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Source: *The Journal of Wildlife Management*, Vol. 36, No. 3 (Jul., 1972), pp. 689-699
Published by: Allen Press
Stable URL: http://www.jstor.org/stable/3799420
Accessed: 31/10/2008 12:44

A POPULATION STUDY OF LESSER PRAIRIE CHICKENS IN NEW MEXICO[1]

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Abstract: A total of 285 lesser prairie chickens (*Tympanuchus pallidicinctus*) were mist-netted in the spring on 16 booming grounds (display grounds) in eastern New Mexico during 1962–70. Life tables, based on capture–recapture data from 3 consistently trapped grounds, were constructed for males only, as comparatively few females were trapped and none was recaptured. The male population underwent virtually a complete turnover in about 5 years. The mean annual overall mortality rate of males was calculated at about 65 percent. Inefficiencies inherent in the trapping method (probable failure to recapture all banded birds present on booming grounds each year) presumably magnified the calculated mortality rate, possibly by about 5 to 10 percent. Age and sex ratios indicate that adult females had a higher mortality rate than adult males. The removal by hunting of about 1,100 birds per year, on the average, over a 12-year period had no observed harmful effect on the population. Recaptures of banded birds suggest that adult males are faithful throughout life to the same booming grounds where they initially established territories, but hunter recoveries show that at least some males shift for feeding purposes in fall and winter to harvested grain fields that may be several miles from their accustomed booming grounds.

This paper reports the results of a field study of the lesser prairie chicken on its native range in eastern New Mexico. The work was done in the heart of that range in southern Roosevelt and northern Lea counties. Life tables, based on capture–recapture data, were constructed for the male segment of the population. Biological and behavioral data derived from the hunting harvests are also presented.

Several general accounts have been published concerning the lesser prairie chicken in New Mexico (Bailey 1928:207–209, Ligon 1961:89–92, Sands 1968), but published reports of specific research studies on the local populations have been few. The first of these reports appears to be that by Lee (1950); it contains data on age and sex ratios, weights, criteria for determining age and sex, habits, and habitats. Campbell (1950) described a typical instance of the often-seen persistent harassment of prairie chickens by wintering marsh hawks (*Circus cyaneus*). Snyder (1967:121–128), in addition to a general account of the species in the state, summarized some of the technical data from a series of unpublished New Mexico P–R reports by W. S. Huey, G. W. Merrill, L. G. Frary, W. A. Snyder, J. F. Johnson, M. G. Wischnofske, and J. L. Sands. The present paper is based chiefly on these reports, and on several of my later unpublished P–R reports.

Portions of Colorado, Kansas, Oklahoma, and Texas also have populations of lesser prairie chickens, and investigators in at least the latter two states have published important work on the species. Copelin (1963) published a comprehensive account of lesser prairie chickens in Oklahoma, and Jones (1963) compared in great detail the habitats of the lesser and greater prairie chickens in Oklahoma. Jones (1964) also studied seasonal behavior of various plant species in

[1] A contribution from Federal Aid Project W–104–R, New Mexico.

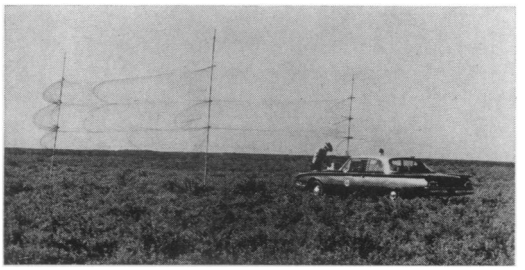

Fig. 1. Mist nets ready for the trapping run on booming ground (New Mexico Department of Game and Fish photo).

relation to the use of different habitat types by lesser prairie chickens. In Texas, Jackson and DeArment (1963) reported on trends in populations of lesser prairie chickens during 1952–62 and pointed out factors controlling these trends.

In the present study, numerous conservation officers and other personnel of the New Mexico Department of Game and Fish helped collect field data. A number of unpaid cooperators, mostly biology students from Eastern New Mexico University, Portales, assisted with some of the trapping and banding work. I thank the New Mexico State Police for traffic control at roadblocks during the hunting seasons.

