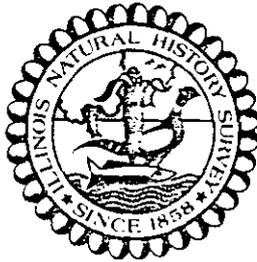


ILLINOIS
NATURAL HISTORY
SURVEY



Section of Wildlife Research

FINAL REPORT SUBMITTED TO
ILLINOIS DEPARTMENT OF CONSERVATION

GRASSLAND WILDLIFE ECOLOGY AND MANAGEMENT
INVESTIGATIONS

24 June - 31 August 1985

by

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GRASSLAND WILDLIFE NEST STUDIES, 1985

(A final report due the IDOC, Div. of Forestry and
Natural Heritage by 31 August 1985)

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The purpose of this report is to provide the Illinois Department of Conservation (IDOC) with results of research done on nesting grassland wildlife in 1985. The study was made possible in part by a grant from the Illinois Nongame Wildlife Conservation Fund and funds from Federal Aid In Wildlife Restoration Project W-66-R.

This study is part of a long-term research project undertaken in 1963 by the Illinois State Natural History Survey to develop management strategies for grassland wildlife with the emphasis on the greater prairie-chicken (Tympanuchus cupido pinnatus). Specific objectives are to (1) describe trends in grassland wildlife abundance, (2) determine habitat preferences of nesting grassland wildlife, (3) develop baseline reproductive data on grassland wildlife, and (4) determine effects of the exotic ring-necked pheasant (Phasianus colchicus) on native wildlife. We thank S.A. Simpson, W. Pruemer, and P. Butler for their help with the field work.

STUDY AREA AND METHODS

The study was conducted on prairie-chicken sanctuaries owned or leased by the IDOC and The Nature Conservancy, primarily in Jasper County (Fig. 1) with a minimal effort in Marion County, Illinois (Fig. 2). Sanderson et al. (1973) and Westemeier (1973, 1984a) provided descriptions of the study areas.

Nest searches were conducted on foot or with a cable-chain drag. Systematic searching on foot was described by Westemeier (1973) and Westemeier and Buhnerkempe (1983), and methods for cable-chain dragging followed Higgins et al. (1977).

RESULTS AND DISCUSSION

A total of 45 fields covering 123 ha dominated by introduced grasses, native grasses, and/or forbs were searched on foot for bird and mammal nests. Also, another 49 ha of grasslands were searched with the use of a cable-chain drag. The search located 336 bird nests of 11 different species.

Nest Densities

All species, except the dickcissel (*Spiza americana*) and mourning dove (*Zenaida macroura*), had higher nest densities than in 1984 (Table 1). Substantial increases in nest densities of 50% and 611% occurred for the northern bobwhite (*Colinus virginianus*) and the microtines, respectively. The dickcissel and mourning dove were the only species showing large declines in nest densities.

Comparing 1985 nest densities with the mean densities from 1966 through 1985 showed microtines and dickcissels to be at depressed levels (Table 1). Nest densities for the ring-necked pheasant and mallard (*Anas platyrhynchos*) were at their highest levels since their introduction into the avian community in 1969 and 1977, respectively. Also, nest densities for northern bobwhites and eastern meadowlarks (*Sturnella magna*) were at their second highest levels in 12 years. Densities of greater prairie-chicken nests densities were slightly lower than the mean density. Nest

numbers for the field sparrow (Spizella pusilla), grasshopper sparrow (Ammodramus savannarum), upland sandpiper (Bartramia longicauda), sedge wren (Cistothorus platensis), and American goldfinch (Spinus tristis) were too low to delineate trends in nest densities.

Nest Placement

Both the prairie-chicken and the ring-necked pheasant nested in cover types at a ratio significantly different ($P < 0.05$) from the ratio of cover types available on the Jasper County prairie-chicken sanctuaries (Fig. 1). Smooth brome (Bromus inermis) was the preferred cover type for the prairie-chicken and the pheasant. The northern bobwhite, red-winged blackbird (Agelaius phoeniceus), and eastern meadowlark nested in cover types at the same proportion as was available ($P > 0.50$).

