

# B.B.S. Equals Beleaguered Bobolinks and Sparrows

*The author uses data from the North American Breeding Bird Survey to demonstrate the decline in numbers of many grassland birds.*

*by Sam Robbins*

For about the past thirty years, the letters "BBS" have stood for the North American Breeding Bird Survey. This project was developed by the U.S. Fish and Wildlife Service in the early 1960s, was field tested in Maryland and Delaware in 1965, and was inaugurated in 1966 in all states east of the Mississippi River. By 1968, with the added cooperation of the Canadian Wildlife Service, the project spanned all of North America.

The BBS is intended to monitor population fluctuations for all breeding bird species—at least those that are likely to be detected near road-sides. Once-a-year coverage is now attempted in about 3700 transects, 70 of which are in Wisconsin. Figure 1 shows the approximate locations of these 70 routes. Each transect is 24.5 miles long, and consists of 50 3-minute look-and-listen stops.

Overall summaries of Wisconsin results at five-year intervals were published in *The Passenger Pigeon* through the first 15 years (Robbins 1971, 1977, 1982). A 26-year sum-

mary is now nearing completion. The paper presented here reports on trends in Wisconsin's grassland bird populations between 1966 and 1994. Table 1 lists 17 species for which data are sufficient to provide statistically reliable trends. Listed also are another 8 species for which data are too fragmentary.

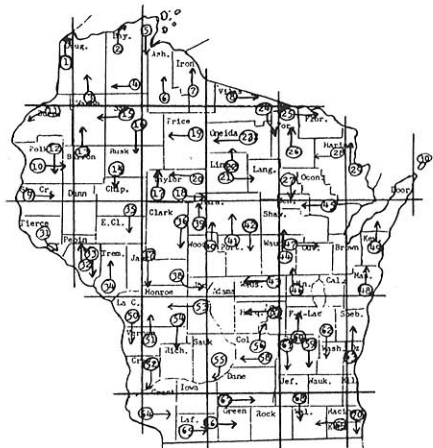


Figure 1. Locations of BBS transects.

Table 1. Grassland birds sampled by BBS.

Adequately sampled	Inadequately sampled
Northern Harrier	Gray Partridge
Ring-necked Pheasant	Greater Prairie-Chicken
Killdeer	Sharp-tailed Grouse
Upland Sandpiper	Short-eared Owl
Horned Lark	Loggerhead Shrike
Sedge Wren	Lark Sparrow
Dickcissel	Le Conte's Sparrow
Clay-colored Sparrow	Lincoln's Sparrow
Field Sparrow	
Vesper Sparrow	
Savannah Sparrow	
Grasshopper Sparrow	
Henslow's Sparrow	
Bobolink	
Eastern Meadowlark	
Western Meadowlark	
Brewer's Blackbird	

## METHODS

A first step toward processing BBS data involves the calculation of the average number of individuals per transect per year for each species. This would be a simple procedure: adding the totals for all transects and dividing by the number of transects run that year. But there are complications. Occasionally the observer had gotten a late start, finished late, and thereby missed part of the morning song period. Delaying the date beyond the July 4 deadline also minimized the advantage of the June song period.

Now and then, when a second observer took over a route, it would become evident that one of the observers was missing the song of a given species. Inevitably transects were missed entirely in a given year. If the missed route had a high con-

centration of an uncommon species such as the Grasshopper Sparrow, the statewide average figure for that year would be distorted. National BBS statisticians have developed methods of minimizing these distortions. Through 1991 this involved reducing the composite total of usable transects from 1657 to 1579. Averages per year for each of our 17 grassland species are included in Figures 2-6.

A second step in data processing involves the calculation of the mean annual gain or loss for each species. Included in Figure 2 are the results of these calculations, as provided by statisticians at the Patuxent Environmental Science Center. One column shows long-term fluctuations over the full 1966-1991 period, and a second column shows short-term changes between 1982 and 1991. Calculations for 1992, 1993 and 1994 are not yet available.

