportant for lesser prairie-chickens (Tympanuchus pallidicinctus). However, the use of surface water by the species use has been noted by several researchers. Thus, understanding drivers of free water use by lesser prairie-chickens is a contemporarily relevant issue due to heightened conservation concern for the species, and a changing climate that may expose the species to increased temperatures and decreased humidity. We used motion-activated camera traps at 12 water sources in West Texas from March 2009 through February 2013 to assess temporal (diel, seasonal, and annual) patterns of free water use by lesser prairie-chickens, and to examine correlations between water use and temperature, precipitation, and presence of potential predators. We collected 1,887,902 digital images, with 2,428 detections of lesser prairie-chickens visiting stock tanks. Lesser prairie-chicken use of surface water occurred primarily from December to May and was correlated with low precipitation: an exception occurred with high visit rates through August during the drought of 2011. There was also very little overlap in timing of water source visits between lesser prairie-chickens and mammalian (P<0.001) and avian (P<0.001) predators, which likely reduces risk of predation mortality at water sources.

AN ASSESSMENT OF LESSER PRAIRIE-CHICKEN NEST MICROCLIMATE AND NEST SURVIVAL AMONG THREE ECOREGIONS

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Nest microclimate and concealment are critical components to the development of avian embryos; however, the correlation between microclimate and nest survival are unclear, especially since trade-offs exists between protecting the nest from predators while maintaining suitable microclimate. To address this question for Lesser Prairie-Chickens, we placed data loggers adjacent to nests to quantify temperature and aridity distribution functions, 2010–2014. We developed a suite of a priori models using the nest survival model in Program MARK to estimate nest survival probabilities. We monitored 105 nests among three ecoregions and our results indicate the southern distribution was hotter and drier during incubation compared to the northern distributions, there was considerable inter-annual variability in nest microclimate within ecoregions, the percentage of microclimate recordings where temperature was > 34°C and aridity was < -23mmHG during the day explained nest survival to the greatest extent, and microclimate received more model support for nest survival compared to visual obstruction. Our results suggest conservation of the species would benefit from the identification of thermal landscapes that promote cooler, more humid conditions during nest incubation.

GREATER PRAIRIE CHICKEN MOVEMENTS AND PRODUCTION IN NEBRASKA AND MINNESOTA, 2012-2015

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In March 2012 STCP initiated a four year research project in the Nebraska sandhills to answer basic questions about the year round ecology of a large greater prairie chickens (Tympanuchus cupido pinnatus) population. After three breeding seasons, preliminary information indicates that production of radio-marked greater prairie chicken hens was 37.7% higher in Nebraska than Minnesota. Nest success was lower in Nebraska than Minnesota (36.8%, n=171 versus 53.0%, n=111) but the percent of hens that fledged chicks in Nebraska was higher than Minnesota (50.9% versus 33.9%) and Nebraska hens fledged more chicks than Minnesota hens (4.5, n=46 versus 3.3, n=34). Prairie chickens in Nebraska were more mobile than radioed birds in Minnesota which seemed related to the proximity of agricultural fields to spring/summer areas and grassland cover for night *roosting*. A majority of the Nebraska adult hens made migratory movements from their breeding areas to wintering areas of up to 65 miles. In 2014-15 four hens were located in a second winter and only one returned to the area used the previous winter. Adult hens left their summer/autumn areas in mid-October and returned in mid-March the following year while young of the year did not return. Last winter, 2014-15 radioed birds were regularly seen feeding on the berries of red cedar trees.

MODELING RANGE-WIDE HABITAT SUITABILITY FOR LESSER PRAIRIE-CHICKENS USING AERIAL SURVEYS AND CITIZEN SCIENCE

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Modeling habitat suitability requires presence data of sufficient quantity and quality. However, collecting these data can be costly and is often complicated by limited land access. Citizen science projects, such as eBird, have created a global network of volunteers collecting data that is freely accessible. The federally threatened lesser prairie-chicken (LPC: Tympanuchus pallidicinctus), is well represented in eBird with presence observations from 182 unique locations from 2012-2014. During that same time period, a range-wide, aerial survey detected 106 LPC lek sites. Our objective was to determine the potential of eBird data for use in habitat suitability modeling. We used maximum entropy modeling to create habitat suitability models. Variables were selected based on biological significance to LPCs as reported in the literature and were identical for each model. We obtained better model performance using aerial survey data (test omission rate: 17.4%, AUC: 0.759) than with eBird data (test omission rate: 33.3%, AUC: 0.682). We used the *I*-statistic to determine the degree of similarity between the two models and found a high level of overlap (I = 0.900). We obtained the best results when we combined eBird data and aerial survey data (test omission rate: 0.9%, AUC: 0.771). Our results indicated that eBird data could be used as a low-cost source for occurrence data to improve habitat suitability models and inform range-wide conservation plans.

ARE BOOM VOCALIZATIONS USED TO RECOGNIZE INDIVIDUALS IN GREATER PRAIRIE-CHICKENS?

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In greater prairie-chickens (Tympanuchus cupido), vocalizations are an integral part of the display males produce on leks. Although display is more intense when females are present, suggesting a female choice function, vocalizations may also be important during male-male competition. In many species, territorial males use vocalizations to discriminate between neighbors and strangers and either respond more aggressively toward strangers relative to neighbors ("dear enemy" effect) or they respond more aggressively toward neighbors relative to strangers ("nasty neighbor" effect). We investigated whether male greater prairie-chickens discriminate among familiar individuals on their own territory, familiar individuals outside their normal territory and strangers from a nearby lek. Vocal characteristics varied among males, but were consistent within a male, suggesting that vocalizations may potentially be used by prairie-chickens to identify individuals. Males responded to playback of prairie-chicken calls by vocalizing at a faster rate and approaching the playback speaker, but did not vary in their response to the vocalizations based on the identity of the caller. Our results suggest that males do not appear to discriminate among familiar individuals and strangers based solely on their 'boom' vocalizations. Greater prairie-chicken vocalization likely functions as a way of announcing that a territory is occupied and defended, but it may also serve as a way of advertising to conspecifics or as a signal that is secondary to other forms of communication.

