

Breeding Birds of Sand Prairie Natural History Reservation, Harvey County, Kansas

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Since 1967, breeding birds have been censused each summer on the Sand Prairie Natural History Reservation located four miles east and four miles north of Burrton, Harvey County, Kansas (E½ SE¼ Sec36 R3WT22S). This 80-acre (32.38 ha) tract (440 x 880 yards) has been divided into squares 65 meters on a side for use in mapping the position of birds. Censuses were begun before sunrise and were usually completed before 0900. Census techniques used were those of the Breeding-bird censuses sponsored by the National Audubon Society. Except for 1967 and 1971, more than eight census trips were made each summer, with five or six of these in June. Some searches for bird nests were also made. Twice-weekly visits throughout the summer for other biological field studies afforded opportunities for additional observations of birds.

The Reservation has never been cultivated. It was pastured from the time of settlement in the late 1800s until the fall of 1965 when it was acquired by Bethel College to be managed as a natural area for use in biological research and education.

The Reservation is in a strip of stabilized sand dunes known as the Hutchinson Dune Tracts. These are wind-blown sand deposits, probably of late Pleistocene age. The elevation varies from 1405 to 1435 feet above sea level. Underlying the sandy surface deposits is a rather impervious subsoil. During periods of wet weather the low areas between the dunes and ridges are often flooded as small ponds or marshes. Table 1 shows the rainfall and degree of flooding during the summers when bird censuses were made. The years 1969 and 1973 were exceptionally wet and at the time of maximum flooding more than 13 of the 80 acres were under water. In 1972, a minimum of surface water was present.

Table 1. Precipitation and Flooding of Low Areas on the Sand Prairie Natural History Reservation, Harvey County, Kansas in the Summers of 1967 to 1973.

[Precipitation is expressed in inches of rainfall and flooding is expressed in the following scale: 0 = no surface water; 1 = only one pond with water, 2 = a few small ponds in addition to the one more permanent pond; 3 = some large areas flooded, including a slough of approximately five acres, 4 = water running onto and off the reservation in a waterway; 5 = maximum flooding]

Year	May	June	July	August
1967				
Precipitation	1.30	8.80	9.40	4.23
Flooding	1	1→3	3→4	4→3
1968				
Precipitation	3.04	4.55	3.57	3.85
Flooding	3	3	3→2	2
1969				
Precipitation	7.34	4.91	4.21	1.71
Flooding	3→4	4→5→4	3	3
1970				
Precipitation	1.22	5.80	1.40	0.48
Flooding	3	3	3→2	1
1971				
Precipitation	3.78	2.12	5.27	1.76
Flooding	2→3	3	3	3→2
1972				
Precipitation	3.45	3.32	3.38	2.44
Flooding	2	2	2→1	1→0
1973				
Precipitation	3.31	1.55	4.41	2.09
Flooding	5→4	4	3	3→2→1

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More than 280 species of plants have been found on the Reservation. In the following description, approximate per cent coverages are listed for prominent species as of 1972 and 1973. These coverages may be more than total plant coverage in each habitat because of overlapping plant strata. The slopes and tops of the dunes and ridges are covered with xeric or mesic grass communities, disturbed forb communities or plum thickets. Total plant coverage varies from 60 to 100 per cent. Some of the prominent species are: Little Bluestem (*Andropogon scoparius*) 20%; Switchgrass (*Panicum virgatum*) 50%; Purple Sandgrass (*Triplasis purpurea*), Hidden Dropseed (*Sporobolus clandestinus*), Sand Dropseed (*S. cryptandrus*), Kearney Threeawn (*Aristida longespica*), Fringeleaf Paspalum (*Paspalum setaceum*) and Scribner Panicum (*Panicum oligosanthes*) 35%; Fourpoint Evening Primrose (*Oenothera rhombipetala*), Camphorweed (*Heterotheca subaxillaris*), Western Ragweed (*Ambrosia psilostachya*), Annual Eriogonum (*Eriogonum annuum*), Field Snakecotton (*Froelichia floridana*), Silky Prairie Clover (*Petalostemon villosus*), Tropic Croton (*Croton glandulosus*) and other forbs 35%; Common Pricklypear (*Opuntia compressa*) 3%; Chickasaw Plum (*Prunus angustifolia*) 8%.

