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THE LESSER PRAIRIE CHICKEN IN COLORADO¹

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Abstract: Lesser prairie chickens (*Tympanuchus pallidicinctus*), now rare though increasing in numbers in Colorado, were once fairly common in the southeastern part of the state, particularly in the area south of the Arkansas River. Information indicates that this species was probably once found in at least six counties: Baca, Prowers, Bent, Kiowa, Lincoln, and Cheyenne. Populations are thought to have occurred in earlier days in both the mixed prairie plant communities and the sand sagebrush-grassland plant communities. The species has been observed in Colorado during the period 1959 through 1962 only within the sand sagebrush-grassland plant communities and bordering cultivated fields. A major reduction in lesser prairie chicken range and numbers in Colorado apparently coincided with the general pasture depletion during the *dust-bowl* conditions of the 1930's. Populations have been censused through spring counts of cocks on booming grounds from 1959 through 1962. The numbers of cocks counted on the grounds have steadily increased over the 4-year period from 6 on three grounds in the spring of 1959 to 104 on thirteen grounds in the spring of 1962. Practices which have benefited the species in recent years include improved grassland management through rotation of pastures, moderate livestock use, and grass reseeding programs. Improved moisture conditions have also benefited the species.

This paper presents the results of a basic inventory study on the lesser prairie chicken in Colorado. The investigations resulted from a lack of knowledge of the species by the Colorado Department of Game, Fish and Parks and from interest in the species by U. S. Forest Service personnel of the Comanche National Grasslands, with headquarters in Springfield, Colorado.

The U. S. Forest Service controls approximately 260,000 acres of grazing lands in southern Baca and southeastern Las Animas counties. These lands were purchased from private landowners during the dust-bowl days of the 1930's. Many of these tracts are located within historical lesser prairie chicken range. Scattered sightings of prairie chickens by landowners and others during recent years indicated the species was still found in some areas in southeastern Colorado prior to the initiation of the study.

I wish to thank E. E. Miller, U. S. Forest Service, Springfield, Colorado, and J. H. De Vore, U. S. Forest Service, Elkhart, Kansas, for their interest and assist-

ance during the study; W. D. Snyder, Colorado Department of Game, Fish and Parks, Springfield, Colorado, for assistance in the field work of locating and counting populations; F. F. Copelin, Oklahoma Department of Wildlife Conservation, for valuable advice on census techniques and habits of the species; and Dr. A. M. Bailey, Denver Museum of Natural History, for historical information.

EARLY HISTORY

Lesser prairie chickens were once fairly common in southeastern Colorado in the area south of the Arkansas River when unbroken grasslands stretched from horizon to horizon (Bailey and Niedrach, manuscript).

The first record of the lesser prairie chicken in Colorado was a male collected in Baca County on May 24, 1914, by Frederick Lincoln, then a staff member of the Denver Museum of Natural History. During September 21-23, 1914, he saw many lesser prairie chickens in the sandhill region in Prowers County south of the Arkansas River in the vicinity of Holly (Bailey and Niedrach, manuscript).

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Dr. Alfred M. Bailey collected a series of study skins in Baca County, December 2–4, 1923, for the Denver Museum of Natural History. During this period, he found rolling, unbroken land with waving bluestem grass (*Andropogon* spp.) waist high in the swales, and yucca (*Yucca* spp.) and wormwood (*Artemisia* spp.) common on the knolls in Baca County (Bailey and Niedrach, manuscript).

Early-day populations were undoubtedly highest within the occupied range south of the Arkansas River, but records indicate that the species probably also occurred north of the Arkansas River into Kiowa, Cheyenne, and Lincoln counties.

During this study, the occurrence of prairie chickens in former years was reported in Kiowa, Cheyenne, and Lincoln counties on areas which are now shortgrass prairie with interspersed farmlands. Many of these shortgrass prairies were formerly mixed prairie plant communities affording better prairie chicken cover than now exists.

The mixed prairie plant communities originally consisted of an overstory of taller grasses such as western wheatgrass (*Agropyron smithii*), little bluestem (*Andropogon scoparius*), sand dropseed (*Sporobolus cryptandrus*), needle-and-thread (*Stipa comata*), red threeawn (*Aristida longiseta*), and galleta (*Hilaria jamesii*), and an understory of short grasses such as blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloë dactyloides*). Most of the mixed prairie is now maintained by grazing animals as a shortgrass disclimax (Harrington 1954).