METHODS

Prairie chickens were livetrapped in mist nets. Most of the trapping was done on booming grounds in April, the peak of the mating season. Trapping occupied a 1-week period each year. Some additional trapping was conducted in winter on harvested grain fields.

The method of trapping on a booming ground was to set up three or four mist nets end to end in a semicircular pattern at one edge of the ground. The birds were flushed into the nets by rushing at them from the opposite side of the ground. The first part of each run was made as fast as possible in cars and pickup trucks from starting points about 100 to 300 yards away, depending on terrain; the last few yards were covered on foot. Two-way radios in the vehicles were of great assistance in coordinating these trapping runs.

At least two vehicles were required, but better results were achieved with three or four. It was also advantageous to have at least six men (10 were better) so that entangled birds could be taken from the nets before they escaped or injured themselves. Several men were also needed to set up and take down the nets.

Most of the details of the trapping equipment and techniques were devised by W. A. Snyder and J. F. Johnson. A trapping setup is shown in Fig. 1.

Trapping was done in early morning, late afternoon, and early evening. When flushed from the booming grounds, the birds (including those just trapped) usually returned within 30 minutes, and it was generally possible to make two or three runs on the same ground during a single trapping session. Birds that missed the nets or failed to become entangled on earlier trapping runs were often captured on later runs, and in this way some of the inherent inefficiency of the trapping method was overcome.

The nets were usually moved from ground to ground during late morning and early afternoon. A total of 16 widely dispersed booming grounds were used, but not all were trapped every year (Table 1). Included among the 16 was a group of 3 grounds (Nos. 3, 42, and 103) spaced in a triangular pattern about 1 mile apart. The other grounds used were in more loosely spaced groups of two's and three's in which individual members of the groups were generally 2 to 4 miles apart.

The trapping method on harvested fields in winter was essentially the same as on booming grounds except that the nets were

set along margins of fields, and the birds were baited into position with grain.

In all cases, trapped birds were removed from the nets as quickly and gently as possible. A few injuries and fatalities occurred, but I believe that losses from this source were not great enough to seriously bias the study. Only 2 birds (0.7 percent) of the 285 banded on booming grounds were killed in trapping. An additional 6 birds (2.1 percent) were noticeably injured, but none of these were known to have died from their injuries.

Each trapped bird was sexed, aged, banded, and immediately released at the trapping location. The metal leg bands were serially numbered and bore the name and mailing address of the Department of Game and Fish. Sex and age determinations were based on tail coloration for sex; and on shape, wear, and color pattern of the outer two primaries (Primaries IX and X) for age. Typical specimens are shown in Fig. 2.

Sex determination was no problem. In males of both young and adult birds, the wide terminal band on the dorsal surface of the tail is almost solid black, whereas in females of both age-groups, the terminal band is broken up with lighter color. Besides this constant difference, the pinnae on the sides of the neck are much longer in males than in females, and in the breeding season the males have brightly colored nuchal air sacs and *eyebrows*. Copelin (1963:13) illustrated some of the sex criteria.

Age determination by plumage characters offered no serious difficulty. In young birds, Primaries IX and X had conspicuous light-colored spotting on the anterior portion of the vanes all the way to the tips, whereas in adults this spotting did not extend to the tips. In young birds, the tips of Primaries IX and X were relatively frayed and worn compared with those of adults,

Table 1. Booming grounds where lesser prairie chickens were trapped in New Mexico, 1962–70.[a]

Booming Ground Number	1962	1963	1964	1965	1966	1967	1968	1969	1970
2							X	X	
3[b,c]		X	X	X	X	X	X	X[d]	X
16		X	X	X		X			
18		X	X						
23					X				
24					X				
34[b]	X	X	X	X	X	X	X	X[d]	X
42[b,c]	X	X	X	X	X	X	X[d]	X	
64–3				X	X				
68–1							X	X	X
81				X	X				
95		X		X					
103[c]		X			X	X		X	X
105			X						
109				X					
110		X							

[a] X = Booming ground was trapped in years indicated.
[b] Data from only booming ground Nos. 3, 34, and 42 were used in life table calculations (Tables 3 and 4).
[c] Booming ground Nos. 3, 42, and 103 were situated in a triangular pattern, each about 1 mile from the others.
[d] Last year for which newly banded birds were included in calculations for the life tables.

and they were noticeably narrower and more pointed than in adults. All these characters are shown in Fig. 2. Copelin (1963:12, 14) discussed age determination in this species.

