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No. 122, June 1981

The Co-operative Breeding Bird Survey in Canada, 1980

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Introduction

The Breeding Bird Survey (BBS) is a large-scale, annual, North American survey sampling the populations of breeding birds (primarily songbirds) from coast to coast. It has been run in Canada since 1966 by the Canadian Wildlife Service (CWS), in close co-operation with its founding group, the United States Fish and Wildlife Service (USFWS). Its success depends on a large number of volunteers who survey various routes throughout the country.

The BBS is described in detail by Erskine (1978). Briefly, it consists of roadside surveys conducted mainly during the month of June. The rules stress that the routes be run under favourable weather conditions and that ideally the survey dates do not differ between years by more than 10 days. Surveys begin 1/2 h before local sunrise. Fifty stops, stationed 0.8 km apart, are assessed along the route. During each 3-min stop, birds observed and heard within a range of 0.4 km are recorded.

Routes are systematically selected within each degree-block of the surveyed area, and are assumed to be samples of the physiographic regions that they represent. The assignment of routes on a degree-block basis results in a more even distribution of routes than if selection within a region were entirely random.

The main objective of the BBS is to look at population trends. It does not evaluate all species equally well for a variety of reasons (see Erskine 1978). We present only the most commonly recorded species in this report, but records of all species recorded on the routes are kept on computer tapes and are available upon request.

Results and discussion

Coverage

Figure 1 shows the distribution by degree-block of surveys made in 1980, and compares it with the coverage in previous years. Table 1 shows the number of routes surveyed in each of the last 8 years and the current number of active routes for each province and territory. In the Maritimes, southern Ontario and southern Quebec, and southern British Columbia, there are usually two routes per degree-block; in other areas, usually only one route per degree-block due to the lack of observers and all-weather roads. Thus, those areas are less completely covered than Figure 1 suggests.

The pattern of coverage in 1980 was similar to that of previous years. Both the numbers of routes surveyed (244) and of those rated comparable increased in 1980. We surveyed new routes in Quebec, Ontario, Alberta and the Yukon Territory. No formal BBS routes were reported in Newfoundland, although several similar surveys were done there.

Of the 244 routes surveyed for the Canadian BBS, 171 (70%) were comparable for 1979-80. Of the 73 non-comparable routes, 42% had not been surveyed in 1979, 20% were rejected due to observer changes, 15% were eliminated due to poor weather, 10% were lost due to divergence of survey dates between years (not considered comparable if dates differed by more than 20 days), and 8% of the routes were attempted but not completed for various reasons, including wet weather in the west and in Quebec, and fire threats causing detours and road closures in Ontario. We rejected 2% of the routes due to a lack of adherence to BBS rules.

The percentages of comparable routes increased substantially in the west, with 86% occurring in the southern Prairie region, and 73% in the central Prairies. Comparability for all regions generally improved over 1979 levels with averages for the other regions ranging from 56% (central Ontario and central Quebec) to 68% (British Columbia). The Maritimes and the southern Ontario and southern Quebec regions were matched at 65% comparability.

Grouping of routes for analysis

We used similar regional groupings in 1980 to those of previous years. The two routes surveyed in northeastern British Columbia were incorporated into the central Prairie region. Tables 2-7 list the 40 species detected in greatest numbers in each region, given as the mean number of birds per route. Table 8 lists the species recorded in greatest numbers for the two routes surveyed in the Yukon. Tables 9-14 indicate the changes in abundance of bird populations for 1979-80, listed as the weighted means, using the comparable routes for the 2 years.

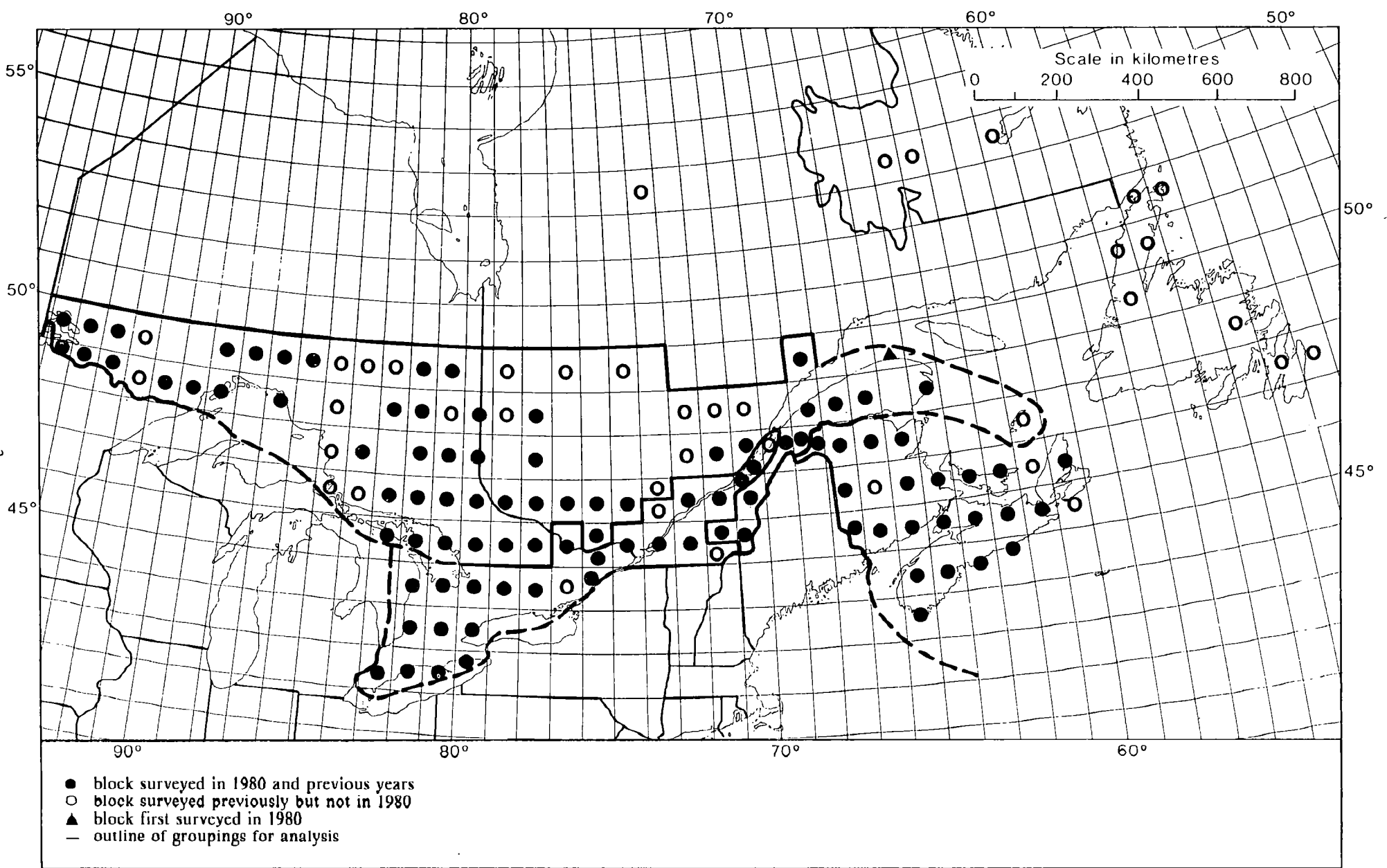
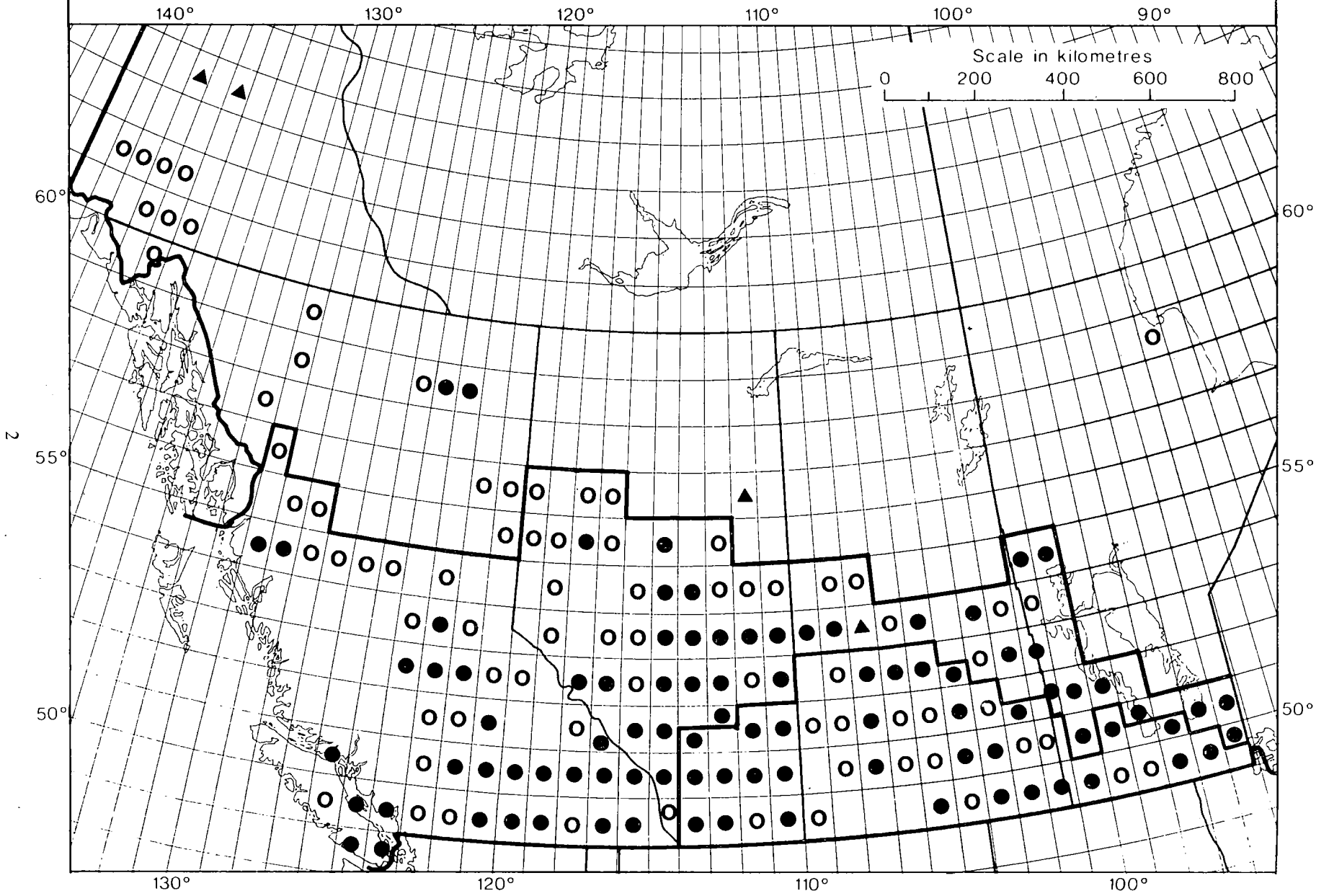
Changes observed

