Abstracts

19th Prairie Grouse
Technical Council Conference

September 25-27, 1991
Holiday Inn
Billings, Montana

PROCEEDINGS OF THE 19th CONFERENCE OF THE PRAIRIE GROUSE TECHNICAL COUNCIL

September 25-27 1991

Holiday Inn, Billings Montana

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SPONSORS

Montana Coal Board

Montana Department of State Lands

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Western Energy Company

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ACKNOWLEDGEMENTS

A meeting such as this requires the support and the help of many people, therefore, I would like to thank the following people.

Bill Pryor for starting the meeting with a great welcoming address, the speakers for providing interesting and informative presentations. John Toepfer for organizing the panel on "Translocations" and the panel members. I would like to thank each session chairman for their help, Bill Schwarzkoph, Tom Hinz, and Charlie Eustace.

Bill Berg and Dan Svedarsky provided raffle prizes along with Chuck Trinder of A and S Tribal Industries who provided numerous prizes and a secure metal file to house the PGTC files.

I would like to thank our sponsors, the Montana Coal Board, The Montana Department of Fish, Wildlife and Parks, The Montana Department of State Lands, The Bureau of Land Management and the meeting host, Western Energy Company. The person I need to thank most for his support is Bill Schwarzkoph, who's support made the meeting possible.

A sincere thanks to all of the above.

Bruce Waage
Western Energy Company,
Colstrip, Montana

Foreword

The National Prairie Grouse Technical Council has met every two years since its first meeting in Grand Island, Nebraska in 1957. The purpose has been to share research findings and ideas concerning the biology and conservation of Prairie Grouse. Meetings have been held in thirteen states over the years in order to see unique habitat and environmental concerns faced by individual states.

The Billings, Montana meeting was attended by 100 people from 20 states and Canadian provinces. Twenty-two papers were presented along with a special 8 member panel which discussed "translocations".

Following the banquet dinner we were entertained by Raphael Cristy, a well known storyteller, who took us back in time to the 1890's when Charlie Russell roamed the wild open plains of eastern Montana.

The Billings meeting was the first ever held in Montana. The focus of the Montana meeting was on sharp-tailed grouse, specifically what a coal mining company (Western Energy Company) has done to develop grouse habitat on reclaimed mine lands and what the results have been.

Western Energy Company became involved in grouse research when it realized future mine plans may come into conflict with existing sharp-tailed grouse dancing grounds and initiated studies to investigate these concerns as early as 1975.

The conference tour reviewed dancing ground mitigation efforts at Western Energy Company's Rosebud Mine with a discussion in the field of reclamation techniques and equipment used. During the tour several reclamation dancing grounds were pointed out and tour members walked some of the 4000 acres of native prairie reclamation.

Following the tour, dinner was served on the plains of Ingomar, Montana with "sheep herders hors d'oeuvres" and the best beans in the west. Lots of story telling and jawing took place. Sam Mattise entertained the group with a poem recital.

The following day was begun with a business meeting (found at the back of this publication) and the last of the paper presentations.

The meeting was enjoyed by all! Thanks to all who participated.

PROGRAM

Tuesday, September 24, 1991

6:00-9:00 pm "Covey-up" session, registration and cash bar at Holiday Inn, Billings (Atrium Terrace)

Wednesday, September 25, 1991

7:30-10:00am Coffee and registration at Big Horn Hallway-PROGRAM IN THE BIG HORN ROOM

8:00-8:15am **"Welcome to Montana"**- *Bill Pryor, Montana Department of Fish, Wildlife and Parks, Region 5 information officer*

Session No. 1
Chairman-Bill Schwarzkoph
Western Energy Company

8:15-8:40am (1) **"The Hixon Sharptail Preserve: A Long Journey"** -*Sam Mattise, Bureau of Land Management, Boise, Idaho*

8:40-9:05am (2) **"A National Strategic Plan for Upland Game Birds"**- *Terry Rich, Bureau of Land Management, Dickinson, North Dakota*

9:05-9:30am (3) **"Managing Livestock Grazing in Sharp-tailed Grouse Habitat on the Charles M. Russell National Wildife Refuge"**-*John R. Foster, Charles M. Russell National Wildlife Refuge, Lewistown, Montana*

9:30-10:00am (4) **"Monitoring Sharp-tailed Grouse Populations on CMR National Wildlife Refuge: A comparison of Techniques"** *Marc R. Matchett, Charles M Russell National Wildlife Refuge, Lewistown, Montana*

10:00-10:15am *Refreshment Break*

10:15-10:40am (5) **"Decline in Quality of Prairie-Chicken Eggs. Symptoms of Inbreeding Depression?"** -*Ronald L. Westemeier, Illinois Natural History Survey, Effingham, Illinois*

10:40-11:05am (6) **"Genetic Management of Illinois Prairie-Chickens"**- *Scott A. Simpson, Illinois Department of Conservation, Newton, Illinois*

11:05-11:35am (7) **"Sharp-tailed Grouse Habitat Use and Movements During Fall and Winter"**-*Charles M. Russell National Wildlife Refuge-Rick D. Northrup, Montana State University, Bozeman, Montana*

11:35-12:00pm (8) **"Columbian Sharp-tailed Grouse on the Tobacco Plains of Montana"** - *Marilyn Wood, Montana Department of Fish, Wildlife and Parks, Kalispell, Montana*

12:00-1:00pm Lunch - Poolside Terrace

Session 2
Chairman - Tom Hinz
Montana Department of Fish, Wildlife and Parks

1:00-1:25pm (9) **"Sexual Selection for Increased Male Courtship and Acoustic Signals and Against Large Male Size at Sharp-tailed Grouse Leks"** - *Michael Gratson, Department of Biology, University of Victoria, British Columbia*