With the change to shortgrass prairie and farmland, the mixed prairie range apparently became less favorable for prairie chickens, and the flocks gradually disappeared.

The sand sagebrush (*Artemisia filifolia*)

–grassland prairie chicken ranges in southeastern Colorado have also undergone extreme changes due to grazing practices and drought. I believe that small populations of lesser prairie chickens have survived through the years in localized areas of suitable cover within these ranges. Most of the areas are isolated, with little human interference.

According to local residents, flocks of prairie chickens numbering over 100 birds were fairly common during the 1930's in the sand sagebrush–grassland belt in Baca County. Several large flocks were resident in the area southwest of Pritchett, Colorado.

A major reduction in lesser prairie chicken range and numbers apparently coincided with the dust-bowl conditions of the 1930's. Drought and land-use practices undoubtedly contributed to this reduction. Reports concerning the locations of flocks and numbers observed within the various flocks are meager for the period from the early 1940's through the early 1950's.

A flock of 17 prairie chickens was observed in the early 1940's by a resident of Las Animas, Colorado, near the site of Keller, located approximately 3 miles east and 2 miles south of the town of Las Animas in Bent County. This flock was reportedly shot out by hunters, and none have been reported in this area since. This is the farthest west that the species has been reported in the area south of the Arkansas River.

Reports indicate the species was probably resident in Colorado during earlier years in at least six counties: Baca, Prowers, Bent, Kiowa, Lincoln, and Cheyenne.

RECENT HISTORY

Reported observations of prairie chickens within the historical range of the lesser species prior to the initiation of field sur-

Table 1. Reports of prairie chickens observed during recent years prior to initiation of study, and reports of observations received during course of study, for which booming grounds were not located.

NUMBER OBSERVED	DATE	COUNTY	AREA
19	April 6, 1954	Prowers	Wright Ranch, 3½ miles SE of Holly
3	March, 1957	Baca	1½ miles SE of Schnauffer Ranch, SE of Campo
1	Spring, 1957	Baca	2 miles W of Bright Ranch, SE of Campo
few	Spring, 1957	Baca	W of Eversoll Ranch, S of Cimarron River
2	Summer, 1957	Baca	Holt Ranch, S of Cimarron River
few	Spring, 1958	Kiowa	3 miles S and 1 mile W of Brandon
1	Summer, 1958	Baca	1½ miles N of Holt Headquarters, SE of Campo
2	Summer, 1958	Baca	Kahler Ranch, S of Cimarron River
3	Fall, 1958	Baca	3 miles E of U.S.F.S. Project Headquarters
1	November, 1958	Prowers	Hudson Ranch, S of Granada
2	March, 1959	Prowers	Hudson Ranch, S of Granada
3	Spring, 1959	Prowers	3 miles W of Dodge Headquarters, S of Carlton
1	June, 1960	Kiowa	Big Sandy Creek, N of Prowers County line
1	Spring, 1962	Prowers	Hudson Ranch, S of Granada

veys to locate booming grounds (1954 to early 1959) are shown in Table 1. Reported observations of prairie chickens since the study began, but for which booming grounds could not be located, are also shown in this table.

Booming grounds have been located for most of the areas where birds were reported in recent years. Exceptions are (1) the area due east of U. S. Forest Service Project Headquarters along Sand Arroyo in Baca County, (2) the area south of Chivington and Brandon along Big Sandy Creek in Kiowa County, and (3) the area south of Granada and Carlton in Prowers County.

RANGE REQUIREMENTS

The lesser prairie chicken appears to be highly selective of its habitat. Present-day populations in Colorado prefer the sand sagebrush-grassland plant communities (Fig. 1) characterized by loose sands. They also range into bordering cultivated fields to feed, particularly during winter. Fig. 2 shows interspersed vegetative cover types within an area of occupied lesser prairie chicken range in southeastern Baca County. For the most part, the potential mixed prairie plant communities

are now maintained as shortgrass, disclimax plant communities. The shin oak (*Quercus havardii*) vegetative type found in the ranges of the lesser prairie chickens in Oklahoma and New Mexico does not occur in Colorado.