EVALUATING THE INFLUENCE OF HABITAT STRUCTURE ON THE MOVEMENT RATES OF GALLINACEOUS CHICKS

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It has been hypothesized that restricted movement of chicks through thick vegetation in unmanaged Conservation Reserve Program (CRP) lands results in lower brood survival rates. Our research investigated the efficacy of various methods of CRP mid-contract management to improve brood rearing habitat, as a whole, for upland game birds. The objective of this particular aspect of the study was to determine which grassland management technique best allowed for gallinaceous chick movement through dense vegetation. Haying, prescribed fire, chemical suppression, interseeding, and grazing treatments were applied to six study sites using a randomized complete block design. To assess ease of movement, we measured the time it took human-imprinted pheasant (Phasianus colchicus) chicks to cross a 4 meter distance in various treatment blocks. Percent canopy cover of grass, forbs, litter, and bare ground were measured within each treatment, along with visual obstruction readings and litter depth measurements. Increased litter depth led to increased chick movement rates, while the sites treated with prescribed fire + chemical suppression and grazed sites allowed for faster movement rates. Faster movement rates were associated with treatments that removed or compacted the litter layer. Management of upland gamebird habitat that promulgates vegetation structures with minimal litter and adequate overhead cover with an open understory is ideal for ease of chick movement.

Poster Abstracts

GENETIC DIVERSITY OF LESSER PRAIRIE-CHICKENS IN A ZONE OF SYMPATRY WITH GREATER PRAIRIE-CHICKENS IN KANSAS

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In March 2014, the US Fish and Wildlife Service listed the Lesser Prairie-Chicken as threatened under the Endangered Species Act due to increasing human disturbance negatively affecting habitat quality. Change in habitat quality can lead to change in population size, fragmentation and population isolation, which can result in reduced genetic diversity leading to inbreeding depression. Additionally, in central Kansas, Lesser Prairie-Chicken range overlaps with Greater Prairie-Chickens resulting in possible hybridization. We used 10-microsatellite markers to develop a multi-locus genetic profile for 196 individual Lesser Prairie-Chickens from Gove County, KS. Genetic diversity of this population was high (H₀=0.78±0.061) and had little indication of inbreeding (F_{IS}=0.0065). Genetic clustering analysis with Program Structure determined greatest support for K=3 populations (-LnK= 1,231.9±29.8), which was not expected given the likely panmictic nature of this population. We therefore speculate that hybridization is occurring among Greater and Lesser Prairie-Chickens co-habiting this landscape. Further evidence for hybridization is that Hardy Weinberg Equilibrium was only detected among half the loci screened, and that several loci screened spanned >100 base-pair range. In the future, to investigate the rate of hybridization in Gove County, we will be including samples of Greater and Lesser Prairie-chickens collected from outside the zone of sympatry in central Kansas.

THE INFLUENCE OF WEATHER PARAMETERS ON LESSER PRAIRIE-CHICKEN NEST SURVIVAL

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Lesser prairie-chicken (LEPC) populations exist along a diverse climatic gradient. Temperature and precipitation impacts nest survival in the sand shinnery oak prairie (SSOP) in the southern extent of the range, but the potential impact remains unexplored across the remainder of the distribution. To assess the impact of environmental conditions on nest survival in all ecoregions we collected data in the short-grass prairie (SGP), 2013–2014, the sand sagebrush prairie (SSP), 1997–2002, the SSOP, 2007–2012, and the mixed grass prairie (MGP), 2013–2014. We used the nest survival model in Program MARK to assess the effect size of biologically relevant environmental variables on nest survival for each ecoregion and the known fate model in Program MARK to assess the effect size on hen survival. Combined, our results suggest LEPCs respond similarly to environmental conditions across the distribution of the species, but weather impacts to nest survival are exacerbated in the SSOP.

A RANGE-WIDE ASSESSMENT OF THE INFLUENCE OF ANTHROPOGENIC FEATURES ON LESSER PRAIRIE-CHICKEN LEK ATTENDANCE

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Nesting lesser prairie-chickens avoid oil and gas wells, buildings, power lines, and roads, but the influence of structure density on lek attendance is unknown. We used ArcGIS 10.1 to digitize and calculate anthropogenic feature densities within 4.8 km of leks in Texas, New Mexico, and Kansas. We used generalized linear mixed models to identify relationships between anthropogenic feature densities and lesser prairie-chicken lek attendance with the maximum number of males per lek as the response variable; annual densities of oil and gas wells, buildings, power lines, and roads as fixed effects; and lek number as a random effect. The number of male lesser prairie-chickens displaying on spring leks serves as an index of population size and can be used to assess temporal trends in response to anthropogenic feature densities. Preliminary results suggest increasing anthropogenic feature densities negatively influenced male lek attendance, and we speculate this was likely due to decreased quality in available nesting habitat around leks for hens.

SPATIAL ECOLOGY OF LESSER PRAIRIE-CHICKENS IN CONSERVATION RESERVE PROGRAM-DOMINATED LANDSCAPES IN THE SOUTHERN HIGH PLAINS OF TEXAS

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The Conservation Reserve Program (CRP) has been identified as a potential conservation practice that may help facilitate population recoveries of the threatened lesser prairie-chicken (LEPC). The goal of our study was to assess LEPC daily movements and space use during the breeding season in CRP lands in the Southern High Plains of Texas. We captured 9 LEPCs in Bailey and Cochran Counties and equipped each with GPS Platform Terminal Transmitters (PTTs). We used GPS data to assess the spatial ecology of the species between the lekking season (15 March – 31 May) and summer season (1 June – 31 August). We calculated daily movement distances, averaged movement distances among individuals, and estimated utilization distributions with Brownian Bridge Movement Models. We then calculated the spatial extent of 50% core and 95% home range polygons from the utilization distributions. Based on preliminary results, daily movements and space use increased during the summer season. Longer daily movements and increased space use correspond to the end of intense lekking activity and male dispersal.

INFLUENCE OF SOUND ON NEST PLACEMENT AND SUCCESS OF THE LESSER PRAIRIE-CHICKEN

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Anthropogenic changes in land use in the form of agriculture, unmanaged livestock grazing, invasive species, and oil and gas (O/G) development have reduced the viability of Lesser Prairie-Chicken (Tympanuchus pallidicinctus; hereafter LPC) habitat resulting in population declines. Previous studies indicate that LPCs avoid vertical structures associated with energy development on the landscape. We considered the possibility that noise produced from O/G pump jack motors are a causal mechanism driving habitat degradation/avoidance. We collected sound pressure level (SPL) measurements at O/G pumps jack motors, nesting points, matched random, and random points throughout Gove County, KS during the 2015 LPC reproductive season. We found that oil and gas pump jack motor noise had an additive effect to environmental noise out to roughly 500 meters from the motors. We found a difference in sound level readings among nest sites, matched random, and random locations on the landscape F(2, 78) = 3.25; P=0.04, with nest sites and matched random points being 6dB (±4dB) lower than the landscape as a whole. However, no difference was detected between successful nests and failed nests F(1, 15) = 0.17; P=0.69. These data suggest that LPC may be utilizing quieter locations on the landscape when choosing nesting locations, suggesting that impacts of anthropogenic noise may be an important component driving LPC habitat suitability.