1:25-2:25pm (10) Panel Discussion: John Toepfer - panel coordinator
Panel Topic: **"Translocations"** - *Discussion on number of birds amount of habitat, evaluation of procedures, handling procedures, interaction with other populations*
Panel: Bob Eng, Nova Silvy, Randy Rodgers, Ronald Westemeier, Clait Braun, Jeff Snyder and Larry Fredrickson

2:25-2:40pm Refreshment Break

2:40-3:40pm Continuation of panel topic - one hour discussion period

3:40-4:00pm **"Validating Caldwell's Method of Determining Age-Class in Sharp-tailed Grouse Based on the Ratio of Calamus Diameters of P9 and P8".**
Hans Landel, Department of Biological Sciences, Purdue University

4:00-4:25pm (12) **"Habitat Use and Survival of Greater Prairie-Chickens Relative to Grassland Structure and Landscape Patterns in Southwestern Missouri"** - *Gwyn McKee, University of Missouria- Columbia, Columbia, Missouri*

4:25-4:50pm (13) **"A Transmitter for Prairie-Chickens"** - *Larry Mechlin, Missouri Department of Conservation, Fish and Wildlife Center, Columbia, Missouri*

4:50-5:05pm (14) **"What the Heck is a Lek?"** - *John Toepfer, Fish and Wildlife Program, Little Hoope Community College, Fort Totten, North Dakota*

5:05-6:00pm Free time

6:00-7:00pm Social Hour

7:00pm Banquet Dinner and Program (Raphael Cristy)

Thursday, September 26, 1991

Field Tour
Tour Leaders - Western Energy Staff

8:00am Leave Billings via chartered bus to view nearly 4,000 acres of reclaimed native prairie - reclamation techniques, management and sharp-tailed grouse response will be discussed.

Noon Lunch - bag lunch provided, tour to continue

3:30pm Leave Western Energy Co. Mine for Ingomar, Montana and dinner at the Jersey Lilly

8:00pm Board bus for departure to Billings

Friday, September 27, 1991

8:00-10:00am Business Meeting

Session No. 3
Chairman - Charlie Eustace
Montana Department of Fish, Wildlife and Parks

10:00-10:25am (15) **"Reclamation of Northeastern Minnesota Minelands for Sharp-tailed Grouse"** - *Bill Berg, Forest Wildlife Populations and Research Group, Minnesota Department of Natural Resources, Grand Rapids, Minnesota*

10:25-10:40am Refreshment break

10:40-11:05am (16) **"An Action Plan for Attwater's Prairie-Chicken Recovery"** - *Stephen E. Labuda, Attwater Prairie-Chicken National Wilflife Refuge, Eagle Lake, Texas*

11:05-11:35am (17) **"Attwater's Prairie-Chicken and Private Lands Management"** - *Michael E. Morrow, Attwater Prairie-Chicken National Wildlife Refuge, Eagle Lake, Texas*

11:35-12:00am (17) **"Breeding Biology and Movements in a Montana Population of Sharp-tailed Grouse"** - *Hans Landel, Department of Biological Sciences, Purdue University, West Lafayette, Indiana*

12:00-1:15pm Lunch on your own

1:15-1:40pm (19) **"Lesser Prairie-Chicken Habitat Management on Public Lands in Southeastern New Mexico"** - *Dan Baggao, Bureau of Land Management, Roswell, New Mexico*

1:40-2:05pm (20) **"Prairie Chicken Management in Wisconsin:** - *Jim Kier, Wisconsin Department of Natural Resources*

2:05-2:30pm (21) **"Movements and Nest Site Selection by Lesser Prairie-Chicken Hens in Colorado"** - *Kenneth M. Giesen, Colordao Division of Wildlife, Fort Collins, Colorado*

2:30-2:55pm (22) **"Use of Summer Roadside Count Data to Estimate Fall Populations of Sharp-tailed Grouse"** - *Jerry Kobriger, North Dakota Game and Fish*

2:55-3:20pm (23) **"Vegetation Composition of Greater Prairie-Chicken Leks in the Central Flint Hills of Kansas"** - *Tom Eddy, Kansas State University, Emporia, Kansas*

1. **" The Hixon Sharp-tail Preserve: A Long Journey"** - *Sam Mattise, Bureau of Land Management, Boise, Idaho*

In the spring of 1977, the Cascade Area Manager, Boise District, B.L.M., discovered a sharptail dancing ground on the Stanley Nelson Ranch. At this time, this was the only active ground in western Idaho. All previously known dancing grounds had been vacant for ten years. A follow up investigation indicated that about 20 birds were using this ground.

This was the beginning of a long journey to protect, enhance and manage the habitat for this last remnant population of Columbian Sharptail grouse in western Idaho. Since the spring of 1977, more grounds have been found, the population is increasing and the Stanley Nelson Ranch, now called the Hixon Sharptail Preserve, has been set aside and is managed along with the BLM allotment for the preservation of this Idaho native bird species.

2. **"A National Strategic Plan for Upland Game Birds"** -
Terry Rich, Bureau of Land Management, Dickinson, North Dakota

Thirty-three species and subspecies of upland game birds occur across the 270 million acres of public land managed by the U.S. Bureau of Land Management. Under BLM's Fish and Wildlife 2000 initiative, the Upland Game Bird Strategic Plan provides future direction on a national level. The plan was coauthored by an unprecedented number of private organizations and state agencies. The current status of upland game bird populations, habitats and management was assessed through a 100% survey of BLM field biologists. Detailed inventory, monitoring, research, management, funding and staffing needs for specific geographic areas were also identified. Sage Grouse, Columbian Sharp-tailed Grouse and Lesser Prairie-chickens were identified as having serious problems and substantial potential to improve. Data on the status, needs and opportunities for Sage Grouse and prairie grouse will be discussed.