Of the 31 birds captured as subadults and recaptured in at least 1 subsequent year, only 1 (3.2 percent) had not, at recapture, assumed all of the characters of Primaries IX and X that we considered to be the adult condition. This bird (No. P-1075) was banded April 14, 1966, and was recaptured on the same booming ground April 10, 1968, at which time its Primaries IX and X were still spotted to the tips. The age of this bird probably would have been estimated incorrectly if the bird had been first captured on April 10, 1968.

By the method we used, we could separate the birds into only two age-classes, but additional data on year-classes were obtained on birds banded as subadults and

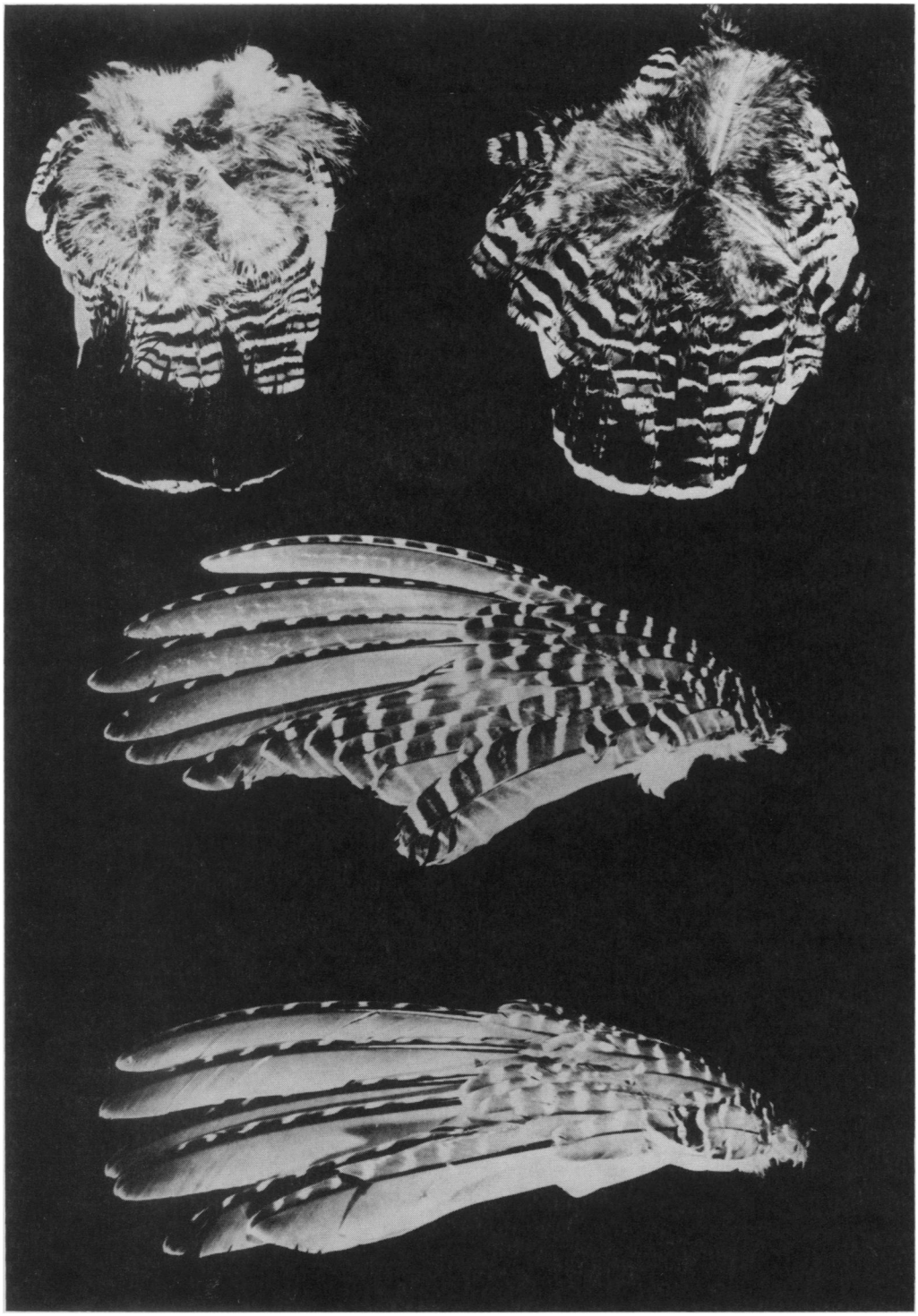

Table 2. Lesser prairie chickens banded on booming grounds in the spring, 1962–70.

YEAR[a]	NUMBER OF BIRDS BANDED					
	Males			Females		
	Subadult	Adult	Total	Subadult	Adult	Total
1962	7	5	12	0	1	1
1963	15	32	47	3	1	4
1964	25	10	35	3	4	7
1965	8	26	34	1	1	2
1966	23	14	37	0	0	0
1967	15	2	17	4	0	4
1968	10	16	26	1	3	4
1969	13	6	19	3	5	8
1970	19	7	26	2	0	2
Total	135	118	253	17	15	32
Percent	53.4	46.6	88.8	53.1	46.9	11.2

[a] Birds were banded in April, except in 1962 when the banding was in May.

recaptured in later years. Subadults trapped on booming grounds in spring were hatched the previous summer; hence they were an average of about 10 months old at the time of banding.

Life tables, based on capture–recapture data, were constructed according to an adaptation of the method illustrated by Hickey (1952:11). The method I used is more specifically illustrated in a paper by Tomlinson et al. (1960:257–259).

Information on hunter-killed prairie chickens was obtained at roadblocks during the hunting seasons. Two roadblocks were operated each year at strategic locations on main highways leading from the major hunting areas. The first 2 days of each hunting season fell on Saturday and Sunday. In some years Monday was also included in the open season, but nearly all hunting occurred on Saturday and Sunday. The