

BIRD USE OF CRP LANDS IN THE PRAIRIE POTHOLE REGION

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Abstract.--In 1990 we surveyed breeding birds in 240 fields in eastern Montana, North and South Dakota, and western Minnesota that were enrolled in the Conservation Reserve Program (CRP). We found many grassland species occurring in that habitat. Only one species, the horned lark, was appreciably more common in cropland than in CRP. Several species were much more common in CRP than in cropland; these included the bobolink, Baird's sparrow, grasshopper sparrow, clay-colored sparrow, dickcissel, and lark bunting, all of which have been declining in number during the 1966-89 period. The Conservation Reserve Program appears to have the potential to help reverse the population decline of prairie species, but more research is needed to determine the productivity of birds in that habitat and the long-term effects of habitat succession.

INTRODUCTION

The Conservation Reserve Program (CRP) was established by the 1985 Food Security Act primarily to conserve and improve soil and water resources of highly erodible cropland. The emphasis was to take out of agricultural production certain highly

erodible or eroding lands by establishing permanent cover on them, thereby reducing soil erosion, reducing sedimentation of streams, and improving water quality. Another objective was to enhance habitat for fish and wildlife populations. To determine in part the degree to which that objective is being met, we initiated the present study on a pilot basis. We evaluated the use by breeding birds of selected CRP fields in eastern Montana, North and South Dakota, and western Minnesota.

We sincerely appreciate the cooperation of numerous landowners who allowed us access to fields they had enrolled in CRP, to the state Agricultural Stabilization and Conservation Service (ASCS) directors, and to the executive directors and staffs of county ASCS offices who kindly provided us with information about those fields. Harold A. Kantrud furnished the original data gathered by Stewart and Kantrud (1972). Sam Droege of the Office of Migratory Bird Management supplied information about trends in bird populations based on the Breeding Bird Surveys. Harold A. Kantrud, Rolf R. Koford, and Pamela J. Pietz gave useful suggestions on an earlier draft of this report.

STUDY AREAS AND METHODS

Counties were selected for sampling in order to provide one county representing each landform within each state, and also to have a large area of land enrolled in CRP. Selected counties are shown in Fig. 1.

In each county, we reviewed ASCS files and selected fields

subject to several considerations: We sought a broad range of field sizes and CRP practices employed. Earlier plantings were favored because they offered more mature cover and thus a better perspective on long-term, as opposed to transient, effects. Also, we preferred fields that were readily accessible. We then contacted landowners to obtain permission to survey the birds on those fields. In only a few cases was access denied.

From files in the ASCS offices we sought information on: 1) size of the field, 2) type of vegetation planted, 3) date of planting, 4) the crop that had been planted before CRP (base crop), 5) soil types in field, and 6) the CP practice employed. CP practices encountered were:

- CP-1 Establishment of permanent introduced grasses and legumes
- CP-2 Establishment of permanent native grasses
- CP-3 Tree planting
- CP-4 Permanent wildlife habitat
- CP-10 Already-established grass.

We surveyed fields for breeding birds according to the procedures followed by Stewart and Kantrud (1972). Each field was searched once, by one or two observers on foot. All indicated pairs were tallied, based on singing or calling males, females (for brown-headed cowbirds), observed pairs, or presence of a nest. Except for small fields, two observers divided a field and each covered about half; care was taken to avoid double-counting birds. Surveys began about dawn and continued

until midafternoon, and were conducted during the period 22 May - 2 July 1990. Adverse weather conditions (precipitation or strong winds) were avoided. The surveys were designed to allow a fairly rapid assessment of the breeding bird communities of a field.

In addition to bird populations, observers recorded a number of environmental and other variables, including: 1) date and time of survey; 2) weather conditions during survey (temperature, wind, precipitation); 3) vegetation occurring in field; 4) land use of field (idle, recently hayed, sprayed, etc.); 5) land use surrounding field; 6) presence of shelterbelts, fence rows, and other perch sites; and 7) status of wetlands in the field.

To compare populations of breeding birds in CRP fields to what might have been present without CRP, we examined breeding bird populations reported for croplands (including growing crops and fallow land) in the same geographic area. Two sources of data were available: 1) published accounts, usually from censuses described in American Birds; and 2) the 1967 survey of Stewart and Kantrud (1972), for which we obtained and analyzed the original data from croplands.

Population trends for bird species encountered were obtained from Breeding Bird Survey (Robbins et al. 1986) results for the 1966-89 period, as obtained from the Office of Migratory Bird Management. We used trends for the Central Region, between the Rocky Mountains and the Mississippi River, and for the continent as a whole.