3. **"Managing Livestock Grazing in Sharp-tailed Grouse Habitat on the Charles M. Russell National Wildlife Refuge"** - *John R. Foster, Charles M. Russell National Wildlife Refuge, Lewistown, Montana*

The Charles M. Russell National Wildlife Refuge was established in 1936. The Refuge was set aside specifically for sharp-tailed grouse and antelope. Other "balanced" populations of wildlife were called for, as well as livestock grazing of forage available over and above the needs of wildlife. Originally named the Fort Peck Game Range, the refuge was jointly managed by the U.S. Fish and Wildlife Service (FWS) and the Bureau of Land Management. In 1976, Congress transferred jurisdiction soley to FWS. A major planning effort was undertaken which resulted in an Environmental Impact Statement and a Record of Decision which called for a 33% reduction in livestock grazing, the development of Habitat Management Plans for the 65 habitat units on the refuge, and development of a biological monitoring plan to determine if wildlife objectives are being met.

Phased-in grazing reductions have been completed. Efforts directed at improving and sustaining nesting cover and shrub habitat for sharp-tailed grouse and other wildlife are being undertaken. Habitat Management Plans are nearly completed. Implementation of the plans and biological monitoring efforts are beginning and the full impacts of changes are several years off.

4. **"Monitoring Sharp-tailed Grouse Populations on Charles M. Russell National Wildlife Refuge: A Comparion of Techniques"** - *Marc R. Matchett, Charles M. Russell National Wildlife Refuge, Lewistown, Montana*

Listening station surveys and dancing ground counts have been employed to monitor sharp-tailed grouse population changes on the 1.1 million acre Charles M. Russell National Wildlife Refuge. Count data did not indicate any substantial changes in grouse abundance over the last 15 years, however, refuge managers felt populations had varied dramatically in space and time. Count data was quite variable and changes of over 400% were not significantly different. Listening station data, reporting the presence or absence of displaying sharp-tails at over 300 stations, indicated significant changes in abundance and distribution over the last three years. Statistically significant differences of less than 10% change were noted over time and area with listening station data. More importantly, listening station data yielded estimates of habitat occupancy and distribution. The time and effort required to collect listening station data is small compared to collection of adequate count data given the many logistic hurdles involved. Listening station data provides the most practical method to monitor refuge sharp-tailed grouse populations.

5. **"Decline in Quality of Prairie-Chicken Eggs. Symptoms of Inbreeding Depression?"** - *Ronald L. Westemeier, Illinois Natural History Survey, Effingham, Illinois*

In contrast to the millions of birds throughout Illinois about 1860, there were an estimated 68 total prairie-chickens in spring 1991 based on a count of 34 cocks in three remnant populations. The two main populations are about 56 km apart and have probably been isolated for about 20 years. Illinois' data base on over 1100 prairie-chicken nests spans 29 consecutive years (1963-91). The declining fecundity shown by these nest data is a possible symptom of inbreeding depression, and may be expected in such isolated populations that have fallen below about 50 individuals. For the population in Jasper County, annual average clutch size ranged from 10.2 to 14.7 (mean = 11.8, N = 320) and showed a slight upward trend with time ($r = 0.47$; $P < 0.01$). Egg fertility, however, revealed a downward trend with time ($r = -0.56$; $P < 0.01$) and was not related to the increase in clutch size. Analysis of embryo mortality revealed two possible sources of bias relative to assessing the possibility of inbreeding. These included nests parasitized by pheasants and nests from which incubating hens were flushed by nest searchers, both of which showed higher rates ($P < 0.001$) of embryo loss than unparasitized nests or those that involved no hen flushes. Embryo mortality, independent of pheasant parasitism and our flushing of incubating prairie-

chickens, still showed a significant ($r = 0.49$; $P < 0.01$) upward trend with time. Such trends may represent the classic symptoms of inbreeding depression, but other factors including subtle interactions and possibly disease caused by pheasants; agricultural chemicals including zinc phosphide rodenticide; oil contamination; and aflatoxin may also supress egg quality. Thus, there may be too many factors impacting reproduction by prairie-chickens to provide a convincing argument for inbreeding depression.
Definitive tests of genetic diversity in Illinois prairie-chickens are needed.

6. **"Genetic Management of Illinois Prairie-Chickens "**- *Scott A. Simpson, Dave Cooper, Illinois Department of Conservation, Newton, Illinois and Ron Westemeier, Illinois Natural History Survey, Effingham, Illinois*

Illinois currently has three isolated remanent populations of greater prairie-chickens, with a total number of less than 75. The Jasper county population has shown significant declines in egg fertility and egg success (hatched eggs/total eggs) from 28 years (1963-1990) of nest data. These declines may be classic symptoms of inbreeding depression and can be expected in small isolated populations. Following a joint decision by the Illinois Department of Conservation, Illinois Natural History Survey, Illinois Nature Preserves Commission and Illinois Endangered Species Protection Board to address possible inbreeding depression in Illinois prairie-chickens, an effort was under-taken in 1990 and 1991 to exchange clutches of eggs under incubation in Jasper and Marion counties. The objective was to enhance genetic variance in both gene pools by mimicking natural dispersal. The 2 populations, about 25 km apart, are supported by a total of 858 ha of intensively managed sanctuaries. To find one or more prairie-chicken nests of reasonable synchronized incubation in each population, three teams (of four to six searchers each) searched 146 ha of sanctuary grasslands between 25 April and 31 May 1990 (86 person days) and 72 ha between 22 April and 16 May 1991 (72 person days). Estimates of the stages of incubation were made by submerging three eggs of each clutch in water (Westerkov 1950). Seven nests were located in 1990 while 8 were found in 1991. The exchange on 18 May 1990 was successful with 12 of 14 eggs from Marion county in the Jasper county nest hatching; two intact eggs contained embryos that had died at about six and 24 days of incubation. The Marion county nest, which contained 10 eggs from the Jasper nest hatched 8 eggs; one intact egg contained a dead, 10 day embryo and another intact egg showed no sign of fertility. The 1991 egg exchange was cancelled when the Marion county exchange nest was destroyed by a predator prior to the exchange. If some of the young from the egg exchange ultimately breed, increased heterozygosity in the two populations may be achieved.

