

**Upland Bird Survey at the Savanna Army Depot and Thomson-Fulton Sand Prairie
Research Natural Area, Upper Mississippi River Refuge**

1998 Annual Report

Prepared by

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The Savanna Army Depot is scheduled for base closure in 2000. Upon its closure, thousands of acres of native sand prairie and savanna will be transferred to the U.S. Fish and Wildlife Service. In a joint agreement with the U.S. Fish and Wildlife Service, the Illinois Department of Natural Resources will take the lead in managing the upland sand prairie and sand savanna portions of the Depot. In order to effectively manage this valuable resource, a thorough assessment of the bird communities of the site are needed.

Bird research at the Depot was initiated in 1997 as part of a large scale study of Illinois grassland bird populations. This research was focused on developing guidelines for landscape-scale grassland bird conservation efforts by comparing grassland bird populations among grasslands of varying sizes, composition (native vs. non-native grasslands) and management practices (burned, mowed, grazed and idle). Research at the Depot has added important data on a new habitat (large sand prairie) and a new management practice (grazed prairie) to these ongoing studies.

Research at the Depot has included both bird censusing and nest monitoring. Bird populations at the Depot were monitored using nationally established point count procedures. We used five minute, fixed-radius (100-m) point counts to estimate relative abundance of birds within study areas. We also collected information on litter depth and vegetation height-density at each census point location.

A total of 80 species were recorded during the bird censusing at the Depot in 1997 and 85 species in 1998 (Table 1). Grasshopper sparrows were the most numerous species recorded in both years, with an average density of 2.5 birds/point (only considering birds detected within 100-m of a point center) in 1997 and 1.8 birds/point in 1998. Western Meadowlarks were the second most abundant species in both years with an average density of 1.3 birds/point in 1997 and 0.9 birds/point in 1998. A complete listing of birds recorded at the Depot in both 1997 and 1998 is shown in Table 1. Bird populations in 1998 were largely comparable to 1997, with a few notable exceptions. Grasshopper sparrow and western meadowlark densities were significantly lower in 1998 than in 1997 (Table 1). Dickcissels, however, were significantly more abundant in 1998 than in 1997. In fact, dickcissels were not recorded at the Depot in 1997 but were the 5th most abundant species in 1998. Additionally, bobolinks were not encountered on the Depot in 1997, but were encountered in the taller vegetation at the Depot in 1998. The changes in bird populations at the Depot appear to be primarily related to vegetation changes. Vegetation height-density was significantly greater in 1998 than in 1997. Both species that showed significantly reduced densities in 1998 (grasshopper sparrow, western meadowlark) prefer grassland areas with relatively short cover, and the dickcissel (which significantly increased in 1998) and bobolink prefer areas with relatively tall vegetation. Therefore, the major changes in bird populations at the Depot we observed between 1997 and 1998 can readily be explained by the changes in vegetation structure between years. Compared to other major grassland areas in Illinois, the Depot has the highest densities of grasshopper sparrows, killdeers, lark sparrows, vesper sparrows, northern mockingbirds, horned larks, and western meadowlarks that we have discovered in our studies of Illinois grasslands (Table 2).

Grasshopper sparrows were also the most commonly encountered species at the Thomson-Fulton Research Natural Area (Table 3) with densities at this site being comparable to those at the Savanna Army Depot (Table 1). The Red-winged blackbird was the 2nd most commonly encountered bird at Thomson-Fulton Research Natural Area. Eastern Meadowlarks were the 3rd most commonly encountered bird at Thomson-Fulton Research Natural Area. Similar to the pattern observed at the Depot, Grasshopper Sparrows and Eastern Meadowlarks were the two most frequently encountered birds at Thomson-Fulton Nature Preserve (Table 3)

