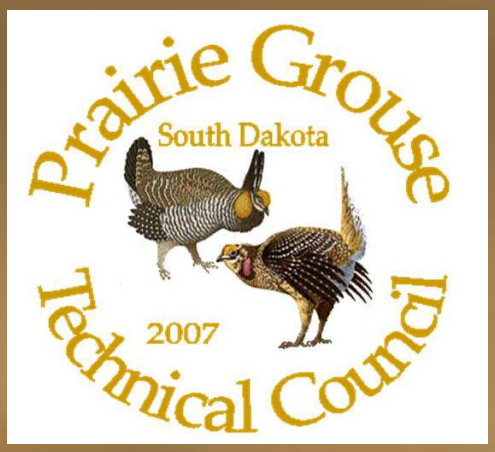
27th Meeting of the Prairie Grouse Technical Council



Chamberlain, South Dakota
7 – 10 October, 2007

Program

27th Meeting of the

Prairie Grouse Technical Council
and
Workshop

Chamberlain, South Dakota
October 7 – 10, 2007

Cover photo courtesy of Doug Backlund

Program Committee

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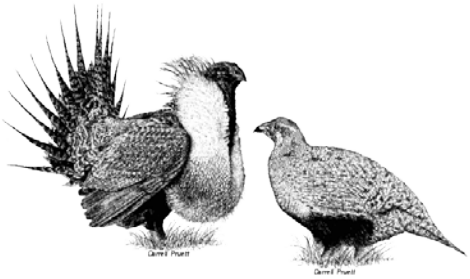


Special Thanks for Organizational Help Above and Beyond the Call of Duty!

Jennifer Randow – SD Game, Fish & Parks
Carol Jacobson – South Dakota State University

Meeting Agenda

(All activities at the Cedar Shore Hotel and Convention Center unless otherwise noted.)

Sunday, October 7	
4:00 - 8:00 PM	**Conference Registration**
7:00 - 8:9:00 PM	**Welcome Social and Mixer**
Monday, October 8	**(break refreshments and lunch provided)**
7:30 - 11:30 AM	**Conference Registration**
8:00 - 8:20 AM	**Welcome and Opening Remarks**
8:20 – 10:00 AM	**Invited Presentations**
10:10 – 12:00	**North American Grassland Conservation Plan**
1:00 - 5:00 PM	**Contributed Papers**
Tuesday, October 9	**(break refreshments and lunch provided)**
8:00 – 10:00	**PGTC Business Meeting**
10:20 AM – 12:00 NOON	**Contributed papers**
12:30 – 5:30 PM	**Field Trip –** *Ft. Pierre National Grasslands*
6:30 PM - ????	**Banquet and Awards Presentations** Banquet Speaker – Jerry Kobriger
Wednesday, October 10	**(break refreshments provided)**
8:00 AM - 12:00 Noon	**Contributed Papers**
1:00 – 4:00 PM	**Lesser Prairie Chicken Working Group Meeting**

Program –

Monday, October 8

Welcome and Invited Presentations
(George Vandel – moderator)

- ***Please turn off cell phones during all paper sessions***

8:00 – 8:05	**Opening remarks** Tom Kirschenmann
8:05 – 8:20	**Welcome and Introduction to the Conference** SDGFP Secretary Jeff Vonk
8:20 – 8:45	**Ft. Pierre National Grasslands** Tony DeToy
8:45 - 9:10	**Farm Bill Update** Dave Nomsen
9:10 - 9:35	**Grassland Trends in the Northern Great Plains**. Boyd Schultz
9:35 – 10:00	**How did the chicken cross the road; the logistics of Columbian sharp-tailed grouse translocations.**
.	Mike Schroeder and Christian Hagen
10:00 – 10:10	Break
10:10 – 12:00	**North American Grassland Conservation Plan**. (Rick Baydack - moderator)

12:00 – 1:00 Lunch

Prairie Grouse Reproductive and Population Ecology
(Tony Leif – moderator)

1:00 – 1:20	**Breeding and non-breeding survival of Lesser Prairie-chickens in Texas.** Eddie K. Lyons, Nova J. Silvy, Benjamin E. Toole and Ryan S. Jones.
1:20 – 1:40	**Habitat selection of nesting and brood-rearing Greater prairie-chickens in Southeast Nebraska.** Ty Matthews.
1:40 – 2:00	**Reproductive success and habitat use of Sharp-tailed Grouse on the Little Missouri National Grasslands, North Dakota.** Ryan M. Williamson and Kent C. Jensen.
2:00 – 2:20	**Nesting and brood-rearing habitat selection by radio-marked Sharp-tailed Grouse (*Tympanuchus***

	***phasianellus*) in northeastern British Columbia.** Alicia D. Goddard.
2:20 – 2:40	**North Dakota Sharp-tailed grouse population data: a closer look.** Jerry D. Kobriger
2:40- 3:00	**Breeding ecology of female Greater Prairie-chickens in unfragmented grasslands of Kansas.** Jacqueline K. Nooker and Brett K. Sandercock
3:00 – 3:20	Break

Prairie Grouse Genetics and Populations. (K.C. Jensen – moderator)

3:20 – 3:40	**Genetic Assessment of Southern Alberta Plains Sharp-tailed Grouse.** Krista L. Bush, Joel Nicholson, Cynthia A. Paszkowski, and David W. Coltman.
3:40 – 4:00	**Genetic insights into lekking behavior: implications for management of Greater Prairie-chickens in Kansas.** Andrew J. Gregory, Jacqueline Nooker, Brett K. Sandercock, and Samantha Wisely.
4:00 – 4:20	**Genetic Tests Reveals Introgression of Plains Sharp-tailed into the Northern Montana Sage-Grouse Population.** Krista L. Bush, Joel Nicholson, Cynthia A. Paszkowski, and David W. Coltman.
4:20 – 4:40	**Population viability analysis of lesser prairie-chickens in Texas.** Eddie K. Lyons, Nova J. Silvy, Benjamin E. Toole, Ryan S. Jones.
4:40 – 5:00	**Nesting success and habitats of greater sage-grouse on the eastern fringe of their range.** Nicholas W. Kaczor, Kent C. Jensen, Katie M. Herman-Brunson, Christopher C. Swanson, Mark A. Rumble, Robert W. Klaver and Charles A. Berdan.
6:00	**Dinner and Auction**

Tuesday – 09 October

8:00 – 10:00	**PGTC Business Meeting**
10:00 - 10:20	Break

Habitat Management and Wind Energy Issues (Bill Smith – moderator)

10:20 – 10:40	**Preliminary results from the monitoring of a Tebuthiuron treatment to enhance Lesser Prairie-chicken habitat and increase livestock production in southeastern Roosevelt County, New Mexico.** Charles E. Dixon
10:40 – 11:00	**Influence of Conservation Reserve Program (CRP) and landscape attributes on the distribution and abundance of prairie grouse in South Dakota.** Travis J. Runia and Kent C. Jensen.
11:00 – 11:20	**A landscape suitability model for Greater Prairie-chickens in northwest Minnesota.** Diane Granfors.
11:20 – 11:40	**Observations of prairie grouse and wind generators in Nebraska and northwestern Minnesota – an update.** John E. Toepfer, William L. Vodehnal and A. Pearson.
11:40 – 12:00	**Effects of wind power development on the demography of Greater Prairie-chickens: pre-construction vital rates from the Flint Hills.** Lance B. McNew, Andrew Gregory, and Brent Sandercock.
12:30 – 5:30	***Field Trip to Ft. Pierre National Grasslands***
6:30 -	Banquet and Awards Banquet Speaker – ***Jerry Kobriger – Reflections of 40+ Years in the Grouse Management World***

Wednesday – 10 October

Population Status Updates and Management (Les Flake – moderator)

8:00 – 8:20	**Greater Prairie-chicken recovery in Missouri.** Max Alleger.
8:20 – 8:40	**The tale of two states: Greater Prairie-chicken management in Wisconsin and Minnesota.** John E. Toepfer.
8:40 – 9:00	**An update on the translocation of greater-prairie chickens from Minnesota into Wisconsin.** Ashly D. Steinke, David Drake, Scott Hull and David Sample.
9:00 – 9:20	**Recent status and conservation of lesser prairie chickens in Kansas.** Randy D. Rodgers.
9:20 – 9:40	**Status of New Mexico Lesser Prairie Chicken Populations.** Grant Beauprez.
9:40 – 10:00	**Attwater's Prairie-chicken recovery: Where are we?** Michael E. Morrow and Terry A. Rossignol.
10:00 - 10:20	**Restoring Greater Prairie-chickens to west-central Minnesota: progress report.** John E. Toepfer, David R. Trauba, and S.C. Vacek.