7. **"Sharp-tailed Grouse Habitat Use and Movements During Fall and Winter"** *- Charles M. Russell National Wildlife Refuge - Rick D. Northrup, Montana State University, Bozeman, Montana.*

Sharp-tailed grouse habitat use and movements were studied during one autumn and two winter seasons on the Charles M. Russell National Wildlife Refuge near

Fort Peck in northeast Montana. Vegetation on the 9,196 ha study area, which bordered the north side of Fort Peck Reservoir, consisted of an Agropyron-Artemisia-Juniperus grassland association. No agricultural grain fields existed within 10 km of the study area.

A total of 254 relocations were made on 16 radio-tagged grouse and were categorized into 1 of 8 cover types. Average shrub canopy coverage and height were analyzed at 199 of the relocations. Food habits were studied from 25 fecal samples and snow tracking.
The juniper cover type was used almost exclusively during a winter of heavy snow cover and cold air temperatures. Mild weather conditions the following winter resembled an extension of autumn with above normal air temperatures and patchy or absent snow cover. In response, radioed grouse used all 8 cover types with the juniper type utilized during 54% of the relocations.
During autumn, grouse used the shoregrass cover type along Fort Peck Reservoir which appeared to be a natural substitute for feeding in cultivated cropland. After morning feeding, the birds moved to adjacent juniper cover for midday roosting. Evening locations included feeding sites (similar to morning) and late evening/ night roosts which commonly occurred in grass with low standing shrub cover. Results from a use versus availability test suggested the juniper and grass-shale cover types were used more than expected within combined grouse home ranges. Cover types lacking junipers were generally avoided except during feeding and night roosting. Junipers were used consistently in both shale and grass-shale types although their canopy covered less than 3% in either type.
Overall, morning use sites were typically grassy with less shrub cover compared to midday roost sites. Morning locations in the juniper type had significantly less shrub canopy coverage than random sites in the juniper type. Also, average shrub height at midday roosts was significantly taller than random sites in the juniper type.
Juniper fruit and buds probably comprised the bulk of food consumed during autumn and both winters. Composite seeds were also prevalent in fecal samples. Green forb leaves and skunkbush sumac (Rhus trilobata) buds may also have been important foods but were not easily identified because of their soft nature.
Seasonal home range sizes ranged from 93 to 577 ha (11 home ranges, 205 relocations, mean = 268 ha).

Conclusions and management recommendations from this study included:
1. Juniper was an important source of food and cover. Sharp-tail management on the Charles M. Russell National Wildlife Refuge should include maintaining and/ or enhancing shrub cover which provides protection and food especially during periods of harsh winter weather ; and 2. The proximity and variety of cover types allowed grouse to use preferred and/or needed habitats on a daily and seasonal basis without travelling great distances. Land management should strive to protect habitat interspersion and diversity.

8. **"Columbian Sharp-tailed Grouse on the Tobacco Plains of Montana"** - *Marilyn Wood, Montana Department of Fish, Wildlife and Parks, Kalispell, Montana, Lewis Young, Michael Cope and Bernie Hall*

The last decade saw a dramatic decline in Columbian Sharp-tailed grouse within Montana and the Intermountain region. Details of the efforts to recover this subspecies at the Nature Conservancy's Dancing Prairie Preserve will be presented.

9. **"Sexual Selection for Increased Male Courtship and Acoustic Signals and Against Large Male Size at Sharp-tailed Grouse Leks"** - *Michael Gratson, Department of Biology, University of Victoria, British Columbia*

In southwestern Manitoba, nearly 60% of the variance in the proportion of matings obtained by male sharp-tailed grouse at 4 leks was explained by variance in time each male spent Dancing, emitting the Cork note, and Clicking their rectrices while courting females. In addition, males closer to the lek center enjoyed higher mating success; however, this can be explained better by higher survival and higher mating success of some males rather than competition for central territories. Unexpectedly perhaps, females selected those males for mating that were smaller, based on weight, wing length, and tarsus length, than an average territory holder. Females were not directly selecting small males, however, rather it is proposed that because there was a negative relationship between Cork rate and male size, this selection against large male size occurred indirectly.

10. Panel Discussion: John Toepfer- panel coordinator Panel Topic: **"Translocations"** - *Discussion on number of birds, amount of habitat, evaluation of procedures, handling procedures and interaction with other populations*

Panel: Robert Eng, Nova Silvy, Randy Rodgers, Ronald Westemeier, Clait Braun, Jeff Snyder and Larry Fredrickson

The panel was convened to discuss past and recent efforts to re-establish prairie-chickens (Tympanuchus cupido pinnatus, T. c.attwateri) and sharp-tailed grouse (T. phasianellus). Five to ten minute presentations were given by the participants followed by a 45 minute question and discussion period. Major topics of discussion included: quantity and quality of habitat, pre-release evaluations of habitat, release methodology, timing of releases, egg substitution and replacement, number of birds, sex ratio, variation between species and subspecies, source of birds, handling, diseases, use of radio telemetry. The participants emphasized that the quantity and quality of habitat is the most important factor in determining the success of a translocation effort and recommended that future prairie grouse translocations be documented until we develop the knowledge necessary to consistently re-establish prairie grouse populations.