roadblocks were manned on those 2 days from early afternoon until dark. Counts were made of prairie chickens brought through by hunters. The sex and age of each bird were recorded, and each bird was checked for the presence of a band. Hunters with banded birds were interviewed to fix as accurately as possible the locations of the kills.

Comprehensive data for the prairie chicken harvest were obtained as part of an annual random-card survey of game bird harvests (Campbell et al. 1971). That survey was not part of the study here reported, but data from it are used in the present paper.

RESULTS AND DISCUSSION

Trapping and Banding

A total of 285 lesser prairie chickens were banded on booming grounds from 1962 to 1970 (Table 2). The great preponderance of males (88.8 percent) among birds trapped on booming grounds does not indicate the actual sex ratio in the spring population. There were generally more males than females on an active booming ground. Females came and went individually, but males, being regularly present on their ter-

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Fig. 2. Top left, tail of male (dorsal view); top right, tail of female; middle, wing of young bird; bottom, wing of adult (New Mexico Department of Game and Fish photo).

Table 3. Abridged composite-dynamic life table for male lesser prairie chickens banded as subadults, based on trapping returns from three booming grounds.[a b]

Year of Return After Banding	Number Alive at Start of Interval	Number Banded and Available	Percentage Alive at Start of Interval	Percentage Dying in Interval	Annual Mortality Rate[c]
0–1	67	67	100.0	67.2	67.2
1–2	22	67	32.8	18.3	55.8
2–3	9	62	14.5	6.0	41.4
3–4	5	59	8.5	8.5	100.0

[a] Birds averaged about 10 months old when banded.
[b] Banding was in 1962–69, and retrapping was in 1963–70. Only birds banded and retrapped on booming ground Nos. 3, 34, and 42 are included (Table 1).
[c] Mean annual mortality rate from 1 to 4 years = 64.2 percent.

ritories, had a much greater chance of being trapped than females.