EFFECTS OF ANTHROPOGENIC NOISE ON MALE LESSER PRAIRIE-CHICKEN LEK ATTENDANCE

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Lesser Prairie-Chickens (Tympanuchus pallidicinctus) show avoidance of anthropogenic structures associated with oil and gas development. Oil and gas development constitutes both visual and acoustic disturbance to the landscape. The Lesser Prairie-Chicken was listed as threatened under the Endangered Species Act in March 2014 due to the increasing human disturbance negatively affecting habitat quality. We measured the effect of anthropogenic noise from oil and gas development on Lesser Prairie-Chicken lek attendance and behavioral display during 2015 in Gove County, Kansas. We found that number of males per lek was negatively correlated with anthropogenic noise produced by oil and gas infrastructure at frequencies of 16 Hz, 32 Hz and 64 Hz ($R^2 = 0.63$; P = 0.001). After controlling for the number of males attending leks, anthropogenic noise had no influence on the frequency of courtship behaviors (e.g., flutter jumps, fighting, and gobbling). Our results suggest that anthropogenic noise associated with oil and gas development could result in lek abandonment possibly via reduced recruitment to leks located in relatively high noise environments. Therefore, conservation and management efforts for Lesser Prairie-Chickens may need to consider including mitigation of anthropogenic noise.

USING THE HISTORICAL RECORD TO MANAGE RIPARIAN AREAS IN GRASSLAND ECOSYSTEMS.

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Prairie streams are some of North America's most endangered habitats (Dodds et al, 2004) due to fragmentation and their position in the landscape. The importance of riparian habitats to aquatic health are well documented. Woody vegetation is critical to maintaining stream bank integrity and fish habitat. The canopy effect of these corridors regulates stream temperatures and is important travel and foraging habitat for a suite of terrestrial wildlife during summer and winter. Landscape alteration has significantly altered hydrologic flow patterns and other ecosystem functions (Rabeni, 1996). In most upland prairie situations, we believe "critical functions" for stream health can be achieved with native shrubs and that they should be managed and/or restored along prairie headwater streams. Managing for native shrub species such as false indigo, button bush, and swamp dogwood can provide many riparian benefits without creating significant avian perch sites which have been shown to be a threat to greater prairie chicken populations. This poster highlights a variety of historical insights that can help managers develop grassland habitat and the associated prairie headwater community objectives.

PATCH-BURNING IMPACTS ON PRAIRIE-CHICKEN HABITAT

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European settlement brought heavy grazing and fire suppression to the Great Plains in the late nineteenth century, changing historic fire regimes and affecting native plant communities. In efforts to return to historic fire regimes and reduce wildfires, prescribed fire has recently become a favored management practice among some stakeholders. Our study examines the effects of the fire-grazing interaction on prairie-chicken habitat structure and vegetation biomass compared to prescribed fire alone. Four vegetation types are represented by sites across Texas and Oklahoma: tallgrass prairie, shinnery oak, sand-sagebrush, and gulf coastal prairie. All sites are within the historic or current range of either Lesser, Greater, or Attwater prairie-chickens. Three sites currently practice patch-burning, while the fourth uses prescribed fire alone. Un-grazed areas are available at each site for comparison to patch-burn treatments. By sampling areas differing in time since fire, we can assess how the fire-grazing interaction affects prairie chicken habitat and vegetation biomass. Preliminary data suggest that patch-burning maintains a diversity of vegetation structure and composition necessary for prairiechickens at different life stages. Such diversity may allow for prairie chicken conservation while simultaneously maintaining reduced fuel levels for an extended period of time compared to burning alone.

SATURATION SURVEYS FOR LESSER PRAIRIE-CHICKENS IN OKLAHOMA

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The Lesser Prairie-Chicken (Tympanuchus pallidicinctus) has experienced considerable declines in both population size and range over the past several decades, leading to a decision by the U.S. Fish and Wildlife Service to list the species as "threatened" under the Endangered Species Act in 2014. Although these declines have been evident, precise population estimates have been difficult, and even within their present-day range, portions are unsuitable or the species has been extirpated for various, sometimes unknown, reasons. To gain a better understanding of the current population size and occupied range of the species in Oklahoma, we conducted "saturation surveys" in 2010 and 2011 along accessible roads, composed of 214 survey routes. At each designated stopping point, habitat was assessed as being "suitable", "marginal', or "unsuitable", and listening for leks was conducted at those stops that were assessed as suitable or marginal. A total of 73 leks was located in 2010-2011. We estimate that 75-80% of the occupied range in Oklahoma was sampled. These surveys are being repeated in in 2015 and 2016, with minor modifications, including photo-points that can be compared to future surveys, and will be repeated again every 5 years in accordance to the Lesser Prairie-Lesser Range-Wide Management Plan. This will provide long-term population comparisons as well as document habitat changes. We will compare survey and habitat assessment results from 2010-2011 to the portions surveyed in 2015.



Notes

State Reports

Illinois

In the spring of 2015, the 53rd consecutive census in south-central Illinois indicated 68 greater prairie-chicken males significantly up from 38 males in the spring of 2014. The 2015 counts included 39 males in Jasper County and 29 males in Marion County. In 2015, the males in Jasper County increased from a very low count of 12 in 2014 to 39 males in 2015. This was following the spring 2014 prairie-chicken translocation from the Smokey Hills Region in Kansas. The Marion County population also increased slightly from 26 males in 2014 to 29 males in 2015. The greater prairie-chicken remains a state endangered species in Illinois and is currently limited to two flocks located in Jasper and Marion Counties.

In 2014, supported by a State Wildlife Grant and the Prairie-Chicken Recovery Plan, the Illinois Department of Natural Resources, Illinois Natural History Survey and the Illinois Audubon Society began a 3-year prairie-chicken translocation for genetic and demographic purposes due to drastic declines in the Illinois population. In 2014, 50 males and 41 females were trapped and relocated to Illinois from the Smokey Hills region in Kansas. In 2015, the translocation effort was suspended due to an Executive Order from the Governor limiting out of state travel.