Maritime Provinces

Of the 38 routes surveyed in the Maritimes in 1980, 25 were comparable (two more than for the 1978-79 comparisons). No comparable routes were surveyed for the BBS in Newfoundland. We used less than half of the routes surveyed in New Brunswick for comparisons, leaving much of the central section of the province unrepresented (including the midlands, farmland, and conifer forests). Routes surveyed in Nova Scotia were 83% and in Prince Edward Island 66% comparable in

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Figure 1
Extent of coverage in 1980 and additional coverage in
1966-79 Breeding Bird Survey



- block surveyed in 1980 and previous years
- block surveyed previously but not in 1980
- ▲ block first surveyed in 1980
- outline of groupings for analysis

1979-80. The majority of those routes evaluated as comparable (16 routes, or 46%) were run between 7 and 22 June.

The population of Common Snipe remained low. Finney *et al.* (1980) noted its declining numbers in 1979 and expressed concern for its status. The National Harvest Survey, which estimates the yearly kill of migratory game birds by hunters in Canada, reported a decrease in the total 1979 kill estimates for this species (Wendt and Hyslop 1980). In the Maritimes, Nova Scotia was the only province to monitor an increase in Common Snipe kill estimates for the 1979 hunting season. It is of interest that although the average number of successful hunters has been decreasing, the average kill per hunter tends to be higher.

The Common Flicker continued to be recorded in low numbers. Erskine (1978) has noted a sustained downward trend for this species in the Maritimes since 1966, with a statistically significant decrease in 1971-72. Finney *et al.* (1980) recorded a more recent population decrease in 1979.

The population of the largely insectivorous Least Flycatcher (easily distinguished by its familiar "chebec", which may frequently be heard on mid June days) repeated the decline noted in 1978 (Freemark *et al.* 1979). This may be due in part to the exclusion from comparison of several routes in New Brunswick, which tended to record higher numbers for this species.

Several species listed in the 1979 BBS (Finney *et al.* 1980) showed statistically significant decreases. Of these, the Song and White-throated sparrows, Blue Jay and Common Raven increased in 1979-80. On the other hand, the Bank Swallow, Brown-headed Cowbird and Nashville Warbler retained their previous year's numbers.

Central Ontario and central Quebec

The region extends from the Ontario - Manitoba border to the Gaspé Peninsula. It covers a diversity of habitats, ranging from deciduous and boreal forests and farmland to prairie-edge shrubland in northwestern Ontario. However, similarities in the species occurring across this zone allow it to be assessed as a region. The ideal situation of sub-dividing it would come about only with a vast increase in the number of routes surveyed annually. Our 81 observers surveyed a total of 111 routes in both central and southern Ontario and Quebec. Of these, 22 observers successfully ran 36 routes in central Ontario and 29 completed 31 routes in central Quebec.

They surveyed most of the routes in mid June: 29 of 66 routes (43%) between 7 and 22 June. They ran 12 routes (18%) in July, including 5 that were too late in the season to be accepted for BBS comparisons. Only 5 routes (7%) were surveyed early in the season from 31 May to 6 June.

The BBS recorded an increase for the Song Sparrow in this region, a reversal of the low levels found throughout eastern Canada in 1979 (Finney *et al.* 1980). Other Fringillids showing increases were the Dark-eyed Junco and White-throated Sparrow.

BBS counts for the Larids are usually erratic, but population declines were noted for the Herring and Great Black-backed gulls in 1980. The survey recorded fewer Cuculids. The Black-billed Cuckoo, noted for its irregular pattern of distribution, had decreased according to the BBS for the central Ontario and Quebec region, and similar results were noted for both the Black-billed and Yellow-billed cuckoos in southern Ontario and southern Quebec. (The latter species remains on the Blue List, which records species that "recently or currently give indications of non-cyclical population declines or range contractions, either locally or widespread." (Arbib 1979)).

Most of northern Ontario went through a relatively dry summer with forest fire threats closing several roads in the central region. Nevertheless, observers did not report any obvious differences in species composition, and the mean number of birds noted per route was comparable to that for the previous year.

Southern Ontario and southern Quebec

This region covers a high-density population area. It extends inland along a stretch of the Great Lakes - St. Lawrence Forest region, and shows variations in its forest species composition. Hardwoods dominate the forested areas in the south, which is an agricultural zone, and the northern and eastern sections (with interspersed agricultural and forest areas) have mixed coniferous and deciduous forests.

The 22 observers ran 24 breeding bird surveys in southern Ontario, and 7 ran 10 routes in southern Quebec. Of these, 18 and 10 routes respectively were considered comparable, one more than in the previous year's study.