The unflooded or infrequently flooded lowland communities are zoned with respect to their relative height above the water table and consist of various types of tall grass communities, disturbed forb communities, willow groves and, less commonly, small groves of trees of mixed species. Total plant coverage is more than 90 per cent. Prominent species are: Switchgrass 45%, Prairie Cord Grass (*Spartina pectinata*) 15%; Little Bluestem 8%, Indian Grass (*Sorghastrum avenaceum*) 8%; Sand Bluestem (*Andropogon hallii*) 5%; other grasses, sedges and rushes 15%; Western Ragweed (*Ambrosia psilostachya*), Horseweed (*Conyza canadensis*), Cudweed (*Gnaphalium obtusifolium*) and other forbs 20%; Buttonbush (*Cephalanthus occidentalis*), Roughleaf Dogwood (*Cornus drummondii*) and Elderberry (*Sambucus canadensis*) 10%; Black Willow (*Salix nigra*) 15%.

The vegetation of the wetlands that are flooded for part or all of most years is continually changing from season to season and year to year as the habitat fluctuates between aquatic and moist lowland. In addition to the changing annual vegetation, there are perennial sedge (*Scirpus* and *Eleocharis*), Prairie Cord grass and Buttonbush communities in some of the wetlands.

Successional changes have occurred since grazing by cattle was stopped in the fall of 1965. Some changes important to breeding birds are:

- 1) An increase in density and height of a number of tall perennial grasses (for example *Andropogon*, *Sorghastrum* and *Panicum virgatum*) and a decrease in some of the lower annual weedy grasses (for example *Cenchrus*).
- 2) An increase in plant and litter coverage.
- 3) An increase in coverage of some shrubs, vines and small trees, particularly *Cornus*

drummondii, *Vitis riparia* and *Rhus radicans* in low or shady areas and *Prunus angustifolia* on the dunes.

Adjoining the reservation on three sides are sand prairie pastures extending a mile or more in each direction; a road, some cultivated land and pasture lie to the east.

In the seven years of censuses, 38 species of breeding birds have been recorded (see Table 2). Twenty-three species were regular nesters in at least four out of the seven years. In the following discussion, abundance is listed as high (8 or more territorial males), moderate (3 to 7.5) or low (+ to 2.5). Populations are classified as variable if there is irregular change involving a difference of at least three territorial males and a doubling of minimum numbers, as increasing or decreasing if there is a consistent trend in population numbers or as relatively constant.

Ten of the 23 species that were regular nesters were variable in abundance from year to year. These changes in abundance could have been related to general population levels in the area or to specific habitat changes on the reservation. Five of these, the Mourning Dove, E. Kingbird, Orchard Oriole, N. Oriole and Field Sparrow in some years reached high abundance and were the most abundant breeding birds. The Gray Catbird, Brown Thrasher, E. Meadowlark, Red-winged Blackbird and Dickcissel only reached moderate abundance. Of these species, the Mourning Dove, E. Kingbird, Orchard Oriole, N. Oriole, Gray Catbird, Brown Thrasher and Red-winged Blackbird increased in numbers in 1969 and to a lesser degree in 1973, years of extensive flooding. Populations in most cases remained high in 1970 after the increase in 1969. The Mourning Dove, E. Kingbird, Orchard Oriole, N. Oriole and Red-winged Blackbird commonly nested in shallowly-flooded sedge marshes, Buttonbush marshes or willow groves and many nests were found in these habitats in years of extensive flooding. Such habitats provided some protection from common predators. Flooding was probably more important in determining the number and success of nests for the polygamous colony-nesting Red-winged Blackbird than in determining the number of territorial males. In these species there was a greater population response to the extensive flooding in 1969 than in 1973, possibly because the water was already lowering by the nesting season in 1973.

The Gray Catbird also commonly nested in shallowly-flooded Buttonbush as well as unflooded lowland thickets. There was a decided

Table 2. Breeding Bird Censuses on the 80-acre Sand Prairie Natural History Reservation, Harvey County, Kansas, 1967 to 1973.

The number of territorial males or breeding pairs is listed. For species with three or more territorial males or breeding pairs, the numbers per 100 acres and per square kilometer are listed in parentheses.

+ = fraction of a territory less than one-half

? = breeding activity occurred but data are too limited to estimate numbers.

* = data on which an estimate is based are limited and estimate may be low.

V = bird was a regular visitor but no territorial or nesting activity observed in that summer.

N = number of nests found.