Estimates of grassland bird nest success at the Depot in 1997 were variable (Table 4). Estimates of nest success reported in Table 4 based on fewer than 10 nests should be interpreted with some degree of caution. For the five species of grassland birds with the largest samples in 1997, three (grasshopper sparrow, vesper sparrow, and field sparrow) had nest success estimates that appear comparable to other locations in the state. Nest success for eastern/western meadowlarks (meadowlark nests were combined due to difficulties assigning some nests to species) at the Depot appeared to be considerably higher than at other locations in Illinois, whereas estimated nest success for lark sparrows at the Depot appeared to be somewhat lower than elsewhere in the state. The overall frequency of nest parasitism by brown-headed cowbirds on grassland birds at the Depot was low and ranged from a high of 42.9% for field sparrows to less than 5% for most other species (Tables 4 and 5). These rates appear comparable to other grassland areas in Illinois. Nest success data from the 1998 season is shown in Table 5.

[sad98.rep.wpd]

TABLE 5. Nest success at the Savanna Army Depot Ordinance (1997-1998) and Thomson-Fulton Research Natural Area (1998).

	SAD - 1997			SAD - 1998			Thomson-Fulton RNA - 1998		
	N	Nest Success ²	Nest Parasitism	N	Nest Success ²	Nest Parasitism	N	Nest Success	Nest Parasitism
American Goldfinch	1	0.7%	0.0%	-	-	-	-	-	-
American Robin	-	-	-	1	100.0%	0.0%	-	-	-
Blue Grosbeak	1	100.0%	0.0%	-	-	-	-	-	-
Blue Jay	1	100.0%	0.0%	-	-	-	-	-	-
Bobolink	-	-	-	1	100.0%	0.0%	-	-	-
Brown Thrasher	4	100.0%	0.0%	11	36.6%	0.0%	2	41.2%	0.0%
Cedar Waxwing	-	-	-	3	0.0%	0.0%	-	-	-
Chipping Sparrow	4	100.0%	0.0%	41	6.6%	34.1%	2	3.1%	0.0%
Common Nighthawk	16	79.9%	0.0%	16	14.5%	0.0%	-	-	-
Dickcissel	-	-	-	25	20.4%	20.0%	-	-	-
Eastern Kingbird	-	-	-	6	47.8%	0.0%	-	-	-
Eastern/Western Meadowlark	46	35.5%	2.2%	28	21.2%	0.0%	1	0.0%	0.0%
Field Sparrow	18	22.2%	27.8%	14	21.6%	42.9%	3	0.1%	0.0%
Grasshopper Sparrow	85	17.0%	3.5%	84	33.2%	8.3%	4	8.8%	0.0%
Horned Lark	2	3.8%	0.0%	-	-	-	-	-	-
Killdeer	5	100.0%	0.0%	1	5.0%	0.0%	-	-	-
Lark Sparrow	19	11.5%	21.1%	6	24.9%	33.3%	4	0.9%	0.0%
Loggerhead Shrike	-	-	-	2	100.0%	0.0%	-	-	-
Mallard	-	-	-	1	100.0%	0.0%	1	2.5%	0.0%
Morning Dove	8	61.2%	0.0%	7	15.1%	0.0%	-	-	-
Northern Bobwhite	-	-	-	-	-	-	1	4.2%	0.0%
Northern Mockingbird	-	-	-	8	50.9%	0.0%	-	-	-
Red-winged Blackbird	1	20.9%	100.0%	5	11.2%	40.0%	1	0.0%	0.0%
Upland Sandpiper	2	100.0%	0.0%	-	-	-	-	-	-
Vesper Sparrow	24	21.3%	8.3%	14	20.2%	14.3%	-	-	-
Wild Turkey	-	-	-	-	-	-	1	100.0%	0.0%

² Mayfield estimates of nest success

[sad98sum.tab.wpd]

TABLE 1. Number of birds recorded at the Savanna Army Depot Ordinance in 1997 and 1998. Data are the mean number of birds recorded at 58 100-m fixed-radius point count stations in 1997 and 55 100-m fixed-radius point count stations in 1998. Results of an ANOVA test comparing mean densities between 1997 and 1998 are also shown. Statistically significant differences are shown in bold. Birds are listed in decreasing order of abundance.