The increase recorded for the Eastern Meadowlark in southern Ontario and southern Quebec matched increases recorded for the Western Meadowlark in both the southern Prairies and British Columbia regions. The increase reported for the Blue Jay in southern Quebec was matched in the Maritimes. The Rock Dove had increased to its highest level in the past decade (Finney *et al.* 1978, 1980; Freemark *et al.* 1979; Erskine 1973, 1974, 1975, 1976, 1977). The Song Sparrow, which had been recorded as decreasing over the past 2 years (Finney *et al.* 1980, Freemark *et al.* 1979) appears to be making a recovery. Another Fringillid, the Vesper Sparrow, decreased for the second consecutive year. No changes were recorded for the Brown-headed Cowbird and Common Yellowthroat, after a statistically significant decline noted in the 1979 BBS (Finney *et al.* 1980).

Southern Prairie Provinces

This region is primarily considered as grassland. The more northern section is classed as forest and grass with aspen and willow predominating. The region recorded the largest number of significant changes in the BBS, with 10 increases and 5 decreases.

The Sora continued to fluctuate, declining in the southern Prairies, but increasing in the central Prairies.

The Corvids generally increased in the southern region, matching a common pattern noted in 1980 in the regions east of the Rockies. Increases were recorded for the Common Crow, Common Grackle, and Black-billed Magpie. Among the Hirundinids, the Bank and Barn swallows increased, the latter species being sighted on all of the comparable routes. On the other hand, the Tree and Rough-winged swallows decreased according to the BBS counts. The Rough-winged Swallow is not a colonial nester and is not often recorded on surveys.

The Warbling Vireo reached a peak in the distribution recorded by the BBS in 1979, but now appears to have declined. Two species that decreased in 1979, the Killdeer and Common Flicker, showed no obvious changes in the western regions in 1980. The numbers of Song Sparrows, which appeared to have increased in all other regions, remained unchanged in the southern Prairies.

Fewer routes were surveyed in 1980, but the percentage of comparable routes was higher (86% for 1980, 61% for 1979). Three of the routes were not comparable because of changes in observers, one route was not completed and another had not been surveyed in the previous year. No routes were surveyed before 7 June.

Central Prairie Provinces

The number of routes surveyed and considered comparable in the predominantly boreal central Prairie region increased to 32 in 1980, after a low of 17 in 1979. We have included the two northern British Columbia routes in the comparisons for this region. Five routes were not comparable because they had not been surveyed in 1979, two were new routes, two were rejected because of changes in observers and one was lost because it was not completed. Only three significant changes were noted in the BBS, two of which were decreases. The decrease recorded for the Pintail matched that in the southern Prairies. Counts for this species are not generally reliable, as nesting occurs in April and May.

A number of species declined in 1979 and remained at low levels in 1980. These included the Lesser Scaup and Franklin Gull, both very erratic in BBS's, and the Tree Swallow, Black-billed Magpie, and Red-winged Blackbird.

The dry seasons experienced in most provinces in 1979-80 may be reflected in lower populations being recorded for wetland species. Numbers of breeding waterfowl reported in the BBS in the Prairie regions did not reveal significant decreases, although there were several observations made earlier than usual of birds feeding in large flocks, possibly indicating non-nesting.

British Columbia

The British Columbia region covers a mosaic of zones including rain forest, fertile coastal farmland, arid plateau, parkland, and sub-alpine and sub-boreal spruce forest. Comparable routes for the 1980 BBS amounted to 24, one more than for the previous year. Of the 14

active routes in the coastal zone, five were surveyed (all on Vancouver Island) and three were comparable. A dozen routes were surveyed in the southwest interior zone with 35% comparable. The southeast interior was the best represented with 77% comparable routes. Enthusiastic observers continue to survey the northern sections of the region, where two routes located above 55° latitude were comparable. Of all routes considered to be comparable, 55% (11) were surveyed between 7 and 22 June.

Only four significant changes were noted in the 1980 BBS. The western race of the Song Sparrow showed no change in numbers, in contrast to the increases generally indicated for its eastern counterpart. None of the seven species which declined in the 1978-79 BBS comparison (Killdeer, Common Crow, Red-eyed Vireo, Yellow Warbler, Winter Wren, Varied Thrush, Golden-crowned Kinglet) showed a significant change in 1980.

The number of observers successfully completing routes in the British Columbia region decreased by one in 1980 to a low of 26. Two observers did four routes each and four observers two each. We hope that the number of observers for this region will increase in future surveys.

Conclusions

Both the numbers of routes surveyed and those considered comparable increased for the 1980 BBS. The total of 244 completed routes was the highest in a 5-yr span. Coverage was particularly good in Quebec, Ontario, and Alberta.

We surveyed most of the routes after 10 June, with 38% (95) surveyed within the 2nd and 3rd weeks of June, 21% (51) after 29 June, and 6 (2%) after 6 July.

The results for 1980 showed that several species that declined in the 1979 survey had rebounded slightly. The Song Sparrow had returned to its previous year's level in the Maritimes, central Ontario and Quebec, and southern Ontario and Quebec. Its numbers had remained constant in the southern and central Prairies and in British Columbia.

Readers familiar with this BBS series will note that trend indices have been omitted for the second consecutive year. Last year, statisticians associated with this project discovered that the method of calculating these indices yielded unreliable results. The longer the string of years compared, the more unreliable the method became. Dr. Geisler of the USFWS has developed a new analytical procedure for calculating long-term trends, and we hope that this method can be applied to BBS data on a continental scale in 1981. Its application to the Canadian context will be tested within the next several months.

Acknowledgments

Several observers have expressed their continued interest in the BBS, but after many years of commitment have decided to retire from it. The survey

organizers are greatly indebted to these volunteers and to the many who have worked with the BBS from its initial years. We also thank the observers, their assistants, and the regional co-ordinators who continue to support the BBS, and those who helped with the running of the 1980 computer programs, in particular, B. Nagpal, G.E.J. Smith, and S. Wendt.

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Alberta: Mr. Jack L. Park, 10236-70 Street, Edmonton T6A 2T4

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Table 1

Number of routes completed in the Breeding Bird Survey, Canada, 1973-80, and the numbers of currently active routes for each province and territory

| Province | No. active routes 1980 | No. routes surveyed* | | | | | | | |
|----------------------|------------------------|----------------------|------------|----------|-----------|----------|----------|-----------|-----------|
| | | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
| Newfoundland | 11 | 2 | 4 | 6 | 4 | 2 | 3 | 1 | — |
| Prince Edward Island | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | 3 |
| Nova Scotia | 24 | 20 | 19 | 17 | 14 | 19 | 17 | 18 | 18 |
| New Brunswick | 28 | 22 | 21 | 16 | 18 | 19 | 19 | 16 | 17 |
| Quebec | 61 | 24 | 21 | 24 | 21 | 20 | 36 | 41 | 41 |
| Ontario | 74 | 55 | 58 | 61 | 65 | 63 | 56 | 53 | 60 |
| Manitoba | 21 | 13 | 14 | 13 | 13 | 16 | 16 | 15 | 17 |
| Saskatchewan | 38 | 28 | 19 | 19 | 20 | 21 | 18 | 19 | 20 |
| Alberta | 51 | 36 | 31 | 33 | 29 | 21 | 24 | 27 | 31 |
| British Columbia | 80 | 38 | 53 | 50 | 42 | 34 | 34 | 36 | 35 |
| Yukon | 10 | 5 | 7 | 5 | 6 | 0 | 0 | 0 | 2 |
| Total | 402 | 247 | 251 | 248 | 235 | 219 | 227 | 229 | 244 |

*The figures in bold type represent the greatest number of routes surveyed in one year for each province. Four routes were also surveyed in PEI each year from 1967-69; 23 routes in NS in 1972; 24 routes in NB in 1971 and 1972; 33 routes in Quebec in 1970.