10:20 – 10:40 Break

10:40 – 11:00 **Human dimensions survey of private landowners within the Central Wisconsin Grassland Conservation Area.** Ashly D. Steinke, David Drake, Scott Hull, David Sample.

11:00 – 11:20 **Use of bird dogs in prairie grouse research: field case studies.** David Dahlgren and E. Thacker.

11:20 -11:40 **Mitigating collision risks for Lesser Prairie-chickens.** Donald. H. Wolfe, Michael. A. Patten and Steve. K. Sherrod.

11:40 – 12:00 **An adaptive harvest management exercise for greater prairie-chicken harvest in Southeast Nebraska: using harvests and surveys to gain information about harvest mortality.** Larkin A. Powell, Scott J. Taylor, and J. J. Lusk

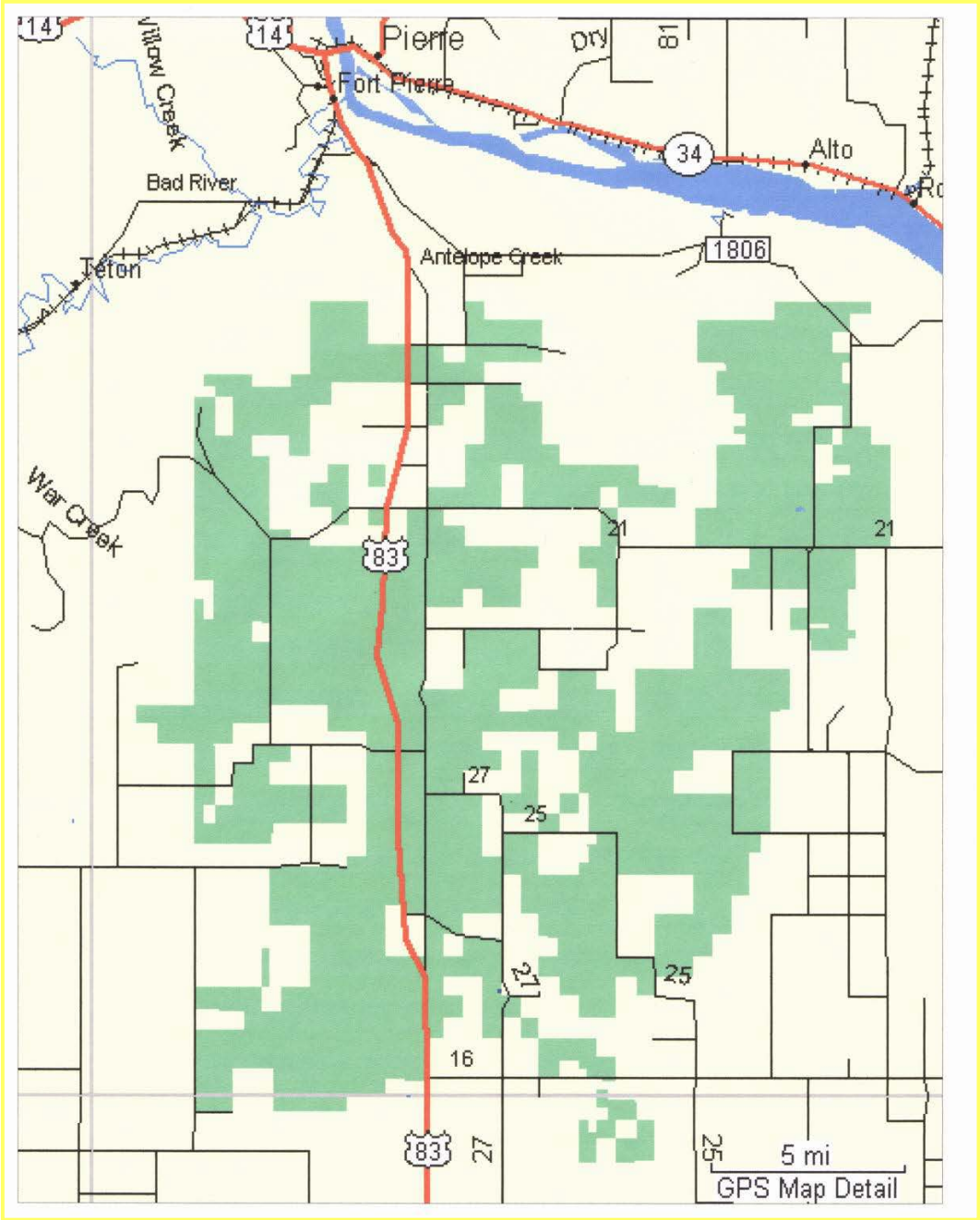
1:00 – 4:00 ***Meeting of the Lesser Prairie Chicken Working Group***

Field Trip, Tuesday, October 9th

Assemble at Cedar Shore Resort parking lot. Buses will depart at 12:30 PM.

12:30 PM to 5:30 PM: **Tour of Ft. Pierre National Grasslands and prairie grouse research sites.**

Refreshments Served



Ft. Pierre National Grasslands

North American Grassland Conservation Plan for Prairie Grouse

A cooperative initiative of the North American Grouse Partnership

A cooperative effort involving state agencies, federal agencies, conservation organizations, and universities was initiated in 2006 to develop a conservation plan for prairie grouse (lesser and greater prairie-chickens and sharp-tailed grouse). A draft of the plan has now been completed and is out for broader review. The plan emphasizes grassland conservation by maintaining or restoring historical grassland diversity and uses prairie grouse as flagship species to accomplish this. Prairie grouse habitat needs were assessed and used to recommend needed amounts and distributions of grasslands. The plan used this approach for the Great Plains of the U.S. and Canada, characterizing desired ecosystem diversity for a 550 million acre area, and focused on the specific needs of prairie grouse where they occur outside of this Great Plains planning area. Specific recommendations were developed for each BCR that included substantial habitat for prairie grouse. The plan will be described followed by an open discussion on its implementation.

(Rick Baydack – Moderator)

10:10 – 10:20	**Background on the prairie grouse plan, relationship to NAGMS** - Stephanie Manes, USFWS, and Rick Baydack, U. Manitoba
10:20 – 10:50	**Ecosystem diversity focus** Jon Haufler, EMRI
10:50 – 11:10	**Prairie grouse habitat needs and implementation strategies** Bill Vodehnal, NGPC
11:10 – 11:40	**Recommendations by BCR: 6 reports of 5 minutes each** BCR teams
11:40 – 12:00	**Open discussion**

Abstracts

HOW DID THE CHICKEN CROSS THE ROAD; THE LOGISTICS OF COLUMBIAN SHARP-TAILED GROUSE TRANSLOCATIONS

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RANDY SMITH, Idaho Department of Fish and Game, 868 E. Main, Jerome, ID
RON GREER, Utah Division of Wildlife Resources, 515 East 5300 South, Ogden,
CHRISTIAN HAGEN, Oregon Department of Fish & Wildlife, 61374 Parrell Road, Bend, OR
DOUG JURY, British Columbia Water, Land & Air Protection, 1259 Dalhousie Drive, Kamloops, BC
SHAWN ESPINOSA, Nevada Department of Wildlife, 1100 Valley Road, Reno, NV
MATT BERGER, Colville Department of Wildlife, P.O. Box 150, Nespelem, WA

Translocation of grouse is a widely accepted tool for re-establishing populations in formerly occupied range and for augmenting existing populations. Despite the simplicity of the concept, there is more to a translocation than just moving birds. Translocations require extensive planning, multi-agency cooperation and coordination, and substantial manpower. To illustrate this complexity, we examined the intricacies of Columbian sharp-tailed grouse translocations in the western United States and British Columbia in Canada. Between 1991 and 2007, 1,298 sharp-tailed grouse were translocated from source populations in Idaho, Utah, British Columbia, and Washington to target areas in British Columbia, Washington, Oregon, Nevada, and Idaho. Considerable research and management was done prior to these translocations including a range-wide assessment of genetics, surveys of habitat and grouse at potential source populations and release locations, and habitat improvement at target locations. The actual movement of birds required considerable logistical coordination, usually among multiple agencies. These logistics were further complicated by the requirements for disease testing, transportation, and release of birds within 24 hours of capture. Despite these challenges, the respective agencies have been successful with the ‘mechanics’ of translocating birds. We believe these cooperative efforts are an excellent model for grouse management.