RESULTS

We counted birds on 240 fields in the nine counties, with 21-34 fields per county. The area surveyed per county ranged from 418 to 603 ha, for a total of 4474 ha. Field size ranged from 0.5 to 72.7 ha, with a median of 15 ha.

Most (58%) of the fields had been planted in CRP cover in 1987, with lesser numbers in 1986 (21%) and 1988 (16%), and only a few in 1989 or 1990. Base crops that were converted to CRP were variable, and included wheat (22%), other small grains (12%), Acreage Conservation Reserve (10%), alfalfa (5%), sunflowers and corn (3% each), and mixed or other (45%). Conservation practices employed were mostly CP-1 (66%) or CP-2 (24%), with fewer fields in CP-10 (7%), CP-4 (4%), and CP-3 (<1%).

Grasses and legumes were the most common plants on CRP fields in general, but there was considerable variation from county to county (Table 1) and among fields within counties.

Overall, the lark bunting was the most abundant bird in CRP, although it was absent or rare in counties in the Drift Prairie and Black Prairie (Table 2). The grasshopper sparrow was the next most common species, occurring in all counties but at low densities in Butte County, SD and Fallon County, MT. The red-winged blackbird, third in average abundance, was uncommon in the more arid habitats of Montana and Butte County, SD. The horned lark and western meadowlark, ranked fourth and fifth, showed patterns of abundance increasing from east to west. Among the

other species common in the CRP fields, the barn swallow, mourning dove, eastern kingbird, western kingbird, and common grackle occurred fairly regularly with average county densities not varying markedly (Table 2). The remaining species were far more variable, some counties having high densities while others had zero.

For a comparison with cropland bird populations, we found published censuses of eight cropland sites in the northern prairie region (Table 3), with a total of 132.3 ha. Eight species of breeding birds were recorded on the fields, with densities as given in Table 4. The horned lark was the most abundant, followed by the chestnut-collared longspur and lark bunting.

A preliminary analysis of data resulting from the 1967 Stewart and Kantrud survey provided information on 190-194 cropland fields totaling 4350-4405 ha (values differ for early-, mid-, and late-nesting species of birds, because each field was visited twice and the survey closest in time to the peak breeding season of each species was used for that species). Densities for most species are similar to those derived from the censuses (Table 4), except that those of horned larks were higher in census totals.

It is evident that only the horned lark occurs in appreciably higher densities in cropland than CRP, with chestnut-collared longspur, vesper sparrow, and killdeer being slightly more common in cropland (Table 4). The brown-headed cowbird had

roughly equal densities in both habitats. In contrast, all other species listed in Table 4 were substantially more common in CRP fields than in cropland.

It is worthwhile to examine the population trends of many of these species, using the 1966-89 data from Breeding Bird Surveys in the Central Region or for the entire continent. Of the five species that occurred in equal or higher densities in cropland than in CRP, none had a significant ($P < 0.05$) upward or downward trend (Table 5). Six of the species less common in cropland than CRP had, in contrast, shown significant trends during 1966-89; all were negative. The two most common species in CRP, the lark bunting and grasshopper sparrow, have declined at about 4 percent per year during that time, both in the Central Region and continentally. The clay-colored sparrow, another common species in CRP, also declined significantly in the Central Region and continentally. The bobolink has been declining at 3 percent per year in the Central Region. The dickcissel, which appeared regularly in CRP fields in Day County, SD, has been decreasing at nearly 2 percent per year. Baird's sparrow, a prairie species with restricted range, has been declining at 2 percent per year; we found it in CRP in every county except Grant in Minnesota, and it was fairly common in Sheridan County, MT.

DISCUSSION

A number of the species commonly found in CRP fields in our study have been declining in population during the 1966-89

period. These grassland species presumably have declined because of the conversion of perennial grassland habitat to annually tilled cropland. Our study indicates that the Conservation Reserve Program might offer the potential to reverse those downward trends.

We recognize, however, that the dynamic nature of populations of grassland birds (e.g., Wiens 1977) might compromise the results of a single year of study. Also, our results are based on but a single survey conducted on each field. The method is less accurate than censusing, but provides data from extensive areas in a relatively short time. In addition, comparisons with cropland bird populations are based either on only a few censuses (Table 3) or a single survey conducted in 1967.

