

# Distribution and Abundance of Lesser Prairie-chicken in Oklahoma

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**ABSTRACT** -- The present abundance and population status of lesser prairie-chicken (*Tympanuchus pallidicinctus*) were investigated in Oklahoma from 1996 to 2000 and compared to historical records and previous population estimates. The distribution of lesser prairie-chicken in Oklahoma has greatly decreased (63.6%) and the species presently exists in only eight of 22 counties it was known to have historically occurred. The historical breeding population size is unknown but probably exceeded 15,000 birds. Presently less than 3000 birds are estimated to occur in Oklahoma during the breeding period.

**Key words:** distribution, lesser prairie-chicken, Oklahoma, population surveys, *Tympanuchus pallidicinctus*.

Lesser prairie-chicken (*Tympanuchus pallidicinctus*) historically occupied sand sagebrush (*Artemisia filifolia*) and shinney oak (*Quercus havardii*) dominated grasslands of the Southern Great Plains in Colorado, Kansas, Oklahoma, New Mexico, and Texas (Aldrich 1963, Taylor and Guthery, 1980). This species still occurs in all five states but its overall distribution is greatly reduced (Taylor and Guthery 1980, Mote et al. 1999). The objective of my paper is to clarify the historical and present distribution of lesser prairie-chicken in Oklahoma.

## METHODS

The published literature was reviewed to locate references to lesser prairie-chicken in Oklahoma. Especially helpful were reviews by Duck and Fletcher (1944) and Copelin (1963). Personnel of the Oklahoma Department of Wildlife Conservation (ODWC) knowledgeable with individual sites were contacted to identify the present



number of males/1.6 km<sup>2</sup>. The correlation coefficient between the mean number of males per lek and lek density is 0.65 (n = 15, p = 0.0085). The correlation coefficient between mean number of males per lek and a linear trend was 0.58 (n = 15, p = 0.023), while the correlation coefficient between lek density and a linear trend was 0.77 (n = 15, p = 0.0008). The PDI was more strongly correlated to both mean number of males per lek (0.81) (n = 15, p = 0.0002) and lek density (0.96) (n = 15, p = 0.0001) than any of the above three correlations. While a more detailed analysis of correlation between these indices and a population of known size is needed to make firm conclusions, apparently the PDI is a more accurate reflection of actual population trends than either mean number of males per lek or lek density alone.

DISCUSSION

Duck and Fletcher (1944) estimated a total population of 14,906 lesser prairie-chicken in 11 counties. Copelin (1963) estimated a spring population of at least 15,000 birds, and noted the presence of lesser prairie-chicken in 12 counties, including Blaine County, from which it apparently was absent in 1944. By 1978, Cannon and Knopf (1980) estimated a total population of 7,500 lesser prairie-chicken in eight counties and noted the disappearance of lesser prairie-chicken in four counties since the 1963 estimate. Population indices suggest that present lesser prairie-chicken populations are substantially smaller than 1978 population levels. Assuming an adult sex ratio of 1:0.78 (Cannon and Knopf 1980), even distribution throughout occupied habitat, and an occupied range of approximately 950 km<sup>2</sup> these data suggest the present breeding population size of lesser prairie-chicken in Oklahoma is less than 3000 birds.

Robel (1980) suggested that current survey methods would not detect even a 20% annual population fluctuation. Mote et al. (1999) suggested that a standardized survey protocol (to be used in all five states comprising lesser prairie-chicken range) should be developed consisting of both a lek detection survey and a flush count of all leks within the survey area. If uniformly applied and consistently used, this protocol would provide the most reliable indication of actual population status. The PDI used in Oklahoma is one way of combining the results of a lek detection survey and lek counts to provide an index of population size.

Reintroductions of lesser prairie-chicken into historical habitat in Oklahoma were tried twice, once each during the 1930's and 1940's (Duck and Fletcher 1944). In 1933 to 1934 some 300 lesser prairie-chicken were moved from Ellis County to 15 sites, most of which were within unoccupied former range of greater prairie-chicken. Later Duck and Fletcher (1944:75) reported "...subsequent investigation showed not one instance of survival or establishment" resulting from these introductions. In 1942 to 1943 some 200 birds were relocated from Ellis County to sites in Cimarron (two), Harper, and Woods counties. Establishment was documented to have occurred at these