BREEDING AND NON-BREEDING SURVIVAL OF LESSER PRAIRIE-CHICKENS IN TEXAS

EDDIE K. LYONS, Department of Wildlife and Fisheries Sciences, Texas A&M University College Station, TX
NOVA J. SILVY, Department of Wildlife and Fisheries Sciences, Texas A&M University College Station, TX
BENJAMIN E. TOOLE, Department of Wildlife and Fisheries Sciences, Texas A&M University College Station, TX
RYAN S. JONES, Department of Wildlife and Fisheries Sciences, Texas A&M University College Station, TX

Lesser prairie-chickens (*Tympanuchus pallidicinctus*; LPC) have shown continued declines in the Texas Panhandle because of overgrazing, and loss or fragmentation of habitat from conversion of native prairie to agricultural cropland. We used radio-marked LPCs to determine whether differences in survival existed between LPC populations existing in 2 different vegetation types (sand sagebrush [*Artemisia filifolia*] versus sand shinnery oak [*Quercus havardii*]) in the Texas Panhandle from 2001–2005. We used a model-selection approach to test hypotheses explaining generalities in LPC survival. Our results indicated survival varied between breeding and nonbreeding periods and between habitat types. Annual survival for the sand-sage habitat was about 52%, and annual survival for the sand shinnery habitat was about 31%. Our results suggest that differences in LPC demography within sand sagebrush and sand shinnery vegetation types throughout the Texas Panhandle should be evaluated, especially during the breeding season.

HABITAT SELECTION OF NESTING AND BROOD-REARING GREATER PRAIRIE-CHICKENS IN SOUTHEAST NEBRASKA

TY MATTHEWS, School of Natural Resources, University of Nebraska-Lincoln, Lincoln, NE

Greater prairie-chickens (*Tympanuchus cupido pinnatus*) depend on large blocks of grassland for much of their life cycle. Native grasslands are continually being destroyed and fragmented as agricultural development intensifies. Because of this, greater prairie-chicken populations have declined over much of their remaining range, including in southeast Nebraska. Beginning in the early 1990's, southeast Nebraska saw an increase in the prairie-chicken population as more cropland was converted to CRP fields. In 2002 the Nebraska Game and Parks Commission initialized a limited hunt in this area. Although numbers seem to be stable, the juvenile to adult ratio is unusually low, .71. This study is designed to asses whether the grassland created by CRP provides adequate nesting and brood-rearing cover for greater prairie-chickens. We will also explore if highly diverse, native grassland is needed by hens and their brood or if old monoculture CRP is adequate. We trapped and radio-collared 20 hens in 2006, 38 hens in 2007, and expect to catch 50 in 2008. Results from this study so far suggest hens selected ($n=51$, $P<.03$) cool season CRP fields for nesting cover. Hens also selected nest sites containing cool season grasses with lower diversity and lower vegetative density than surrounding sites. Only 1 brood survived 3 weeks post hatch out of 13 found nests in 2006 and 2 broods in 38 initialized nests in 2007.

REPRODUCTIVE SUCCESS AND HABITAT USE OF SHARP-TAILED GROUSE ON THE LITTLE MISSOURI NATIONAL GRASSLANDS, NORTH DAKOTA

RYAN M. WILLIAMSON, Department of Wildlife and Fisheries, South Dakota State University, Brookings, SD
KENT C. JENSEN, Department of Wildlife and Fisheries, South Dakota State University, Brookings, SD

Brood-rearing habitat quality and quantity is considered to be one of the most important factors influencing brood survival and grouse populations. Alteration and loss of ideal residual nesting and brood-rearing habitats for sharp-tailed grouse (*Tympanuchus phasianellus*) can have detrimental effects on populations in areas where these conditions are heavily modified by human induced factors such as cattle grazing and cropland conversions. A two-year study was initiated to determine the nest success, survival, and habitat use of Plains Sharp-tailed Grouse (*T. p. jamesi*) on the Little Missouri National Grasslands in North Dakota. Ninety hens were radio-collared to determine these objectives. Habitat use was determined by comparing vegetative characteristics using Robel (1970) and Daubenmire (1956) methods, and species composition at nest sites, brood-rearing sites, randomly generated sites. Overall nest success for the two years was estimated at 46% (n=46) and 51% (n=54) for 2006 and 2007, respectively (Program MARK, White and Burnham 1999). Hen survival was estimated at 72% (n=45) and 44% (n=45) with an estimated brood survival of 28% (n=19) and 2% (n=24), for 2006 and 2007, respectively (Pollack et al. 1989). Visual obstruction readings taken at nest sites (n=30), brood-rearing sites (n=44), and random sites (n=82) in 2007 was significantly taller than those nest sites (n=31, p=0.067), brood-rearing sites (n=45, p=0.007), and random sites (n=81, p=0.029) averaged in 2006. Total ground cover for nest sites, brood-rearing sites, and random sites were found to be also significantly greater in 2007 than in 2006 for nest sites ($p<0.00001$), brood-rearing sites (p=0.005), and random sites (p=0.0007). Seventeen species including bare ground, ≥ 1% total cover, made up over 85% of the habitat sampled in 2006. In 2007, 16 species including bare ground, ≥ 1% total cover, made up 89% of the habitat sampled.

NESTING AND BROOD-REARING HABITAT SELECTION BY RADIO-MARKED SHARP-TAILED GROUSE (*TYMPANUCHUS PHASIANELLUS*) IN NORTHEASTERN BRITISH COLUMBIA, CANADA

ALICIA D. GODDARD, SS#2 SITE 12 COMP 228, FORT ST. JOHN, BC

To avoid detection by predators, sharp-tailed grouse (*Tympanuchus phasianellus*) rely on habitats that provide high-quality cover characteristics during the breeding season. For management purposes, therefore, it is important to identify the patterns of habitat selection choices made by female sharp-tailed grouse during the breeding season. I examined the selection of nesting and brood-rearing habitats at 3 spatial scales (landscape, patch, and site) using conditional logistic regression models and an information-theoretic approach. At the landscape scale, nesting females selected for non-forest cover-types between 550-700 m in elevation. At the patch and site scales, nesting females showed selection for shrub-steppe habitats during first nest attempts, as well as selection for sites with high shrub and grass cover, taller vegetation, and more residual vegetation compared to random sites. Brood-rearing females selected for agricultural habitats during the early brood-rearing period (0-14 days of age), but did not show selection of any habitat type or site attribute during the late brood-rearing period (15-49 days of age). The selection of shrub-steppe habitats, high shrub and grass cover, and taller vegetation at the nest site suggest the importance of managing habitats that provide high-concealment values, not only at the nest site, but in habitats at all spatial extents.