Meadows subjected to various management practices from the previous year were utilized for nesting at significantly different ($P < 0.05$) ratios by the prairie-chicken, ring-necked pheasant, and red-winged blackbird when compared to type availability (Fig. 2). Fields left undisturbed the previous year were preferred by all three species, and the red-winged blackbird also displayed a preference for rotary mowed meadows. The bobwhite and meadowlark nested in management types in proportion to what was available ($P > 0.50$).

Caution is necessary in drawing conclusions on nesting in relation to cover management, because (1) grasslands left undisturbed for more than 1 year lead to rapid deterioration of meadows through weed and woody sprout invasion and excessive buildup of residue, (2) pheasant survival may be enhanced by the presence of undisturbed grasslands (Westemeler 1984a) and (3) stands unharvested for grass seed do not help pay management costs

(especially land taxes) and contribute to the local economy. Also, prairie-chickens in Marion County continue to do well, compared with those in Jasper County, with a management strategy based more predominantly on redtop harvested for seed than is the case in Jasper County (Westemeier 1984b, Westemeier and Buhnerkempe 1985). We must have a more comprehensive analysis than is feasible in this report, including a look at hatching rates in various management types, before safe conclusions can be drawn.

Nest Success

The prairie-chicken had a nest success of 67% in 1985, slightly down from the rate of 71% for 1984, but still above the nest success of 52% for 770 nests of known fate for the period of 1963 through 1984 in Jasper County (Table 2). Predation and abandonment accounted for 21% and 12%, respectively, of the prairie-chicken nest losses in 1985. The abandonment rate was the third highest since 1963. The rate at which ring-necked pheasants parasitized prairie-chicken nests was the second highest recorded since the appearance of the pheasant on the Jasper County prairie-chicken sanctuaries.

Ring-necked pheasants had a nest success of 27% for all nests, but removal of collected clutches from the sample increased the success rate to 39% (Table 2). This nest success rate was not much different from the 42% success rate from 1970 through 1984. The most notable divergence from previous years data was a three-fold increase in the abandonment rate from 9% overall to 28% in 1985.

Nest success for the northern bobwhite was 36% in 1985 (Table 2), considerably lower than the 50% success rate for nests from 1967 through 1984. The reason for the decrease in nest success was an increase in the

desertion rate from 15% for nests found from 1963 through 1984, to 29% in 1985.

Above-average precipitation in Jasper County may be a factor in the increased nest abandonment noted for galliform birds in 1985.

Clutch Size, Egg Fertility and Success

The mean clutch size for prairie-chicken nests in 1985 (Table 3) was slightly higher than the 11.9 eggs per clutch found in nests from 1963 through 1984. Statistics for egg fertility were similar to the fertility rate of 94% found from 1963 through 1984. However, there was a drop of 15 percentage points in the proportion of prairie-chicken eggs hatching in 1985 as compared with 87.8% from 1963 through 1984.

The mean clutch size of the ring-necked pheasant in 1985 (Table 3) did not change from the average clutch size of 12.7 from 1970 through 1984. Fertility levels for 1985 were similar to the 93.0% found for previous years. Egg success for the pheasant in 1985 (73.4%) was considerably lower than the overall egg success of 85.3%.

The clutch size for the northern bobwhite was almost 2 eggs higher in 1985 (Table 3) than the average clutch size of 14.7 from 1963 through 1984. All eggs in 3 hatched bobwhite nests were successful in 1985.

Nest Parasitism

Clutch size was significantly larger ($P < 0.05$) for parasitized prairie-chicken nests than for unparasitized prairie-chicken nests (Table 4). The larger clutch size was due primarily to pheasants parasitizing the early prairie-chicken nests which have larger clutch sizes than later nests.