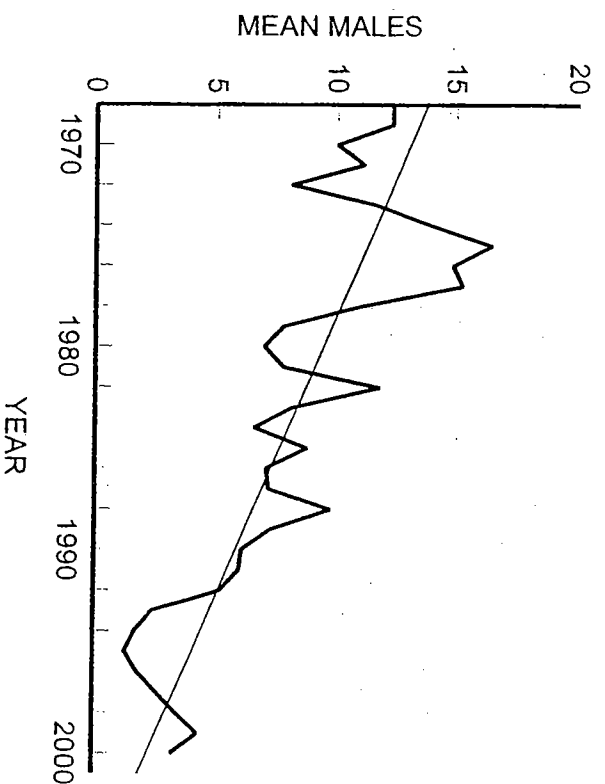


Figure 2. Mean number of male lesser prairie-chicken/lek in Oklahoma, 1968 to 2000.

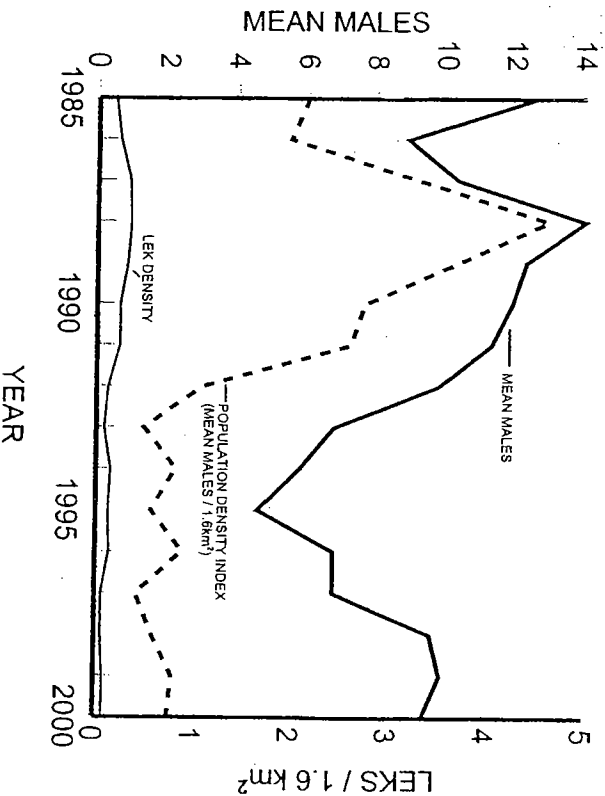


Figure 3. Mean lesser prairie-chicken lek density, mean males/lek, and Population Density Index in Oklahoma, 1985 to 2000.

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sites. We do not know, however, if lesser prairie-chicken had been extirpated from these sites prior to the reintroduction efforts. Future efforts to benefit lesser prairie-chicken in Oklahoma should focus on maintaining large, contiguous tracts of native shrub/grassland habitats and should include developing incentives for landowners to manage, maintain, and increase (restore) native shrub/grassland habitats adjacent to or within presently and/or historically occupied areas.

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distribution of lesser prairie-chicken in local areas. Historically-used habitats were searched from 1996 to 2000 to ascertain present distribution. Suitable habitats around historically-used leks were visited during spring to verify the presence of lesser prairie-chicken. In addition, locations in proximity to anecdotal sighting reports were also investigated to determine if lesser prairie-chicken was present. I defined occupied range as all habitats within 4.8 km of verified occurrence(s) of lesser prairie-chicken.