NORTH DAKOTA SHARP-TAILED GROUSE POPULATION DATA: ANOTHER LOOK

JERRY D. KOBRIGER, North Dakota Game and Fish Department, 225 30th Avenue SW, Dickinson, ND

Long-term population data sets exist for sharp-tailed grouse in North Dakota. These consist of brood data (44 years), age and sex ratio data from fall harvest (58 years), harvest data (37 years) and spring census data (44 years). These data were examined to determine relationship between summer brood data and fall age ratio; brood data and age ratio to the following spring census; and relationship of sex ratio to season opening date.

BREEDING ECOLOGY OF FEMALE GREATER PRAIRIE-CHICKENS IN UNFRAGMENTED GRASSLANDS

JACQUELINE K. NOOKER, Division of Biology, Kansas State University, Manhattan, KS
BRETT K. SANDERCOCK, Division of Biology, Kansas State University, Manhattan, KS

Populations of greater prairie-chickens (Tympanuchus cupido) have been declining in Kansas for at least 30 years due to the destruction and fragmentation of their tallgrass prairie habitat. Management of this species is hindered by a lack of contemporary demographic data analyzed with modern statistics. In this study, we examined nesting success and female movements to provide baseline demographic information for a population in natural, unfragmented prairie. Four leks were monitored for four years (2003-2006) in northeast Kansas. We fitted 43 females with radio-transmitters to locate nests and to monitor survival. Potential reproductive output was high because females laid large clutches (10.9 ± 1.7 eggs, n = 24), renested following clutch loss (22.2%, n = 27 females), and had high egg viability (88.6 ± 13.3 % of eggs hatched; n = 7 nests). However, daily survival rate of nests was low (0.928, n = 34 nests) resulting in a predicted nest success rate of 7.4% for a 35-day exposure period. By applying known fate models to our telemetry data of 40 female prairie-chickens, we estimated a weekly survival rate of 0.970 resulting in a predicted survival rate of 45.7% for the 6-month breeding season. Using Cormack-Jolly-Seber models for live encounter data, annual apparent female survival was 0.277 ± 0.081 (± SE) for 55 marked females after initial capture, and 0.424 ± 0.139 among females that returned at least once in a time-since-marking model. Comparison of seasonal and annual survival of females indicates that survival is 1.6 to 2.0 times higher during the nonbreeding season than the breeding season, presumably because females are susceptible to predation during incubation. Nest survival and breeding season survival was unexpectedly low in greater prairie-chickens in natural habitats and may be the primary demographic factors limiting population viability. Rangeland practices that increase residual nesting cover or reduce predator impacts may be beneficial.

GENETIC ASSESSMENT OF SOUTHERN ALBERTA PLAINS SHARP-TAILED GROUSE

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JOEL NICHOLSON, Alberta Fish and Wildlife, Southeast Region, Medicine Hat Office, Medicine Hat, AB
CYNTHIA A. PASZKOWSKI, Department of Biological Sciences, University of Alberta, Edmonton, AB
DAVID W. COLTMAN, Department of Biological Sciences, University of Alberta, Edmonton, AB

Plains Sharp-tailed Grouse (*Tympanuchus phasianellus jamesi*) originally occupied 21 U.S. states and 8 provinces, but have been extirpated from 8 states. Populations have been greatly reduced due to habitat loss and conversion of native land to agriculture, especially in the eastern and southern portions of their range. In southern Alberta the habitat is primarily native grassland interspersed with varying sized patches of agriculture with no natural barriers fragmenting the landscape. Little is known about Sharp-tailed Grouse in this region, as lek counts have been sporadic and no research has been conducted on the species that far south in Alberta. Fragmentation by agriculture is thought to be the primary conservation concern for Sharp-tailed Grouse in the region, with much of the habitat being converted in the last 100 years. To investigate the population structure, genetic diversity, and fragmentation of Alberta Sharp-tailed Grouse, molted feathers were collected from 66 Alberta and 3 Saskatchewan leks from 1999 to 2007. We ran 1136 samples at 13 microsatellite loci and sequenced a subset of those at the variable part of the mitochondrial control region. Preliminary results on a subset of leks show that Sharp-tailed Grouse have high genetic diversity. Genetic differentiation data shows that birds in Alberta and Grasslands National Park (Saskatchewan) are significantly differentiated from each other suggesting that they belong to separate populations. However, some leks within Alberta are also significantly differentiated from each other indicating that some leks may be becoming isolated.

GENETIC INSIGHTS INTO LEKKING BEHAVIOR: IMPLICATIONS FOR MANAGEMENT OF GREATER PRAIRIE-CHICKENS IN KANSAS

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JACQUELINE NOOKER, Division of Biology, Kansas State University, Manhattan KS
BRETT K. SANDERCOCK, Division of Biology, Kansas State University, Manhattan KS
SAMANTHA WISELY, Division of Biology, Kansas State University, Manhattan KS

Many lek mating systems exhibit high skew in male reproductive success. To explain participation in lekking behavior of non successful males, the kinship hypothesis (leks are aggregates of related individuals) is often invoked. Both kin selection and high skew in reproductive success can lead to lowered effective population sizes and reduced allelic diversity. Low allelic diversity leading to inbreeding depressions has been demonstrated in several grouse species. In Greater Prairie-chickens, from Illinois, loss of allelic diversity has lead to reductions in egg viability and lowered hatch rates. In this study we investigate the genetic processes underlying Greater Prairie-chicken lek breeding behavior, to better understand the evolutionary consequences to population structure and viability. Greater Prairie-chickens (n=169) were captured, measured, marked, released, and observed on leks throughout central Kansas from 2003-2006. Observations of chicken behavior (quantification of display behaviors and aggressive interactions taken in five minute focal bouts), morphometric measures of: wing length, comb and pinnae length, and weight, along with number of successful copulations on leks were recorded and paired with genetic data from 12 microsatellite markers. If Greater Prairie-chicken leks are aggregates of related males (kinship hypothesis), then we would expect inter male relatedness on leks to be significantly greater than zero. Our results indicate that leks are comprised of males less related than would be expected by chance alone ($P < 0.01$, $R = -0.136$, average inter male relatedness within leks), suggesting that male dispersal among leks is occurring. Additionally, both individual male heterozygosity and aggressive behavior displays were predictors of female mate choice; which indicates that vigorous breeding behavior may be a true advertisement of heterozygote superiority. Consequently more genetically diverse males receive more copulations than less heterozygous males which maintains diversity in a breeding system that reduces effective population size. The net result is that Kansas greater prairie chickens currently show relatively high levels of genetic variation ($H_z = 0.69$, $H_E = 0.77$, and $A_R = 13.03$). Our estimates of within lek male relatedness do not support kinship hypothesis as an evolutionary mechanism of lek breeding in Greater Prairie-chickens. Our results suggest that maintenance of genetic diversity and male dispersal are important component of Greater Prairie-chicken breeding biology, and maintenance of this diversity if dependant on both female and male dispersal. Natural resource management should focus on establishing corridors of suitable habitat between potentially isolated groups to allow migration and maintain diversity.