Kansas

Population Status

The extreme drought observed across the Great Plains from 2010-2013 had differing effects across the state. In the west half of the state, where water is a limiting resource, nesting and brood rearing habitat was depleted causing population declines. Widespread annual burning was limited throughout the Flint Hills, allowing for slight recoveries in populations. Spring precipitation in 2014 and 2015 greatly improved range conditions across the state. The index to the state wide population density for LPCH increased by 13.7% in 2015 as compared to 2014, while the statewide index to GPCH population density increased by 12.9%.

Annual range wide aerial surveys have also been conducted on the LPCH since 2012. Population estimates increased in all three ecoregions surveyed that are partially or completed within KS. Following this methodology, a statewide population estimate was generated for the first time in Kansas for GPCH in 2015. Preliminary results are presented in Table 1 below.

Table 1. Estimated densities of GPC per 100 km² and population sizes by ecoregion and overall. Ecoregions that are included are Smoky Hills (ESH), Flint Hills (FH), Glaciated Plains (GP), Osage Cuestas/Chautauqua Hills (OCCH), and Northern High Plains (NHP). Oklahoma (OK) also had estimates completed and the overall estimate includes estimates from this region.

Region	Densi	ty (per 100 km ²)	Population Size		SE	CV
ESH	117.3	(60.4, 162.3)	28,771	(14807, 39803)	8073	0.28
FH	133.3	(71.1, 181.2)	32,090	(17117, 43619)	8179	0.25
GP	14.7	(6.7, 21.0)	661	(302, 945)	206	0.31
OCCH	32.4	(11.6, 54.6)	2,332	(832, 3928)	971	0.42
NHP	60.2	(46.4, 85.7)	23,975	(18492, 34133)	4807	0.20
OK*	47.3	(18.7, 69.6)	1,914	(757, 2817)	651	0.34
Overall	86.1	(57.69, 109.55)	89,744	(60098, 114123)	17,015	0.19

Hunter Activity and Harvest

Greater prairie chicken harvest has been tracked through our Small Game Harvest survey since 1963; Lesser Prairie Chicken was added in 1975. Species estimates are derived by county of pursuit with the harvest being attributed to the dominant species in counties within the range overlap. Estimated combined species harvest through this survey has ranged from a high of 120,000 birds in 1982 to a low of 3,622 in 2013. Survey results indicate that most Kansas prairie chicken hunters are opportunistically taking chickens while hunting other upland game. In the 2014-2015 season an estimated 5,619 active hunters harvested an estimated 1,496 birds, which translates into 1.7% of the total estimated population from 2015 spring aerial surveys.

Habitat Management Projects

Kansas Department of Wildlife Parks and Tourism, partnering with many agencies both outside and within the state, was a recipient of a Regional Conservation Partnership Program Grant through USDA. The Kansas portion of these funds will be targeted at improving and preserving grasslands in the smoky hills ecoregion. The Greater Prairie Chicken estimated occupied range is used to target these funds and Lek surveys will be used in part to track the results of the project. Outside of this focus area we continue to work with private landowners through federal EQIP and our state habitat programs to develop and enhance prairie chicken habitat where possible.

Missouri

In 2015, 8 public areas, 5 routes, and1 non-public area were surveyed by MDC staff, and other state agency and NGO personnel. A total of 74 males were observed on 14 leks within 5 population areas for an estimated population of 148 prairie-chickens in the state (Figure 1). The number of routes and area surveys have been modified or dropped in the last 3 years due to > 5 years since last reporting of booming prairie-chickens in several of the survey areas. In 2005, 33 route and area surveys were run with 24 of them being occupied (11/15 public areas, 9/12 routes, and 4/6 odd areas) by 183 male prairie-chickens on 33 leks. This corresponds to a 58% drop in the number of routes surveyed, a 70% drop in the number of occupied leks, and a 60% drop in the number of booming male prairie-chickens during this 10 year period (2005 – 2015).

Overall the state population of greater prairie-chickens has remained stable since 2009 averaging 112 total birds (56 male prairie-chickens on 10 leks) over the last 5 years. Three population areas (Taberville Prairie, Wah'Kon-Tah Prairie, Dunn Ranch-Grand River Grasslands) currently hold 95% of the Prairie-Chickens in Missouri. The other 2 areas (Prairie State Park and Shelton Prairie in the Stony Point/Golden Prairie complex) are essentially relicts that will more than likely blink out in the coming years without additional management or input from private lands to conservation and restoration of suitable habitat. In 2005, Stony Point/Golden Prairie complex held 33%, and Prairie State Park held 8% of the prairie-chickens in Missouri.

The Wah'Kon-Tah Prairie and Dunn Ranch-Grand River Grasslands areas have benefited from recent augmentation of populations through translocations. From 2008 – 2012, 451 birds were moved to Wah'Kon-Tah Prairie from Kansas that re-established this population after it is believed to have become extirpated in 2000. In the 3 years since the end of the translocations, there has been 1 good year indicative of good production and recruitment, and 2 years in which numbers have dropped possibly as a result of poor production or recruitment. In 2015, we did see a rebound at Taberville Prairie from last year's count of only 5 birds to 14 birds. However, similar to the last 2 years at Taberville Prairie, the northern harriers consistently pushed displaying males off the historic lek onto neighboring crop ground and pasture. In 2012 lowa

Department of Natural Resources (DNR) initiated a 4-year translocation project into the Iowa side of Grand River Grassland Population area to bolster this declining population. In 2013 Iowa DNR expanded this effort into the Missouri side of the Grand River Grasslands at The Nature Conservancy's Dunn Ranch. In 2015 (the end of this translocation project) 40 males on 9 leks were observed within the Missouri side of the Grand River Grasslands.

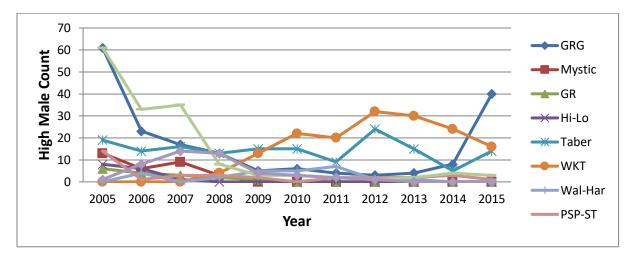


Figure 1. Missouri greater prairie-chicken area population totals 2005 – 2015. Number of males represented is the high count observed within a given year between 1 March and 15 May. GRG = Grand River Grassland COA, Mystic = Mystic Plains COA, GR = Green Ridge PCFA, Hi-Lo = Hi Lonesome PCFA, Taber = Taberville PCFA, WKT = Wah'Kon-Tah Prairie, Wal-Har = Walker/Harwood Private Lands, PSP-ST = Prairie State Park/Shawnee Trails COA, STP-GP = Stony Point/Golden Prairies COA, Law-Jas = Lawrence/Jasper Count Private Lands.