The percentage of egg fertility was significantly lower ($P < 0.05$) in parasitized prairie-chicken nests than in those not parasitized (Table 4). However, this difference seems unrelated to species interactions because fertility rates are determined prior to parasitism.

In 1985, success of prairie-chicken eggs within parasitized clutches was not significantly lower ($P > 0.20$) than was egg success for clutches not parasitized by pheasants. However, for the period of 1970 through 1985 parasitized prairie-chicken nests did show a significantly lower ($P < 0.05$) rate of egg success, than was the case for unparasitized nests (Westemeier, Buhnerkempe, and Edwards in review). In one abandoned prairie-chicken clutch in 1985, the hatching of a single parasitic pheasant chick was a sufficient stimulus to cause the prairie-chicken hen to desert her clutch of 13 eggs that were pipped, but the embryos died due to the premature departure of the hen.

CONCLUSIONS

(1) Although increased nest densities were evident for some grassland species in 1985, the status of several species continues to be cause for concern, or at best their status remains uncertain.

(2) Because of the continued high preference shown by prairie-chickens for smooth brome, this cover type should probably be increased on the sanctuaries. However, since pheasants also prefer brome and because parasitism rates on prairie-chicken nests are highest in brome (Westemeier, Buhnerkempe, and Edwards in review), early nest searches are recommended in fields of brome in order to (1) remove parasitic eggs from prairie-chicken nests and (2) terminate pheasant nests.

(3) Due to the similar rates of utilization of all cover types at similar by nesting prairie-chickens and ring-necked pheasants, altering habitat management practices will not reduce parasitism of prairie-chicken nests or competition for nest sites between the two species. However, much different patterns of cover use by pheasants and prairie-chickens are evident for roosting (nocturnal and diurnal), escape cover, and possibly crowing/booming territories (Westemeier 1984a).

(4) Increases in abandonment rates of nesting prairie-chickens, pheasants, and bobwhites need further research.

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Table 1. Comparison of nest densities of grassland birds and mammals for 1984, 1985, and the period of 1966 through 1985 on prairie-chicken sanctuaries in Jasper County, Illinois.

Species	1984		1985		Mean Density 1966-85
	N	/4ha	N	/4ha	
Red-winged Blackbird	211	6.4	229	7.5	9.2
Eastern Meadowlark	20	0.6	28	0.9	1.1
Greater Prairie-Chicken	25	0.7	24	0.8	1.0
Dickcissel	11	0.3	4	0.1	1.0
Northern Bobwhite	7	0.2	14	0.5	0.4
Mourning Dove	6	0.2	1	0.03	0.3
Ring-necked Pheasant	20	0.6	25	0.8	0.2
Field Sparrow	0	0.0	2	0.1	0.2
Grasshopper Sparrow	0	0.0	0	0.0	0.1
Upland Sandpiper	0	0.0	2	0.1	0.05
Sedge Wren	0	0.0	2	0.1	0.04
Mallard	4	0.1	5	0.2	0.03
American Goldfinch	0	0.0	0	0.0	0.03
Eastern Cottontail	0	0.0	2	0.1	0.3
Microtines	45	1.4	275	9.0	40.3

Table 2. Fates of nests for galliform birds in Jasper County, Illinois, 1985.

Nest Fates	Number of Nests		
	Greater Prairie-Chicken (N=24)	Ring-necked Pheasant (N=26)	Northern Bobwhite (N=14)
Hatched	16	7	5
Destroyed	5	6	5
Predator	5	6	3
Human Disturbance	0	0	2 ^a
Abandoned	3	5	4
Collected	0	8	0
Parasitized	9	0	0

^a Chicks from both clutches were incubated and reared in captivity and released on the sanctuaries.

Table 3. Reproductive statistics for nesting galliform birds in Jasper County, Illinois, 1985.