ODWC personnel have conducted spring population surveys for lesser prairie-chicken since 1968. The number of males present on selected leks is counted each spring. The average number of males per lek has been used as an annual index of population trends. Since 1985, ODWC personnel have also conducted stop-and-listen routes to estimate density of display grounds, which is a more reliable indicator of population status than a count of the number of males on display grounds (Cannon 1980, Cannon and Knopf 1981). The stop-and-listen route is a 16-km route with three-minute listening stops at 1.6 km intervals. Routes are conducted on fair weather mornings (clear skies and wind less than 16 kmph) during the last week of March and all of April. The assumption is that all active leks within 1.6 km of the listening station can be detected. One route is conducted in each county surveyed and, when possible, each route is surveyed twice during the count period. The greatest number of leks heard on each route is used for data analysis. Routes were initially set up in known occupied habitat, and have remained consistent even though habitat may have changed.

## RESULTS

### Historical Review

The historical range of lesser prairie-chicken in Oklahoma as shown by Duck and Fletcher (1944) and Copelin (1963) encompassed all or parts of 22 western counties (Fig. 1). The earliest documented occurrence of lesser prairie-chicken in Oklahoma was that by Bendire (1892), who mentions a lesser prairie-chicken nest found on 1 June 1860 some 64 km west of Fort Cobb in Caddo County. Duck and Fletcher (1944:68) mention but did not document "...some 30 literature references to prairie chickens in western Oklahoma, extending from 1792 to present..." Bent (1932) reported lesser prairie-chicken in Beaver, Cimarron, Texas, and Woodward counties in 1914, but lists the southern and eastern extent of its range as unknown. He specifically mentions the breeding range included Fort Reno (Canadian County) in central Oklahoma, but this location is 30 km outside the known historical range (Fig. 1). Hence, these may have been greater prairie-chicken (*T. cupido*). Lesser prairie-chicken was considered to be abundant and widely distributed prior to settlement by Euro-Americans (Crawford 1980) but, according to Duck and Fletcher (1944) especially in the eastern and southern portions of its range in Oklahoma, populations were restricted to only those grasslands with a suitable brush component, such as typically found along the north side of major drainages.

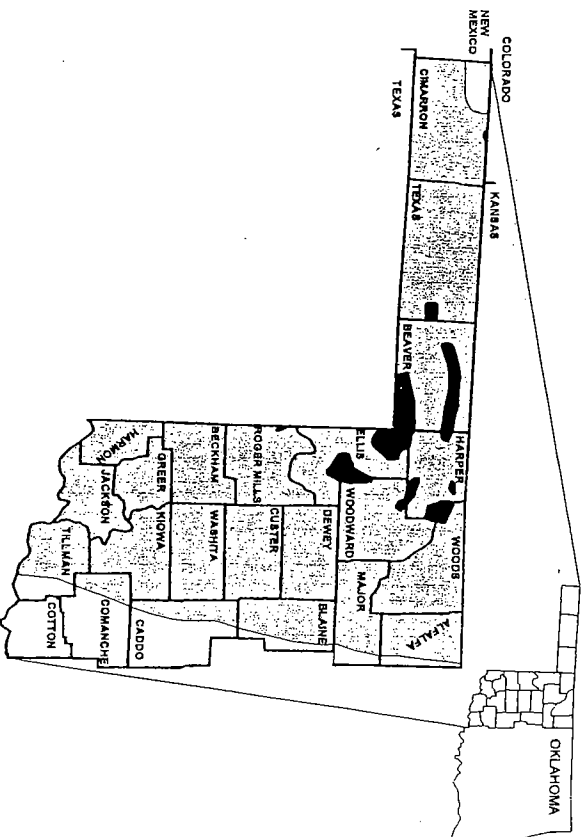


Figure 1. Estimated historical (light shading) and present (dark shading) distribution of lesser prairie-chicken in Oklahoma.

### Population Status

The data derived from counts of males on selected leks (Fig. 2) and standardized routes (Fig. 3) indicate the present population of lesser prairie-chicken in Oklahoma is significantly smaller than the 1978 estimated population. The present range of lesser prairie-chicken in Oklahoma is restricted to portions of Beaver, Cimarron, Ellis, Harper, Roger Mills, Texas, Woods, and Woodward counties (Fig. 1). The Cimarron County population is contiguous with the population in Baca County, Colorado (Giesen 1994), and the Beaver County and Ellis County population is contiguous with the population in Lipscomb County, Texas. The population in Roger Mills County is contiguous with the population in Hemphill County, Texas. Because of lack of documentation in recent (1980 to present) ODWC records and no anecdotal reports of any lesser prairie-chicken sightings in Beckham County, I assumed the Beckham County population to which Cannon and Knopf (1980) referred has disappeared.

Combining the results of lek density (leks/1.6 km<sup>2</sup>) and mean number of males per lek yields a population density index (PDI) (Fig. 3). The PDI gives an index of the