Appropriate grassland management is required for the survival and increase of the lesser prairie chicken. The decline in numbers of lesser prairie chickens in Colorado has been attributed to pasture depletion during the severe drought of the 1930's. During this period, the stands of taller grasses within the sand sagebrush-grassland areas, including little bluestem, sand bluestem (*Andropogon hallii*), switchgrass (*Panicum virgatum*), and sideoats grama



Fig. 1. Lesser prairie chicken range south of the Cimarron River in Baca County, Colorado. Sand sagebrush-grassland plant community. May, 1962.

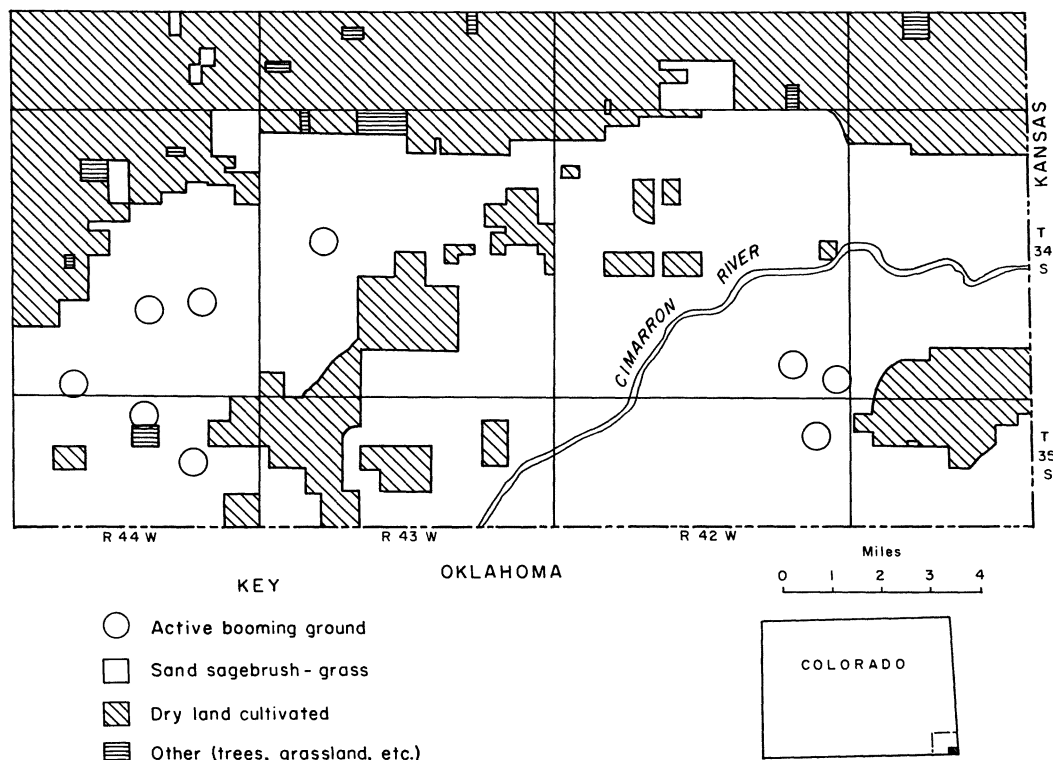


Fig. 2. Location of active booming grounds in relation to vegetative cover types in southeastern Baca County, Colorado. Spring, 1962.

(*Bouteloua curtipendula*) were reduced to the extent that many were replaced by weeds. Remnant stands of climax grasses are found scattered throughout the historical range. *Yucca* is commonly found in association with sand sagebrush in Colorado.

Fig. 3 shows the extent of the sand sagebrush-grassland plant communities in southeastern Colorado. The quality of these ranges in Pueblo, Otero, El Paso, Crowley, and Las Animas counties is poor, and it is doubtful that the historical range of the species extended into these counties.

Lesser prairie chickens apparently cannot exist in areas consisting predominantly of short grasses such as occur within the shortgrass disclimax.

CENSUS METHOD

Regular spring counts of cocks were conducted on booming grounds. Observations indicate that the same booming grounds are used with a high degree of consistency from year to year after establishment. Of 16 grounds which appeared to be well established when found, 3 were abandoned during the 4-year study period. Most of the booming grounds located to date are situated on slightly elevated terrain (Fig. 4), but some are located on level flats.