Yukon Territory: co-ordinated from CWS, Ottawa K1A 0E7

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Table 2

The 40 species recorded in greatest numbers in the Breeding Bird Survey, Maritime Provinces, 1980; the mean number of each per route; and the percentage of routes on which they were found. Thirty-eight routes were surveyed, with a mean of 751 birds noted per route

| Species | Mean no. per route | % of 38 routes |
|-------------------------|--------------------|----------------|
| American Robin | 59.7 | 100 |
| Common Crow | 40.4 | 97 |
| Starling | 39.8 | 97 |
| White-throated Sparrow | 36.1 | 100 |
| Song Sparrow | 28.4 | 100 |
| Bobolink | 24.7 | 84 |
| Common Yellowthroat | 22.7 | 100 |
| American Redstart | 22.5 | 95 |
| Barn Swallow | 20.6 | 100 |
| Common Grackle | 18.8 | 97 |
| Herring Gull | 18.5 | 63 |
| Red-eyed Vireo | 18.4 | 95 |
| Red-winged Blackbird | 17.9 | 97 |
| Ovenbird | 16.0 | 89 |
| Alder Flycatcher | 15.5 | 92 |
| House Sparrow | 15.3 | 87 |
| Tree Swallow | 14.4 | 97 |
| Swainson's Thrush | 14.4 | 95 |
| Magnolia Warbler | 14.1 | 87 |
| Yellow Warbler | 11.7 | 97 |
| Bank Swallow | 11.5 | 61 |
| Veery | 10.6 | 71 |
| Dark-eyed Junco | 10.5 | 84 |
| Common Raven | 10.0 | 97 |
| Chipping Sparrow | 9.3 | 84 |
| American Goldfinch | 8.7 | 97 |
| Evening Grosbeak | 8.6 | 53 |
| Ruby-crowned Kinglet | 8.6 | 87 |
| Hermit Thrush | 8.2 | 87 |
| Rose-breasted Grosbeak | 8.2 | 79 |
| Double-cr. Cormorant | 7.9 | 26 |
| Tennessee Warbler | 7.6 | 74 |
| Purple Finch | 7.4 | 84 |
| Gt. Black-backed Gull | 7.0 | 58 |
| Cedar Waxwing | 6.9 | 68 |
| Northern Parula Warbler | 6.7 | 79 |
| Savannah Sparrow | 6.5 | 71 |
| Yellow-rumped Warbler | 6.3 | 82 |
| Black-th. Green Warbler | 6.2 | 79 |
| Rock Dove | 6.1 | 45 |

Table 3

The 40 species recorded in greatest numbers in the Breeding Bird Survey, central Ontario and central Quebec, 1980; the mean number of each per route; and the percentage of routes on which they were found. Sixty-six routes were surveyed, with a mean of 681 birds per route

| Species | Mean no. per route | % of 66 routes |
|------------------------|--------------------|----------------|
| White-throated Sparrow | 47.6 | 100 |
| American Robin | 38.8 | 100 |
| Starling | 30.9 | 79 |
| Common Crow | 26.6 | 94 |
| Red-eyed Vireo | 26.0 | 97 |
| Red-winged Blackbird | 22.3 | 89 |
| Ovenbird | 20.1 | 91 |
| Veery | 18.9 | 88 |
| Swainson's Thrush | 18.3 | 80 |
| Ring-billed Gull | 17.8 | 18 |
| Song Sparrow | 16.8 | 86 |
| Chipping Sparrow | 15.8 | 97 |
| Common Grackle | 14.5 | 83 |
| Common Yellowthroat | 14.4 | 97 |
| Herring Gull | 14.4 | 56 |
| Barn Swallow | 14.2 | 82 |
| Chestnut-sided Warbler | 13.6 | 86 |
| Tree Swallow | 13.6 | 92 |
| Bobolink | 13.4 | 61 |
| Savannah Sparrow | 11.5 | 67 |
| Evening Grosbeak | 9.7 | 58 |
| Common Eider | 9.1 | 5 |
| Bank Swallow | 9.1 | 39 |
| Nashville Warbler | 8.8 | 83 |
| Tennessee Warbler | 8.7 | 45 |
| Mourning Warbler | 8.7 | 82 |
| American Redstart | 8.1 | 88 |
| Common Raven | 8.0 | 73 |
| Alder Flycatcher | 7.8 | 83 |
| American Goldfinch | 7.5 | 76 |
| House Sparrow | 7.1 | 42 |
| Least Flycatcher | 6.8 | 92 |
| Rose-breasted Grosbeak | 6.7 | 74 |
| Yellow-rumped Warbler | 6.2 | 89 |
| Cedar Waxwing | 6.2 | 85 |
| Brown-headed Cowbird | 5.9 | 71 |
| Ruby-crowned Kinglet | 5.8 | 74 |
| Cliff Swallow | 5.8 | 36 |
| Magnolia Warbler | 5.2 | 74 |
| Winter Wren | 5.2 | 61 |

Table 4

The 40 species recorded in greatest numbers in the Breeding Bird Survey, southern Ontario and southern Quebec, 1980; the mean number of each per route; and the percentage of routes on which they were found. Thirty-five routes were surveyed, with a mean of 1199 birds noted per route

| Species | Mean no. per route | % of 35 routes |
|------------------------|--------------------|----------------|
| Red-winged Blackbird | 175.3 | 100 |
| Starling | 145.8 | 100 |
| House Sparrow | 75.6 | 100 |
| Common Grackle | 69.5 | 100 |
| American Robin | 54.2 | 100 |
| Bobolink | 53.1 | 100 |
| Savannah Sparrow | 47.1 | 100 |
| Common Crow | 45.7 | 100 |
| Barn Swallow | 42.2 | 100 |
| Song Sparrow | 39.1 | 100 |
| Ring-billed Gull | 38.9 | 60 |
| Bank Swallow | 32.0 | 74 |
| Rock Dove | 25.4 | 94 |
| Eastern Meadowlark | 25.2 | 100 |
| Brown-headed Cowbird | 20.7 | 100 |
| Mourning Dove | 20.3 | 97 |
| Killdeer | 19.4 | 100 |
| American Goldfinch | 19.1 | 100 |
| Chipping Sparrow | 13.4 | 97 |
| Cedar Waxwing | 12.7 | 91 |
| Tree Swallow | 12.1 | 89 |
| Common Yellowthroat | 11.9 | 91 |
| Eastern Kingbird | 11.7 | 100 |
| Yellow Warbler | 11.4 | 97 |
| Baltimore Oriole | 10.6 | 91 |
| Rose-breasted Grosbeak | 7.9 | 94 |
| Horned Lark | 6.7 | 83 |
| Vesper Sparrow | 6.4 | 77 |
| Veery | 6.2 | 77 |
| Blue Jay | 6.0 | 89 |
| House Wren | 5.9 | 91 |
| Red-eyed Vireo | 5.8 | 89 |
| White-throated Sparrow | 5.5 | 60 |
| Warbling Vireo | 5.5 | 91 |
| Gt. Crested Flycatcher | 5.1 | 91 |
| Yellow-shafted Flicker | 5.1 | 97 |
| Gray Catbird | 4.6 | 91 |
| Eastern Wood Pewee | 4.4 | 80 |
| Purple Martin | 4.3 | 37 |
| Brown Thrasher | 4.3 | 71 |