	1967	1968	1969	1970	1971	1972	1973
No census trips	3	9	14	13	6	9	11
1 Mourning Dove	?	9 (11.3) (27.8)	15 (18.8) (46.4)	18 (22.5) (55.6)	9 (11.3) (27.8)	6 (7.5) (18.5)	8 (10.0) (24.7)
2 E. Kingbird	N 6 3 (3.8) (9.3)	N 17 3 (3.8) (9.3)	N 28 8 (10.0) (24.7)	N 29 7 (8.8) (21.6)	N 10 4 (5.0) (12.4)	N 6 5 (6.3) (15.5)	N 10 5½ (6.9) (17.0)
3 Orchard Oriole	?	N 1 4 (5.0) (12.4)	N 8 13 (16.3) (40.2)	N 7 9 (11.3) (27.8)	N 1 2* (5.0) (12.4)	N 3 2 (5.0) (12.4)	N 4 8 (10.0) (24.7)
4 N. Oriole	N 3 ?	5½ (6.9) (17.0)	13 (16.3) (40.2)	8 (10.0) (24.7)	4* (5.0) (12.4)	N 1 4 (5.0) (12.4)	N 5 8 (10.0) (24.7)
5 Field Sparrow	?	5 (6.3) (15.5)	8 (10.0) (24.7)	10 (12.5) (30.9)	4* (5.0) (12.4)	7½ (9.4) (23.2)	7 (8.8) (21.6)
6 Gray Catbird	N 1 ?	N 4 1 (5.0)	N 12 4 (5.0) (12.4)	N 11 5 (6.3) (15.5)	N 7 2 (5.0)	N 6 1 (5.0)	N 4 2 (5.0)
7 Brown Thrasher	2	2	4 (5.0) (12.4)	4 (5.0) (12.4)	1* (5.0)	2 (5.0)	4½ (5.6) (13.9)
8 Eastern Meadowlark	3* (3.8) (9.3)	2½	2 (2.5) (6.3)	+ (2.5) (6.3)	+ (2.5) (6.3)	1 (1.25) (3.15)	4½ (5.6) (13.9)
9 Red-winged Blackbird	0	3 (3.8) (9.3)	3½ (4.4) (10.8)	2½ (3.15) (7.95)	2½ (3.15) (7.95)	2 (2.5) (6.3)	5 (6.3) (15.5)
10 Dickcissel	0	N 3 5 (6.3) (15.5)	N 1 4 (5.0) (12.4)	N 1 2½ (3.15) (7.95)	N 2 5½ (6.9) (17.0)	N 2 4 (5.0) (12.4)	N 7 2 (2.5) (6.3)
11 Bobwhite	2*	4½ (5.6) (13.9)	4 (5.0) (12.4)	3 (3.8) (9.3)	3 (3.8) (9.3)	2 (2.5) (6.3)	3 (3.8) (9.3)
12 Yellow-billed Cuckoo	?	N 1 2½ (3.15) (7.95)	N 7 4½ (5.6) (14.4)	N 2 2½ (3.15) (7.95)	N 3 2 (2.5) (6.3)	N 2 3 (3.8) (9.3)	N 1 3 (3.8) (9.3)
13 Cardinal	?	3 (3.8) (9.3)	3½ (4.4) (10.8)	4 (5.0) (12.4)	3 (3.8) (9.3)	3 (3.8) (9.3)	4 (5.0) (12.4)