Abridged composite-dynamic life tables for hypothetical populations (Hickey 1952: 12), based on capture–recapture data from trapping on the booming grounds, indicate a high annual mortality among the male segment of the prairie chicken population. There was virtually a complete population turnover in about 5 years (Tables 3 and 4). A 67.2 percent mortality was calculated for male birds, banded as subadults (averaging about 10 months of age), during the first year after banding, or by approximately the second year of age (Table 3). The overall mean annual mortality rate for males trapped as subadults was 64.2 percent. A life table (Table 4), including both subadult and adult males at time of initial capture, revealed similarly high annual mortality rates. Capture–recapture data from only booming ground Nos. 3, 34, and 42 were used in these life tables because these three grounds were the ones most consistently trapped (Table 1).

The mortality rates probably were not as high as indicated in the tables. Trapping inefficiency (probable failure to recapture all banded birds present on each booming ground trapped) probably inflated the calculated mortality rates to some extent—possibly by 5 to 10 percent. Also, the cohort of 1969 was not followed to extinction, although it was retrapped in 1970 (the only year in which most of the survivors of this cohort would still have been alive).

Table 4. Abridged composite-dynamic life table based on trapping returns of male lesser prairie chickens banded as subadults and adults on three booming grounds.[a b]

Year of Return After Banding	Number Alive at Start of Interval	Number Banded and Available	Percentage Alive at Start of Interval	Percentage Dying in Interval	Annual Mortality Rate[c]
0–1	116	116	100.0	69.0	69.0
1–2	36	116	31.0	18.6	60.0
2–3	13	105	12.4	5.9	47.6
3–4	6	93	6.5	5.2	80.0
4–5	1	78	1.3	1.3	100.0

[a] At the time of banding, 67 birds (57.8 percent) were subadults about 10 months old. The other 49 birds (42.2 percent) were adults of unknown ages; probably most of them were about 2 years old.
[b] Banding was in 1962–69, and retrapping was in 1963–70. Only birds banded and retrapped on booming ground Nos. 3, 34, and 42 are included (Table 1).
[c] Mean annual mortality rate from 1 to 5 years = 66.1 percent.

Hunting Season Data

Beginning in 1958, hunting seasons on lesser prairie chickens have been held in New Mexico every year except 1959. Opening dates have been as early as October 18 and as late as December 7. Either 2 or 3 consecutive days were open for hunting, and daily bag and possession limits ranged from 2 and 3 to 2 and 6 (Table 5).

Two significant ($P < 0.01$) correlation coefficients were revealed by a comparison of harvest data obtained at roadblocks with harvest projections from postseason random-card surveys (Table 6). First, the total numbers of birds in samples collected at roadblocks were statistically correlated ($r = 0.877$; 8 df) with projected total harvests according to random-card surveys. Second, the mean numbers of birds bagged per hunter in samples collected at roadblocks were correlated ($r = 0.926$; 8 df) with the projected mean numbers bagged per hunter per season, according to random-card surveys. Hence, these two independent sets of data supported each other.

The correlations were concerned with trends, not absolute values, because the projections of the random-card surveys were for the total harvest and the entire hunting season, but the data from roadblocks were

Table 5. Summary of lesser prairie chicken hunting regulations, New Mexico, 1958–70.

Year	Season Dates	Number of Hunting Days	Bag Limits	
			Per Day	In Possession
1958	October 18–19	2	3	3
1959	No open season	0	–	–
1960	October 22–23	2	2	2
1961	October 21–23	3	3	6
1962	October 20–22	3	3	6
1963	October 19–21	3	3	6
1964	November 28–30	3	3	6
1965	December 4–5	2	2	4
1966	December 3–4	2	2	4
1967	October 21–22	2	3	3
1968	December 7–8	2	3	3
1969	December 6–8	3	3	6
1970	December 5–7	3	3	6

Table 6. Hunter harvest of lesser prairie chickens in New Mexico.