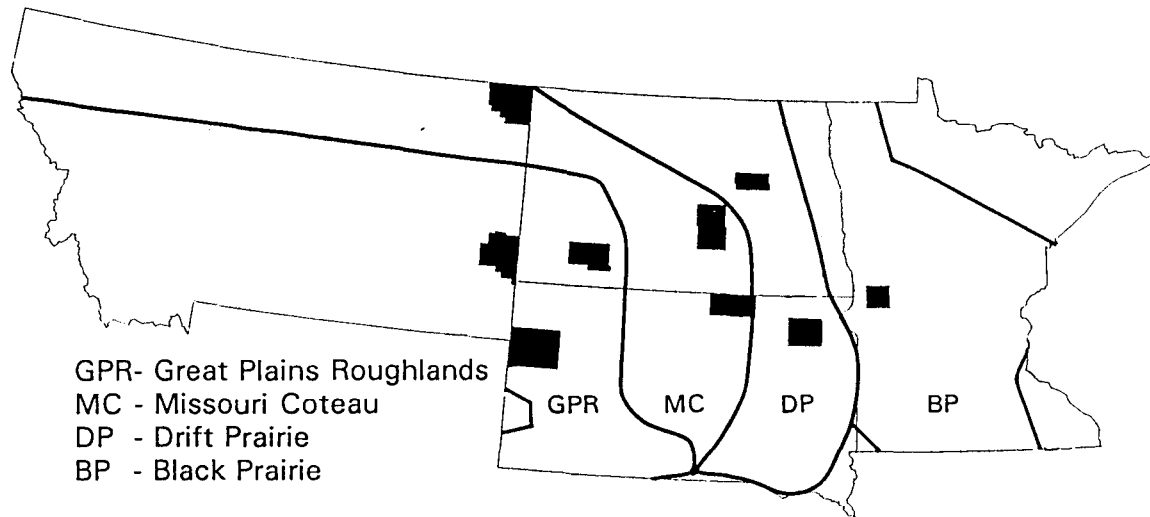
Because of annual variability in populations of prairie birds, surveys during a single year cannot adequately portray the values of CRP as habitat for breeding birds. Therefore we propose that this study be continued for several years. Additional years would also allow maturation of the cover, permitting the longer-term effects of the program to be assessed. We also recommend that studies be conducted to determine the productivity of birds inhabiting CRP as well as cropland fields. The presence of birds during the breeding season is an incomplete measure of the suitability of habitat; more critical is the reproductive success of those birds. Studies of nesting and fledging success would address that important issue.

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Figure 1. Counties selected for study of breeding birds in Conservation Reserve Program fields: (a) Physiographic strata, based largely on Robbins et al. (1986); (b) names of counties.