Species	Abundance	Abundance	Difference	F-statistic	Probability
	(#birds/pt.) 1997	(#birds/pt.) 1998	(birds/pt.) '98-'97		
grasshopper sparrow	2.541	1.882	-0.659	6.33	0.0133
western meadowlark	1.303	0.900	-0.403	4.12	0.0447
field sparrow	0.670	0.636	-0.033	0.00	0.9445
lark sparrow	0.550	0.345	-0.205	1.95	0.1651
chipping sparrow	0.422	0.445	0.023	0.05	0.8319
brown headed cowbird	0.394	0.427	0.033	0.06	0.8112
vesper sparrow	0.394	0.264	-0.131	1.92	0.1684
red-winged blackbird	0.193	0.427	0.235	0.12	0.7312
eastern meadowlark	0.229	0.373	0.143	2.00	0.1602
morning dove	0.211	0.382	0.171	1.22	0.2725
horned lark	0.339	0.245	-0.094	0.64	0.4243
house wren	0.303	0.236	-0.066	0.24	0.6266
dickcissel	0.000	0.427	0.427	25.19	0.0000
eastern kingbird	0.174	0.155	-0.020	0.48	0.4885
American robin	0.202	0.109	-0.093	1.33	0.2508
Baltimore oriole	0.174	0.136	-0.038	0.16	0.6867
blue jay	0.165	0.127	-0.038	0.19	0.6622
brown thrasher	0.183	0.100	-0.083	1.94	0.1666
Canada goose	0.000 ^a	0.273	0.273		
orchard oriole	0.138	0.118	-0.019	0.16	0.6944
gray catbird	0.138	0.109	-0.029	0.10	0.7507
killdeer	0.119	0.127	0.008	0.01	0.9211
eastern bluebird	0.110	0.127	0.017	0.01	0.9238
American goldfinch	0.119	0.109	-0.010	0.00	0.9759
song sparrow	0.128	0.100	-0.028	0.05	0.8185
northern cardinal	0.092	0.118	0.026	0.37	0.5417
common grackle	0.128	0.073	-0.056	0.30	0.5837
European starling	0.092	0.100	0.008	0.00	0.9456
northern mockingbird	0.119	0.073	-0.047	0.78	0.3795
black-capped chickadee	0.046	0.100	0.054	1.29	0.2579
great-crested flycatcher	0.083	0.064	-0.019		
indigo bunting	0.064	0.064	-0.001	0.00	0.9484
rose-breasted grosbeak	0.101	0.027	-0.074	2.22	0.1389
eastern towhee	0.064	0.055	-0.010	0.02	0.8834
northern flicker	0.064	0.045	-0.019	0.26	0.6113
common yellowthroat	0.064	0.027	-0.037	0.33	0.5643
American crow	0.073	0.000	-0.073		
cedar waxwing	0.028	0.045	0.018	0.42	0.5171
tree swallow	0.000	0.073	0.073	1.06	0.3066
upland sandpiper	0.009	0.064	0.054	1.02	0.3141
blue-gray gnatcatcher	0.028	0.036	0.009		
warbling vireo	0.046	0.009	-0.037	0.83	0.3653
barn swallow	0.000	0.045	0.045		
bobolink	0.000	0.045	0.045	1.57	0.2135
downy woodpecker	0.028	0.018	-0.009	0.15	0.6946
eastern wood-pewee	0.009	0.036	0.027		
ovenbird	0.009	0.036	0.027		

TABLE 1. Continued.