	Greater Prairie-Chicken	Ring-necked Pheasant	Northern Bobwhite
Clutch size	12.6 (16 nests)	12.6 (15 nests)	17.6 (7 nests)
Fertile eggs/clutch	11.7 (12 nests)	11.3 (11 nests)	16.8 (5 nests)
% Fertility	91.5 (153 eggs)	93.2 (133 eggs)	100.0 (84 eggs)
Hatched eggs/clutch	9.3 (14 nests)	9.4 (5 nests)	16.3 (3 nests)
% Egg success	72.2 (180 eggs)	73.4 (64 eggs)	100.0 (49 eggs)

Table 4. Comparison of reproductive statistics between prairie-chicken nests parasitized by ring-necked pheasants and nests not parasitized in Jasper County, Illinois, 1985.

	Greater Prairie-Chicken Nests	
	Unparasitized	Parasitized
Number of Clutches	15	9
% Hatched	73.3	55.5
% Destroyed	20.0	22.2
% Abandoned	6.7	22.2
Prairie-Chicken Eggs		
Clutch size	11.7 (9 clutches)	13.9 (7 clutches)
Fertile Eggs/Clutch	10.7 (7 clutches)	12.8 (5 clutches)
Percent Fertility	95.0 (80 eggs)	87.7 (73 eggs)
Hatched Eggs/Clutch	9.3 (8 clutches)	8.8 (5 clutches)
Percent Egg Success	77.9 (95 eggs)	62.9 (70 eggs)
Parasitic Pheasant Eggs		
Clutch size	-	2.0 (7 clutches)
Fertile Eggs/Clutch	-	1.9 (7 clutches)
Percent Fertility	-	92.9 (14 eggs)
Hatched Eggs/Clutch	-	1.8 (5 clutches)
Percent Egg Success	-	90.0 (10 eggs)

PRAIRIE CHICKEN SANCTUARIES, JASPER COUNTY

Ownership or Lease By:

-  = Illinois Department of Conservation 612 acres
-  = The Nature Conservancy 589 acres

TOTAL 1,201 acres

1. Ralph E. Yeatter, 77 acres
2. Max McGraw, 20 acres
3. Donnelley Brothers, West 60 acres
4. Cyrus H. Mark, 17 acres
5. Jamerson McCormack, 80 acres
6. Mr. and Mrs. Chauncey McCormick, 140 acres
- * = Grassland Wildlife Research Lab.
7. Cyrus H. Mark, 40 acres
8. Stuart H. Otis, 58 acres
9. Donnelley Brothers, East 60 acres
10. Marshall Field III, 135 acres
11. Fuson Farm, 164 acres
12. Joseph W. Galbreath, 110 acres
13. Walters, 40 acres
14. CIPS, 200 acres