## RESULTS

One glance at the following figures for Wisconsin grassland species suggests that "BBS" might well stand for "Beleaguered Bobolinks and Sparrows." Western Meadowlarks and Dickcissels too. Figure 2 portrays the changes that have come over those members of the blackbird family that rely most heavily on grasslands. Notice that the vertical axis of this graph extends from 0 to 30, and that dots along the horizontal axis are based on averages for five-year intervals.

Bobolinks showed an increase in the late 1960s, peaking at 25 birds per transect per year in 1972. A consistent decline then set in, with an-

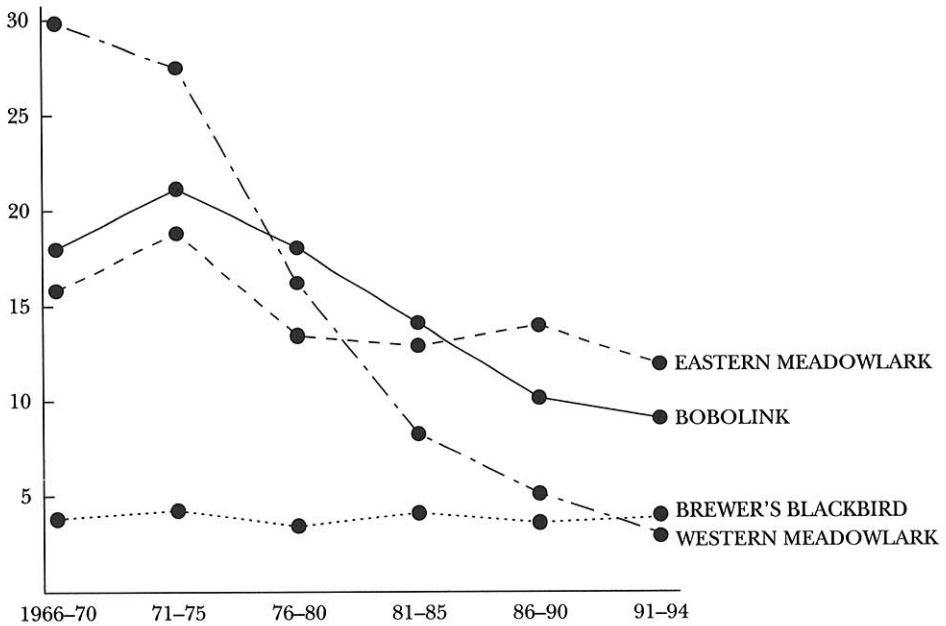


Figure 2. Average number of birds per transect per year for the period 1966-1994.

nual averages dropping below 10 in 1987. Numbers have leveled off since 1987, but there are no signs of recovery.

Like the Bobolink, the Eastern Meadowlark showed an increase in the late 1960s, peaking in 1972. A slight decline followed, with a sudden drop from 18 to 11 between 1976 and 1977. Numbers gradually recovered through 1991, but have declined modestly in the past three years.

Far more serious is the continued decline of the Western Meadowlark. In 1966 the average of 33 birds ranked this species among the top ten of the state's summer residents. The next ten years witnessed a modest decline to 25 in 1976. Then populations plummeted. By 1983 the average annual figure dropped below 10, and now stands around 3.

Can it be that Wisconsin has lost over 90% of its Western Meadowlarks in less than 30 years?

The influences leading to the decline of the Meadowlarks have had no noticeable effect on the Brewer's Blackbird, whose range is restricted to the northern half of the state. Numbers have remained remarkably constant since the 1960s.

Numbers of Savannah Sparrows (Figure 3) have remained relatively stable, usually averaging 25-30 birds per transect per year. The one exception: a sharp drop after a peak of 41 in 1976. This bottomed out at 21 in 1979, and has been followed with a modest but steady recovery.

Vesper Sparrows declined alarmingly from a peak of 14 (1966) to a low of 5.5 (1985). Numbers have leveled off since 1985, but there has been no perceptible recovery.