Table 5

The 40 species recorded in greatest numbers in the Breeding Bird Survey, southern Prairie Provinces, 1980; the mean number of each per route; and the percentage of routes on which they were found. Twenty-nine routes were surveyed with a mean of 975 birds noted per route

| Species | Mean no. per route | % of 29 routes |
|------------------------|--------------------|----------------|
| Red-winged Blackbird | 107.9 | 100 |
| Horned Lark | 101.0 | 100 |
| Western Meadowlark | 65.6 | 100 |
| House Sparrow | 62.7 | 100 |
| Common Crow | 43.4 | 100 |
| Mallard | 34.5 | 90 |
| Brewer's Blackbird | 34.2 | 100 |
| Brown-headed Cowbird | 31.3 | 93 |
| Clay-colored Sparrow | 28.2 | 100 |
| Cliff Swallow | 23.7 | 34 |
| Savannah Sparrow | 22.4 | 100 |
| Chestnut-col. Longspur | 22.2 | 52 |
| Starling | 20.7 | 93 |
| Vesper Sparrow | 20.0 | 100 |
| Mourning Dove | 19.8 | 83 |
| House Wren | 19.0 | 93 |
| Yellow-head. Blackbird | 19.0 | 66 |
| Ring-billed Gull | 18.5 | 52 |
| Killdeer | 18.1 | 100 |
| Barn Swallow | 18.1 | 100 |
| Black-billed Magpie | 11.4 | 93 |
| American Robin | 10.9 | 83 |
| American Coot | 11.0 | 48 |
| Common Grackle | 10.6 | 62 |
| Unident. Gull | 9.9 | 10 |
| Song Sparrow | 9.6 | 59 |
| Rock Dove | 9.3 | 83 |
| Franklin's Gull | 8.9 | 38 |
| Lesser Scaup | 7.7 | 52 |
| Eastern Kingbird | 7.7 | 100 |
| Blue-winged Teal | 7.6 | 66 |
| Sprague's Pipit | 5.5 | 55 |
| Warbling Vireo | 5.5 | 62 |
| American Goldfinch | 5.5 | 66 |
| Marbled Godwit | 5.3 | 62 |
| Northern Shoveler | 4.9 | 48 |
| Black Tern | 4.3 | 45 |
| Northern Oriole | 4.1 | 69 |
| Least Flycatcher | 4.1 | 66 |
| Bank Swallow | 3.8 | 24 |

Table 6

The 40 species recorded in the greatest numbers in the Breeding Bird Survey, central Prairie Provinces, 1980; the mean number of each per route; and the percentage of routes on which they were found. Forty-one routes were surveyed with a mean of 727 birds noted per route

| Species | Mean no. per route | % of 41 routes |
|------------------------|--------------------|----------------|
| Red-winged Blackbird | 44.0 | 93 |
| Common Crow | 34.2 | 93 |
| Mallard | 31.9 | 73 |
| Clay-colored Sparrow | 30.9 | 93 |
| Red-eyed Vireo | 21.9 | 93 |
| American Robin | 20.5 | 100 |
| Savannah Sparrow | 20.2 | 88 |
| Chipping Sparrow | 18.9 | 85 |
| Cliff Swallow | 18.0 | 44 |
| Brewer's Blackbird | 16.8 | 71 |
| Starling | 16.7 | 68 |
| Song Sparrow | 16.3 | 80 |
| House Sparrow | 13.8 | 73 |
| House Wren | 13.8 | 78 |
| Barn Swallow | 13.3 | 88 |
| Blue-winged Teal | 12.9 | 41 |
| Black-billed Magpie | 12.4 | 78 |
| Vesper Sparrow | 12.3 | 76 |
| Brown-headed Cowbird | 12.0 | 80 |
| Yellow Warbler | 11.5 | 88 |
| White-throated Sparrow | 11.2 | 59 |
| Swainson's Thrush | 11.0 | 56 |
| Least Flycatcher | 10.9 | 95 |
| Western Meadowlark | 10.6 | 54 |
| Pine Siskin | 9.8 | 44 |
| Common Yellowthroat | 9.4 | 85 |
| Alder Flycatcher | 8.9 | 78 |
| Franklin's Gull | 8.4 | 34 |
| Bank Swallow | 8.0 | 37 |
| Black Tern | 7.9 | 44 |
| Killdeer | 7.1 | 88 |
| American Goldfinch | 6.9 | 73 |
| Yellow-head. Blackbird | 6.6 | 49 |
| Warbling Vireo | 6.4 | 73 |
| Tree Swallow | 6.2 | 73 |
| Canada Goose | 6.1 | 22 |
| Common Snipe | 6.0 | 73 |
| Yellow-rumped Warbler | 5.5 | 46 |
| Mourning Dove | 5.5 | 59 |
| American Coot | 5.2 | 46 |

Table 7

The 40 species recorded in greatest numbers in the Breeding Bird Survey, British Columbia (west of Rocky Mountains), 1980; the mean number of each per route; and the percentage of routes on which they were found. Thirty-three routes were surveyed with a mean of 680 birds noted per route

| Species | Mean no. per route | % of 33 routes |
|-------------------------|--------------------|----------------|
| American Robin | 59.6 | 100 |
| Starling | 46.6 | 91 |
| Swainson's Thrush | 27.6 | 100 |
| Common Crow | 25.7 | 79 |
| Pine Siskin | 21.6 | 85 |
| Chipping Sparrow | 18.3 | 94 |
| Barn Swallow | 17.9 | 91 |
| Cliff Swallow | 17.4 | 52 |
| Dark-eyed Junco | 15.8 | 97 |
| Glaucous-winged Gull | 15.0 | 18 |
| Western Meadowlark | 13.6 | 61 |
| Brewer's Blackbird | 13.4 | 76 |
| Red-winged Blackbird | 12.8 | 67 |
| Northwestern Crow | 11.9 | 21 |
| Yellow-rumped Warbler | 11.6 | 91 |
| Tree Swallow | 11.0 | 73 |
| Red-eyed Vireo | 10.9 | 73 |
| Red Crossbill | 10.3 | 52 |
| Song Sparrow | 9.7 | 94 |
| Common Raven | 9.3 | 91 |
| Black-capped Chickadee | 9.3 | 82 |
| MacGillivray's Warbler | 8.8 | 76 |
| Brown-headed Cowbird | 8.6 | 85 |
| Dusky Flycatcher | 8.5 | 73 |
| Warbling Vireo | 8.2 | 94 |
| Yellow Warbler | 8.0 | 85 |
| Rough-winged Swallow | 7.7 | 73 |
| Common Flicker | 7.3 | 88 |
| Western Tanager | 7.3 | 85 |
| Violet-green Swallow | 7.1 | 64 |
| Mountain Chickadee | 6.9 | 58 |
| Orange-crowned Warbler | 6.7 | 73 |
| Vesper Sparrow | 6.7 | 42 |
| Red-breasted Nuthatch | 6.5 | 88 |
| House Sparrow | 5.8 | 27 |
| Chestnut-bkd. Chickadee | 5.7 | 24 |
| Western Wood Pewee | 5.3 | 79 |
| Veery | 5.2 | 55 |
| Savannah Sparrow | 5.1 | 64 |
| Varied Thrush | 5.0 | 42 |

Table 8

The 14 species recorded in greatest numbers in the Breeding Bird Survey, Yukon Territory, 1980; the mean number per route; and the number of routes on which they were found. Two routes were surveyed with a mean of 490 birds noted per route

| Species | Mean no. per route | No. of routes |
|------------------------|--------------------|---------------|
| Swainson's Thrush | 127.5 | 2 |
| Dark-eyed Junco | 93.0 | 2 |
| Hermit Thrush | 48.0 | 2 |
| Alder Flycatcher | 36.5 | 2 |
| American Robin | 24.0 | 2 |
| White-crowned Sparrow | 18.5 | 2 |
| Western Wood Pewee | 16.0 | 1 |
| Varied Thrush | 15.0 | 2 |
| Lincoln's Sparrow | 14.5 | 2 |
| Gray Jay | 14.0 | 2 |
| Yellow-rumped Warbler | 11.5 | 2 |
| Fox Sparrow | 10.5 | 2 |
| Orange-crowned Warbler | 7.0 | 2 |
| Mew Gull | 5.0 | 2 |