COUNTIES SELECTED FOR CRP STUDY



COUNTIES SELECTED FOR CRP STUDY

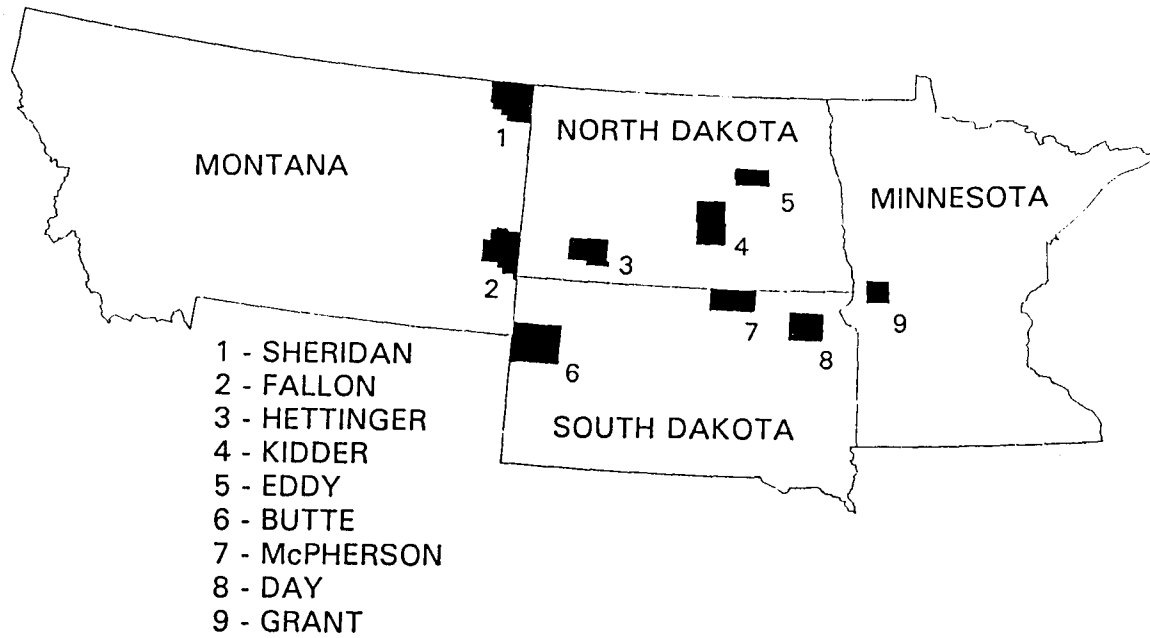


Table 1. Average percent cover of plants in CRP fields surveyed for birds, by county, in 1990.

	Great Plains Roughlands			Missouri Coteau			Drift Prairie		Black Prairie	Average
	Fallon	Butte	Hettinger	Sheridan	Kidder	McPherson	Eddy	Day	Grant	
	MT	SD	ND	MT	ND	SD	ND	SD	MN	
<u>Agropyron</u> spp.	20.1	19.0	8.0	26.3	13.6	13.9	43.8	24.1	27.8	21.8
<u>Medicago sativa</u>	16.2	8.3	24.7	17.0	20.7	16.6	5.9	36.1	18.4	18.2
<u>Kochia scoparia</u>	3.9	0.2	8.3	1.1	30.3	27.0	8.7	1.4	1.2	9.1
<u>Bromus inermis</u>	0	0	1.7	0.5	5.6	13.5	9.6	16.3	31.6	8.8
<u>Stipa</u> spp.	20.4	15.2	0.2	2.0	0	1.0	0	0	0	4.3
<u>Agropyron cristatum</u>	5.3	0	16.3	8.2	0.4	0	0	0	0	3.4
<u>Bromus japonicus</u>	0	29.6	0	0	0	0	0	0	0	3.3
<u>Sonchus</u> spp.	0.1	1.3	6.6	9.1	2.2	0	4.3	0.2	1.6	2.8
<u>Melilotus</u> spp.	7.0	0	4.4	0.5	1.9	0	3.0	5.2	1.2	2.6
Brassicaceae	4.0	2.9	0.6	5.4	0	1.8	0.2	0.4	0.1	1.7
<u>Panicum</u> spp.	0	0	0	0	0	0	0	0	6.0	0.7
Bare soil/litter	0.6	1.0	5.4	2.5	0	0.7	4.4	0	2.6	8.5
Other	10.0	14.0	13.7	12.0	8.4	14.5	8.3	7.9	5.8	10.5

Table 2. Average density of breeding birds (indicated pairs/100 ha) in CRP fields, by county, in 1990.

	Great Plains Roughlands			Missouri Coteau			Drift Prairie		Black Prairie	Average
	Fallon	Butte	Hettinger	Sheridan	Kidder	McPherson	Eddy	Day	Grant	
	MT	SD	ND	MT	ND	SD	ND	SD	MN	
Lark bunting	10.16	35.08	50.48	66.08	14.19	20.98	0.18	0	0	23.02
Grasshopper sparrow	6.41	1.95	21.80	27.73	27.23	41.04	41.93	19.77	10.83	21.87
Red-winged blackbird	0.99	1.53	16.50	2.61	15.42	16.72	14.51	36.39	10.38	12.48
Horned lark	7.50	22.93	5.80	26.76	4.16	6.57	3.56	0.84	0	9.05
Western meadowlark	12.33	16.99	9.78	7.63	6.53	8.07	6.77	3.05	1.37	8.36
Savannah sparrow	0	0.85	9.12	5.22	4.92	2.42	8.55	20.40	10.95	6.80
Brown-headed cowbird	0.39	0.17	4.97	10.43	4.63	5.53	4.80	4.00	0.91	3.99
Clay-colored sparrow	0	0	0.50	3.77	0.94	3.69	11.93	8.94	4.91	3.75
Bobolink	0	0	3.65	0.39	2.08	2.42	3.21	10.30	10.27	3.38
Chestnut-collared longspur	0	0.42	2.90	14.49	4.26	4.73	0	0.21	0	2.99
Sedge wren	0	0	0	0	0	0	0.36	10.31	20.08	2.99
Common yellowthroat	0	0	0.16	0	0.47	0.23	1.69	8.20	11.29	2.20
Barn swallow	1.97	2.21	0.99	0.60	1.89	2.31	1.96	2.94	3.43	1.98
Dickcissel	0	0	0	0	0.19	0	0.53	16.72	1.03	1.89

Table 2. Average density of breeding birds (indicated pairs/100 ha) in CRP fields, by county, in 1990 (continued).