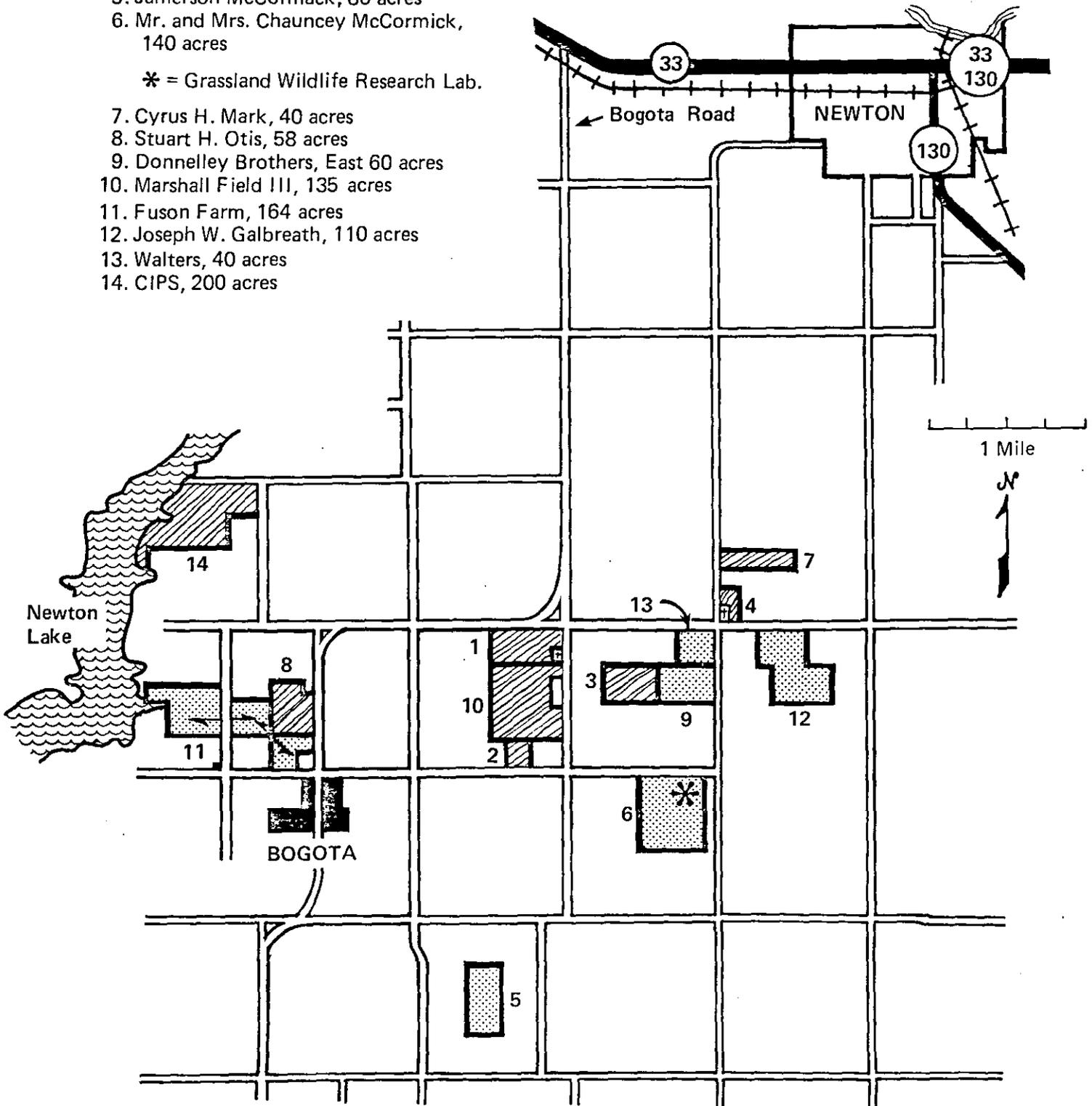


Fig. 1. Map of the Jasper County prairie-chicken sanctuaries.