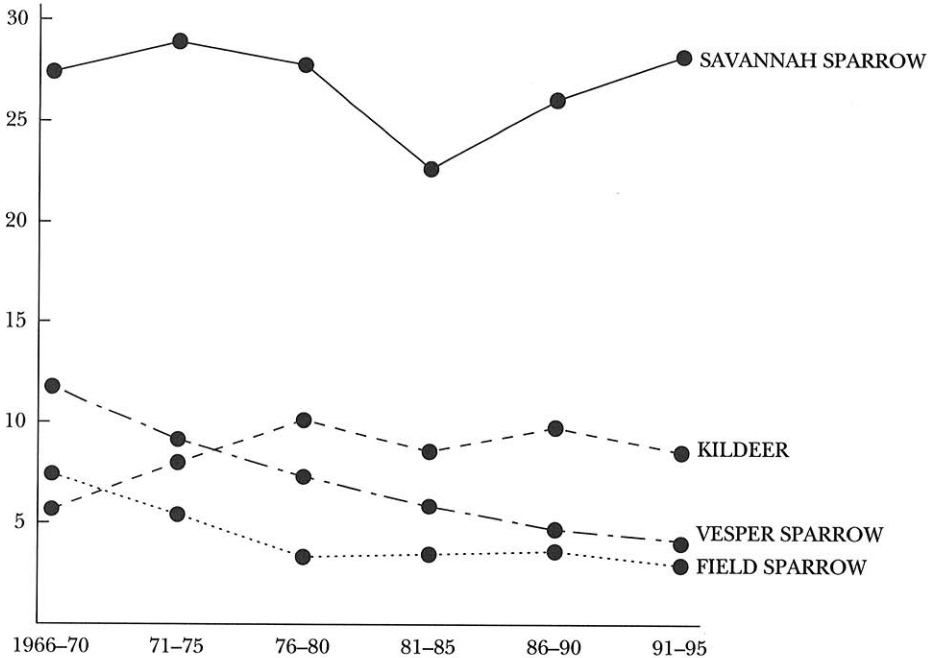


Figure 3. Average number of birds per transect per year for the period 1966–1994.

The Field Sparrow, with somewhat different habitat preference, has also declined significantly. The annual average dropped from 7 to 4 by 1978, with only the slightest hint of recovery in the past 15 years.

In contrast with the declines shown in Figure 3, the Killdeer is one of the few open farmland species to show growth. The growth was steady from 6 to 10 during the 1966–1980 period, with numbers leveling off since 1980.

In figures 4 and 5, the top number on the vertical axis changes from 30 to about 5, the better to depict the fluctuations among our less numerous grassland species. For the Sedge Wren annual numbers vary more widely than for most other species. In general, populations appear stable.

Changes in numbers of Clay-colored Sparrows have also been minor. Annual averages dipped below 3 between 1978 and 1984, recovered, then dipped again from 1992 through 1994. Virtually all sightings are in the northern half of Wisconsin.

Two southern Wisconsin sparrows appear to be in real trouble. The Grasshopper Sparrow started with an average of 4 individuals per transect per year in the late 1960s. This figure dropped suddenly to 2 by 1973, and under 1 by 1979. A modest recovery brought the average to 2 from 1987 through 1991, followed again by a slight dip.

In the early years of BBS, the Henslow's Sparrow appeared on a few northern transects, and has been recorded on 49 of the 70 routes. No