	1967	1968	1969	1970	1971	1972	1973
No census trips	3	9	14	13	6	9	11
14 Ring-necked Pheasant	1	1	2	2	1	1	1
		N 3					N 1
15 Common Flicker	?	1	+	2	V	+	1
		N 1	N 1	N 1		N 1	
16 Gt. Crested Flycatcher	?	2	1	1	1	V	1
17 Black-cap. Chickadee	V	1*	1*	1*	V	V	+
18 Barn Swallow	?	½	0	2	?	2	3
							(3 8)
							(9 3)
19 Bell's Vireo	0	N 1	2	N 4		N 4	N 6
		1		1	2	2	4
							(5 0)
							(12 4)
			N 1			N 1	N 1
20 Com. Yellowthroat	2	2	3	4	3	4	4
			(3.8)	(5.0)	(3.8)	(5.0)	(5 0)
			(9.3)	(12.4)	(9.3)	(12.4)	(12 4)
21 Blue-gray Gnatcatcher	0	0	0	1	1	1	1
				N 1		N 1	N 1
22 Western Kingbird	?	2	1	1	1	0	0
	N 1		N 1	N 1	N 1		
23 House Wren	6	6	5	5	3½	1	1
	(7.5)	(7.5)	(6.3)	(6.3)	(4.4)		
	(18.5)	(18.5)	(15.5)	(15.5)	(10.8)		
		N 1	N 2				
24 Pied-billed Grebe	0	0	0	0	0	0	1
							N 1
25 Mallard	0	0	?	0	0	0	?
							N 2
26 Blue-winged Teal	0	?	0	0	0	0	?
							N 1
27 Northern Shoveler	0	?	0	0	0	0	0
28 Red-bellied Woodpecker	0	1	0	0	0	0	0
		N 1					
29 Eastern Phoebe	0	0	0	0	½	½	0
						N 1	
30 Blue Jay	V	V	1	2	V	V	5
							(6 3)
							(15 5)
				N 2			N 4
31 Mockingbird	+	+	0	V	V	0	0
32 American Robin	0	0	0	0	0	0	1
							N 1
33 Eastern Bluebird	0	1	0	0	0	0	0
		N 1					
34 Warbling Vireo	0	0	0	0	0	1	+
35 Yellow-breasted Chat	0	0	0	0	0	1	0
36 Common Grackle	V	V	1	V	V	V	V
			N 1				
37 Indigo Bunting	0	0	0	0	0	2	0
38 Lark Sparrow	0	½	V	½	0	0	0
		N 1		N 1			
Total Species	19	28	25	25	21	24	28
Total Territorial Males (or Breeding Pairs)	?	69.0	103.5	98.0	55.0	58.0	87.5
		(86.3)	(129.4)	(122.5)	(68.8)	(72.5)	(109.3)
		(213.1)	(319.8)	(302.6)	(169.8)	(179.1)	(270.4)

increase in the number of breeding pairs in 1969 but little increase in 1973. The Brown Thrasher, however, was an upland nester (usually utilizing plum thickets), and yet, during these seven years, its population was also higher in wet years. The E Meadowlark, Field Sparrow and Dickcissel show no obvious correlation of population size with environmental factors. Their numbers may have been more indicative of general population levels in the area. The Dickcissel was usually not seen until a couple weeks after they had arrived in the vicinity.

Seven species have had relatively constant breeding populations; the Yellow-billed Cuckoo and Cardinal at moderate population levels, the Com. Flicker, Great Crested Flycatcher and Black-capped Chickadee at low population levels and the Bobwhite and Ring-necked Pheasant at relatively high population levels for gallinaceous species. Of course the actual number of pheasant nests was higher than the estimate of breeding males. The populations of the Bobwhite were probably affected by their release on a shooting range immediately south of the Reservation. The data for the Black-capped Chickadee are inadequate because few censuses were made during its nesting season.

A breeding pair of Blue-gray Gnatcatchers has established itself and the Barn Swallow, Bell's Vireo and Com. Yellowthroat have shown a general increase in breeding populations in the seven years. A colony of Barn Swallows has been building up in culverts on the edge of the Reservation. This is probably the result of generally high populations in the vicinity. Since the nests were at the edge and the birds foraged both on and off the Reservation, the population estimate listed is one-half the number of breeding pairs. The increase in Bell's Vireo and Com. Yellowthroat populations may have been in response to increased shrubby habitat and increased plant cover.

The W. Kingbird has stopped nesting and the House Wren has undergone a substantial decline in the breeding population. There has been no obvious deterioration in wren habitat but the decline in wren populations may be owing to a number of factors including: 1) traps for snakes used in a long-term study of snake population dynamics have caught wrens in spring and late summer resulting in substantial mortality. Although trapping began in 1966, the greatest decline in wren populations did not occur until 1971. 2) House Wren populations appear to have made a general decline in this area.

Fifteen species of birds were irregular nesters. The Pied-billed Grebe, Mallard, Blue-winged

Teal and N. Shoveler only remained to nest when there was sufficient aquatic habitat. The Yellow-breasted Chat and Indigo Bunting probably did not nest, but territorial males were present for more than two weeks during the nesting season. The Red-bellied Woodpecker, E. Phoebe, Mockingbird, Am. Robin, E. Bluebird, Warbling Vireo and Lark Sparrow nested in neighboring areas in small numbers and one or two established at least a part of their nesting territories on the Reservation. The Com. Grackle and Blue Jay were common summer visitors in most years but usually nested more commonly along the Little Arkansas River, one-half mile to the east

Regular summer visitors during the nesting season included the following species:

1. Common summer visitors but no nesting records: Com. Crow, Red-headed Woodpecker and Am. Goldfinch.
2. Uncommon summer visitors but probably nested in the immediate vicinity: Great Horned Owl, Screech Owl (young were seen in 1973), Chimney Swift, Hairy Woodpecker, Downy Woodpecker, Blue Grosbeak and Grasshopper Sparrow.
3. Uncommon summer visitors known to nest regularly less than one mile away: Mississippi Kite and Red-tailed Hawk.
4. Common summer visitors when there were extensive aquatic habitats: Great Blue Heron, Green Heron, Killdeer and Belted Kingfisher.
5. Uncommon summer visitors when there were extensive aquatic habitats: Wood Duck (has nested on adjoining areas or possibly on the Reservation), Black-crowned Night Heron and Am. Bittern.