11. **"Validating Caldwell's Method of Determining Age-Class in Sharp-tailed Grouse Based on the Ratio of Calamus Diameters of P9 and P8"** - *Hans Landel, Department of Biological Sciences, Purdue University, West Lafayette, Indiana*

Caldwell (1980, J. Wildl. Manage. 44:202-204) presented a method for determining age-class (yearling or adult) in sharp-tailed grouse based on the ratio of calamus diameters of the 8th and 9th primaries.However, he did not detail the method. I describe the method as I used it for a Montana population of sharp-tailed grouse. Distributions of P9:P8 ratios were calculated for adults and yearlings (known-aged or classified on the basis of feather wear and shape) based on samples of the population. Several cut-offs were calculated, depending on the assumptions made concerning the distributions; they ranged from 0.918 to 0.933. Probabilities of misclassification ranged from 2-30%. The best cut-off was based on known-aged individuals. All cut-offs were similar to Caldwell's 0.92. Sexes did not differ. The method of using shape and wear of the tips of the primaries was estimated to be incorrect 21% of the time. It is recommended that Caldwell's method be used, as long as it is based on known-aged individuals.

12. **"Habitat Use and Survival of Greater Prairie-Chickens Relative to Grassland Structure and Landscape Patterns in Southwestern Missouri"** - *Gwyn McKee, University of Missouri - Columbia, Columbia, Missouri, Larry M. Mechlin, Missouri Dept. of Conservation, Mark R. Ryan, Univ. Missouri Columbia*

Greater prairie-chicken (Tympanuchus cupido) populations have declined in Missouri as a result of large-scale changes in the landscape and the consequent loss of native prairies. The Missouri Department of Conservation's Species Management Plan focuses on Greater prairie-chicken restoration through intensive mangement of grasslands. Yet, the specific grassland management techniques best suited to stabilize and increase prairie-chicken populations in Missouri have not been determined. Our primary objective is to quantify the habitat characteristics that result from burning, grazing, haying and resting on two Missouri prairies and to relate these data to prairie-chicken reproductive success, habitat use, movements and survival. Data will be collected via radio telemetry and vegetation sampling. A secondary objective is to evaluate the effects of radio transmitters on prairie-chicken survival. Proportions of males returning to leks in spring and fall will be compared between color-marked males with and without radios. The results of our research will be useful in evaluating prairie tracts for acquisition and management toward sustaining Missouri's dwindling prairie-chicken populations.

13. **"A Transmitter for Prairie-Chickens"** *Larry Mechlin, Missouri Department of Conservation, Fish and Wildlife Research Center, Columbia, Missouri, Gwyn McKee, Mark R. Ryan, University Missouri-Columbia*

Telemetry provides a pathway to gather information about wildlife unattainable through other means. The quality of this information however is often questioned, especially when researching survival rates within a population. In 1990, prairie-chicken cocks were trapped on booming grounds in Southwest Missouri. All birds

were fitted with unique color leg band combinations. Every other bird was fitted with a recently developed 11 gram transmitter designed for 1+ years of life. Color leg band combinations were read the spring of 1991. Minimum annual survival rates for birds with and without transmitters were estimated.

14. **"What the Heck is a Lek?"**- *John Toepfer, Fish and Wildlife Program, Little Hoope Community College, Fort Totten, North Dakota*

The use of the term lek to refer to both the display behavior and display ground of prairie grouse was questioned because of the wide variety of animals that exhibit this type of behavior. Lek is also the monetary standard for the European Country of Albania. Consequently, it was argued that the term is not exact enough to be used to refer to the display activities and/or display grounds of various animals especially the prairie grouse. In order to be exact it is necessary to precede lek with a noun such as greater or lesser prairie chicken, sharptail, sage grouse, ruff, giant snipe so there will be no doubt as to what species is under consideration. Even if the term lek is used correctly, its usage is often confusing. This is especially true when a lek census or a count is involved because in this usage lek could represent a count of display grounds, and/or number of males for over 100 species of vertebrate and invertebrate animals i.e. fishes, insects, amphibians, bats, unglulates and numerous bird species lek. This question has been raised before in the literature by earlier grouse researchers. Hjorth (1970) indicated that "some authors use lek when talking about the place; others mean both activity and place". He also pointed out that "in Swedish terminology from which the word is derived lek, (=play) always refers to the activity; even fish and frogs may collect for lek". Lumsden (1965) indicated that the term lek could be used either as a noun or a verb and that the exact derivation was not known. However, he emphasized that both the displays and display grounds of each of the arena grouse has a unique name - greater prairie chickens boom on booming grounds, lesser prairie chickens gobble on a gobbling grounds, sharp-tailed grouse dance on dancing grounds, sage grouse strut on strutting ground and black grouse displayed on a lek. In my opinion the terminology - booming and booming ground, dancing and dancing ground, strutting and strutting ground used by Lumsden (1965) are more exact than lek. Therefore, I recommend that they should be used for the respective displays and display grounds of the prairie grouse.

Hjorth, I. 1970. Reproductive Behavior in Tetraonidae. Viltrvy 7:184-596.

Lumsden, H.G. 1965. Displays of the sharptail grouse. Rep. No. 66. Ontario Dept. Lands and Forests. 68pp.

15. **"Reclamation of Northeastern Minnesota Minelands for Sharp-tailed Grouse"** - *Bill Berg, Forest Wildlife Populations and Research Group, Minnesota Department of Natural Resources, Grand Rapids, Minnesota*

Reclamation of active and abandoned taconite tailings basins in northeastern Minnesota's 5,000 km^2 Mesabi Iron Range presents an opportunity to manage for sharp-tailed grouse and several other open grasslands species. The tailings basins, some exceeding 15 km^2 in area, are seeded to grass mixtures and allowed to advance

successionally. Although succession is slow, willows, birch, and aspen gradually encroach into these areas, providing habitat for sharptails. Management problems occur because mine companies are reluctant to use prescribed fire, and often plant coniferous and deciduous trees in brushland areas. Cooperative work between public agencies has resulted in some mechanical habitat management and experimentation with warm season grasses. Sharptail numbers in these areas are stable to slightly increasing, but remain at a fraction of their potential with adequate habitat management.