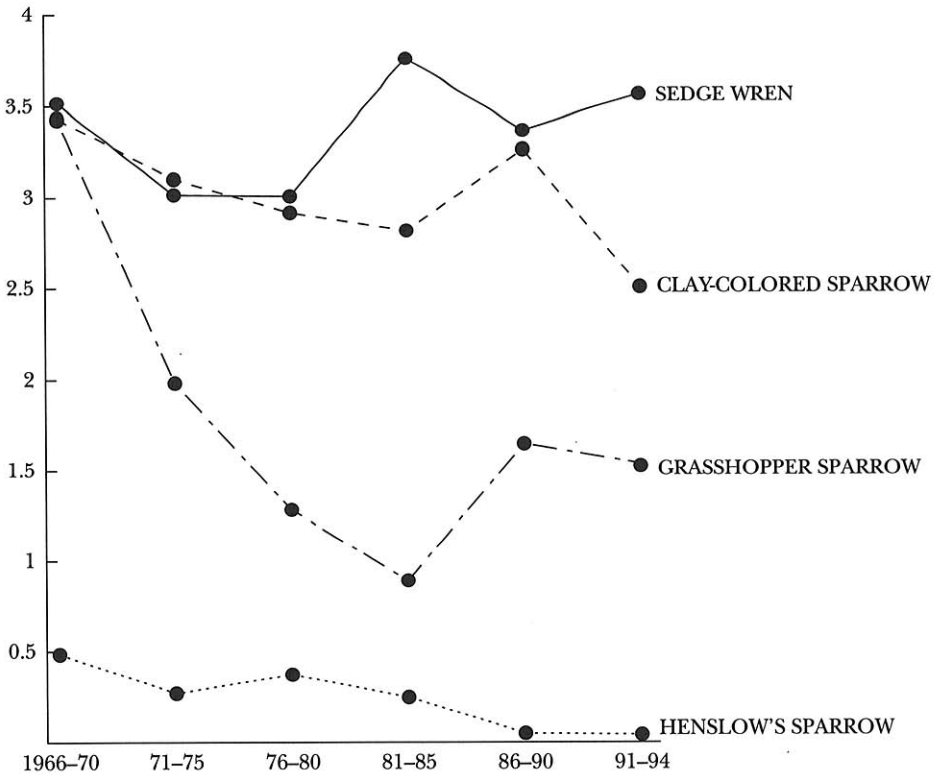


Figure 4. Average number of birds per transect per year for the period 1966–1994.

more. Since 1984 the composite total for any one year has been 7.

Some interesting contrasts appear in Figure 5. The Northern Harrier is at least holding its own, with a hint of an ever-so-slight increase since 1986. The picture of the Upland Sandpiper is one of steady decline of 50% or more. Numbers of Ring-necked Pheasants declined slightly after 1972, and followed with a precipitous drop from 1984 through 1990. A 1991–1994 recovery is encouraging. How many of these are established wild birds, and how many are survivors of plantings from the previous year, is anyone’s guess. Horned Larks have increased notice-

ably from 4 (1968–1970) to 7 (1989–1994), with the largest increase coming at the same time Ring-necked Pheasant numbers were dropping.

The ups-and-downs show up even more vividly when one plots the average number of individuals per year on an annual basis, rather than by five-year intervals, as shown in Figure 6. Note especially the pattern for the Dickcissel. During the first three BBS years, this species was experiencing one of its highest population outbreaks of the twentieth century. The next expected high for this cyclic species would have been around 1972–1973, and a modest bulge