Populations of Brown-headed Cowbirds were not regularly censused but were high. Twenty to forty cowbirds per census were counted in three censuses in 1973. Table 3 lists the percentage of nests parasitized by cowbirds for each of the species that has been observed to be a host of the cowbird.

Table 4 lists the plants or structures supporting nests. Preferences were shown by many species for the life form of supporting plants. The Northern Oriole prefers tall spreading trees of which there were few. More than one-fourth of the nests were found in four tall Eastern Cottonwoods and most nests in Black Willows were more than 25 feet high. The preference of most shrub-nesting species for Buttonbush over the more common Chickasaw Plum may have been a preference for a taller shrub or for a flooded habitat. The greater

Table 3. Parasitism of Nesting Birds on the Sand Prairie Natural History Reservation by Brown-headed Cowbirds, 1967 to 1973.

For the following species no instance of parasitism was observed (numbers of nests with eggs or young observed are listed in parentheses): Mourning Dove (60), Brown Thrasher (14), Yellow-billed Cuckoo (11), Gray Catbird (9), Cardinal (8), Barn Swallow (4), Blue Jay (3), Northern Oriole (3), Bell's Vireo (2), Western Kingbird (1), Common Grackle (1), Am. Robin (1) and Eastern Phoebe (1).

Species	Number nests	Per cent parasitized
1 Field Sparrow	35	54%
2 Orchard Oriole	13	46%
3 Red-winged Blackbird	11	36%
4 E Kingbird	10	10%
5 Dickcissel	4	75%
6 Lark Sparrow	2	100%

number of Field Sparrow nests in Little Bluestem rather than the more abundant Switchgrass was probably owing to a preference for the more compact Little Bluestem clump and for the more open upland habitat where Little Bluestem was common. However preference was limited by availability. More than three-fourths of the trees were Black Willows and more than three-fourths of the

nests built in trees were in the willows. The two most abundant shrubs, Chickasaw Plum and Buttonbush, contained almost all of the nests that were built in shrubs. All of the nests found in grass clumps were in the two most abundant species of tall grass. Availability was probably the most important factor determining the species of plants in which nests were built.

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Table 4. Main Support for Nests of Breeding Birds on the Sand Prairie Natural History Reservation

The table includes only those species for which five or more nests were found. The following served as supports (trees are listed in order of abundance): 1. Black Willow (*Salix nigra*), 2. White Mulberry (*Morus alba*), 3. American Elm (*Ulmus americana*), 4. Cottonwood (*Populus deltoides*), 5. Juniper (*Juniperus virginiana*), 6. Chickasaw Plum (*Prunus angustifolia*), 7. Buttonbush (*Cephalanthus occidentalis*), 8. Roughleaf Dogwood (*Cornus drummondii*), 9. Am. Elderberry (*Sambucus canadensis*), 10. Indigobush Amorpha (*Amorpha fruticosa*), 11. Riverbank Grape (*Vitis riparia*), 12. Great Bulrush (*Scirpus acutus*), 13. Switchgrass (*Panicum virgatum*), 14. Little Bluestem (*Andropogon scoparius*), 15. culvert, and 16. ground. * = young tree under six feet in height

Species	Main Support for Nests															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Mourning Dove	52	5	4				16									10
2 Yellow-billed Cuckoo	10		1			1	1									
3 Eastern Kingbird	17						6									
4 Blue Jay	6															
5 Northern Oriole	16	1	2	7												
6 Orchard Oriole	11	1	2				12									
7 Cardinal	2		2				2		1							
8 Gray Catbird		1			1	1	9	2								
9 Brown Thrasher	2	3	2			8	5				1					
10 Red-winged Blackbird	2*						11					4				
11 Dickcissel	1*															4
12 Field Sparrow			*2			5	1			1			7	22		
13 Barn Swallow																15