

## DISTRIBUTION AND STATUS OF THE LESSER PRAIRIE CHICKEN IN OKLAHOMA<sup>1</sup>

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**Abstract:** The range, population size, and status of the lesser prairie chicken (*Tympanuchus pallidicinctus*) in western Oklahoma were determined during a 2 1/2 year study initiated in July 1977. The contemporary range includes several spatially isolated segments totaling 2,791 km<sup>2</sup>; a decline of 55% in 20 years. Sand sagebrush (*Artemisia filifolia*) rangeland comprises 68% of the range and occurs primarily along the North Canadian (Beaver) River in Texas, Beaver, Harper, and Woodward counties. Shinnery oak (*Quercus havardii*) rangeland comprises most of the remaining range and occurs in Woodward, Ellis, Roger Mills, and Beckham counties. The spring population was estimated at 7,500 birds in 1979; 58% inhabited rangelands of sand sagebrush and 40% shinnery oak.

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Historically, the lesser prairie chicken (*Tympanuchus pallidicinctus*) ranged over much of central and western Oklahoma (Copelin 1958, Sutton 1967). Population levels began declining in the early 1900's and have fluctuated dramatically (Davison 1935, 1940; Duck and Fletcher 1944; Copelin 1963). The last extensive survey that reported the population size and distribution of lesser prairie chickens in Oklahoma was conducted by Copelin (1958, 1963). The purpose of this study was to determine the contemporary range, population size, and status of the species in Oklahoma. We thank P. A. Vohs and J. A. Bissonette for advice on the study design and comments on the manuscript.

### STUDY AREA

Lesser prairie chickens were reported (Copelin 1958, 1963) to inhabit parts of Beaver, Beckham, Blaine, Cimarron, Dewey, Ellis, Greer, Harper, Roger Mills, Texas, Woods, and Woodward counties. These counties occur primarily in the Grama-Buffalograss section of the Great Plains Shortgrass Prairie Province with some extensions eastward into the Bluestem-Grama Prairie section of

the Tall-Grass Prairie Province (Bailey 1976). This study was confined to these counties because interviews with State Game Rangers and biologists indicated a considerable decrease in occupied range had occurred since Copelin's (1963) survey.

Within the study area, lesser prairie chicken habitats have traditionally included the Sand Sage Grassland and Shinnery Oak Grassland game types (Duck and Fletcher 1943). The Sand Sage Grassland game type occurs along the North Canadian (Beaver) River through the length of the Panhandle (Cimarron, Texas, and Beaver counties) and extending into Harper and Woodward counties. The Shinnery Oak Grassland game type is prominent in parts of Woodward, Ellis, Roger Mills, and Beckham counties. A few flocks extended into the Shortgrass Highplains and Mixed Grass Eroded Plains game types (Duck and Fletcher 1943) according to Copelin's (1963) survey. Detailed descriptions of the vegetative and life-form composition of lesser prairie chicken habitats in Oklahoma can be found in Copelin (1963), Jones (1963), and Donaldson (1969).

### METHODS

A questionnaire was mailed to State Game Rangers and biologists located within the study area. Subsequent interviews with landowners combined with field verification of reported sightings provided the basis for determining current range and distribution of remaining populations. Population locations were plotted on county highway maps (8mm = 1 km) and area of occupied range was quantified with a Numonics model 1224 electronic digitizer.

Six 16-section (4,144 ha) study areas, 3 in Sand Sage Grassland and 3 in Shinnery Oak Grassland were established to determine density of

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displaying males within the larger remaining segments of the range of the species. During the springs of 1978 and 1979, each study area was searched for active leks along east-west transects approximately 0.8 km apart between daylight and approximately 2 hours after sunrise. The calls made by displaying males on leks were triangulated and plotted on topographic maps (Hamerstrom and Hamerstrom 1973) to aid in the location of active leks. Each lek was censused at least 3 times during April and the 1st week in May.

The density of displaying males on each study area was used to estimate the population size in adjacent, continuous rangeland. An adult sex ratio of 1:0.78, which is an average ratio from several lesser prairie chicken studies (Taylor and Guthery 1979), was used to estimate total population numbers. While no statistical estimate of population size can be obtained in this manner, the method has been used previously to evaluate prairie chicken population trends (Duck and Fletcher 1944; DeArment, personal communication). Because intensive study areas were located within good habitats rather than marginal sites, our estimates of population size may be biased upward.

## RESULTS

The contemporary range of the lesser prairie chicken in western Oklahoma (Fig. 1) is comprised of several spatially isolated segments totaling 2,791 km<sup>2</sup> (Table 1). The predominant vegetative associations are Sand Sage Grasslands (68%) and Shinnery Oak Grasslands (32%). Occupied Sand Sage Grassland range occurs primarily along the North Canadian River in eastern Texas, Beaver, Harper, and northern Woodward counties. Occupied Shinnery Oak Grassland range occurs in scattered tracts across southern Woodward, Ellis, and Roger Mills counties. Approximately 5% of the range estimate for Sand Sage Grassland includes Short-grass High Plains infested by sand sagebrush.