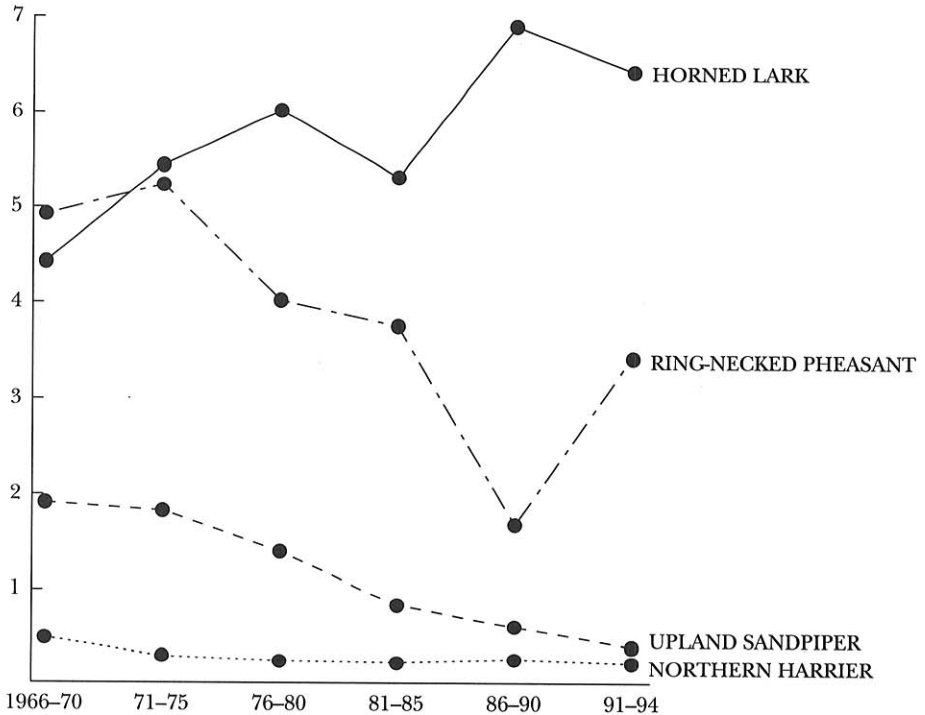


Figure 5. Average number of birds per transect per year for the period 1966–1994.

shows for that period. No sign of a six-year cyclic high followed. Instead, the bird went virtually unreported on any Wisconsin transect until 1987. Perhaps the rise shown for 1988 will prove to have been another cyclic high, but it has not lasted long. The Dickcissel is a scarce bird in all but the southwestern portion of the state.

The numbers quoted above all deal with statewide boundaries. Birds, however, respond much more to habitat features than to state lines. So BBS statisticians have redrawn the map of North America by a series of strata. Figure 7 shows that four of these strata intersect Wisconsin. (1) The Great Lakes Plain stratum (#16) encompasses southern Michigan,

northern Indiana, and southeastern Wisconsin. (2) The Wisconsin Driftless region (#17) combines southwestern Wisconsin with southeastern Minnesota and northeastern Iowa. (3) The Great Lakes Transition area (#20) extends from central Minnesota across central Wisconsin to central Michigan. (4) The Spruce Hardwood Forest (#28) is an extensive tree-dominated territory stretching from Minnesota to Maine, crossing northern Wisconsin.

The right hand column in Table 2 lists the strata that are most seriously affected for each decreasing grassland species. Included are only the strata that touch some portion of Wisconsin, but the trends affect the complete strata—not just the Wis-

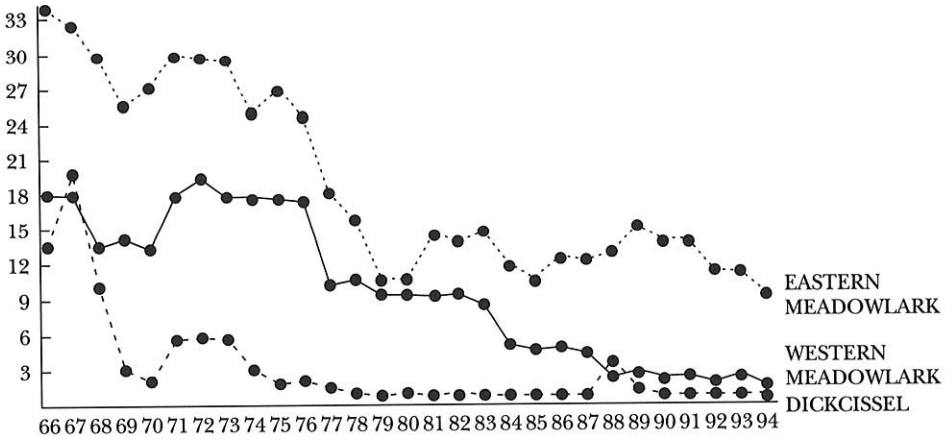


Figure 6. Average number of birds per transect per year for the period 1966–1994.

consin portion. All strata trends in this table are deemed statistically significant.