Table 9

Changes in bird populations for 25 comparable routes, Breeding Bird Survey, Maritimes, 1979-80

| Species | Weighted mean no. birds per route | | % change (bold) with 95% confidence limits | | |
|-------------------------|-----------------------------------|-------|--|------------|-----|
| | 1979 | 1980 | | | |
| Common Snipe | 3.17 | 3.54 | -40 | 12 | 63 |
| Herring Gull | 23.70 | 17.69 | -57 | -25 | 7 |
| Common Flicker | 2.25 | 2.99 | -34 | 33 | 100 |
| Yellow-bel. Sapsucker | 3.22 | 2.59 | -42 | -19 | 3 |
| Alder Flycatcher | 12.74 | 14.68 | -4 | 15 | 34 |
| *Least Flycatcher | 4.36 | 2.20 | -60 | -50 | -39 |
| Tree Swallow | 13.36 | 13.72 | -27 | 3 | 32 |
| Bank Swallow | 10.48 | 9.47 | -62 | -10 | 43 |
| Barn Swallow | 19.20 | 19.36 | -31 | 1 | 32 |
| *Blue Jay | 3.61 | 5.09 | 3 | 41 | 79 |
| *Common Raven | 6.80 | 10.55 | 8 | 55 | 103 |
| Common Crow | 34.77 | 40.47 | -2 | 16 | 35 |
| Winter Wren | 1.10 | 1.52 | -71 | 38 | 147 |
| American Robin | 48.36 | 59.29 | -1 | 23 | 46 |
| Hermit Thrush | 8.10 | 7.43 | -37 | -8 | 20 |
| Swainson's Thrush | 16.23 | 13.44 | -48 | -17 | 13 |
| Veery | 10.02 | 8.80 | -31 | -12 | 7 |
| Ruby-crowned Kinglet | 5.68 | 7.32 | -10 | 29 | 68 |
| Starling | 42.96 | 43.55 | -26 | 1 | 29 |
| *Red-eyed Vireo | 23.50 | 18.86 | -32 | -20 | -7 |
| Nashville Warbler | 2.75 | 4.36 | -20 | 59 | 137 |
| Yellow Warbler | 13.48 | 12.79 | -17 | -5 | 7 |
| Magnolia Warbler | 13.51 | 14.72 | -13 | 9 | 31 |
| Black-th. Green Warbler | 5.92 | 6.18 | -18 | 4 | 27 |
| Chestnut-sided Warbler | 5.97 | 5.71 | -34 | -4 | 25 |
| Ovenbird | 14.56 | 15.03 | -15 | 3 | 22 |
| Common Yellowthroat | 23.37 | 23.35 | -13 | 0 | 13 |
| American Redstart | 25.68 | 21.03 | -38 | -18 | 1 |
| House Sparrow | 16.84 | 17.48 | -19 | 4 | 26 |
| Bobolink | 21.15 | 25.02 | -33 | 18 | 70 |
| Red-winged Blackbird | 19.71 | 18.56 | -50 | -6 | 38 |
| Common Grackle | 15.00 | 15.46 | -34 | 3 | 40 |
| Brown-headed Cowbird | 2.57 | 3.57 | -26 | 39 | 103 |
| *Evening Grosbeak | 6.48 | 3.90 | -58 | -40 | -22 |
| Purple Finch | 4.80 | 5.74 | -23 | 20 | 62 |
| American Goldfinch | 8.09 | 8.92 | -9 | 10 | 29 |
| Savannah Sparrow | 7.52 | 6.87 | -70 | -9 | 53 |
| Dark-eyed Junco | 9.45 | 9.19 | -17 | -3 | 11 |
| Chipping Sparrow | 9.80 | 8.73 | -31 | -11 | 9 |
| White-throated Sparrow | 32.87 | 33.74 | -8 | 3 | 13 |
| *Song Sparrow | 25.94 | 30.45 | 1 | 17 | 34 |
| Yellow-rumped Warbler | 5.86 | 5.51 | -36 | -6 | 24 |
| Black-capped Chickadee | 3.70 | 3.30 | -34 | -11 | 12 |

*Change greater than 95% significant.

Table 10
Changes in bird populations for 37 comparable routes,
Breeding Bird Survey, central Ontario and central Quebec,
1979-80

| Species | Weighted mean no. birds per route | | % change (bold) with 95% confidence limits | | |
|-------------------------|--------------------------------------|-------|---|------------|-----|
| | 1979 | 1980 | | | |
| Killdeer | 5.87 | 5.11 | -28 | -13 | 3 |
| *Herring Gull | 31.39 | 15.03 | -89 | -52 | -15 |
| *Common Flicker | 2.79 | 4.00 | 9 | 43 | 78 |
| Yellow-bel. Sapsucker | 2.45 | 2.14 | -50 | -13 | 25 |
| Alder Flycatcher | 11.34 | 10.79 | -22 | -5 | 12 |
| Least Flycatcher | 7.90 | 8.09 | -18 | 2 | 23 |
| Tree Swallow | 12.40 | 13.03 | -22 | 5 | 32 |
| Bank Swallow | 8.64 | 12.01 | -35 | 39 | 113 |
| Barn Swallow | 12.82 | 12.11 | -23 | -6 | 11 |
| Blue Jay | 2.77 | 3.02 | -40 | 9 | 58 |
| Common Raven | 9.95 | 10.68 | -27 | 7 | 42 |
| *Common Crow | 25.12 | 29.09 | 1 | 16 | 31 |
| Winter Wren | 5.15 | 6.47 | -29 | 26 | 81 |
| American Robin | 34.88 | 39.31 | -5 | 13 | 30 |
| Hermit Thrush | 4.36 | 5.27 | -13 | 21 | 55 |
| Swainson's Thrush | 23.39 | 21.13 | -33 | -10 | 14 |
| Veery | 17.01 | 17.25 | -13 | 1 | 15 |
| Ruby-crowned Kinglet | 6.02 | 7.18 | -19 | 19 | 57 |
| Cedar Waxwing | 6.95 | 5.97 | -51 | -14 | 23 |
| Starling | 28.66 | 32.05 | -9 | 12 | 33 |
| Red-eyed Vireo | 31.07 | 31.09 | -11 | 0 | 11 |
| Nashville Warbler | 9.79 | 7.60 | -46 | -22 | 1 |
| Yellow Warbler | 4.02 | 4.29 | -21 | 7 | 34 |
| Magnolia Warbler | 5.19 | 5.64 | -22 | 9 | 39 |
| Yellow-rumped Warbler | 6.46 | 7.23 | -15 | 12 | 39 |
| Chestnut-sided Warbler | 13.13 | 12.74 | -17 | -3 | 11 |
| Ovenbird | 20.05 | 19.25 | -14 | 4 | 6 |
| Mourning Warbler | 10.55 | 12.65 | -3 | 20 | 42 |
| Common Yellowthroat | 15.31 | 14.32 | -20 | -6 | 7 |
| American Redstart | 10.34 | 9.77 | -24 | -5 | 13 |
| *House Sparrow | 4.09 | 8.07 | 34 | 97 | 160 |
| Bobolink | 15.44 | 15.24 | -17 | -1 | 15 |
| Red-winged Blackbird | 21.77 | 21.89 | -23 | 1 | 24 |
| Common Grackle | 13.98 | 15.13 | -24 | 8 | 41 |
| Brown-headed Cowbird | 8.47 | 6.59 | -50 | -22 | 6 |
| Rose-breasted Grosbeak | 6.05 | 6.41 | -18 | 6 | 30 |
| Evening Grosbeak | 10.15 | 11.85 | -28 | 17 | 61 |
| American Goldfinch | 4.53 | 6.78 | -12 | 50 | 111 |
| Savannah Sparrow | 15.07 | 13.48 | -28 | -11 | 7 |
| *Dark-eyed Junco | 3.66 | 4.88 | 3 | 33 | 64 |
| Chipping Sparrow | 12.56 | 13.73 | -6 | 9 | 24 |
| *White-throated Sparrow | 43.68 | 50.95 | 1 | 16 | 31 |
| *Song Sparrow | 11.73 | 15.72 | 13 | 34 | 55 |

*Change greater than 95% significant.