Species	Density (#birds/pt.) 1997	Density (#birds/pt.) 1998	Difference (birds/pt.) '98-'97	F-statistic	Probability
yellow warbler	0.037	0.009	-0.028	0.75	0.3868
mallard	0.009	0.027	0.018		
red-eyed vireo	0.009	0.027	0.018		
red-headed woodpecker	0.028	0.009	-0.018	0.92	0.3392
wood thrush	0.028	0.009	-0.018		
yellow-throated vireo	0.018	0.018	-0.000		
American kestrel	0.028	0.000	-0.028		
American redstart	0.009	0.018	0.009		
Kentucky Warbler	0.018	0.009	-0.009		
least flycatcher	0.000	0.027	0.027		
red-bellied woodpecker	0.009	0.018	0.009		
common nighthawk	0.009	0.009	-0.000		
great blue heron	0.000	0.018	0.018		
loggerhead shrike	0.000	0.018	0.018		
savannah sparrow	0.009	0.009	-0.000	0.00	0.9701
tufted titmouse	0.009	0.009	-0.000		
yellow-bellied sapsucker	0.000	0.018	0.018		
bell's vireo	0.000	0.009	0.009	1.06	0.3066
black-billed cuckoo	0.009	0.000	-0.009		
blue grosbeak	0.000	0.009	0.009		
house sparrow	0.009	0.000	-0.009		
white-breasted nuthatch	0.000	0.009	0.009		
yellow-bellied flycatcher	0.009	0.000	-0.009		
bank swallow	-	^b			
barred owl	-	^b			
belted kingfisher	-	^b			
chimney swift	^a	^b			
Cooper's hawk	^a	^b			
double-crested cormorant	^a	^b			
great egret	-	^b			
great blue heron	^a	^b			
green heron	^a	^b			
house finch	-	^b			
morning warbler	^a	-			
northern-rough winged swallow	^a	^b			
northern bobwhite	-	-			
pileated woodpecker	^a	^b			
red-tailed hawk	^a	^b			
rock dove	^a	^b			
scarlet tanager	^a	^b			
solitary vireo	-	^b			
turkey vulture	^a	^b			
wild turkey	^a	^b			
willow flycatcher	^a	-			
yellow-billed cuckoo	^a	^b			

^a Detected only outside of 100-m point count circles in 1997^b Detected only outside of 100-m point count circles in 1998

TABLE 2. Comparison of bird populations at major grassland areas in Illinois. Figures are the mean number of birds recorded at 100-m fixed-radius point count stations between 1995 - 1997. The number of point count stations at each site is shown in parentheses below each site. Birds are listed in taxonomic order.

	Des Plaines Conservation Area (43)	Goose Lake Prairie (43)	Green River Conservation Area (50)	Midewin National Tallgrass Prairie (107)	Nachusa Grasslands (48)	Savanna Army Depot (58)
upland sandpiper	0.01	0.00	0.00	0.18	0.01	0.01
killdeer	0.01	0.10	0.00	0.03	0.01	0.12
northern bobwhite	0.06	0.04	0.12	0.01	0.01	0.00
ring-necked pheasant	0.02	0.09	0.03	0.01	0.18	0.00
morning dove	0.06	0.04	0.30	0.03	0.05	0.21
downy woodpecker	0.02	0.00	0.11	0.00	0.01	0.03
red-headed woodpecker	0.00	0.00	0.16	0.01	0.00	0.03
northern flicker	0.02	0.00	0.09	0.00	0.02	0.06
eastern kingbird	0.28	0.03	0.47	0.26	0.09	0.17
willow flycatcher	0.05	0.00	0.07	0.01	0.23	0.00
horned lark	0.00	0.06	0.00	0.01	0.00	0.34
blue jay	0.08	0.00	0.09	0.02	0.04	0.17
European starling	0.04	0.03	0.01	0.50	0.01	0.09
bobolink	0.09	0.05	0.43	1.36	0.09	0.00
brown-headed cowbird	0.37	0.12	0.80	0.12	0.50	0.39
red-winged blackbird	1.06	2.82	2.37	1.77	1.22	0.19
eastern meadowlark	0.98	0.80	0.21	1.36	0.31	0.23
western meadowlark	0.00	0.00	0.00	0.00	0.00	1.30
orchard oriole	0.26	0.00	0.17	0.05	0.01	0.13
Baltimore oriole	0.07	0.00	0.05	0.05	0.03	0.17
common grackle	0.15	0.10	0.12	0.06	0.06	0.13
American goldfinch	0.52	0.35	0.28	0.13	0.58	0.12
vesper sparrow	0.00	0.00	0.02	0.01	0.10	0.39
savannah sparrow	0.01	0.11	0.02	0.59	0.15	0.01
grasshopper sparrow	0.55	0.72	0.48	1.51	1.12	2.54
Henslow's sparrow	0.27	0.29	0.00	0.02	0.01	0.00
lark sparrow	0.00	0.00	0.22	0.00	0.04	0.55
chipping sparrow	0.00	0.00	0.16	0.02	0.03	0.42
field sparrow	0.99	0.19	0.87	0.36	0.69	0.67
song sparrow	0.48	0.33	1.31	0.32	0.79	0.13
swamp sparrow	0.00	0.02	0.09	0.00	0.09	0.00
eastern towhee	0.11	0.00	0.13	0.01	0.01	0.06
northern cardinal	0.07	0.00	0.37	0.02	0.13	0.09
rose-breasted grosbeak	0.05	0.00	0.11	0.00	0.02	0.10
indigo bunting	0.22	0.01	0.48	0.08	0.11	0.06
dickcissel	0.07	0.07	0.45	0.77	0.41	0.00
tree swallow	0.01	0.05	0.34	0.04	0.03	0.00