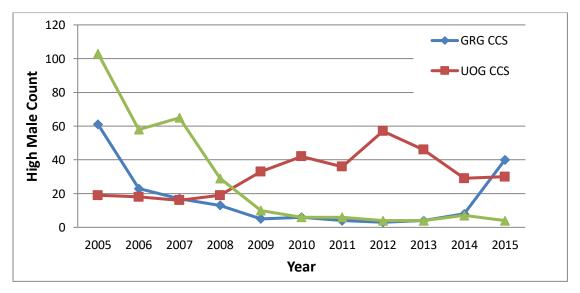
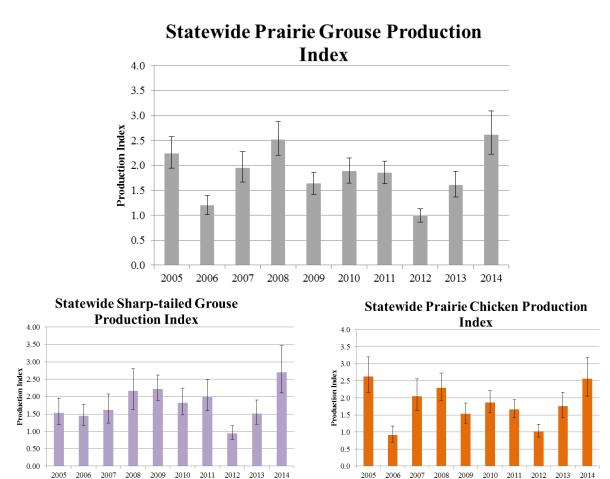


Figure 2. Missouri greater prairie-chicken CCS population area totals 2005 – 2015. Number of males represented is the high count observed within a given year between 1 March and 15 May. GRG = Grand River Grassland CCS, UOG = Upper Osage Grassland CCS (Wah'Kon-Tah and Taberville Prairies).

South Dakota **Prairie Grouse Harvest Survey**



Results and Analysis:

2005 2006 2007 2008

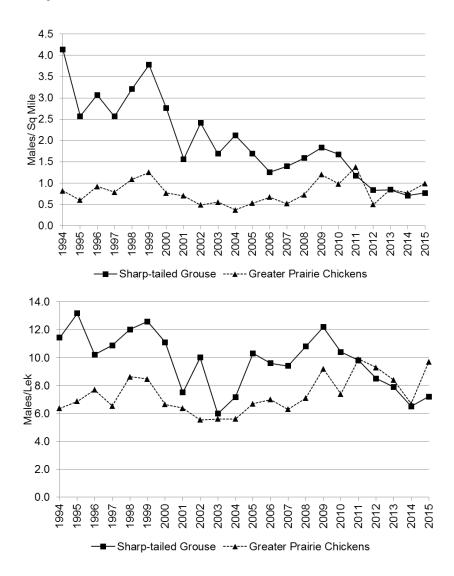
Wings from 706 hunter-harvested sharp-tailed grouse and greater prairie-chickens were collected throughout the state during the 2014 hunting season. The overall young/adult ratio was 2.6, which was higher than the 2013 index of 1.6. Age ratios were similar between species.

2005

2006 2007 2008 2009 2010 2011 2012 2013 2014

2013 2014

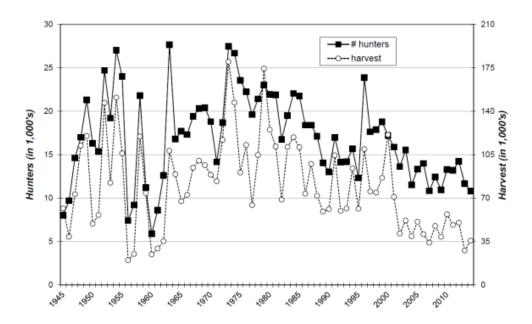
Spring Lek Survey



Results and Analysis:

Between 25 March and 30 April, 2015, Department personnel and cooperators conducted lek surveys using traditional survey methods on 10 survey blocks established throughout the main prairie grouse range in South Dakota. Sharp-tailed grouse leks were detected on 10 of the blocks, totaling 39 leks and 281 males observed. Prairie-chicken leks were detected on 8 blocks, totaling 20 leks and 194 males observed. During the past 20 years, sharp-tailed grouse abundance has declined while prairie-chicken abundance has held steady.

Total Prairie Grouse Harvest



In 2014, an estimated 6,503 resident and 4,254 non-resident hunters harvested 35,790 prairie grouse (25,847 by residents and 9,943 by non-residents) throughout South Dakota. Harvest in 2014 was higher than the 27,698 prairie grouse harvested in 2013; however, it is still below the 10-yr average harvest of 43,086 prairie grouse.

Prairie Grouse Occupancy Model

Data collection began in 2014 to develop a spatially explicit habitat-based statewide occupancy model for prairie grouse. The model will be useful to focus conservation efforts and prioritize certain geographic areas. The model will be developed by determining presence or absence of prairie grouse leks on 1 mile² sample units across the state. Samples were spatially balanced across the state and occurred along a gradient of landscape-level grassland availability. A total of 1,400 sampling units were randomly selected throughout the prairie grouse range in South Dakota. Samples were stratified among high, medium, and low grassland strata. The 1 mile² areas are searched 2-3 times per year and the final presence/absence data set will be used in conjunction with landscape level habitat covariates to develop an occupancy model. So far, 337 sections have been searched with 55 leks detected (5 mixed, 31 sharp-tailed grouse, and 19 greater prairie-chicken) for a total of 463 males. Data collection will continue until enough data is collected to develop a useful model.