Table 11
Changes in bird populations for 28 comparable routes,
Breeding Bird Survey, southern Ontario and southern
Quebec, 1979-80

| Species | Weighted mean no. birds per route | | % change (bold) with 95% confidence limits | | |
|------------------------|--------------------------------------|--------|---|------------|-----|
| | 1979 | 1980 | | | |
| Killdeer | 20.07 | 18.80 | -21 | -6 | 8 |
| *Rock Dove | 16.53 | 25.75 | 6 | 56 | 106 |
| Mourning Dove | 17.49 | 18.32 | -16 | 5 | 25 |
| Common Flicker | 3.38 | 4.93 | -8 | 46 | 100 |
| Eastern Kingbird | 9.39 | 9.74 | -21 | 4 | 29 |
| Gt. Crested Flycatcher | 4.21 | 4.62 | -20 | 10 | 40 |
| Eastern Wood Pewee | 4.31 | 3.96 | -29 | -8 | 13 |
| Horned Lark | 7.26 | 7.18 | -32 | -1 | 30 |
| Tree Swallow | 10.45 | 11.87 | -20 | 14 | 47 |
| Bank Swallow | 21.97 | 25.97 | -38 | 18 | 74 |
| Barn Swallow | 42.16 | 38.75 | -23 | -8 | 6 |
| Purple Martin | 4.46 | 3.69 | -67 | -17 | 33 |
| *Blue Jay | 3.41 | 5.45 | 9 | 60 | 110 |
| Common Crow | 42.12 | 49.27 | -11 | 17 | 45 |
| *House Wren | 3.87 | 4.79 | 2 | 24 | 46 |
| Gray Catbird | 4.08 | 3.76 | -36 | -8 | 20 |
| Brown Thrasher | 3.88 | 4.90 | -16 | 26 | 69 |
| American Robin | 45.78 | 51.49 | -8 | 12 | 33 |
| Veery | 7.29 | 7.81 | -14 | 7 | 29 |
| Cedar Waxwing | 7.82 | 11.54 | -5 | 48 | 100 |
| Starling | 116.30 | 141.72 | -4 | 22 | 47 |
| Red-eyed Vireo | 7.10 | 6.48 | -21 | -9 | 3 |
| Warbling Vireo | 4.09 | 4.25 | -22 | 4 | 30 |
| *Yellow Warbler | 6.12 | 9.19 | 9 | 50 | 92 |
| Common Yellowthroat | 10.55 | 12.13 | -8 | 15 | 38 |
| House Sparrow | 72.89 | 78.77 | -9 | 8 | 25 |
| Bobolink | 55.14 | 55.19 | -23 | 0 | 23 |
| *Eastern Meadowlark | 16.15 | 22.79 | 16 | 41 | 66 |
| Red-winged Blackbird | 168.04 | 165.83 | -21 | -1 | 18 |
| Northern Oriole | 9.92 | 8.91 | -26 | -10 | 6 |
| *Common Grackle | 52.67 | 69.53 | 14 | 32 | 50 |
| Brown-headed Cowbird | 19.08 | 20.55 | -15 | 8 | 31 |
| Rose-breasted Grosbeak | 7.35 | 8.39 | 11 | 14 | 39 |
| American Goldfinch | 15.28 | 17.76 | -9 | 16 | 41 |
| Savannah Sparrow | 56.04 | 47.43 | -35 | -15 | 4 |
| *Vesper Sparrow | 8.14 | 6.30 | -40 | -23 | -5 |
| Chipping Sparrow | 11.37 | 11.79 | -8 | 4 | 16 |
| White-throated Sparrow | 8.37 | 7.34 | -43 | -12 | 18 |
| *Song Sparrow | 28.25 | 38.89 | 17 | 38 | 58 |

*Change greater than 95% significant.

Table 12
Changes in bird populations for 25 comparable routes,
Breeding Bird Survey, southern Prairies, 1979-80

| Species | Weighted mean no. birds per route | | % change (bold) with 95% confidence limits | | |
|-------------------------|--------------------------------------|--------|---|------------|------|
| | 1979 | 1980 | | | |
| Mallard | 45.91 | 36.63 | -55 | -20 | 14 |
| *Pintail | 16.16 | 3.27 | -93 | -80 | -67 |
| Blue-winged Teal | 10.40 | 8.13 | -65 | -22 | 22 |
| Northern Shoveler | 6.74 | 4.95 | -114 | -27 | 61 |
| American Wigeon | 5.07 | 3.55 | -72 | -30 | 13 |
| Lesser Scaup | 9.19 | 8.64 | -83 | -6 | 71 |
| *Sora | 4.29 | 1.18 | -91 | -72 | -54 |
| American Coot | 6.25 | 12.53 | -37 | 100 | 237 |
| Killdeer | 15.46 | 17.05 | -13 | 10 | 34 |
| Ring-billed Gull | 29.05 | 14.40 | -101 | -50 | 0 |
| Franklin's Gull | 13.81 | 9.34 | -96 | -32 | 31 |
| Black Tern | 5.23 | 4.77 | -67 | -9 | 49 |
| Rock Dove | 5.74 | 10.38 | -7 | 81 | 169 |
| *Mourning Dove | 14.23 | 18.96 | 1 | 33 | 66 |
| Common Flicker | 1.22 | 2.09 | -4 | 72 | 147 |
| *Eastern Kingbird | 5.59 | 7.56 | 1 | 35 | 70 |
| Least Flycatcher | 3.97 | 4.35 | -26 | 10 | 45 |
| *Horned Lark | 87.89 | 106.82 | 6 | 22 | 37 |
| *Tree Swallow | 3.28 | 1.60 | -75 | -51 | -28 |
| *Barn Swallow | 14.54 | 17.89 | 4 | 23 | 42 |
| Cliff Swallow | 13.43 | 15.36 | -124 | 14 | 153 |
| *Black-billed Magpie | 7.73 | 11.60 | 17 | 50 | 83 |
| *Common Crow | 34.74 | 44.93 | 8 | 29 | 51 |
| House Wren | 16.53 | 19.52 | -3 | 18 | 39 |
| *American Robin | 4.31 | 8.64 | 33 | 100 | 168 |
| Starling | 19.00 | 21.63 | -38 | 14 | 66 |
| *Warbling Vireo | 7.93 | 5.83 | -52 | -26 | -1 |
| Yellow Warbler | 4.37 | 3.34 | -50 | -23 | 3 |
| *House Sparrow | 46.05 | 62.36 | 10 | 35 | 60 |
| Bobolink | 3.03 | 3.52 | -39 | 16 | 71 |
| *Western Meadowlark | 50.97 | 67.72 | 18 | 33 | 48 |
| *Yellow-head. Blackbird | 41.65 | 20.95 | -91 | -50 | -8 |
| Red-winged Blackbird | 111.49 | 109.86 | -11 | -1 | 8 |
| Brewer's Blackbird | 27.33 | 36.61 | -47 | 34 | 115 |
| *Common Grackle | 6.33 | 10.43 | 4 | 65 | 126 |
| Brown-headed Cowbird | 30.67 | 27.66 | -40 | -10 | 20 |
| American Goldfinch | 4.37 | 5.53 | -44 | 27 | 97 |
| Lark Bunting | 0.45 | 3.44 | -1039 | 659 | 2356 |
| Savannah Sparrow | 21.33 | 23.39 | -12 | 10 | 31 |
| Vesper Sparrow | 15.79 | 17.61 | -17 | 11 | 40 |
| Clay-colored Sparrow | 25.33 | 29.56 | -1 | 17 | 34 |
| Song Sparrow | 8.44 | 8.08 | -41 | -4 | 33 |
| Chestnut-col. Longspur | 18.79 | 24.49 | -47 | 30 | 107 |

*Change greater than 95% significant.