(continued)

TABLE 2. Continued.

	Des Plaines Conservation Area (43)	Goose Lake Prairie (43)	Green River Conservation Area (50)	Midewin National Tallgrass Prairie (107)	Nachusa Grasslands (48)	Savanna Army Depot (58)
cedar waxwing	0.09	0.00	0.11	0.03	0.03	0.03
warbling vireo	0.06	0.00	0.20	0.02	0.02	0.05
Bell's vireo	0.01	0.00	0.08	0.00	0.04	0.00
yellow warbler	0.14	0.00	0.33	0.04	0.24	0.04
common yellowthroat	0.46	0.65	0.99	0.07	0.50	0.06
yellow-breasted chat	0.01	0.00	0.01	0.00	0.01	0.00
northern mockingbird	0.00	0.00	0.00	0.05	0.00	0.12
gray catbird	0.23	0.02	0.44	0.03	0.17	0.14
brown thrasher	0.18	0.02	0.39	0.07	0.10	0.18
house wren	0.11	0.01	0.65	0.04	0.06	0.30
sedge wren	0.14	0.43	0.12	0.13	0.09	0.00
marsh wren	0.00	0.09	0.00	0.00	0.00	0.00
black-capped chickadee	0.05	0.00	0.05	0.01	0.02	0.05
American robin	0.28	0.08	0.39	0.14	0.16	0.20
eastern bluebird	0.01	0.00	0.19	0.01	0.03	0.11

[pavg2.tab.wpd]

Table 3. Number of birds recorded at the Thomson-Fulton Research Natural Area and Thomson-Fulton Nature Preserve in 1998. Data are the mean number of birds recorded at 100-m fixed-radius point count stations. Birds are listed in taxonomic order.