Table 2 deals with the measurement of trends, and the comparison of Wisconsin trends with those of other regions. Of the 17 species listed, the Savannah Sparrow is by far the most numerous. Read this species' information in this manner: It has been recorded on 69 of the state's transects (column 1), with an average of 51 transects per year (column 2), and an average of 27 individuals per transect per year (column 3). Between 1966 and 1991 there was an average annual loss of 1.9% (column 4), but a gain of 1.6% during the more limited 1982–91 period (column 5). The long-term decrease of 1.9% is estimated at the 99% probability level (\*\*\*) , while the short-term increase of 1.6% was measured as significant at the 90% level (\*). In the Eastern region (1966–91) a decline was estimated at the 99% probability level (column 6). In the central region (column 7),

as well as on the continent level (column 8), population levels showed little change. The decline was especially noticeable in strata 16 and 20 (column 9).

### DISCUSSION

The purpose of the Breeding Bird Survey is to indicate what changes in populations have taken place over a given period of time. The explanations for the increases and decreases of grassland species lie beyond the scope of this project, and beyond the purview of this report.

It can be pointed out that the Ring-necked Pheasant is a non-migratory species. The Upland Sandpiper, Dickcissel and Bobolink are long-distance migrants. Most of the sparrows and blackbirds winter in the southern United States and northern Mexico. Severe weather in the southern United States during the winters of 1976–77 and 1977–78 may help explain the sudden drops in Eastern and Western Meadowlarks

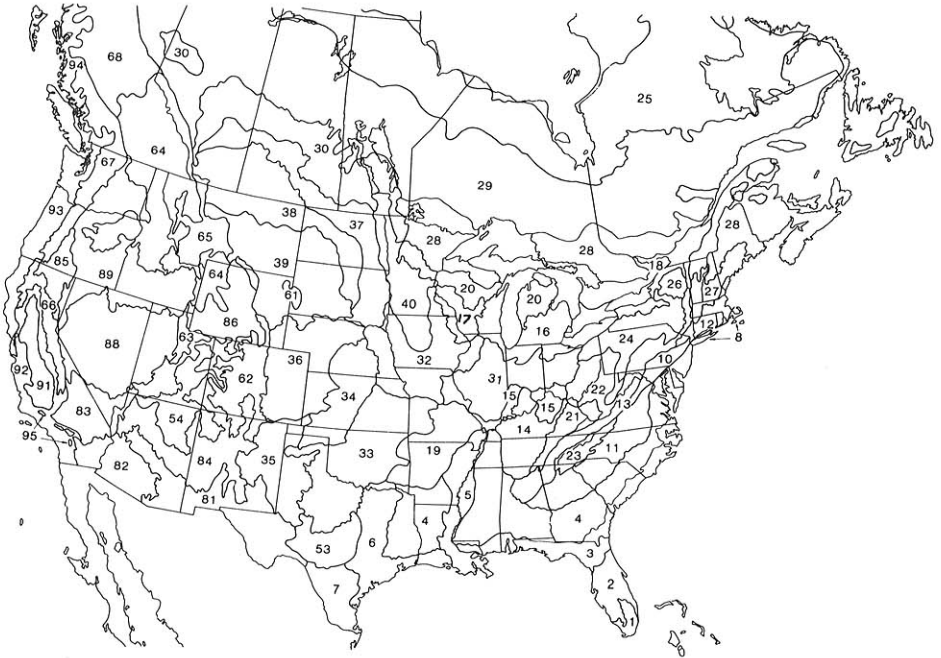


Figure 7. Breeding Bird Survey stratum boundaries. 16 Great Lakes Plain, 17 Wisconsin Driftless, 20 Great Lakes Transition, 28 Spruce Hardwood Forest.

Table 2. Comparison of trends between Wisconsin and the region.