Genetic Tests Reveals Introgression of Plains Sharp-tailed into the Northern Montana Sage-Grouse Population

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CYNTHIA A. PASZKOWSKI, Department of Biological Sciences, University of Alberta, Edmonton, AB
DAVID W. COLTMAN, Department of Biological Sciences, University of Alberta, Edmonton, AB

Greater Sage-Grouse (*Centrocercus urophasianus*) and Plains Sharp-tailed Grouse (*Tympanuchus phasianellus jamesi*) distributions overlap across the entire range of Sage-Grouse in Canada. Sage-Grouse have declined by 66%-92% over the last 30 years and are endangered in Canada. Hybridization between the two species has been detected frequently in Alberta and Saskatchewan, likely because low population numbers are causing Sage-Grouse to find alternative mates. Six Alberta male hybrids and 4 to 6 Saskatchewan male hybrids have been observed since the 1970's. Behavioral observations have documented the occurrence of one Saskatchewan "hybrid" lek and two in Alberta with one to several male Sage-Grouse displaying on Sharp-tail leks. Additionally, multiple Sharp-tailed feathers have been found on Sage-Grouse leks indicating the two species are regularly interacting. We used microsatellites to genetically determine potential hybrids in the Sage-Grouse population (all known hybrids display and flock with Sage-Grouse) and mitochondrial DNA (inherited from the mother) to determine the maternal species of the seven sampled hybrids. Our findings show that hybrids possess a mixture of Sage-Grouse and Sharp-tail microsatellite alleles, indicating that hybrids may be detectable in the population without visual observations. Nineteen Sage-Grouse were discovered to be back-crossed hybrids and 31 additional birds possess unique alleles that may be either low frequency Sage-Grouse alleles or Sharp-tailed Grouse alleles. A previous study has also shown that the mothers of two Alberta hybrids were Sage-Grouse, which is consistent with our findings that a radio-collared Alberta female mated with both a Sage-Grouse and a Sharp-tailed, as determined by genetic analysis on her predated nest. Due to the high incidence of hybridization in Canada, it appears as though this may be an indicator of a stressed population, and may be a significant threat for Sage-Grouse conservation.

POPULATION VIABILITY ANALYSIS OF LESSER PRAIRIE-CHICKENS IN TEXAS

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NOVA J. SILVY, Department of Wildlife and Fisheries Sciences, Texas A&M University College Station, TX
BENJAMIN E. TOOLE, Department of Wildlife and Fisheries Sciences, Texas A&M University College Station, TX
RYAN S. JONES, Department of Wildlife and Fisheries Sciences, Texas A&M University College Station, TX

We evaluated the status of lesser prairie-chickens (*Tympanuchus pallidicinctus*; LPC) in Texas using a stage structured model. Current status and effects of harvest were evaluated using data obtained from radio telemetry, published and unpublished studies of LPCs in Texas. Model simulations predicted a terminal extinction risk of 1.0 and a median time to extinction of 9.5 years without recovery strategies. Population trajectories suggest the LPC populations in Texas will likely go extinct within 10–20 years, and the populations will go extinct in the southwestern shinnery oak (*Quercus havardii*) vegetation type more quickly compared to the northeastern sand sage (*Artemisia filifolia*) vegetation type (4.1 years compared to 14.8 years, respectively). .Assuming no hunting of LPC populations, all measures of population viability improved. Sensitivity analyses indicated that model output was most sensitive to changes in adult and juvenile survival. Conservation and recovery strategies for LPC populations should address variables that increase survival (e.g., habitat management practices such as improved quality and quantity of habitats).

NESTING SUCCESS AND HABITATS OF GREATER SAGE-GROUSE AT THE EASTERN FRINGE OF THEIR RANGE

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KENT C. JENSEN, Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings, SD
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Greater sage-grouse (*Centrocercus urophasianus*) populations have declined range-wide at an overall rate of 2% per year from 1965 to 2003. Reasons for the decline are numerous, but are mainly attributed to human-induced factors (i.e., sagebrush degradation and removal, poor range management practices, oil and gas exploration, and urban expansion). Sage-grouse occupy habitats at the eastern fringe of their range in western South Dakota and recent research has suggested that sagebrush obligates may not utilize habitats as predictable as core areas (e.g. central Wyoming). Currently, no reproductive data exists for sage-grouse in South Dakota. A 2-year study was conducted to investigate reproductive ecology and habitat selection of sage-grouse in northwestern South Dakota. Female sage-grouse were captured and radiocollared (n=40) on traditional display grounds. Radiocollared hens were tracked to determine reproductive effort, nest success, and associated habitats. Reproductive effort was 90% (35/39), with overall nest success of 38% (n=39, Program MARK); adults (≥2 years) were more successful (42%) than yearlings (34%). Successful nests averaged 1.49 km from nearest active lek, while unsuccessful nests averaged 2.93 km. However, 83% (30/41) of nests were within the 5 km management buffer of active leks, established from current sage-grouse management guidelines. Hens selected habitats that provided more shrub canopy cover ($P \leq 0.000$) and overall visual obstruction ($P=0.048$) compared to random sites. Models developed in Program MARK indicated both higher shrub densities and overall visual obstruction increased nest success (AIC_c weight = 0.907). Future management of sage-grouse on the eastern edge of their range should focus on increasing levels of sagebrush density, canopy cover and grass understory.

PRELIMINARY RESULTS FROM THE MONITORING OF A TEBUTHIURON TREATMENT TO ENHANCE LESSER PRAIRIE CHICKEN HABITAT AND INCREASE LIVESTOCK PRODUCTION IN SOUTHEASTERN ROOSEVELT COUNTY, NEW MEXICO

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During September, 2000, pre-treatment vegetative surveys were conducted in Southeastern New Mexico on both the Weaver Ranch (treatment area) and the adjacent North Bluit Prairie Chicken Area (control area) owned by the New Mexico Department of Game and Fish to determine if differences existed in the vegetative composition of the two land parcels. No significant differences were observed. During October, 2000, tebuthiuron was applied to approximately 1600 ha of the Weaver Ranch at the rate of .65 kg/ha (0.6 of the labeled rate) to suppress shinnery oak (*Quercus harvardii*) and restore grasses to their former dominance. No tebuthiuron was applied to the dune areas that were historically dominated by dense shinnery oak mottes. Following the treatment there was a reduction in shrub occurrence, with much of the reduction observed in shinnery oak, and a corresponding increase in grass occurrence. The increase in grass occurrence was a result of the expansion of grasses present before the treatment, not planted grasses or seed that sprouted post treatment. Initially forb occurrence was similar on treated and non-treated areas but by the spring of 2003 the density of forbs was greater on treated areas. The resultant landscape is a mosaic of grasslands and shinnery oak, similar to that described by early settlers. Following treatment, the treated area produced more forage, grass seed and forbs than did the control area and forage quality was similar on both areas. Lesser Prairie Chickens have been observed on all treatments during all seasons. During the 2006 breeding season, a dry spring, little evidence of recruitment was observed while to this point the 2007 breeding season, a wet spring, appears more successful. No clear trend has been observed as a result of invertebrate sampling.

INFLUENCE OF CONSERVATION RESERVE PROGRAM (CRP) LANDS AND LANDSCAPE ATTRIBUTES ON THE DISTRIBUTION AND ABUNDANCE OF PRAIRIE GROUSE

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Changes in distribution and abundance of prairie grouse have been linked to landscape-level habitat changes throughout their range. Sod busting has altered much of the landscape in the upper Midwest by converting large tracts of native prairie to cropland. The Conservation Reserve Program (CRP) of the Federal Food Security Act of 1985 converted millions of cropland acres back to perennial grassland. These large-scale land use changes have undoubtedly impacted prairie grouse abundance and distribution. We investigated how prairie grouse distribution and abundance were related to landscape-level land use at multiple scales in northeastern South Dakota. We searched township sized sites for leks in three different counties (Day, McPherson, and Hyde). Land use in the study areas were dominate by native rangeland in Hyde (68%) and McPherson (46%) Counties and by cropland in Day (46%) County. Lands enrolled in the CRP were also abundant in Day (24%) and McPherson (15%) Counties, but scarce in Hyde (<1%) County. Fourteen leks were located in the Hyde County site, four were located in the Day County site, and 10 in the McPherson County site. Both sharp-tailed grouse and greater prairie-chicken leks were present in Hyde County while only sharp-tailed grouse were present at the other two sites. We generalized and digitized the entire landscape in the study sites and within a 3km buffer around the study sites into 12 land use categories using a vector-based GIS. We analyzed the land use surrounding lek sites at seven different buffer widths (400, 800, 1200, 1600, 2000, 2400, and 3000m) because birds may relate to the landscape differently at different scales. We identified land use factors that influence male lek attendance and lek location at multiple scales.