Washington

Declining populations and distribution of Columbian sharp-tailed grouse (*Tympanuchus*) phasianellus columbianus) in Washington have resulted in serious concerns for their long-term conservation status. The overall population was estimated to be 794 in 2014, associated with 38 leks. Management activities are directed by the 2012 "Washington State recovery plan for the Columbian sharp-tailed grouse" (http://wdfw.wa.gov/publications/00882/). Translocations of sharp-tailed grouse from 'healthy' populations outside the state have been conducted to improve the genetic and demographic health of populations within Washington. The Washington Department of Fish and Wildlife, in cooperation with the Colville Confederated Tribes, translocated 368 Columbian sharp-tailed grouse from central British Columbia, southeastern Idaho, and north-central Utah to Washington State in spring 2005-2013. The release sites in Washington included Dyer Hill (south of Brewster in Douglas County), Swanson Lakes (south of Creston in Lincoln County), Greenaway Springs (southeast of Okanogan), and Nespelem (east of Nespelem in Okanogan County). Two of the release sites included stateowned public land and the other sites are Colville Tribal land; all are being managed for the benefit of wildlife, and in particular sharp-tailed grouse. In all release sites, sharp-tailed grouse declined through the year 2005, despite the acquisition, protection, and restoration of habitat. Efforts to monitor movement, survival, and productivity of the translocated birds are ongoing. Although it is too early in the process to determine whether the augmentations should be considered a success, population increases have been documented.

Wisconsin

Greater Prairie-Chicken. Found in all Wisconsin counties in 1900, the range of prairie chickens has contracted in the state to such an extent that the species is now found only in central Wisconsin, predominantly in association with four public properties where large blocks of grassland remain. Annual surveys of males at traditional lek sites are used to index prairie chicken population size. The number of male prairie chickens observed on booming grounds in central Wisconsin increased from 230 to 253 between the 2014 and 2015 spring surveys, while the number of observed leks decreased (from 40 to 36). The population in this area experienced a population bottleneck in the 1950s that resulted in a significant reduction in genetic diversity. To address this issue, 110 hens from an established population in Minnesota were translocated to Wisconsin from 2006-2009. An assessment of this project indicated that many Minnesota hens survived and successfully fledged young, and that introgression resulting from the translocation had at a minimum offset the continued loss of diversity due to genetic drift.

Pressure to convert grassland acres to agricultural purposes (corn, potatoes, cranberries) imposes the most significant challenge to expanding the habitat base for prairie chickens in Central Wisconsin. Current subpopulations on the four "core" public properties (Buena Vista, Leola, Mead, and Paul J. Olson Wildlife Areas) are nearly completely isolated, and restoring gene flow among these population segments via habitat development on surrounding public lands will be important in insuring the long-term persistence and genetic health of prairie chickens in Wisconsin.

Effectively partnering with private landowners to explore means of establishing or enhancing grassland habitat in agricultural areas (e.g., rotational grazing) will be important to fostering

gene flow and increasing the probability of persistence for this species. Researchers with the University of Wisconsin-Stevens Point recently conducted a five-wave mail survey to understand Central Wisconsin farmers' attitudes towards conservation. Results indicated that multiple farmer typologies exist in the Central Wisconsin landscape and each farmer typology has preferred methods of involvement in the planning process. To best involve farmers and private landowners, conservation organizations need to tailor collaborative approaches to accommodate the individualized preferences of different stakeholder typologies to the best of their abilities.

Managed intensive grazing plans on private lands are initiated through local grazing specialists. Pilot managed intensive grazing projects are underway on the Buena Vista and Paul J. Olson Wildlife Areas, including vegetation and insect response assessments in coordination with the University of Wisconsin-Madison and other partners.

Revision of the ten-year prairie chicken management plan is currently underway, including the formation of task groups on public lands, private lands, research, and education/outreach. Development of spatially-explicit population viability analyses (PVA) will help determine the efficacy of different management approaches that are designed to improve prairie chicken persistence in Wisconsin. A University of Wisconsin-Stevens Point study conducted from 2014-2015 will help determine factors limiting nest and brood survival on the Buena Vista and Paul J. Olson Wildlife Areas and improve PVA analyses. Apparent nest success estimates are approximately 35% when data was pooled across sites and years. The majority of nest failures occurred from mammalian (63%) and avian (6%) depredations. Nest hatch success was >84% in both years. Final analyses are underway.

The master planning process for the four core grassland properties has been initiated in order to coincide with the revision of the prairie chicken management plan. The master planning process involves data gathering (e.g. biotic inventories), analysis by an integrated team of natural resource professionals, and extensive public participation.

Sharp-Tailed Grouse. Once found throughout much of Wisconsin, the distribution of sharptailed grouse in the state has changed dramatically since European settlement. Their range has retreated and contracted northward as Wisconsin's southern forest, savannas, and grasslands were cleared and converted to agriculture. Sharp-tailed grouse can be found on scattered private lands, but are primarily found on state-managed properties in northwest and northcentral Wisconsin, including Crex Meadows, Namekagon Barrens, Douglas County, and Riley Lake Wildlife Management Areas, among others. Annual surveys of dancing males are conducted in early spring as an index to population size. The number of male sharp-tailed grouse dancing on leks within state-managed properties in northern Wisconsin remained essentially unchanged between 2013 and 2014 (124 and 125 males, respectively), but increased to 184 males in 2015 (38.6% increase). Population trends, however, still show an overall decline on managed properties since 1998, when 350+ dancing males were counted. Sharp-tailed grouse continue to be managed as an upland game species in Wisconsin. Recent population declines and evidence of reduced genetic variability led to the cancellation of the sharp-tailed grouse hunting season in 2013 and 2014. However, given the increase in the number of dancing males counted during spring 2015 surveys, the Wisconsin Department of Natural Resources has made a limited number (100) of harvest permits available for the upcoming 2015 hunting season. Though the population has yet to recover from historic levels, wildlife managers believe a limited harvest to be sustainable without impeding population growth.

Numerous factors may threaten the persistence of sharp-tailed grouse in Wisconsin, including habitat loss, fragmentation, genetic degradation, over-harvest, and disease. As such, the species remains listed as a Species of Greatest Conservation Need in Wisconsin. Suitable habitat exists in scattered patches within a primarily forested matrix. As the sharp-tailed grouse is an area-sensitive species, there is concern that many of the remaining habitat patches are not large enough to sustain a viable population in the long-term. Additionally, the scattered distribution of remaining suitable habitat limits the dispersal and movement of sharp-tailed grouse among habitat patches. As a result, sharp-tailed grouse dispersal appears to be limited likely by significant habitat barriers, additionally impacting any genetic exchange among subpopulations. Dispersal among habitat patches and colonization of new habitat is likely necessary to maintain overall population size and genetic viability in the long-term. Given that there are multiple landowners across the landscape, there is a significant challenge in managing for sharp-tailed grouse habitat on the landscape scale.