Year	Data from Roadblocks			Random-card Survey Projections		
	Number of Hunters Checked	Number of Prairie Chickens Checked	Mean Number of Birds per Hunter	Total Number of Hunters	Total Number of Prairie Chickens Bagged	Mean Number of Birds Bagged per Hunter per Season
1958	429	150	0.4	1,064	553	0.5
1959[a]						
1960	397	301	0.8	940	940	1.0
1961	798	886	1.1	1,944	2,918	1.5
1962	601	232	0.4	2,000	1,606	0.8
1963	533	240	0.5	1,856	1,552	0.8
1964	449	223	0.5	1,639	1,233	0.8
1965	351	133	0.4	985	645	0.7
1966	327	197	0.6	982	653	0.7
1967	488	188	0.4	1,158	652	0.6
1968	663	295	0.4	1,127	776	0.7
1969[b]				1,160	1,177	1.0
1970				865	804	0.9
Total	5,036	2,845		15,720	13,509	
Mean	504	285	0.6	1,310	1,126	0.8

[a] No prairie chicken hunting season in 1959.
[b] Collection of biological data at roadblocks was discontinued in 1969.

based on obviously incomplete field samples. There were at least two reasons why the values in Table 6 for birds bagged per hunter were consistently lower in the roadblock data than in the projections from the random-card surveys: a disproportionate number of the most successful hunters were not checked at the roadblocks, either because they filled their limits early in the morning and drove home before the roadblocks were set up, because they went home by routes where there were no roadblocks, or because they were local farmers or ranchers who hunted on their own lands; also, some hunters killed birds on more than 1 day, but if these persons were checked at roadblocks on successive days, they usually were listed as separate individuals, thus lowering the average per hunter. Another possible reason for the slightly higher harvest per hunter in the random-card survey data was that successful hunters may have been more apt to respond to the questionnaires than unsuccessful hunters. Prestige bias in the random-card responses may also have been present, because none of the standard biases were removed for species, including prairie chickens, which were comparatively little hunted and hence for which samples were relatively small.

Nevertheless, various lines of evidence, accumulated over many years for several species of game birds, have provided a high degree of confidence in the results of our random-card surveys. The fact that the trends shown in the roadblock samples paralleled those of the random-card surveys therefore gave good reason to consider the roadblock samples of hunter-killed birds to be representative of the total prairie chicken harvests. The roadblock samples were also believed to be reasonably representative of the total prairie chicken population. We found no evidence that sex or age made any significant difference in vulnerability to the gun, and it seems justifiable to conclude that the sample from the harvest provided essentially unbiased random samples. Lee (1950) concluded that in the 1949 hunt, on which his paper was based, young and adult prairie chickens were about equally vulnerable to the gun, as were males and females.

If the roadblock samples of shot birds represented the population reasonably well, the percentage of young prairie chickens in the fall varied greatly from year to year (Table 7). This might have been due to the effects of varying climatic factors on breeding success. It has often been assumed that with upland birds, hunter success depends on the percentages of young birds in the population, because the young, less experienced birds were believed to be more readily killed than adults. However, our data did not support this idea for lesser prairie chickens. There was no statistically significant correlation between the percentage of young birds in the harvest samples secured at roadblocks and average number of birds bagged per hunter per season, according to the random-card surveys ($r = -0.181$; 8 df). Furthermore, the overall percentage of young birds in the shot sample (55.2 percent), shown in Table 7, is similar to the overall percentages of subadults in the April trap sample (53.4 percent males, 53.1 percent females, weighted average 53.3 percent) from Table 2. Of course, it might be that young birds were more easily trapped in mist nets than adults, but I believe this is doubtful.