A LANDSCAPE SUITABILITY MODEL FOR GREATER PRAIRIE-CHICKENS IN NORTHWEST MINNESOTA

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A landscape suitability model was developed for the purpose of indicating areas in the Minnesota-Iowa portion of the prairie pothole region that should be favorable for supporting prairie-chicken booming grounds. Logistic regression was used to compare landscape characteristics between random locations and booming grounds, and AIC was used to guide model selection. Booming ground counts were provided by the Minnesota Prairie Chicken Society and the Minnesota DNR. Counts from 1996-2004 were used to be contemporaneous with the land cover data (LANDSAT TM classified images from 2000-2001). Only grounds with at least 2 males were included in the analysis (*n*=624). Random locations (*n*=715) that had no record of prairie chicken booming grounds were selected from within counties suggested by the current prairie chicken range. As expected, the final model was heavily weighted toward the presence of grass and the absence of trees. The resulting map clearly depicts the current stronghold along the Agassiz Beach Ridge, and also suggests areas with the greatest management potential to connect disparate populations and search for new booming grounds. Simulation models based on conversion of land currently enrolled in CRP to cropland show the dependence of prairie chickens on this farm program, and the potentially devastating impact of losing these grassland acres.

OBSERVATIONS OF PRAIRIE GROUSE AND WIND GENERATORS IN NEBRASKA AND NORTHWESTERN MINNESOTA – AN UPDATE

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This paper presents population information on greater prairie chickens near a small three wind generator complex in northwestern Minnesota 1997-2007 and on prairie grouse distribution near a larger 36 generator complex near Ainsworth in the Nebraska Sandhills. From 1997-2007, the prairie chicken population in northwestern Minnesota has increased and numbers around this small complex has paralleled these trends. In April 2005 there were two active booming grounds within 0.75 mi of the three generator complex totaling 38 cocks and this past April, 2007 there were five booming grounds totaling 62 cocks. Nest distribution and movements of a small sample of radio-marked birds within the vicinity of the three generator complex will be discussed. Results indicate that prairie chickens are not avoiding the small, isolated three tower wind generator complex in Minnesota. The larger 36 tower complex in Nebraska has been surveyed for display grounds in 2006 and 2007. There were 6 dancing grounds and 7 booming grounds located within the 25 mi^2 area associated with the larger complex in Nebraska. The number of prairie chicken numbers increased and sharptail numbers decreased during the 2 year period. Other bird species were also identified while surveying. Under the proper conditions effects of wind generators on prairie grouse can be minimized through the proper placement of the towers.

EFFECTS OF WIND POWER DEVELOPMENT ON THE DEMOGRAPHY GREATER PRAIRIE-CHICKENS: PRE-CONSTRUCTION VITAL RATES FROM THE FLINT HILLS

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The Greater Prairie-Chicken (*Tympanuchus cupido*) is an obligate grassland bird and indicator species for unfragmented grasslands in the tallgrass prairie ecosystem. They are a species of conservation concern because their numbers have been declining annually since 1980. The core of the remaining breeding range of Greater Prairie-Chickens is in the Flint Hills of Kansas; where wind power development is scheduled to occur. Recent research has suggested that population reduction and loss of genetic diversity facilitates decreases in reproductive potential. In addition, anthropogenic features are known to have deleterious effects on prairie grouse demography. A better understanding of the impacts of wind power development on Greater Prairie-Chickens is essential because federal listing of this species under the Endangered Species Act would have enormous impacts on future wind development. We hypothesize that development may impact population viability by affecting lek attendance, mating behavior, habitat use, and demography. Our study utilizes a Before/After-Control Impact (BACI) design with three replicates of paired study sites to assess the potential impact of wind power development on prairie-chicken demography. Impact sites where wind resource development will occur were paired with reference sites without development and demographic data were collected at each site. Impact and reference sites are being monitored simultaneously during three phases of wind power development: pre-development, construction and operation. We will present preliminary demographic findings from areas prior to wind power development. Approximately 150 hens (50/matched pair site) were captured at leks and fitted with radio transmitters during 11 March – 30 May 2007 to estimate and compare fecundity and survival via standard demographic analyses. These data represent baseline vital rate estimates of greater prairie-chicken populations in the Flint Hills of Kansas and will be used to evaluate the effects of wind power development on population viability.

GREATER PRAIRIE-CHICKEN RECOVERY IN MISSOURI

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In July, 2005 Missouri Department of Conservation (MDC) Administration tasked an eight-member team with updating recovery recommendations for the State Endangered Greater Prairie-Chicken. Recovery recommendations were approved in August, 2006. To date, more than $2.5 million from federal, state and private sources have been secured for habitat improvement on public and private lands, land acquisition, monitoring and outreach activities. Restoring native tallgrass prairie and increasing suitable habitat on working lands within highly fragmented landscapes remains the focus of recovery efforts. Missouri's Grasslands Coalition works to forge partnerships among federal and state agencies, non-governmental partners, corporations, communities and individuals aimed at increasing landowner participation and community support for long-term recovery efforts within six prairie-chicken recovery geographies. However, these six landscapes are profoundly isolated, and a flexible, responsive approach to local resource issues and social concerns has proven essential. Landowner survey results are informing collaborative work with agricultural economists intended to identify incentive program and market-based approaches that address the economic constraints and lifestyle objectives of landowners within recovery geographies. Emphasis is also given to creating demand for experienced habitat contractors, educating volunteers to implement habitat and monitoring projects and impacting state-level rules for implementation of USDA and other federal programs.

THE TALE OF TWO STATES GREATER PRAIRIE CHICKEN MANAGEMENT IN WISCONSIN AND MINNESOTA

JOHN E. TOEPFER, Society Tympanuchus Cupido Pinnnatus, Plover, WI .

Fifty years ago Hamerstrom, Mattson and Hamerstrom in A Guide to Prairie Chicken Management proposed the concept of ecological patterning or a scatter pattern of permanent grassland reserves to save the prairie chicken in Wisconsin. The concept of ecological patterning (EP) is commonly used in natural resource management yet few resource managers have embraced the concept or are aware of it yet we use it on a regular basis. It is the practical application of Leopold's land ethic. In the future the answer to successful wildlife habitat management and especially prairie grouse management lies in the Hamerstrom's and Mattson's concept of ecological patterning (EP) or a scatter pattern of essential/critical habitats, that is sage brush for sage grouse, forest land for turkeys and wetlands and grasslands for waterfowl scattered through an open agricultural landscape. This is simply because people along with wildlife have to live on the same land and most landscape will have to provide food, water, cover and/or energy for both. This will be an inescapable paradox "as complete competitors cannot coexist". Establishing larger contiguous blocks of wildlife habitat especially the permanent grasslands necessary to sustain viable prairie chicken populations will not occur often if at all. This presentation discusses the general greater prairie chicken management approaches used by two states since the early 1970's - Minnesota where the range has expanded and numbers increased at least seven fold; and Wisconsin where the subpopulations have become isolated and the range contracted by half.

AN UPDATE ON THE TRANSLOCATION OF GREATER-PRAIRIE CHICKENS FROM MINNESOTA INTO WISCONSIN

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Wisconsin's greater-prairie chicken (*Tympanuchus cupido pinnatus*) population experienced a population bottleneck in the 1950's, ultimately resulting in decreased genetic variation in contemporary populations (Bellinger et al. 2003). Currently, the greater prairie chicken is listed as a state threatened species and exists as a relatively small statewide population (<1500) separated into 4 nearly isolated populations due to habitat loss and fragmentation. Although the hatching success for the Wisconsin population has remained high (89-91%) (Bouzat et al., Bowling Green State University, unpublished report) despite loss of genetic variability, proactive management needs to be conducted in order to pre-empt any further population and genetic reduction amongst the Wisconsin population. The consensus opinion of a conservation genetics advisory committee assembled in 2005 by the Wisconsin Department of Natural Resources (WDNR) was that interstate translocations should occur as soon as feasible to ensure the long-term survival of greater-prairie chickens in Wisconsin (Bouzat et al., Bowling Green State University, unpublished report). In addressing this concern, translocations of greater-prairie chicken hens from Minnesota into Wisconsin began in September, 2006 with 40 adult females from Minnesota being released into the existing Wisconsin population. Additional translocations will occur in 2007 and 2008. Concurrent research through the University of Wisconsin-Milwaukee is analyzing the genetic dispersal associated with the translocation. We have been radio-monitoring the Minnesota females along with a control group of resident Wisconsin females since January 2007. The objective of this study is to evaluate the success of the translocation by measuring survival rates, nesting success, hatching success, and brood survival rates between translocated hens and resident hens. We will report results from the 2007 breeding season.