	Great Plains Roughlands			Missouri Coteau			Drift Prairie		Black Prairie	Average
	Fallon	Butte	Hettinger	Sheridan	Kidder	McPherson	Eddy	Day	Grant	
	MT	SD	ND	MT	ND	SD	ND	SD	MN	
Mourning dove	1.48	1.02	3.81	0.77	0.38	5.07	1.69	1.05	0.68	1.76
Eastern kingbird	0.99	0.85	1.91	1.26	2.46	2.77	1.07	2.94	0.91	1.65
Baird's sparrow	0.59	1.70	0.17	7.25	1.61	2.07	0.80	0.21	0	1.60
Western kingbird	0.59	0.51	1.33	1.74	3.03	4.84	1.07	1.37	0.23	1.58
Common grackle	0	0	1.66	1.45	1.13	0.46	1.51	3.26	0.23	1.09
Sharp-tailed grouse	0.39	0	0.33	5.80	0.19	0.92	0	0.42	0	0.88
Total	4.77	10.90	17.61	20.46	10.87	12.19	12.81	15.46	8.24	113.31

Table 3. Published censuses of breeding bird communities in cropland in the northern prairie region.

Site	Area (ha)	Habitat	Reference
Dunn Co., ND	5.06	wheat, corn	Jacobson 1975a
Dunn Co., ND	5.06	wheat, stubble	Jacobson 1975b
Dunn Co., ND	10.12	stubble, wheat	Voorhees 1975
Dunn Co., ND	10.12	wheat, barley, fallow, oats	Jacobson 1975c
Oliver Co., ND	20.90	flax, fallow	Fleckenstein and Mack 1981a
Oliver Co., ND	16.20	small grain	Fleckenstein and Mack 1981b
SE Alberta	32.40	fallow	Owens and Myres 1973
SE Alberta	32.40	wheat	Owens and Myres 1973

Table 4. Densities of breeding birds (indicated pairs/100 ha) in cropland, as determined from censuses (listed in Table 3) or results of Stewart and Kantrud survey in 1967, and in CRP fields.

Species	Cropland		CRP
	Censuses	Stewart and Kantrud	
Horned lark	28.0	18.0	9.0
Chestnut-collared longspur	7.8	5.0	3.0
Western meadowlark	1.6	4.3	8.4
Lark bunting	5.4	4.2	23.0
Brown-headed cowbird	3.1	2.7	4.0
Savannah sparrow	0	1.9	6.8
Mourning dove	0	1.3	1.8
Vesper sparrow	0.8	1.2	0.5
Bobolink	0	1.2	3.4
Killdeer	0.8	1.1	0.4
Red-winged blackbird	0	1.1	12.5
Clay-colored sparrow	0.8	0	3.8
Grasshopper sparrow	0	0.5	21.9
Sedge wren	0	0	3.0
Common yellowthroat	0	0	2.2
Barn swallow	0	0.3	2.0
Dickcissel	0	0.2	1.9
Eastern kingbird	0	0.2	1.8
Baird's sparrow	0	0	1.6
Western kingbird	0	0.3	1.6
Common grackle	0	0.5	1.1
Sharp-tailed grouse	0	0.1	0.9

Table 5. Trends of birds common in cropland or CRP fields, as determined from Breeding Bird Surveys during 1966-89, for the Central Region and for the North American continent.

Species	Average annual change (percent)	
	Central Region	Continental
Species more common in cropland than in CRP fields		
Horned lark	0.1	-0.6
Chestnut-collared longspur	-0.3	0.6
Vesper sparrow	0.3	-1.1
Killdeer	0.7	0.5
Species about equally common in cropland and CRP fields		
Brown-headed cowbird	-0.1	-0.8
Species less common in cropland than CRP fields		
Bobolink	-3.0 **	-0.8
Red-winged blackbird	0.2	0.2
Western meadowlark	-0.4	-0.7
Savannah sparrow	0.6	-0.7
Baird's sparrow	-2.2	-2.0 *
Grasshopper sparrow	-4.4 **	-4.5 **
Clay-colored sparrow	-2.2	-1.6 *
Dickcissel	-1.8 **	-1.9 **
Lark bunting	-3.9 **	-4.0 **
Common yellowthroat	-0.4	-0.4
Sedge wren	-1.9	1.3

* P < 0.05; ** P < 0.01.