Species	No. routes (N = 70)	Mean no. of routes	Mean no. of birds per route	% Annual change in Wisconsin (1966-91)	% Annual change in Wisconsin (1982-91)	Eastern Region	Central Region	Continental Region	Affected strata
Northern Harrier	56	11.1	0.27	1.7	3.5		-***		
Ring-necked Pheasant	53	24.3	3.08	-2.9**	-2.7	-*		-*	16, 20
Killdeer	70	55.0	9.22	1.9***	-0.2				16, 17
Upland Sandpiper	44	13.7	0.85	-1.7	-2.7		+***	+***	16, 28
Horned Lark	59	35.0	9.22	0.6	2.4				
Sedge Wren	66	31.7	3.14	0.5	5.5	+**		+	20
Dickcissel	54	20.2	3.43	-8.0	16.2**	-*	-**	-***	16, 17, 20
Clay-colored Sparrow	55	26.5	2.31	-1.6	0.5			-**	
Field Sparrow	69	38.5	5.19	-3.3***	-0.3	-***	-***	-***	All
Vesper Sparrow	67	44.3	7.88	-4.7***	-3.8**	-***			All
Savannah Sparrow	69	51.3	27.10	-1.9***	1.6*	-***			16, 20
Grasshopper Sparrow	61	21.7	1.62	-10.1	-0.4	-***	-***	-***	16, 17, 20
Henslow's Sparrow	51	7.2	0.21	-0.1	-7.5*	-***		-**	16
Bobolink	68	52.0	15.11	-2.9***	-4.3***		-***	-**	16, 17
Eastern Meadowlark	66	50.3	14.26	-2.2***	-0.5	-***		-***	16
Western Meadowlark	65	44.5	16.46	-9.0***	-9.6***	-***			16, 17, 20
Brewers Blackbird	58	24.4	3.72	0.2	-5.0***	+**	+		20



(Figure 6) and Savannah Sparrow (Figure 3).

There has been considerable speculation about the effect of the Conservation Reserve Program may have on grassland birds. Since its inception in 1985, CRP has resulted in the set-aside of over 700,000 Wisconsin acres that would have been used in crop production. If this should result in more suitable habitat for grassland birds, population gains would show up in the 1986-90 and 1991-94 intervals. Such gains seem corroborated for the Grasshopper Sparrow (Figure 4), Savannah Sparrow (Figure 3), Eastern Meadowlark (Figure 6) and Dickcissel (Figure 6). A substantial increase in Ring-necked Pheasants shows up in the 1991-94 period (Figure 5). No such gains are detected for the Bobolink, Western Meadowlark, or the Vesper, Field and Henslow's Sparrows.

### SUMMARY

Two of Wisconsin's grassland species have reached perilously low levels. The composite annual totals of Henslow's Sparrows have been under 10 every year since 1985, while the Dickcissel total dropped to 5 in 1985 before making a modest recovery.

Declines in Bobolinks, Grasshopper Sparrows and Western Meadowlarks have been so substantial that composite annual totals in 1991-94 are less than half those of 1966-70. Of these, only the Grasshopper Sparrow has shown a modest recent recovery. Ring-necked Pheasant numbers were also halved by 1985, but have recovered substantially since then.

Steady but less precipitous de-

clines are indicated for the Upland Sandpiper, Vesper and Field Sparrows. Since 1985 Vesper and Field Sparrow numbers appear to have stabilized.

For the Savannah Sparrow and Eastern Meadowlark there was a noticeable drop in the late 1970s. Gradual recovery since 1980 has brought populations back close to the 1966-75 level. The Northern Harrier appears to be recovering since the banning of DDT in the late 1960s.

Fluctuations have been relatively small for the Horned Lark, Sedge Wren, Clay-colored Sparrow and Brewer's Blackbird. The only grassland bird to have shown a significant increase in this 29-year BBS history in Wisconsin is the Killdeer.

### ACKNOWLEDGEMENTS

For data gathering I am grateful to the 130 plus observers who—year in and year out—were afield by 4:30 A.M. to run the state's 70 transects with remarkable consistency. Four observers who were afield in 1966 were still active participants in 1994. The list would be much longer had it not been for the inevitable aging process that reduces hearing capabilities.

For data processing I am indebted to the Wisconsin DNR research team of Paul Rasmussen, Dave Sample and Mike Mossman whose computer wizardry turns me green with envy. The calculations made by Bruce Peterjohn, Sam Droege, and others at the Patuxent Environmental Science Center were also of great help.

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Cardinals by *Thomas R. Schultz*