In 2011, an updated conservation and management plan for sharp-tailed grouse was completed due to continued local population declines, range contractions, and conservation genetics research indicating that Wisconsin sharp-tailed grouse may show reduced genetic diversity relative to more continuous populations in Minnesota and the Great Plains. Additionally, research by the University of Wisconsin-Madison and University of Wisconsin-Stevens Point suggest the scale and approach of managing for sharp-tailed grouse on core public properties may not be enough to sustain the species.

An ongoing collaborative project between Wisconsin DNR and the University of Wisconsin-Madison aims to locate previously undiscovered lek sites and subpopulations of sharp-tailed grouse in the Northwest Sands Ecological Landscape in northwest Wisconsin by using occupancy-based survey methods. Such methodologies allow researchers and managers to examine for differences in sharp-tailed grouse occupancy (or presence) between core-managed and non-managed properties, in addition to better understanding how grouse utilize recently disturbed areas resulting from clear-cuts, large fires, or storm damage. Subsequent models can be developed to determine relationships between habitat characteristics (i.e., vegetation, topography, and patch configuration) and occupancy rates and abundance of grouse at landscape and within-patch spatial scales. Such information is needed so appropriate, costefficient management frameworks and habitat initiatives can be developed to better sustain and increase sharp-tailed grouse populations in Wisconsin.

Meeting Minutes 2013 Prairie Grouse Technical Council Business Meeting October 12, 2013 Crookston, Minnesota

Nova Silvy moved to approve the 2011 Business Meeting minutes as presented; 2nd by K.C. Jensen; the motion passed unanimously.

Establishing a formal relationship between the PGTC and the North American Grouse Partnership (NAGP)

Discussion:

- Steve Sherrod stated that the NAGP was founded in 1999 with the vision of becoming an advocate and fundraising entity similar to Ducks Unlimited.
- Rick Baydack added that the North American Grassland Management Plan chose grouse as flagship species as an overall focus for implementing on-the-ground management plans.
- Nova Silvy stated that additional emphasis on landowners and economics (ecotourism benefits) is needed to save grouse.
- Dan Svedarsky stated that the recent American Grasslands Conference provided a forum for landowner participation
- Karen Smith stated that many public lands in her area are not being well managed and are losing their potential to provide grouse habitat.
- Christian Hagen brought the discussion back to the issue of whether to enter a formal memorandum of understanding with NAGP, asking what each organization stands to gain by the agreement.
- Bill Vodenahl stated that discussions between the two groups began at the PGTC held in Woodward, OK, and that it was felt at the time that combining the strengths of the two groups (NAGP advocacy and PGTC Science) would provide mutual benefits.
- Dan Svedarsky stated that the agreement would give the PGTC a web-based home, and that NAGP agrees, by way of the MOU, to help future PGTC host states organize and handle finances and Council meetings.
- K.C. Jensen and Steve Sherrod stated that PGTC funds are currently held by the Grasslands Charitable Foundation of NM (Jim Weaver, Chair) as part of an informal agreement.
- Andrew Gregory stated the need for a mutual statement of indemnification / nonresponsibility clause, as well as a dissolution clause to specify how funds would be handled in the case one of the groups dissolves.
- Dan Svedarsky stated the need for NAGP to set clear expectations for financial support in return for hosting the PGTC website.
- Max Alleger added that an agreement with NAGP should include a clear statement of annual financial commitments on the part of both parties, as well as a list of deliverables.

K.C. Jensen moved to table the issue given the lack of needed information, and to allow Council members to vote on the issue via email after the details are known. Bill Vodenahl seconded the motion, which passed.

Social Media and Youth Outreach Efforts

Karen Smith stated the need for youth education to raise awareness of grassland habitat losses, and that social media approaches should be considered.

Andrew Gregory noted that many similar organizations maintain a Facebook page, and volunteered to look into establishing such for the PGTC.

Archival of PGTC documents

- Max Alleger led the discussion related to archiving PGTC documents through the Missouri State Historical Society (MSHC) in Columbia, Missouri. This option emerged via contact from MSHC regarding documents that the heirs of Don Christisen gifted to the society.
- Nova Silvy stated support, noting the importance of maintaining historical records for the Council.
- Steve Sherrod and Andrew Gregory noted the need to archive both digital and hard copy files.
- Max Alleger stated that the MSHC only archives hard copy documents, and that individual states or organizations will be responsible for scanning their documents prior to submission to the MSHC.
- Max Alleger moved that the PGTC enter into an agreement with MSHC to archive relevant hard copy documents, and that the PGTC provide support to MSHC in the amount of \$150 annually. Furthermore, states and organizations are to review their documents and bring one copy of each item they wish to have archived to the 2015 Council meeting. PGTC members from Missouri will be responsible for transferring documents to MSHC on behalf of PGTC member states and organizations following future Council meetings. Dan Svedarsky seconded the motion, which passed unanimously.

2015 PGTC

- Max Alleger discussed tentative plans for the 2015 PGTC, which will be held in the Nevada, Missouri area.
- Christian Hagen suggested involvement by NRCS staff related to Lesser Prairie-Chicken and Sage Grouse conservation efforts.

Tom Smith discussed the need to involve local landowners and focus on private land issues. Don Sexton moved to adjourn the business meeting; 2nd by Nova Silvy; the motion passed unanimously.

2015 PGTC Budget Report

Per the October, 2014 memorandum of agreement between the Prairie Grouse Technical Council and the North American Grouse Partnership (NAGP), NAGP agreed to provide fiscal services. This includes holding and administering financial resources associated with the official biennial meeting of the PGTC.

NAGP has collected registration funds via an online PayPal site. The Missouri Department of Conservation has expended funds to cover up-front costs related to the meeting and will be reimbursed by NAGP from the PGTC sub-account for actual expenses incurred. A total of \$2,406.50 expended by MDC will not be submitted for reimbursement, and is offered as an in-kind donation in support of our 2015 meeting.