Counts on booming grounds were started in the spring of 1959 and were continued through the spring of 1962. The known occupied range was covered each year and surveys to locate new populations were accomplished. Activity on the grounds has

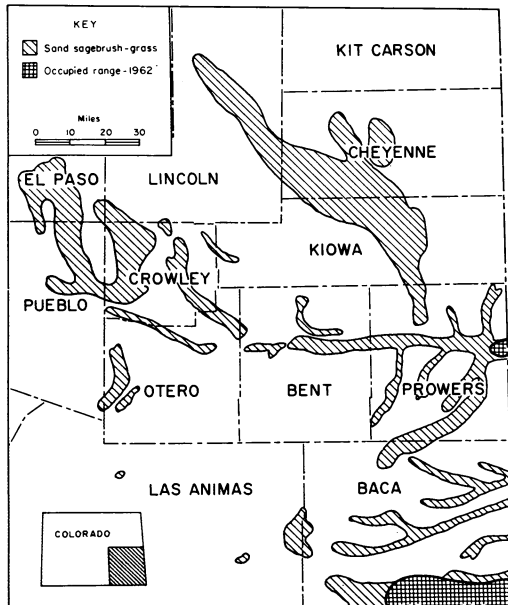


Fig. 3. Extent of sand sagebrush-grassland plant communities and occupied lesser prairie chicken range in Colorado during 1962.

been observed as early as mid-March but is usually commenced somewhat later. Birds have been found using the grounds regularly in early April, and activity normally continues through mid-June. Peak activity probably occurs in late April and early May.

The numbers of cocks and hens on the grounds were determined whenever possible, and the total number of birds was obtained by flushing them at the end of the count. Sometimes several trips were required to secure an accurate count of the individual ground. The highest count of cocks was utilized for determination of the population trend. In order to secure consistency, the counts were made on booming grounds in each area at about the same time each year.

Hens were recognized by the shorter pinnae (neck tufts), and they were nor-

mally much less active than the males while on the booming grounds.

Best counts were obtained on clear, calm mornings, when the cocks were most active on the grounds. On mornings with strong winds or rain, the cocks were usually far less active. The activity on the grounds was normally completed by 7:30 AM (MST), with the birds flying off to feed and water.

New grounds were located by selecting a road or foot trail through the area to be checked, along which the observer drove or walked, starting approximately $\frac{1}{2}$ hour before sunrise, listening at regular intervals for sounds indicating active grounds. When these distinctive sounds were heard, the ground was located as soon as possible by driving or walking to it for a count of the birds. The location of the new ground was then mapped, using paces or mileages and directions from landmarks.

RESULTS

The existence of a small resident population of lesser prairie chickens in Colorado became known during the spring of 1959, when three booming grounds with a total of six cocks were located in Baca and Prowers counties. In 1960, 1961, and 1962, spring counts of cocks on known grounds and early morning listening checks to locate new booming grounds were conducted (Table 2).



Fig. 4. Portable observation blind, similar to type used by F. F. Copelin in Oklahoma, on perimeter of booming ground located on slightly elevated terrain southeast of Holly in Prowers County, Colorado. Sand sagebrush-grassland plant community. Spring, 1962.

Table 2. Counts of lesser prairie chickens on booming grounds in spring, 1959, 1960, 1961, and 1962.