16. **"An Action Plan for Attwater's Prairie-Chicken Recovery"** - *Stephen E. Labuda and Michael Morrow, Attwater Prairie Chicken National Wildlife Refuge, Eagle Lake, Texas*

The Attwater's Prairie Chicken Recovery Plan, approved in 1983 and currently under revision, outlines tasks that must be accomplished in order to recover the Attwater's prairie-chicken (Tympanuchus cupido attwateri) from its endangered status. However, the Recovery Plan discusses these tasks only briefly and in general terms. Therefore, an action plan was developed to provide specific guidance for implementation of the Recovery Plan. This action plan focuses on five major task groups: (1) habitat management, (2) education, (3) research, (4) population management, and (5) cooperation and coordination.

17. **"Attwater's Prairie-Chicken and Private Lands Management"** -*Michael E. Morrow, Royce W. Jurries and Stephen E. Labuda, Jr. Attwater Prairie Chicken National Wildlife Refuge, Eagle Lake, Texas*

Approximately 85% of Attwater's prairie-chickens (Tympanuchus cupido attwateri) are currently found on lands in private ownership. Many of these ranges, especially those in large land holdings, have traditionally provided relatively stable ranges for the Attwater's. In other areas, native prairie grasslands which provide habitat for the Attwater's prairie-chicken have become severely degraded due to brush encroachment and/or overgrazing. This paper describes cooperative efforts involving the Texas Parks and Wildlife Department, the U.S. Fish and Wildlife Service, and Texas ranchers to restore native prairie ranges for Attwater's prairie-chickens.

18. **"Breeding Biology and Movements in a Montana Population of Sharp-tailed Grouse"** - *Hans Landel, Department of Biological Sciences, Purdue University, West Lafayette, Indiana*

Breeding behavior and movement were studied in a Montana sharp-tailed grouse population from 1983 to 1986. I outline results on lek behavior, distance females nest from the lek on which they mated, movements of females, and nesting habitat data.

19. **"Lesser Prairie Chicken Habitat Management on Public Lands in Southeastern New Mexico"** - *Dan Baggao, Bureau of Land Management, Roswell, New Mexico*

The range of the lesser prairie chicken (Tympanuchus pallidicinctus) has shrunk dramatically since the 1900's, and in 1979, was restricted to isolated areas in New Mexico, Colorado, Kansas, Oklahoma, and Texas. In New Mexico, they occupy about one half of their original range.

Lesser prairie chicken are most abundant in areas dominated or previously dominated by sand shinnery oak (Quercus harvardii). The Bureau of Land Management (BLM) administers about 245,000 acres of public land in an area known as Mescalero Sands located about forty-five miles east of Roswell, New Mexico. The BLM is revising an existing Habitat Management Plan for this area which will specify goals, objectives and wildlife projects for the improvement of wildlife habitat to benefit several key wildlife species including the lesser prairie chicken.

The Roswell District has conducted prairie chicken lek inventories since 1971 with about 190 lek sites identified. An intensive survey was conducted in 1988, resulting in an estimated population of 2540 prairie chickens within the Caprock Wildlife Habitat Area (WHA). The goal is to protect and enhance habitat to maintain a population of 3400 to 3600 birds within the Caprock WHA.

The most significant habitat manipulation undertaken by Bureau of Land Management (BLM) has been shinnery control using the herbicide Tebuthiuron. About 95,000 acres have been treated in the Roswell District since 1982. The management objective is to establish a diverse vegetation community, creating more livestock forage and better wildlife habitat. BLM vegetation and wildlife monitoring studies on the shinnery-treated areas have shown tremendous grass and forb response and an overall improvement to the wildlife habitat.

Evaluation data from the treated pastures shows that an increase in lekking activity occurs three to four years after treatment. Lekking activity in a one-mile perimeter around the treated pastures varies, but the trend has been the establishment of new lek sites adjacent to the treated pastures or high bird counts on established leks within the perimeter area.

Current shinnery oak treatment guidelines include: 1. Coordination of treatment areas with BLM Range and Wildlife staff and the New Mexico Department of Game and Fish. 2. Application rate of 0.5 pounds of active ingredient per acre. 3. Twenty percent of the public lands in a targeted pasture are left untreated, including buffer areas around sand dune areas, tree groves, lek sites, wildlife and livestock waters and brushy drainages. 4. Adjacent pastures are not treated the same year. 5. Livestock is deferred from the treated pasture for two growing seasons.

20. **"Prairie Chicken Management in Wisconsin"** - *Jim Keir, Wisconsin Department of Natural Resources*

Bergerud and Gratson in Adaptive Strategies and Population Ecology of Northern Grouse (1988) describe the prairie chicken as "probably the most intensively managed grouse in North America". Beginning in 1954 with the acquisition of the first of many scattered parcels of land, a successful management effort has evolved from the direction provided by A Guide To Prairie Chicken Management by Hamerstrom, Mattson and Hamerstrom (1957). A healthy remnant population has been maintained.

Approximately 14000 acres of grassland are presently being managed on three properties in central Wisconsin. The program objectives of maintaining quality nest cover, brood cover, winter cover and winter food are achieved through control of woody vegetation encroachment and stimulation of herbaceous vegetation through periodic disturbance. Management tools used to accomplish these goals include fire, grazing and farming. Herbicides were extensively used in the past for woody vegetation control. Today's use of herbicides has been dramatically reduced due to the success of other management tools.