Although considerable annual variation in sex ratios occurred in the samples obtained at roadblocks, the mean sex ratio of birds of the year was about even (Table 8). Presumably, this sex ratio would also be found at hatching. However, the mean sex ratio among adults was heavily weighted in favor of males. This unbalanced sex ratio

Table 7. Fall age ratios of lesser prairie chickens checked at roadblocks during hunting seasons, 1958–68.

Year	Males		Females		Ratio of Young to Adult	Ratio of Young to Adult Female	Percentage of Young
	Number of Young-of-the-year	Number of Adults	Number of Young-of-the-year	Number of Adults			
1958	51	19	31	23	2.0 : 1	3.6 : 1	66.1
1959[a]							
1960	92	97	66	34	1.2 : 1	4.7 : 1	54.7
1961	166	204	153	94	1.1 : 1	3.4 : 1	51.7
1962	29	89	73	74	0.6 : 1	1.4 : 1	38.5
1963	56	42	84	22	2.2 : 1	6.4 : 1	68.6
1964	36	95	45	41	0.6 : 1	2.0 : 1	37.3
1965	22	45	43	16	1.1 : 1	4.1 : 1	51.6
1966	94	29	49	15	3.3 : 1	9.5 : 1	76.5
1967	45	42	63	28	1.5 : 1	3.9 : 1	60.7
1968	89	72	64	15	1.8 : 1	10.2 : 1	63.8
Total or mean	680	734	671	362	1.2 : 1	3.7 : 1	55.2

[a] No prairie chicken hunting season in 1959.

probably indicated a differential loss of females as the birds grew older. If this interpretation is correct, it implies that the average annual mortality of adult females was higher than that of adult males. The extra burdens and hazards of egg-laying, incubating, brooding, and rearing young may account for this higher mortality rate. Similar differential sex ratios have been reported for Gambel's (*Lophortyx gambelii*) and scaled quail (*Callipepla squamata*) in New Mexico (Campbell and Lee 1956).

In the present study, all banding was done in that portion of the state's prairie chicken range where the heaviest hunting occurred, yet band recoveries by hunters were relatively few. The available data are summarized in Table 9, where it is shown that for both sexes the known recovery rate of bands by hunters averaged 7 or 8 percent. Each bird checked through the roadblocks was examined for bands. Additional bands were mailed in by hunters not checked at roadblocks. Probably not all of the un-

Table 8. Fall sex ratios of lesser prairie chickens checked at roadblocks during hunting seasons, 1958–68.[a]

Year	Young-of-the-year		Adults		All Birds	
	Percentage of Males	Percentage of Females	Percentage of Males	Percentage of Females	Percentage of Males	Percentage of Females
1958	62.2	37.8	45.2	54.8	56.5	43.5
1959[b]						
1960	58.2	41.8	74.0	26.0	65.4	34.6
1961	52.0	48.0	68.5	31.5	60.0	40.0
1962	28.4	71.6	54.6	45.4	44.5	55.5
1963	40.0	60.0	65.6	34.4	48.0	52.0
1964	44.4	55.6	69.9	30.1	60.4	39.6
1965	33.8	66.2	73.8	26.2	53.2	46.8
1966	65.7	34.3	65.9	34.1	65.8	34.2
1967	41.7	58.3	60.0	40.0	48.9	51.1
1968	58.2	41.8	82.8	17.2	67.1	32.9
Mean	50.3	49.7	67.0	33.0	57.8	42.2

[a] For the numbers of birds on which the averages are based, see Table 7.
[b] No prairie chicken hunting season in 1959.

Table 9. Hunter recoveries through the 1969 hunting season of lesser prairie chickens banded in New Mexico, 1962–69.

Sex	Total Number Banded[a]	Known Hunter Recoveries	
		Number	Percentage
Male	269	19	7.1
Female	48	4	8.3
Total	317	23	7.3

[a] Includes birds banded on harvested grain fields in addition to those banded on booming grounds.

checked hunters who bagged banded birds reported this fact, but if only 50 percent of them reported (in my opinion, a low estimate), the actual recovery rate did not exceed 15 percent of the banded sample. The magnitude of the crippling loss was unknown, but if we assume that it was 50 percent as great as the bag (arbitrarily estimated at 15 percent of the banded sample), and, by extension, of the total population, we arrive at an estimated kill rate of 22.5 percent. Under anything approaching normal habitat conditions, this rate of kill could easily be absorbed in the fall without damage to the population. A hunting kill of 22.5 percent of New Mexico's fall prairie chicken population probably is a very liberal estimate, and I believe the actual kill rate was well below that figure.