RECENT STATUS AND CONSERVATION OF LESSER PRAIRIE CHICKENS IN KANSAS

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It has been previously noted to the Prairie Grouse Technical Council that lesser prairie-chickens (LPCH) have responded positively to the Conservation Reserve Program (CRP) in Kansas. The species has expanded it's range significantly in western Kansas, with over 200 new leks located, in response to the mixed-species, native, warm-season CRP grasslands. By developing solid partnerships with both the USDA Farm Service Agency (FSA) and the Natural Resources Conservation Service (NRCS), the Kansas Department of Wildlife and Parks (KDWP) has, in recent years, successfully built upon the positive responses of LPCH to existing USDA conservation programs. Kansas has been most successful in adding new CRP stands in the past 3 general signups (signups 26 in '03; 29 in '04; 33 in '06) with 647,700 new acres. Of that, 410,000 acres (63%) has gone into counties occupied by lesser prairie-chickens and 182,000 acres (28%) has been established in Kansas' 6-county Lesser Prairie-Chicken Conservation Priority Area. Virtually all of these new grasslands have been established as Conservation Practice 25 (CP25) or CP2 stands, both of which provide grass and forb mixtures that should be highly beneficial to LPCH. The KDWP has specifically developed recommended seeding mixtures, within Kansas NRCS specifications, designed to benefit prairie birds and these mixtures have been widely adopted. Interseeding of existing CRP warm-season stands (CP10) with forbs has been extensive across western Kansas. Although early results of these interseedings were variable and severe drought resulted in some outright failures, many of these interseedings eventually proved successful. Many forb interseedings took 4–6 years to develop. Existing warm-season stands successfully interseeded with alfalfa now provide what we believe to be excellent habitat structure and chick-food sources for LPCH. Interseeded alfalfa and some native forbs appear likely to persist indefinitely in Kansas' warm-season CRP stands. Efforts to demonstrate and evaluate CRP prescribed burning are also occurring. Tree invasion has been identified as one of the most significant threats to the health of LPCH habitats in parts of Kansas. State and federal partners have collectively launched a series of efforts to counter this threat. These efforts include cost sharing and technical assistance provided by (1) the US Fish and Wildlife Service Partners for Wildlife Program, (2) KDWP administration of the USDA Wildlife Habitat Incentives Program, (3) NRCS administration of the USDA Environmental Quality Incentives Program, and (4) the Kansas FSA's decision to require removal of invasive trees from CRP grasslands in order to maintain program eligibility. Other important conservation efforts in Kansas include the 51-mi^2 Wheatland Electric water-rights/grassland-restoration project, efforts to steer industrial wind-power projects away from occupied LPCH range, the Arkansas River Conservation Reserve Enhancement Project (CREP), and educational efforts including distribution of > 1,000 LPCH DVD's. The KDWP has added 5 new 20-mi^2 survey areas since 2000 (bringing the total to 15), better defined the Kansas range, and created an objective methodology for estimating Kansas' LPCH breeding populations. Kansas LPCH populations recovered from the rangewide decline of the 1990's, but severe drought in 2006 produced substantially lower breeding populations in 2007. Favorable nesting conditions will probably increase LPCH numbers in 2007.

STATUS OF NEW MEXICO LESSER PRAIRIE CHICKEN POPULATIONS

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In 2007, Lesser Prairie-Chickens (LPC) (*Tympanuchus pallidicinctus*) were surveyed audibly and visually along public roads and on State Game Commission-owned Prairie Chicken Areas (PCAs). This was the tenth year of roadside route survey efforts. Ninety-two leks were detected on 15 of 27 (56%) roadside routes surveyed. Trend analysis of the total number of leks detected have shown a statistically significant increase from1998– 2007 along these routes. Twenty-six Prairie Chicken Areas (PCAs) were also surveyed. Over the last 11 years, both the number of leks detected and number of LPC observed have steadily increased in these areas. One hundred sixty-four leks were detected on or near PCAs, and 757 LPC were observed on 89 of those leks. Average lek size was 8.51 birds/lek with an estimated minimum spring breeding population of approximately 6,300 birds. Although numbers of leks detected and numbers of LPC counted in the core population are down from 2006, the overall trend has increased over the past 10 years. The decrease from 2006 may be attributed to the very dry spring and summer that year which reduced reproductive effort and success. The comparatively wet spring and summer of 2007 may reverse that trend and populations could rebound and surpass those numbers seen in 2006.

ATTWATER'S PRAIRIE-CHICKEN RECOVERY – WHERE ARE WE?

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With fewer than 50 free-ranging Attwater's prairie-chickens (APC) (*Tympanuchus cupido attwateri*) in spring 2007 populations, this subspecies continues to teeter on the brink of extinction. While numbers in free-ranging populations remain disappointingly low, progress has been made in removing limiting factors. Cost share assistance has been provided to restore more than 27,000 hectares of prairie habitat. A captive breeding program, initiated in 1992, contained approximately 60 breeding hens in spring 2007. This breeding program produced 262 >6 week-old chicks in 2007. Approximately 150 of these chicks are scheduled for release in summer 2007 to supplement existing populations at the Texas City Prairie Preserve (TCPP) (Galveston County, Texas) and the Attwater Prairie Chicken National Wildlife Refuge (APCNWR) (Colorado County, Texas). Additionally, approximately 50 chicks will be released on private property in Goliad County, Texas in currently unoccupied habitat. This will represent the first release of captive-bred birds on private property. From 1995-2006, 1,005 captive-reared birds were released at TCPP and APCNWR. Kaplan-Meier annual survival estimates have averaged 21% (range 8-40%) for 1996-2006 releases, substantially higher than survival of other pen-reared galliforms reported in the literature. Studies indicated that movements, monthly ranges, and habitat use of released pen-reared APC were similar to wild birds. With the use of predator deterrent fences, 2001-2005 nest success averaged 61% compared to 32% reported in the literature for historic wild populations. Current impediments to recovery include poor brood survival of released pen-reared birds – near zero in the absence of intensive intervention, and insufficient production by the captive breeding program.

RESTORING GREATER PRAIRIE CHICKENS TO WEST CENTRAL MINNESOTA – PROGRESS REPORT

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S. C. VACEK, United States Fish and Wildlife Service, Morris, MN

Habitat loss and fragmentation are serious threats to prairie grouse throughout North America. As managers work toward re-connecting isolated greater prairie chicken (*Tympanuchus cupido pinnatus*) populations, a better understanding of the techniques to re-establish populations is needed. From 1999-2006, 574 wild greater prairie chickens were released at 15 different sites within a 2,757-km^2 (1,064 mi^2) project area. Overall, 16 booming grounds were established with 10 still active in 2007. Concern has been raised for this reestablished population because of the high density of ring-necked pheasants (*Phasianus colchicus*), which has increased from 132 pheasants per 100 miles in 1999 to a record high of 768 birds per 100 miles in 2006 in the core project area. The pheasant nest parasitism rate has ranged from 25-40% and was 33% in 2007. No prairie chicken renests have been parasitized. The proportion of hen prairie chickens that have fledged chicks has declined: 3 of 14 in 2004, 1 of 19 in 2005, and 0 of 11 in 2006. This observed lack of production was corroborated by trapping on booming grounds this past April when only 2 of 30 birds captured were immatures. Cock pheasants have often been seen on or near booming grounds but have yet to cause problems and in several instances the prairie chicken cocks chased them off. Similarly, we documented prairie chickens dominating pheasants when both were feeding in a common area this past winter.