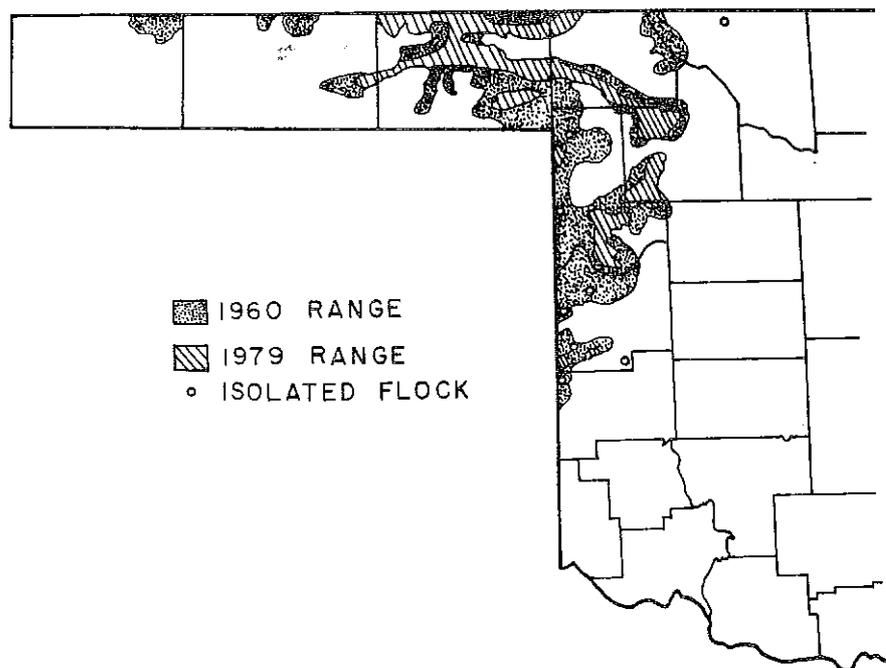


Fig. 1. Distribution of the lesser prairie chicken in western Oklahoma.

Table 1. Comparison of the historical (Duck and Fletcher 1944, Copelin 1963) and contemporary (1979) range (km<sup>2</sup>) of the lesser prairie chicken in Oklahoma.

County	1944	1960	1979	Percentage reduction (1960 to 1979)
Beaver	1,803	1,515	1,182	21
Beckham	720	41	3	93
Blaine	0	10	0	100
Cimarron	998	86	0	100
Dewey	303	10	0	100
Ellis	1,736	2,169	461	79
Greer	207	10	0	100
Harper	715	368	350	5
Roger Mills	1,373	956	106	89
Texas	332	78	59	24
Woods	461	249	5	98
Woodward	1,495	733	625	15
Total	10,143	6,225	2,791	55

Our estimates of the number of lesser prairie chickens in Oklahoma in 1979 was approximately 7,500 birds, up 3% from the 1978 estimate (Table 2). Sand Sage Grassland supported 58% of the population, and Shinnery Oak Grassland supported 40%. Remnant flocks inhabiting relic tracts of the Mixed Grass Eroded Plains and Shortgrass High Plains comprised about 2% of the population.

#### DISCUSSION

The range of the lesser prairie chicken in Oklahoma has decreased approximately 55% since the study of Copelin (1963), and nearly 72% since the mid-1940's (Duck and Fletcher 1944). The majority of the remaining range lies within Roger Mills, Ellis, Woodward, Harper, and Beaver counties (Fig. 1). Prairie chicken range within the Shinnery Oak Grasslands of Ellis and Roger Mills counties has declined to a small fraction of historical levels. Occupied range in Sand Sage Grasslands in Woodward, Harper, and Beaver counties has also decreased, but only slightly in comparison. Small populations have disappeared in Blaine, Cimarron, Dewey, and Greer counties since Copelin's (1963) survey, while isolated populations persist in eastern Texas, northern Woods, and northwestern Beckham counties.

The current population estimate of 7,500 birds represents a decline of 50% from Copelin's (1963) spring 1960 estimate of 15,000 birds. Most of the present population inhabits parts of Beaver, Harper, Woodward, and Ellis counties (Table 2). Population size relative to Copelin's (1963) survey has declined in Ellis and Roger Mills counties, closely paralleling the loss in occupied range. Historical population estimates (Duck and Fletcher

1944) for the counties listed by Copelin (1963) also reflect this decline, with the exception of Beaver County. Duck and Fletcher's (1944) population estimate for Beaver County (Table 2) appears unrealistic when historical range estimates (Table 1) and flock locations (Copelin 1958, 1963) are considered.

