

# Lesser Prairie-Chicken Movements and Home Ranges in New Mexico

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**ABSTRACT** — Information on mobility and related habitat use is a necessary prerequisite to realistic attempts to stabilize or increase numbers and range of lesser prairie-chickens (*Tympanuchus pallidicinctus*). We studied movements and patterns of habitat use of female lesser prairie-chickens in the Southern Mixed Prairie of Chaves County, New Mexico. We used radio telemetry to document movements and home range size of 51 female prairie chickens captured with mist, cannon, and rocket nets. Prairie-chickens used the High Plains Bluemont Subtype almost exclusively (>90%) during reproduction and brood rearing. Pre-nesting movements ( $\bar{x}$  = 390 m, SE = 117.3) and home ranges ( $\bar{x}$  = 231 ha, SE = 40.9) were more extensive than during nesting ( $\bar{x}$  = 250 m, SE = 56.1, 92 ha, SE = 2.7). Movements ( $\bar{x}$  = 280 m, SE = 280.6) and home ranges (119 ha, SE = 234.1) of females with broods were more extensive than for females without broods after nesting (movement  $\bar{x}$  = 220 m, SE = 71.4, home range  $\bar{x}$  = 73 ha, SE = 15.2).

**Key words:** Home range, lesser prairie-chicken, movements, New Mexico, *Tympanuchus pallidicinctus*

Distribution and population size of lesser prairie-chickens (*Tympanuchus pallidicinctus*) on the Southern Mixed Prairie have been severely affected by livestock grazing and cultivation (Crawford 1980, Doerr and Guthery 1983). Information on mobility and related habitat use is necessary to stabilize or increase numbers and range of lesser prairie chickens; however, such information, applicable to New Mexico, is lacking. Copelin (1963) studied movements in western Oklahoma, and Taylor and Guthery (1980) documented fall and winter movements, ranges, and habitat use in west Texas. Campbell (1972) reported limited findings on movements in New Mexico. To meet the need for information on lesser prairie-chicken movements and habitat-use, we initiated a three-year study in eastern New Mexico to document and compare movements and habitat-use of females during the pre-nesting, nesting, and post-nesting periods.

## STUDY AREA

Our study area was 15,500 ha of public land in southeastern New Mexico administered primarily for livestock grazing by the U. S. Bureau of Land Management (BLM). Topography was gently undulating to dunelike, and climate was

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semi-arid with moderately low rainfall (30-yr  $\bar{x}$  = 380 mm/yr, U.S. Department of Commerce 1978). Vegetation of the area was the Southern Mixed Prairie Type, where the High Plains Bluestem Subtype (HPBS) graded into the Desert Prairie Subtype (DPS) (Holechek et al. 1989). Most of the study area (89%) was on deep sandy soils and vegetation was similar to that described by Taylor and Guthery (1980).

## METHODS

Female prairie-chickens were captured on leks during mid-March to mid-April of 1976 (n=8), 1977 (n=11), and 1978 (n=21) using mist, cannon and rocket nets. Captured birds were fitted with radio transmitters and released.

In 1976, the transmitter package was similar to that described by Brander (1968), with the transmitter resting on the bird's back and the battery resting on the breast (20 g, 2.9% of birds' body mass). In 1977 and 1978, the transmitter (solar-powered) and battery were sealed together in one package which was held on the bird's back by a cord or band that passed around both wings (18 g, 2.6% of birds' body mass). The procedure for attaching this package was described by Riley (1978:16). Transmitter frequencies were in the 150-155 MHz range.

We attempted to obtain 3-6 radio locations/bird/3-day period randomly during daylight hours to determine movements and home ranges. We used a truck-mounted Yagi antenna to determine general locations, and a hand-held Yagi antenna for specific locations. Triangulation was used with a single receiver to find the approximate location of radioed birds (Heezen and Tester 1967). We located missing females using a fixed-wing aircraft with a Yagi antenna attached to a wing strut (Riley 1978). We segregated movements and home ranges into prenesting, nesting, and postnesting activities. Prenesting was activity between capture and initiation of incubation. Locations taken between initial nests and re-nests also were considered to be prenesting. Nesting was considered to be any activity in or around active nests. Postnesting activities were those associated with brood rearing or those of females without broods that showed no nesting behavior after loss of initial nest or re-nest.

We partitioned a base map into a grid pattern for the purpose of obtaining location coordinates. Each grid square was 0.5 km<sup>2</sup>, translating to an area of approximately 1.3 ha. We overlaid movement maps onto base maps to determine a row x column coordinate (two, three-digit numbers) for each location. We recorded coordinates chronologically for each bird by activity. The data included 730 discrete locations. Home range for any given period was derived from the three-day mean distances calculated for that period. Mean distance was used as a radius, and the circle defined by the radius was considered to be the home range for that period.

We calculated mean distances moved per three-day period (later converted to daily means) and number of zero and non-zero movements. To reduce the problem of pseudoreplication resulting from within-year variability, we used mean distance

moved and home range size for all females within years as sample units to compare movements and home ranges among activity periods, limiting sample size to  $n=3$  (Hurlbert 1984, SAS Institute, Inc. 1985). Small sample sizes precluded any further statistical analysis.

## RESULTS

Ninety-one percent (399/438) of the radio locations of 40 prenesting female prairie-chickens were in the High Plains Bluestem Subtype (HPBS) and 9% were in the Desert Prairie Subtype (DPS). We did not detect any use of the DPS by 12 nesting females based on 26 radio locations. Twenty-two postnesting females primarily used the HPBS (94%, 250/266), but 6% of the locations were in the DPS.

Prenesting females ( $n=40$ ) moved an average of 390 m/day ( $SE=117.3$ ) over a 231-ha average home range ( $SE=40.9$ ). Nesting females ( $n=12$ ) moved an average of 250 m/day ( $SE=56.1$ ), and home range averaged 92 ha ( $SE=2.7$ ). Average daily movement for females with broods ( $n=3$ ) was 280 m ( $SE=280.6$ ) within a 119-ha average home range ( $SE=234.1$ ). Movements of postnesting females without broods (19) averaged 220 m ( $SE=71.4$ ), and home range averaged 73 ha ( $SE=15.2$ ).

## DISCUSSION

The most extensive movements occurred during prenesting ( $\bar{x}=390$  m). During this time nest-site searching activity was apparent; the data also may reflect some inter-lek movements prior to copulation. The large variation in distances moved might have been caused by individual females being captured at different times prior to mating; many of those that moved greater distances could have moved several times before mating at leks closer to their nest site. Some movements might have resulted from foraging activity.

In comparison to prenesting, nesting movements were much reduced, due to nest building, egg laying, and incubation. Average movements estimated for females during the nesting period may be biased because movements during nest building, egg laying, and incubation were not analyzed separately.

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