	Amount	Source / Notes	Balance
		Incoming Balance	\$15,735.82
		Registrations	
	\$6,294.39 Paypal – Early Registrations (\$125)		
	\$1,889.55	Paypal - Standard Registrations (\$150)	
	\$1,125.00	Registration - checks deposited	
Income	\$9,308.94	Total Registrations	
·		Other Cash Income	
	\$250.00	MPCS donation	
	\$9,558.94	Total Income	\$25,294.76
	+-,		
	\$838.07	Excalibur Screenprinting	
	\$652.19	Kraft Mercantile; food service supplies	
	\$104.01	Grainger; field trip supplies	
	\$450.27 Wal-Mart; food items; bottled water		
	\$853.75	Big T Rentals; Tents, tables & chairs	
	\$427.86	Arwood Waste; field trip supplies	
_	\$315.00	Field Trip rentals	
Expenses	\$900	Buzz's BBQ; lunch	
	\$2,391	Field trip; 3 buses + drivers	
	\$1,670	Banquet caterer (EST)	
	\$800.00	Sam's Club; food & drinks (EST)	
	\$9402.15	Total expenses for NAGP reimbursement to MDC	
	\$1,404.00		
	\$1,002.50	Specialty Sportswear (MDC donation)	
	\$2,406.50	Additional expenses not reimbursed to MDC	• • • • • • •
		Estimated Ending Balance	\$15,892.61
All proce	eds from the s	silent auction will be deposited in the NAGP account administered	for the PGTC

The Hamerstrom Award

The Hamerstrom Award was established in honor of Fred and Fran Hamerstrom, pioneers of prairie grouse research and management. It will be awarded at the meeting of the Prairie Grouse Technical Council. The award will consist of a plaque with the engraved name of the recipient.

Award Criteria:

- 1. To recognize individual(s) and organization(s) who have made significant contributions in prairie grouse research, management, or other support programs which have enhanced the welfare of one or more species of prairie grouse in a particular state or region.
- 2. The contribution should be evidenced by a sustained effort over at least 10 years.
- 3. The contribution may be related to research, management activity, promotion of an integrated program, or some combination thereof. The relative importance given to these three categories of contributions is the prerogative of the Awards Committee but it should be based on how it has helped the overall welfare and survival of prairie grouse.

Selection Procedure:

- 1. The selection of award recipients will be made by the three-member Executive Board and two additional members appointed by the Chairman.
- 2. Nominations will be accepted at large as well as from members of the Awards Committee.
- 3. Nominations will be submitted to the designated Awards Committee Chairman at least one month before (deadline for the 31st meeting is August 23, 2015) the biennial meeting of the Prairie Grouse Technical Council.
- 4. Nominations should include the following information:
 - A. Name, address, and phone number of nominee
 - B. Biographic sketch of individual or brief history of organization
 - C. Overview of contributions indicating the nature of the contributions, duration, how it has contributed to the welfare of one or more species of prairie grouse, and the geographic area influenced by the contributions.
- 5. A maximum of two individual awards and two organization awards may be presented at a biennial meeting. No awards will be given if the Awards Committee feels that no deserving individuals or organization are available at the time.

A bit about the Hamerstrom Award

The first recipient was Fran Hamerstrom, in 1992, and it has been since awarded at the biennial meetings of the Prairie Grouse Technical Council. She was presented "The Hamerstrom Award" at the annual meeting of the Society of Tympanuchus Cupido Pinnatus in Milwaukee, Wisconsin.

When the awards program was in the concept stage, Fran wanted to ensure that the Hamerstrom name not be associated with any interpretation of the word "conservation" that would include any relationship to the anti-hunting mentality. To make that clear, the awards presentation is to include the following recommendation from Fran's *Wild Foods Cookbook* on yet another way to enjoy prairie grouse.

Prairie grouse are outstanding table birds. Unlike most gallinaceous birds such as pheasant and ruffed grouse, they retain their juices well and do not tend to dry out while cooking.

Very young birds, still in juvenal plumage, have light breast meat and delicate texture, but the flavor is still undeveloped. By October, almost all the birds are in prime condition, with breast meat dark, almost like the legs, and very delicious.

Chickens and sharptails should be served rare or at most medium well-done.

Roast – Pluck dry, dress and clean. Do not stuff. Roast in a hot over (450°) for 25 minutes for medium-rare sharptails or chickens.

Fried Prairie Grouse – Pluck, dress, and clean. Cut in pieces for frying. The breasts of these birds are so plump that it is often simpler to cut them away from the bone: then cut or divide each side of the breast into two pieces. If this is not done, the legs and back will be overdone while the breast still requires more cooking. Flour each pieces lightly before placing it in the hot fat. Salt just before serving.

If you want to take the wild taste out of your grouse, pay no attention to anything I've written.

Hamerstrom Award Recipients

- 1992Fran Hamerstrom
- 1993 Ron Westemeier
- 1995 Dan Svedarsky and Jerry Kobriger
- 1998 Bob Robel
- 1999 Bill Berg
- 2001 Len McDaniel
- 2003 John Toepfer
- 2005 Nova Silvy and The Society of Tympanuchus Cupido Pinnatus, Ltd.
- 2007 Rick Baydack and Kerry Reese
- 2009 Randy Rodgers and Bill Vodehnal
- 2011 Mike Morrow, Jack Connelly, and The Minnesota Prairie Chicken Society
- 2013 Terry Wolfe, Mike Shroeder, and the Sutton Center

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PGTC Conferences

1 st	Grand Island, Nebraska	September 1957
2 nd	Emporia, Kansas	March 1959
3 rd	Stevens Point, Wisconsin	September 1960
4 th	Pierre, South Dakota	September 1961
5 th	Nevada, Missouri	September 1963
6 th	Warroad, Minnesota	September 1965
7 th	Effingham, Illinois	September 1967
8 th	Woodward, Oklahoma	September 1969
9 th	Dickinson, North Dakota	September 1971
10 th	Lamar, Colorado	September 1973
11 th	Victoria, Texas	September 1975
12 th	Pierre, South Dakota	September 1977
13 th	Wisconsin Rapids, Wisconsin	September 1979
14 th	Halsey, Nebraska	September 1981
15 th	Emporia, Kansas	September 1983
16 th	Sedalia, Missouri	September 1985
17 th	Crookston, Minnesota	September 1987
18 th	Escanaba, Michigan	September 1989
19 th	Billings, Montana	September 1991
20 th	Ft. Collins, Colorado	July 1993
21 st	Medora, North Dakota	August 1995
22 nd	College Station, Texas	February 1998
23 rd	Gimli, Manitoba	September 1999
24 th	Woodward, Oklahoma	September 2001
25 th	Siren, Wisconsin	September 2003
26 th	Valentine, Nebraska	September 2005
27 th	Chamberlain, South Dakota	October 2007
28 th	Portales, New Mexico	October 2009
29 th	Hayes, Kansas	October 2011
30 th	Crookston, Minnesota	September 2013
31 st	Nevada, Missouri	September 2015

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