PRAIRIE CHICKEN SANCTUARIES, MARION COUNTY

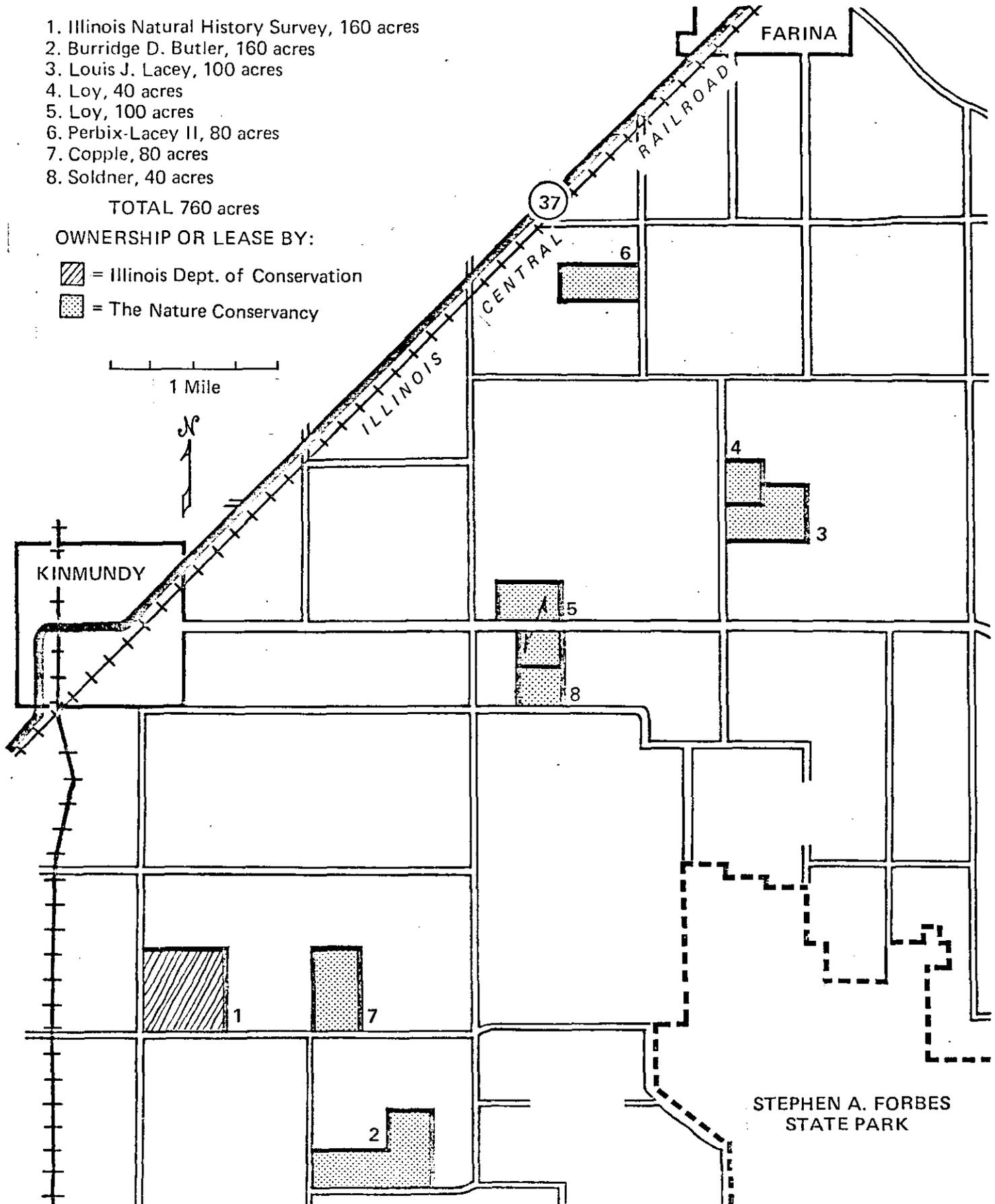


Fig. 2. Map of the Marion County prairie-chicken sanctuaries.