21. **" Movements and Nest Site Selection by Lesser Prairie Chicken Hens in Colorado"** - *Kenneth M. Giesen, Colorado Division of Wildlife, Fort Collins, Colorado*

Radio telemetry was used to document movements and microhabitat selection of nesting lesser prairie-chicken (Tympanuchus pallidicinctus) hens in southeastern Colorado from 1986-90. Movements of 31 hens from lek-of-capture to nest site averaged 1.80 $\pm$ 1.04 km (range 0.22 - 4.85 km) and was farther than the average distance from nest sites to the nearest lek (1.04 $\pm$ 0.60 km). Most nests were adjacent to shrubs, primarily sand sagebrush (Artemisia filifolia) and yucca (Yucca glauca), with the remainder being in bunchgrasses. Vegetative height above nest bowls averaged 50.7 $\pm$ 14.7 cm (range 29-81 cm). Shrub height (47.6 $\pm$ 14.9 cm), forb height (21.2 $\pm$ 11.0 cm), grass height (36.1 $\pm$ 15.0 cm), and vegetative height density (3.2 $\pm$ 1.5 dm) were greater at nests than at dependent sites within 5 m of nests. Sand sagebrush density (2471 $\pm$ 3439 plants/ha) and canopy cover (7.2 $\pm$ 9.4%) were greater at nest sites than at randomly selected sites within the study area. Vegetative cover was sparse at nests with a line intercept average of 69.5% bare ground, 29.4% grasses, and 1.4% forbs.

22. **"Use of Summer Roadside Count Data to Estimate Fall Populations of Sharp-tailed Grouse"** - ***Jerry Kobriger, North Dakota Game and Fish***

Over the years the general philosophy, supported by data, has been that hunting has little or no effect on upland game populations. Unfortunately this belief, along with game management agencies wanting seasons set early in the year, has resulted in many states discontinuing summer roadside counts. Large sample sizes needed for accurate counts may have discouraged some states from making "brood runs".

In North Dakota, 24 areas are censused each spring and an estimate is made of the density of the breeding sharptail population. But, there is no correlation between spring census, or density, and the fall population ($r = .28$; $P > .10$).
Data compiled from summer roadside counts are broods and birds/100miles and both show good correlation with the Fall Population Index (FPI). Birds/100 miles of survey are significantly correlated with the FPI ($r = .66$; $P = .01$) as is broods/ 100 miles ($r = .68$; $P < .01$).
The FPI is an estimate of the fall population using spring density and age ratio data. The age ratio is estimated from summer roadside count data. Age ratio data from summer roadside surveys are significantly correlated with the fall age ratio ($r = .80$; $P < .001$). There are 2 advantages to using age ratio data rather than birds or broods/ mile of survey: weather conditions are not as critical; sample sizes can be smaller.
The opening and closing dates for the sharptailed grouse hunting season in North Dakota have been standardized. The season opens on the Saturday closest to September 15, and closes on the first Sunday in January. Season length has no effect on sharp-tail harvest ($r = -.33$;$P > .10$).
The bag limit does have an effect on harvest ($r = .59$; $P < .01$). Correlation of the bag limit to FPI is also very good ($r = .75$; $P < .001$). The Fall Population Index could be used to set bag limits for sharptails in North Dakota.

23. **"Vegetation Composition of Greater Prairie-Chicken Leks in the Central Flint Hills of Kansas"** - *Tom Eddy, Kansas State University, Emporia, Kansas*

Short perennial grasses and annual forbs dominated lek sites in the study area. Mean height-density of vegetation on the leks was 0.8 decimeters. Patterns of basal cover among leks were highly variable. Down slope areas surrounding leks were more vegetatively complex.

Business Meeting Minutes
19th Prairie Grouse Technical Council
27 September 1991
Billings, Montana

Chairman Bruce Waage (MT), opened the meeting and called for approval of the minutes from the Escanaba, Michigan, meeting as contained in the 1989 conference proceedings. Jim Keir (WI) moved and Dan Svedarsky (MN) seconded. Passed. Chairman Waage called on Bill Berg (MN) to report on some developments in Michigan following the Escanaba meeting. Former PGTC chairman, Gregg Stoll, was charged with wildland arson and Berg was subpoenaed as a character witness by the defense. Berg indicated that, to some extent, the PGTC as an organization was on trial as the prosecution attempted to establish that the PGTC was extreme in advocating the use of fire. Gregg Stoll is no longer with the Michigan D.N.R. and Waage asked Svedarsky to continue to serve on the Executive Board until the next Council meeting. In view of Stoll's situation, Svedarsky had developed the Proceedings of the 18th Conference held in Michigan. There were some delays due to the temporary confiscation of PGTC records and other materials as "evidence". Presumably most of the records were present when they were eventually released to Svedarsky who forwarded them to Waage.

At the Escanaba meeting, Dan Svedarsky and Nova Silvy (TX) were asked to implement the awards program as established by Section 2, Article IX of the Bylaws. Svedarsky and Silvy presented the following proposal for discussion:

AWARD PROPOSAL

TITLE:

THE HAMERSTROM AWARD, in recognition of exemplary contributions towards prairie grouse conservation.

BACKGROUND:

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

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AWARD CRITERIA:

1. To recognize an 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, province, 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 hereof. 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 PROCEDURES:

1. The selection of award recipients will be made by the 3-member Executive Board and 2 additional members appointed by the Chairman.

2. Nominations will be accepted from the PGTC "membership" as well as from members of the Awards Committee.

3. Nominations will be submitted to the designated Awards Committee Chairman one month before 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 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 organizations are available at the time.