Species	Thomson-Fulton Research Natural Area	Thomson-Fulton Nature Preserve
Killdeer	0.06	0.00
Northern Bobwhite	0.24	0.50
Ring-necked Pheasant	0.00 ^a	0.00
Mourning Dove	0.06	0.10
American Kestrel	0.00 ^a	0.00
Belted Kingfisher	0.00 ^a	0.00
Downy Woodpecker	0.00 ^a	0.00
Red-bellied Woodpecker	0.00 ^a	0.00
Northern Flicker	0.00 ^a	0.20
Eastern Kingbird	0.06	0.00 ^a
Blue Jay	0.00 ^a	0.00 ^a
American Crow	0.00 ^a	0.20
European Starling	0.00 ^a	0.00
Brown-headed Cowbird	0.00 ^a	0.00
Red-winged Blackbird	1.18	0.70
Eastern Meadowlark	0.82	1.90
Orchard Oriole	0.00 ^a	0.00
Baltimore Oriole	0.00 ^a	0.00
Common Grackle	0.06	0.10
American Goldfinch	0.06	0.00 ^a
Vesper Sparrow	0.00	0.10
Grasshopper Sparrow	1.88	2.20
Lark Sparrow	0.18	0.50
Chipping Sparrow	0.06	0.00 ^a
Field Sparrow	0.71	1.00
Song Sparrow	0.06	0.20
Northern Cardinal	0.00 ^a	0.00 ^a
Rose-breasted Grosbeak	0.00	0.00 ^a
Indigo Bunting	0.00 ^a	0.00 ^a
Dickcissel	0.76	0.00
Common Yellowthroat	0.06	0.00
Gray Catbird	0.06	0.00 ^a
Brown Thrasher	0.00 ^a	0.10
House Wren	0.00 ^a	0.20
American Robin	0.35	0.30
Eastern Bluebird	0.00	0.00 ^a

^aDetected on site but not within 100-m of a point count location.

TABLE 4. Comparison of nest success at the Savanna Army Depot Ordinance with other grassland areas in Illinois.

	SAD (1997)					STATE (1995-1997) ¹				
	N	Nest Success ²	Nest Parasitism	# Fledged/ Succ. Nest	# Fledged/ Nest Attempt ³	N	Nest Success ²	Nest Parasitism	# Fledged/ Succ. Nest	# Fledged/ Nest Attempt ³
Grasshopper Sparrow	85	17.0%	3.5%	3.0	0.51	139	18.5%	2.2%	3.5	0.65
Eastern/Western Meadowlark	46	35.5%	2.2%	3.6	1.29	197	9.3%	2.0%	3.1	0.03
Vesper Sparrow	24	21.3%	8.3%	2.1	0.44	14	17.2%	0.0%	2.7	0.46
Lark Sparrow	19	11.5%	21.1%	3.1	0.36	11	44.8%	27.3%	2.4	1.07
Field Sparrow	18	22.2%	27.8%	2.4	0.53	300	20.1%	10.7%	2.7	0.54
Common Nighthawk	16	79.9%	0.0%							
Morning Dove	8	61.2%	0.0%	2.0	1.22	11	22.3%	0.0%	2.0	0.44
Killdeer	5	100.0%	0.0%	2.5	2.50	5	53.6%	0.0%		
Brown Thrasher	4	100.0%	0.0%	2.5	2.50	79	42.5%	2.5%	2.6	1.10
Chipping Sparrow	4	100.0%	0.0%	3.0	3.00	7	8.6%	0.0%	3.0	0.26
Upland Sandpiper	2	100.0%	0.0%	4.0	4.00	17	81.2%	0.0%	3.7	3.00
Horned Lark	2	3.8%	0.0%							
Blue Jay	1	100.0%	0.0%			4	37.3%	0.0%	2.3	0.86
Blue Grosbeak	1	100.0%	0.0%	3.0	3.0	1	100.0%	0.0%	3.0	3.00
Red-winged Blackbird	1	20.9%	100.0%			192	14.7%	8.3%	2.7	0.39
American Goldfinch	1	0.7%	0.0%			94	36.6%	4.3%	3.5	1.28

¹ Includes nest data from Des Plains Conservation Area (Will Co.), Goose Lake Prairie (Grundy Co.), Green River Conservation Area (Lee Co.), Midewin National Tallgrass Prairie (Will Co.), Nachusa Grasslands (Lee Co.).

² Mayfield estimates of nest success

³ Calculated as *Mayfield nest success* x *the number of birds fledged/successful nest*.

[sad97sum.tab]