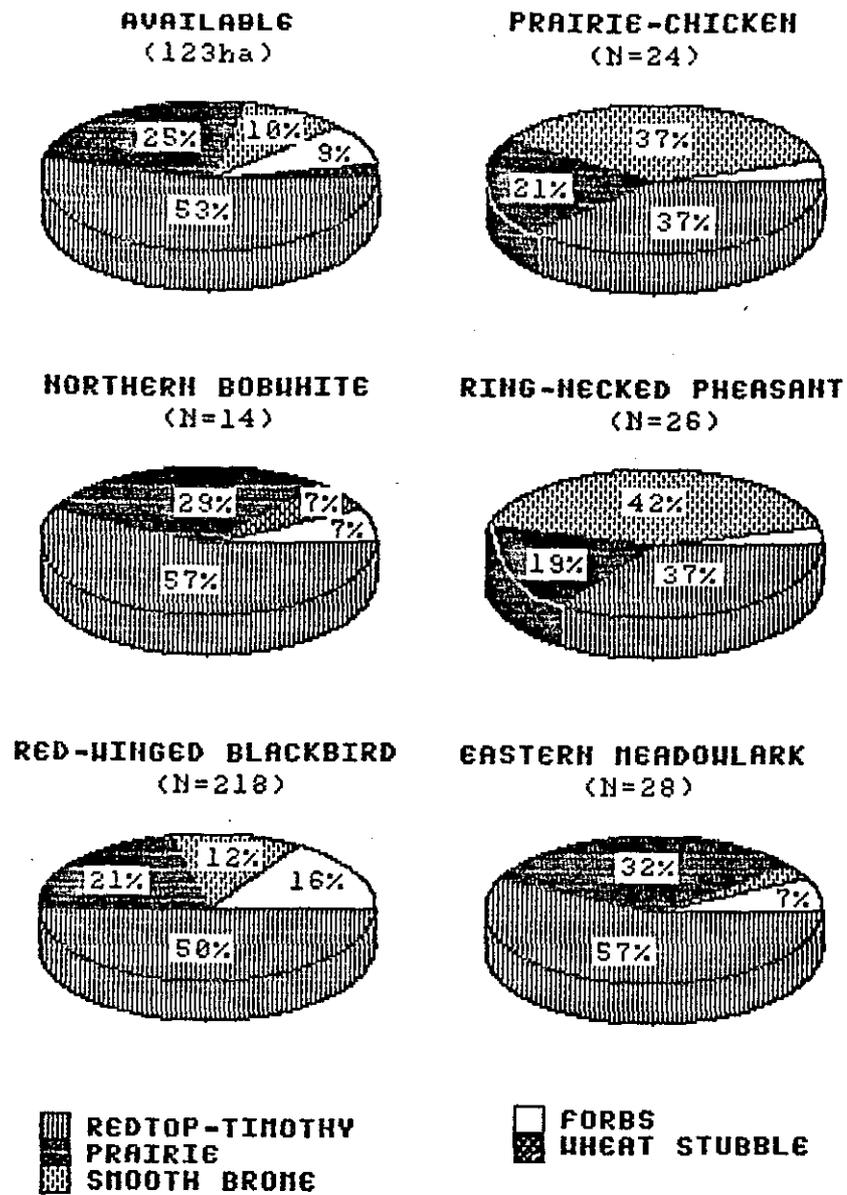


Fig. 3. Cover types utilized by nesting birds in Jasper County, Illinois, 1985.