The following points regarding the award proposal were mentioned or acted upon during the discussion:

1. The proposed award would be termed the "Hamerstrom Award" if that is acceptable with Fran Hamerstrom, who is presently in Africa. It would otherwise be termed the "Prairie Grouse Award".

2. The group recommended that the first recipient of this award appropriately be Fran Hamerstrom. It could be presented at another (not necessarily PGTC) meeting in the near future where Fran would be in attendance. It is possible that some future award recipients might not be able to attend the PGTC meeting where they are scheduled to receive an award so alternative times and places should be considered for award presentation.

3. The Bylaws were modified by a majority vote in accordance with the proposal to allow the Awards Committee the flexibility to present up to 2 awards to individuals and 2 awards to organizations if suitable recipients were available. The Bylaws stated 1 individual and 1 organization award.

4. A traveling trophy in addition to an individual award plaque was discussed but it was generally concluded that they are a bit cumbersome considering the spread-out nature of the PGTC group.

5. Should the award include money? It was generally felt that receiving the award would be honor enough. Also, the PGTC treasury is very limited.

6. Award expenses would be considered a part of the expenses to be borne by the hosting organization. Waage will approach Western Energy Company regarding the preparation of the initial award plaque (s) which, hopefully can be presented in 1991.

7. Nominations should be submitted 2 months, instead of 1 month, ahead of the PGTC Council meeting to allow the Awards Committee sufficient lead time. The potential problem of a lack of nominations is solved by the provision that the Awards Committee can nominate candidates as well.

8. Whether the award can be presented posthumously was discussed, but not resolved.

9. Svedarsky agreed to chair the Awards Committee and will contact Fran Hamerstrom and check into plaque designs. Chairman Waage appointed Larry Mechlin (MO) as another at-large committee member along with Nova Silvy and the 3-member Executive Board including Waage, Svedarsky and Ken Giesen (CO).

At the Escanaba meeting, it was suggested that the PGTC consider a joint meeting with the Western States Sage Grouse and Columbian Sharp-tailed Grouse Workshop. The Sage Grouse group met in Pocatello, Idaho earlier in 1991, and also felt a joint meeting was a good idea according to the chairman of that group, Jack Connelly (ID). Colorado offered to stage a joint meeting of these two groups in Fort Collins, Colorado in July or Auguest of 1993 with Ken Giesen (CO) as chair. Their offer was accepted. A joint meeting might be held periodically in the future, but both groups will remain as distinct organizations and have their own business meetings. Clait Braun (CO) suggested that it would be desirable from an administrator's viewpoint for the two groups to meet in alternate years so personnel would not have to choose between meetings held the

same year. A plan for this action will be suggested at the Colorado meeting.

Nova Silvy reported on the status of the Prairie Grouse book. Four more chapters have been submitted since the last meeting. Dick McCabe of the Wildlife Management Institute is interested in the book as a possible WMI-sponsored publication. Nova's schedule is as follows:

January 1, 1992	All remaining chapters to Nova, preferably on 5.1 Word Perfect disk.
July 1, 1992	Revision of all previously written chapters to Nova.
December 1, 1992	Book to press.

Nova requested that revisions include 1992 census results. Nova can provide a disk on request and if authors only have hard copy, send that to him because he has access to a scanner which can transfer to a computer disk.

Chairman Waage expressed his concern about an appropriate depository for the PGTC archives; presently a taped-up box covered with a variety of stamps and mailing labels. It is risky to send the only copy of the archives through the mail. Recently, Waage made a copy of most of the materials and sent it to Helen Corneli, in Wisconsin, who is writing a biography of Fred Hamerstrom. Ron Westemeier (IL) agreed to look into his agency, the Illinois Natural History Survey, being a permanent home for the archives. It was suggested that at least two people should be involved in shepherding the records. Don Christisen (MO) was mentioned as an appropriate historian.

John Toepfer (ND) raised a concern about elevating the national image of prairie grouse. For example, would a "Grand Slam of Prairie Grouse" be appropriate where a hunter would bag a Greater Prairie-Chicken, Lesser Prairie-Chicken, Sharp-tailed Grouse and Sage Grouse? Randy Rodgers (KS) said he personally feels "something is lost" in competitive hunting events. Clait Braun felt that the PGTC is more of a professional/scientific advisory group and not the group to promote a grand slam project. Perhaps a US/Canada group organized along the lines of the Ruffed Grouse Society of America or Quail Unlimited would be appropriate. (Section 4 of Article II of our Bylaws provides that "It (PGTC) shall encourage, promote, and support a citizens not-for-profit organization formed to aid in the research and management of prairie grouse.") Don Elsing (MI) was in favor of some sort of national strategy to improve the image of prairie grouse and bring them off the back burner. Ron Westemeier noted that any promotion effort regarding prairie grouse should include the non-consumptive aspects of viewing their spectacular courtship displays. A committee of Ron Westemeier, John Toepfer, and Don Elsing was appointed to develop a strategy to promote prairie grouse

in North America. A solicitation of input might be included in PGTC newsletters. Terry Rich (ND) along with Mike Gratson (ID) and Jack Connelly (ID) also volunteered to assist the committee. Tom Huggler, a Michigan outdoor writer, was suggested as a possible input person. He has offered to provide $5.00 to the PGTC for each copy of his book, Grouse of North America - a cross-continental hunting guide, purchased by people on the PGTC mailing list. Huggler apparently would provide coded order blanks that could be included with a mailing of the PGTC newsletter.

The meeting was adjourned at 10 a.m.

PAST
PRAIRIE GROUSE TECHNICAL COUNCIL 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

Executive Board 1987-1989
Gregg Stoll, Chairman
Daniel Svedarsky, Member
Donald M. Christisen, Member

Executive Board 1990-1991
Bruce Waage, Chairman
Gregg Stoll, Member
Dan Svedarsky, Member