Table 13
Changes in bird populations for 32 comparable routes,
Breeding Bird Survey, central Prairies, 1979-80

| Species | Weighted mean no. birds per route | | % change (bold) with 95% confidence limits | | |
|------------------------|--------------------------------------|-------|---|------------|-----|
| | 1979 | 1980 | | | |
| Mallard | 19.04 | 38.31 | -83 | 101 | 286 |
| *Pintail | 4.34 | 2.44 | -84 | -44 | -4 |
| Blue-winged Teal | 5.26 | 4.99 | -46 | -5 | 36 |
| Northern Shoveler | 1.61 | 2.24 | -25 | 39 | 103 |
| Lesser Scaup | 4.05 | 5.97 | -47 | 48 | 143 |
| American Coot | 5.60 | 5.77 | -9 | 3 | 15 |
| Killdeer | 5.94 | 7.57 | -7 | 28 | 62 |
| Common Snipe | 7.19 | 5.63 | -54 | -22 | 10 |
| Franklin's Gull | 6.09 | 5.00 | -88 | -18 | 52 |
| Black Tern | 6.56 | 5.85 | -71 | -11 | 49 |
| Common Flicker | 2.17 | 2.15 | -39 | -1 | 38 |
| Alder Flycatcher | 6.81 | 8.31 | -15 | 22 | 58 |
| Least Flycatcher | 10.55 | 11.05 | -12 | 5 | 22 |
| Western Wood Pewee | 2.87 | 4.06 | -7 | 42 | 90 |
| Tree Swallow | 5.58 | 5.68 | -52 | 2 | 56 |
| Barn Swallow | 13.74 | 12.51 | -38 | -9 | 20 |
| Black-billed Magpie | 12.02 | 11.11 | -21 | -8 | 6 |
| Common Crow | 37.49 | 33.90 | -25 | -10 | 6 |
| House Wren | 12.52 | 13.41 | -17 | 7 | 31 |
| American Robin | 14.81 | 15.71 | -12 | 6 | 25 |
| Starling | 22.15 | 19.09 | -76 | -14 | 48 |
| Red-eyed Vireo | 25.34 | 26.59 | -17 | 5 | 26 |
| Warbling Vireo | 4.64 | 5.07 | -31 | 9 | 49 |
| Yellow Warbler | 10.94 | 10.63 | -20 | -3 | 14 |
| Common Yellowthroat | 7.80 | 9.35 | -3 | 20 | 43 |
| House Sparrow | 12.91 | 14.93 | -28 | 16 | 59 |
| Western Meadowlark | 6.99 | 8.50 | -19 | 22 | 63 |
| Red-winged Blackbird | 41.68 | 43.29 | -13 | 4 | 20 |
| Northern Oriole | 5.23 | 4.22 | -46 | -19 | 7 |
| Brewer's Blackbird | 19.81 | 17.72 | -30 | -11 | 9 |
| *Brown-headed Cowbird | 11.77 | 9.18 | -36 | -22 | -8 |
| Pine Siskin | 5.60 | 2.83 | -135 | -49 | 36 |
| American Goldfinch | 6.46 | 6.91 | -26 | 7 | 40 |
| *Savannah Sparrow | 17.74 | 22.15 | 4 | 25 | 46 |
| Vesper Sparrow | 13.87 | 13.87 | -35 | 0 | 35 |
| Dark-eyed Junco | 3.51 | 4.27 | -26 | 22 | 69 |
| Chipping Sparrow | 17.03 | 18.06 | -15 | 6 | 27 |
| Clay-colored Sparrow | 31.50 | 32.20 | -9 | 2 | 13 |
| White-throated Sparrow | 11.23 | 12.15 | -11 | 8 | 28 |
| Song Sparrow | 17.68 | 15.72 | -30 | -11 | 8 |

*Change greater than 95% significant.

Table 14
Changes in bird populations for 24 comparable routes,
Breeding Bird Survey, British Columbia, 1979-80

| Species | Weighted mean no. birds per route | | % change (bold) with 95% confidence limits | | |
|-------------------------|--------------------------------------|-------|---|------------|-----|
| | 1979 | 1980 | | | |
| Killdeer | 2.39 | 2.57 | -46 | 7 | 61 |
| Rufous Hummingbird | 2.08 | 1.29 | -86 | -38 | 10 |
| Common Flicker | 6.25 | 6.90 | -13 | 10 | 34 |
| Yellow-bel. Sapsucker | 3.04 | 3.09 | -45 | 2 | 49 |
| Traill's Flycatcher | 3.09 | 3.57 | -21 | 15 | 52 |
| Western Wood Pewee | 5.99 | 6.00 | -29 | 0 | 29 |
| Violet-green Swallow | 8.00 | 7.66 | -32 | -4 | 23 |
| Tree Swallow | 7.07 | 10.51 | -24 | 49 | 122 |
| Rough-winged Swallow | 5.26 | 8.62 | -37 | 64 | 165 |
| Barn Swallow | 12.13 | 19.44 | -13 | 60 | 134 |
| *Cliff Swallow | 5.89 | 11.73 | 29 | 99 | 169 |
| Common Raven | 11.68 | 10.85 | -25 | -7 | 11 |
| Common Crow | 21.84 | 22.17 | -29 | 2 | 32 |
| Black-capped Chickadee | 7.69 | 9.31 | -33 | 21 | 75 |
| Chestnut-bkd. Chickadee | 6.17 | 6.56 | -43 | 6 | 56 |
| Winter Wren | 2.41 | 3.07 | -50 | 27 | 104 |
| American Robin | 42.78 | 44.00 | -38 | 3 | 43 |
| Varied Thrush | 3.86 | 5.06 | -32 | 31 | 94 |
| Swainson's Thrush | 29.83 | 27.13 | -22 | -9 | 4 |
| Golden-crowned Kinglet | 2.39 | 3.70 | -15 | 54 | 124 |
| Ruby-crowned Kinglet | 5.23 | 5.70 | -19 | 9 | 37 |
| Cedar Waxwing | 2.80 | 2.07 | -66 | -26 | 14 |
| Starling | 46.12 | 42.64 | -51 | -8 | 36 |
| Red-eyed Vireo | 9.87 | 9.91 | -19 | 0 | 20 |
| Warbling Vireo | 6.94 | 7.18 | -17 | 3 | 24 |
| *Orange-crowned Warbler | 8.72 | 7.21 | -34 | -17 | 0 |
| Yellow Warbler | 7.66 | 6.88 | -36 | -10 | 15 |
| Yellow-rumped Warbler | 10.84 | 11.95 | -16 | 10 | 36 |
| MacGillivray's Warbler | 7.52 | 8.01 | -36 | 7 | 49 |
| Wilson's Warbler | 1.44 | 1.27 | -65 | -12 | 41 |
| House Sparrow | 5.01 | 5.57 | -17 | 11 | 39 |
| *Western Meadowlark | 10.87 | 12.78 | 2 | 18 | 34 |
| Red-winged Blackbird | 8.53 | 10.81 | -7 | 27 | 60 |
| Brewer's Blackbird | 12.18 | 8.53 | -63 | -30 | 3 |
| Brown-headed Cowbird | 8.93 | 8.17 | -35 | -9 | 18 |
| Western Tanager | 4.74 | 5.62 | -30 | 19 | 67 |
| *Pine Siskin | 30.02 | 19.39 | -62 | -35 | -9 |
| American Goldfinch | 2.44 | 3.39 | -27 | 39 | 105 |
| Rufous-sided Towhee | 2.79 | 2.65 | -49 | -5 | 39 |
| Savannah Sparrow | 4.47 | 4.30 | -26 | -4 | 19 |
| Dark-eyed Junco | 18.20 | 17.57 | -32 | -3 | 25 |
| Chipping Sparrow | 18.19 | 19.08 | -11 | 5 | 21 |
| Song Sparrow | 7.80 | 8.26 | -23 | 6 | 35 |

*Change greater than 95% significant.