GROUND NUMBER	NAME	COUNTY	1959				1960				1961				1962			
			Cocks	Hens	Unclass.	Total	Cocks	Hens	Unclass.	Total	Cocks	Hens	Unclass.	Total	Cocks	Hens	Unclass.	Total
1	Low Ranch (a)	Prowers	4	2	0	6	7	2	0	9	6	4	0	10	5	1	0	6
2	Stalford Ranch (a)	Baca	0	0	8	8	10	0	2	12	7	0	2	9	10	0	3	13
3	USFS Lease (a)	Baca	2	2	0	4	6	5	0	11	12	0	0	12	12	0	3	15
4	Stalford Ranch (b)	Baca					7	0	0	7	abandoned				abandoned			
5	Stalford Ranch (c)	Baca					2	0	0	2	5	0	8	13	13	0	3	16
6	Hanes Ranch (a)	Baca					6	0	0	6	0	0	13	13	12	0	8	20
7	USFS Lease (b)	Baca					1	0	0	1	7	1	0	8	4	0	2	6
8	Low Ranch (b)	Prowers									5	0	1	6	7	0	2	8
9	Hanes Ranch (b)	Baca									0	0	7	7	abandoned			
10	USFS Lease (c)	Baca									4	0	0	4	5	0	1	6
11	Stalford Ranch (d)	Baca									2	0	0	2	2	0	0	2
12	USFS Lease (d)	Baca									6	1	3	10	13	0	3	16
13	USFS Lease (e)	Baca									0	0	4	4	7	0	0	7
14	USFS Lease (f)	Baca									2	0	0	2	abandoned			
15	USFS Lease (g)	Baca												9	0	1	10	
16	USFS Lease (h)	Baca												5	0	0	5	
Totals			6	4	8	18	39	7	2	48	56	6	38	100	104	1	25	130

The numbers of cocks counted on the grounds have steadily increased over the 4-year period from 6 cocks on three grounds in the spring of 1959 to 104 cocks on thirteen active grounds in the spring of 1962.

Cock densities within three ranges (Table 3) have increased from 0.8 cock per square mile in the spring of 1959 to 5.8 cocks per square mile in the spring of 1962, based on booming-ground counts.

Birds unclassified as to sex counted on the grounds within these three ranges were utilized in these calculations on the basis that cocks made up 92 percent of the total of 223 lesser prairie chickens classified as to sex, on booming grounds during the 4-year study period.

Much of the population increase noted was indicated by the establishment of new grounds as well as by increased numbers of cocks on most of the established grounds.

Table 3. Cock densities within three occupied ranges in Colorado as indicated by booming-ground counts.

AREA	COUNTY	SQUARE MILES	NUMBER COCKS*			
			1959	1960	1961	1962
Low Ranch	Prowers	2	4	7	12	13
Stalford Ranch	Baca	4	7	21	23	31
Dye, Glover, Bright USFS Lease	Baca	10	2	6	29	49
Totals		16	13	34	64	93
Cocks per square mile			0.8	2.1	4.0	5.8

* Unsexed birds were assumed to have the same proportion of cocks (92 percent) as 223 birds classified to sex.

DISCUSSION

Despite the increase in numbers of males counted on the booming grounds over the 4-year study period, the species must be considered rare in Colorado at the present time. The present-day occupied range in Colorado (Fig. 3) is only a small portion of the formerly occupied range or possibly potential range. Lesser prairie chickens have been observed in Colorado only in the sand sagebrush-grassland vegetative type and bordering cultivated fields during the study. Earlier populations also existed within the mixed prairie plant communities which have undergone extreme changes in plant composition.

Improved grassland management through rotation of pastures, moderate livestock use, grass reseeding programs, and improved moisture conditions are thought to be bettering conditions for the species in a number of areas within the historical range in Colorado. With continued improvement in range management practices, it is hoped that the species will continue to increase in numbers and spread to more areas of suitable cover.

Personnel of the U. S. Forest Service in Baca County suggested that isolated federal tracts having little or no value for grazing be developed as game-bird habitat. Some of these tracts are located within historical lesser prairie chicken range, and most have populations of scaled quail

(*Callipepla squamata*), bobwhite quail (*Colinus virginianus*), and pheasants (*Phasianus colchicus*). Some have populations of lesser prairie chickens as well.

Two separate 160-acre tracts have been improved for the lesser prairie chicken. These tracts were developed primarily to provide nesting and brood-rearing cover, with no future grazing of livestock anticipated. Habitat improvements were patterned after management practices for the lesser prairie chicken in New Mexico, described by Frary (1957). Work accomplished on the two tracts has consisted of fencing to exclude livestock, reseeding with preferred grass species, water development through installation of *guzzler* devices, and tree and shrub plantings. This work has been a cooperative effort of the U. S. Forest Service, the Colorado Department of Game, Fish and Parks, and the Campo Sportsmen's Club.

The future of the lesser prairie chicken in Colorado appears much brighter than during past years because of improved range conditions and the interest of many game managers in increasing populations.

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