* Dave Trauba will be presenting

HUMAN DIMENSIONS SURVEY OF PRIVATE LANDOWNERS WITHIN THE CENTRAL WISCONSIN GRASSLAND CONSERVATION AREA

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In central Wisconsin, current greater-prairie chicken (*Tympanuchus cupido pinnatus)* management practices (controlled burns, mowing, grazing, etc.) are conducted primarily on public lands within the boundaries of 4 separate and isolated management areas (Buena Vista Grasslands, Leola Grasslands, George W. Mead, and the Paul J. Olson Wildlife Area). Even though prairie chickens inhabit all four management areas, anthropomorphic actions such as row crop farming, tree planting, and development have nearly isolated the remaining populations into four sub-populations. This isolation has resulted in reduced genetic diversity in the overall prairie chicken population. In an attempt to address this problem, the Wisconsin All Bird Plan recommends grassland restorations of 200-500 acres in size be conducted between the previously mentioned state wildlife areas that currently harbor prairie chickens. These restorations would facilitate movement of prairie chickens between isolated populations resulting in increased genetic diversity in the overall population. Currently, interstate translocations are occurring to boost the genetic diversity of the Wisconsin prairie chicken population. The majority of lands between management areas, however, are held in private ownership. Therefore, we are conducting a human dimensions survey of private landowners to prioritize which parcels of land may be available for acquisition and to identify landowners who are interested in maintaining ownership of their land but would be willing to manage their property to support prairie chickens. The survey also will gauge attitudes and opinions toward prairie chickens and other grassland species as well as inform and educate private landowners on the economic and ecological benefits of creating habitat for greater prairie chickens and other grassland species on their property. Without expanding the prairie chicken range and increasing habitat connectivity through cooperating private landowners, thus increasing the population, there will be a need for continuous and costly interstate translocations to offset decreases in genetic variability.

USE OF BIRD DOGS IN PRAIRIE GROUSE RESEARCH: FIELD CASE STUDIES

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Fence collisions are a known contributing factor to several species of grouse including the lesser prairie chicken, however little information exists concerning risks to greater sage-grouse. Two separate study areas (north-western and south-central Utah) have had recent fence construction and subsequent sage-grouse collisions. A series of small (8.09 ha) pastures were constructed in 2003 unknowingly near a greater sage-grouse lek in south-central Utah. Collisions were monitored from 2003-2006, and in the fall of 2006 the section of fence nearest the lek was marked. The marked fence was again monitored during and post lekking activity spring 2007. Though fewer strikes occurred, it was not significant. This was likely due to inadequate marking. A newly constructed (2006) fence in north-western Utah was monitored from July 2006 to July 2007. Approximately 15 sage-grouse strikes were recorded during that time period. The fence has been recently marked, and will continue to be monitored. Bird dogs have proven to be useful in finding carcasses from fence collisions and are additionally being utilized in Oklahoma to validate this method of fence marking. In this case, sections of marked and unmarked fences are considered transect lines, and repeatedly sampled to detect carcasses and points of collisions. Additionally, bird dogs have been used in Utah for the past several years to monitor sage-grouse habitat treatments to determine sage-grouse brood use. The study areas contain a series of experimental sagebrush treatment plots ranging from 30-50 ha intended to improve sage-grouse habitat. Bird dog surveys were particularly valuable allowing researchers to classify individual birds by sex and age. Additionally, dogs were used to monitor chick survival of sage-grouse broods. In 2006 at the Columbian sharptailed and sage-grouse WAFWA meetings Walker et al. (2006) suggested an improved method of spotlighting, instead of walking flush counts, for more accurate estimates of sage-grouse chick survival. However, bird dogs were not included in their comparison of methods. In the summer of 2006 and 2007 we compared bird dog flush, walking flush, and spotlight count methods for sage-grouse brood monitoring. Our data suggests bird dog and spotlight methods superior to walking flush counts, and no difference between bird dog and spotlight count methods. Finally, bird dogs are commonly used throughout the Intermountain West to search for new leks of both sage-grouse and sharptailed grouse, particularly in areas of low density. In summary, we have found numerous applications of trained bird dogs in field research of prairie grouse. The use of dogs offers a low cost, time effective method of data collection that would be difficult to obtain otherwise. These methods could be applied to many prairie grouse research questions.

MITIGATING COLLISION RISKS FOR LESSER PRAIRIE-CHICKENS

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Collisions, primarily with stock fences, account for over 43% of the adult male Lesser Prairie-Chicken mortality and for over 57% of the adult female Lesser Prairie-Chicken mortality in Oklahoma. Since fall of 2004, we have been removing unnecessary fences within Lesser Prairie-Chicken range in northwestern Oklahoma and the northeast part of the Texas Panhandle, and have been developing methods of marking fences around gobbling grounds and other high use areas to increase visibility and reduce collisions. To date, we have removed over 30 km of fences and have marked nearly 100 km of fences. We will explain the methodology we developed, some preliminary findings, and further management implications. These marking techniques, along with an overall reduction in fences in grouse occupied areas, may benefit many other species as well, including Greater Sage-Grouse.

AN ADAPTIVE HARVEST MANAGEMENT EXERCISE FOR GREATER PRAIRIE-CHICKEN HARVEST IN SOUTHEAST NEBRASKA: USING HARVESTS AND SURVEYS TO GAIN INFORMATION ABOUT HARVEST MORTALITY

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Adaptive harvest management (AHM) can assist biologists with decisions made under uncertainties in system structure, stochastic environmental effects, and, and incomplete management control of harvest rates. However, we know of no applications of AHM at the state level. Here, we provide a theoretical exercise using AHM in the context of greater prairie-chicken harvests in Southeast Nebraska. At present, AHM is not formally used for prairie grouse harvest regulation decisions in Nebraska. Thus, our goals were to develop and evaluate an AHM framework for a state-specific harvest decision, and to use the AHM process to gain information with regards to the uncertainties associated with harvest mortality for greater prairie-chickens in Nebraska. Harvests of prairie-chickens in Southeast Nebraska began in 2000, using a limited permit system. We have conducted annual lek counts of males since 1997. Surveys have predicted increasing populations since harvest began, including after harvest regulations were liberalized in 2003. The development of our AHM framework began with setting the objectives of our harvest: (1) to have a population index of 1500 males on annual surveys, and (2) to maximize recreational opportunities associated with harvest of prairie chickens. We created a formal utility function to reward harvest outcomes that would meet objectives. Next, we developed a set of 4 potential regulation choices, from no harvest (most restrictive) to the elimination of the limited permit system (most liberal); we varied bag limits and number of permits for the two moderate regulation options. We used harvest results during 2000-2005 to predict harvest rates under each regulation scenario, which ranged from 0-12%. We then started our *a posteriori* exercise with lek survey data from 1999. We used the two competing harvest mortality models, additive and compensatory, to predict the survey index in 2000. We then compared the competing predictions with the actual survey results; we continued this exercise for each year. At the conclusion of the 2005 harvest season, the compensatory harvest mortality model had received 95% of available model weights, or confidence. Thus, our model predictions suggest that harvest mortality for prairie chickens in Nebraska may be compensatory. Our exercise shows that AHM can be effectively applied to harvest decisions on the state level. We encourage state biologists to consider using harvests to formally gain information that will enhance harvest management.

Notes

Notes

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 27th meeting is September 7, 2007) 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 of brief history of an 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.

The first recipient was Fran Hamerstrom, in 1991, and it has been since awarded at the biennial meetings of the Prairie Grouse Technical Council.

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 Recipe

Adapted from:

Hamerstrom, Frances. 1989. *Wild Foods Cookbook.* Iowa State University Press, Ames, Iowa.

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 well-done.

Roast:
Pluck dry, dress and clean. Do not stuff. Roast in a hot oven (450 degrees) 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 piece 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.

Recipients of the Hamerstrom Award

1991	Fran 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	

Past PGTC Conferences

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