Movements

One of the objectives of the study was to collect data on movements of prairie chickens, but less was learned than was anticipated because of a scarcity of recoveries by hunters. Also, some of the hunters who made recoveries were unable to remember the locations of kill, probably because of lack of prominent lnadmarks in the flat-to-gently-rolling habitat of the prairie chicken. However, some approximate information on travel distances was collected. The data for males banded on booming grounds are shown in Table 10.

Table 10. Approximate distances between points of banding on booming grounds and hunter recoveries of male lesser prairie chickens in New Mexico, 1962–69.

Bird Number	Age-class When Banded	Date Banded	Date Recovered	Approximate Minimum Distance Traveled (miles)
D–2040	SA[a]	4– 9–63	10–19–63	0.25
P–1087	SA	4–14–66	12– 8–68	2
P–1089	SA	4–15–66	12– 7–68	2
P–1090	SA	4–14–66	12– 8–68	4
P–1094	SA	4–15–66	12– 7–68	4
D–2104	SA	4–16–64	12– 4–65	6
P–1355	SA	4–18–69	12– 6–69	7
P–1095	SA	4–15–66	12– 3–66	11
P–1010	SA	4–21–65	10–21–67	13
Mean	SA			5.5
D–2042	A[b]	4– 9–63	10–19–63	0.5
B–4506	A	5– 9–62	10–21–62	2
D–2190	A	4–22–65	12– 3–66	2
D–2196	A	4–23–65	12– 5–65	4
Mean	A			2.1
Mean	All			4.4

[a] Subadult.
[b] Adult.

Male prairie chickens banded on booming grounds may subsequently travel considerable distances (at least 13 miles). This much was clear, but from there on the data (Table 10) are open to more than one interpretation. In my judgment, the evidence suggests that although the birds may travel several miles from their accustomed booming grounds to feed in harvested grain fields during fall and winter, they tend strongly to return year after year, in spring, to the specific booming grounds where they first established territories. The data in Table 10 also suggest that subadult males were more mobile than adult males that presumably had already established territories. Copelin (1963:43–46) recorded his opinion that in Oklahoma lesser prairie chicken cocks usually maintain the same

booming ground territories throughout their lives, and he presented data on movements that in general support the conclusions reached in the present study.

Lifelong attachment of most males to specific booming grounds was a basic assumption in our study, and the data appear to support this assumption. A total of 253 males were banded on booming grounds in spring (Table 2). Of 114 incidents of recapture (including repeats in year of banding as well as recaptures in later years), only 4 (3.5 percent) were made on booming grounds other than those where the birds were banded. Only three cocks (1.2 percent) were involved in these four exceptional recaptures. Of these three cocks, two were banded as subadults and one as an adult. Of the two subadults, one was recaptured on a different booming ground the day after it was banded and was recaptured again a year later on the second booming ground, where it evidently had successfully established a territory. The other subadult that moved to a different ground was recaptured there 1 year after banding. The bird, originally banded as an adult, was recaptured 1 year later on a different booming ground. In all cases, the pairs of grounds involved were about 1 mile apart.

All seven hunter recoveries (four males and three females) of the 41 birds (29 males and 12 females) banded in fall and winter on harvested grain fields were made in the same fields where the birds were banded. Of these seven recoveries, two were of birds banded only about 1 week before the hunting season in which they were killed, four about 10 months before, and one about 22 months before.

The only female (a subadult) that was banded on a booming ground in spring, and subsequently reported as bagged by a hunter, was killed about 0.5 mile from the point of banding 6 months after it was banded.

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Received for publication September 15, 1971.