Copelin (1963) expected that increases in rangeland acreage following his studies would have a favorable effect on lesser prairie chicken population levels in the 5 counties where the birds were most abundant. Since his survey, rangeland acreage in Beaver, Harper, Ellis, Woodward, and Roger Mills counties increased an average of 12% (USDA, SCS 1962, 1976). The actual change in rangeland acreage ranged from a decrease of 4% in Roger Mills County to an increase of 40% in Ellis County. The decreases in population numbers and distribution, especially in Ellis County, suggest that overgrazing or other land-use practices have adversely affected remaining flocks and compensated the "favorable" gains in rangeland acreage.

Within the current range, Shinnery Oak Grasslands support higher prairie chicken densities than Sand Sage Grasslands. These results support Copelin's (1963) earlier observations. However, Sand Sage Grassland appears to be a more stable habitat in Oklahoma since it is unsuited for row crop farming (Allgood et al. 1962) and proper stocking rates of cattle are necessarily low to support successful grazing operations (E.C. Snook, State Range Conservationist).

Although shinnery oak rangeland soils are subject to wind erosion, row cropping is possible in certain areas if minimum tillage techniques are employed (Cole et al. 1966). Shinnery Oak Grassland supporting prairie chickens occurs on large ranches where conversion to row cropping is

Table 2. Comparison of historical (Duck and Fletcher 1944) and contemporary estimated numbers of lesser prairie chickens in Oklahoma.

County	1944 survey	1978		1979 estimate	Percentage change 1944-1979
		Game Ranger and biologist survey	1978 estimate		
Beaver	445	2,000	3,408	3,492	+685
Beckham	228	20	25	20	- 91
Cimarron	50	0	0	0	-100
Dewey	268	0	0	0	-100
Ellis	7,500	3,000	1,046	1,681	- 78
Harper	855	500	735	542	- 37
Roger Mills	2,560	300	200	210	- 92
Texas		800	89	132	
Woods	50	20	20	40	- 20
Woodward	2,950	2,500	1,752	1,410	- 52
Total	14,906	9,140	7,275	7,527	

absent or minimal, and cattle grazing intensities are moderate by choice. Even though Shinnery Oak Grasslands can withstand row cropping and over-grazing somewhat better than soils in Sand Sage Grasslands (Allgood et al. 1962; Cole et al. 1966; Snook, personal communication), the former may be lost in the future if grazing intensity increases.

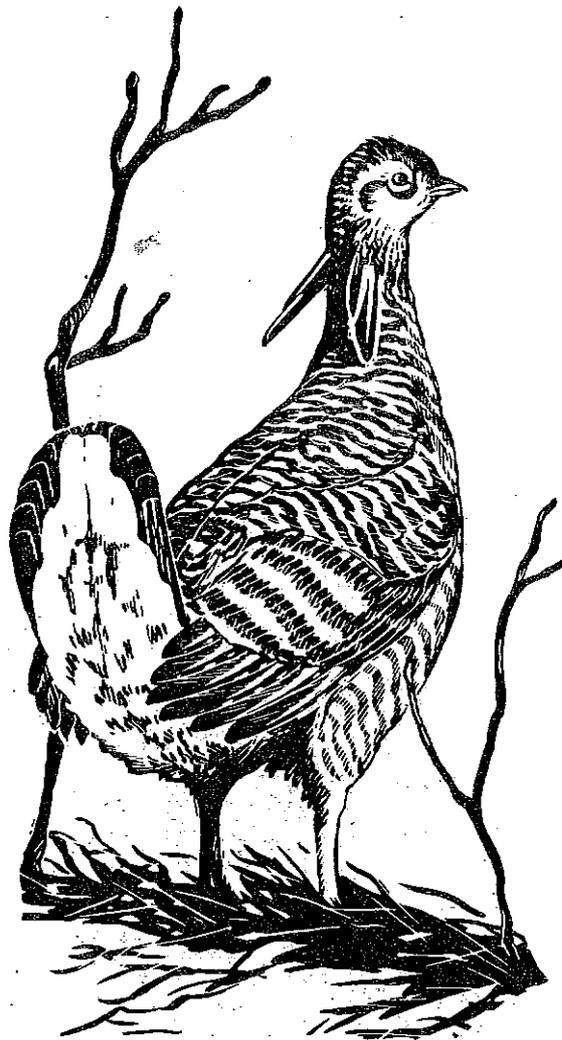
Most remaining populations of lesser prairie chickens occur on large blocks of privately owned, native rangeland. The complete absence of stable breeding populations on adjacent, smaller land-holdings suggests that associated land-use practices are incompatible with the habitat requirements of the species. The future status of lesser prairie chickens in Oklahoma will reflect the practices of individual landowners, since few scattered populations remain on public lands. Current populations, although widely scattered and isolated, should remain stable provided that the large ranches: (1) remain intact, (2) support grazing operations primarily, and (3) are managed within proper grazing guidelines.

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# PROCEEDINGS

## PRAIRIE GROUSE SYMPOSIUM



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