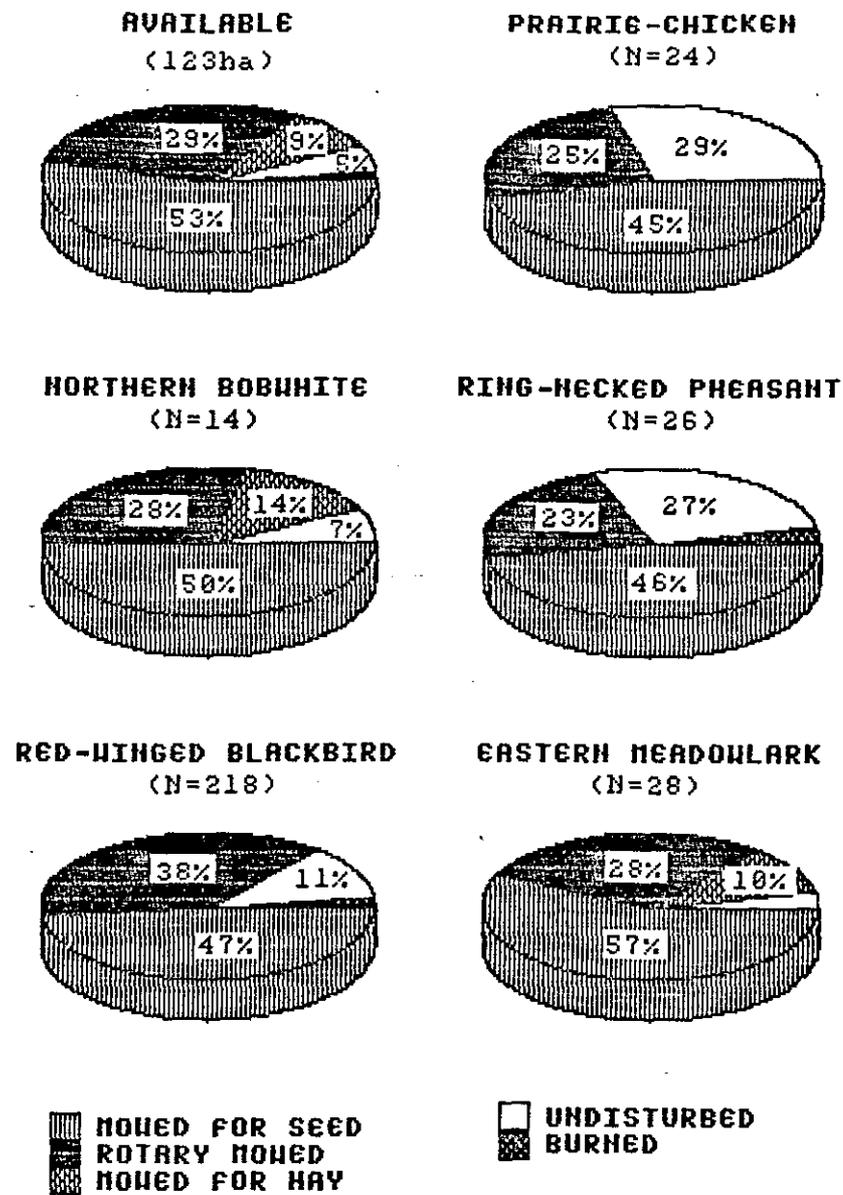


Fig. 4. Utilization of grasslands by nesting birds as affected by the previous years management in Jasper County, Illinois, 1985.

Appendix 1. Other activities conducted during the course of the nest study
in 1985.

Pheasant Control

Because of the serious threat that pheasants pose in efforts to preserve Illinois prairie-chickens (Vance and Westemeier 1979, Westemeier 1984a, Westemeier, Buhnerkempe, and Edwards in review), work was continued to find locally discrete and acceptable methods of pheasant control. Four large (4' X 8.5' X 2') funnel-type traps were constructed and tested for effectiveness. A welded wire (1' X 2') cage containing a game-farm cock or hen pheasant was placed inside each funnel trap as bait for wild pheasants. The baited traps were tried in central locations on the Yeatter, M. Field, and C. McCormick sanctuaries from 5 June through 26 June.

Although only 4 wild pheasant cocks were captured during 19 trap-days, these captures were sufficient to demonstrate the effectiveness of the trapping technique despite the lateness of the trapping effort. We feel confident that wild cock pheasants can be readily captured with gamefarm cocks (rivals) as bait by initiating a trapping program about 1 April. Capture of wild pheasant hens, however, remains to be demonstrated. Successful trapping of wild hens may hinge on first trapping wild pheasant cocks to use as bait for harems of hens on the sanctuaries.

Bluebird Boxes

During rainy days, when a nest search could not be conducted, bluebird boxes were constructed for placement on the prairie-chicken sanctuaries. A total of 30 Peterson bluebird houses and 21 one-board houses were built. Paul Butler (summer field assistant, 1985) will place the bluebird houses on the sanctuaries this fall as part of a Boy Scout project.

Prairie Restoration

A 1.5-acre plot near the Bogota Laboratory was seeded to big bluestem, Indian grass, little bluestem, and various prairie forbs. Some forbs were also transplanted to the site. The plot was disked three times and rolled prior to and after seeding. Six man-hours were required in the prairie restoration effort.

Brush Control

Six man-days were spent assisting the Sanctuary manager with brush control on the Galbreath sanctuary.