

The Co-operative Breeding Bird Survey in Canada, 1978by K.E. Freemark¹, C.R. Cooper¹, G.H. Finney¹ and A.J. Erskine²**Introduction**

The Breeding Bird Survey (BBS) began in Canada in 1966. It provides a means of assessing year to year changes as well as long-term trends in numbers of birds (especially songbirds) in settled areas of Canada. The BBS is limited mainly by the availability and distribution of qualified observers and of all-weather roads. The disadvantages of the roadside method of surveying (Erskine 1978) are partly offset by its efficiency as a means of sampling large numbers of individual birds in a relatively short time. This report compares the 1977 and 1978 data and examines some of the more widespread or continuing changes. It is similar in format and coverage to recent reports (cf. Finney *et al.* 1978; Erskine 1975, 1976, 1977).

The BBS is a co-operative effort co-ordinated by the Canadian Wildlife Service (CWS) and the United States Fish and Wildlife Service (USFWS) with the surveys being conducted by volunteers and professional ornithologists. The methods of data collection are standardized throughout; the editing and analysis of data were the same in 1978 as in 1977. A description of the methods used in data collection and analysis is presented in the report by Erskine (1978) covering the first ten years of the BBS in Canada.

Results**Coverage**

Figure 1 shows the distribution of degree-blocks in which surveys were made in 1978, compared with past coverage. Table 1 shows the actual numbers of routes surveyed in each of the last six years and the total number of different routes surveyed since the survey began in 1966. In the Maritimes and in the southern parts of Quebec, Ontario and British Columbia, most degree-blocks contain two routes each. In other areas there is only one route per degree-block. Therefore, the coverage in those areas is somewhat less complete than Figure 1 indicates.

Grouping of routes for analysis

Except for minor adjustments, the 1977 groupings were used in 1978. The species detected in greatest numbers in each region are shown in Tables 2-7. The species most frequently detected along routes in Labrador and near Churchill, Manitoba, are shown in Tables 8 and 9 respectively; data from these subarctic areas cannot be combined for analysis with those from more southern regions.

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Analyses cover six major regions of Canada, as in recent years. Summaries of comparisons for the Maritimes, central Ontario and central Quebec, southern Ontario and southern Quebec, southern Prairie Provinces, central Prairie Provinces and British Columbia (west of the Rockies) between 1977 and 1978 are presented in Tables 10-15. Although data for about 60 species were analyzed for each region, only the comparisons made for species reported previously (cf. Finney *et al.* 1978; Erskine 1975, 1976, 1977) are presented here. Indices of relative abundance of those species are presented for the last six years for each region in Tables 16-21. For these analyses, 1973 estimates of abundance were fixed at an index value of 100.

Discussion**Coverage**

The pattern of coverage in 1978 was similar to that in previous years. The downward trend in the total number of routes surveyed would have continued this year except for the commendable effort in Quebec. Coverage in British Columbia, Alberta and Saskatchewan was low again this year, limiting the reliability of the data. No routes were surveyed in the Yukon Territory or on the island of Newfoundland.

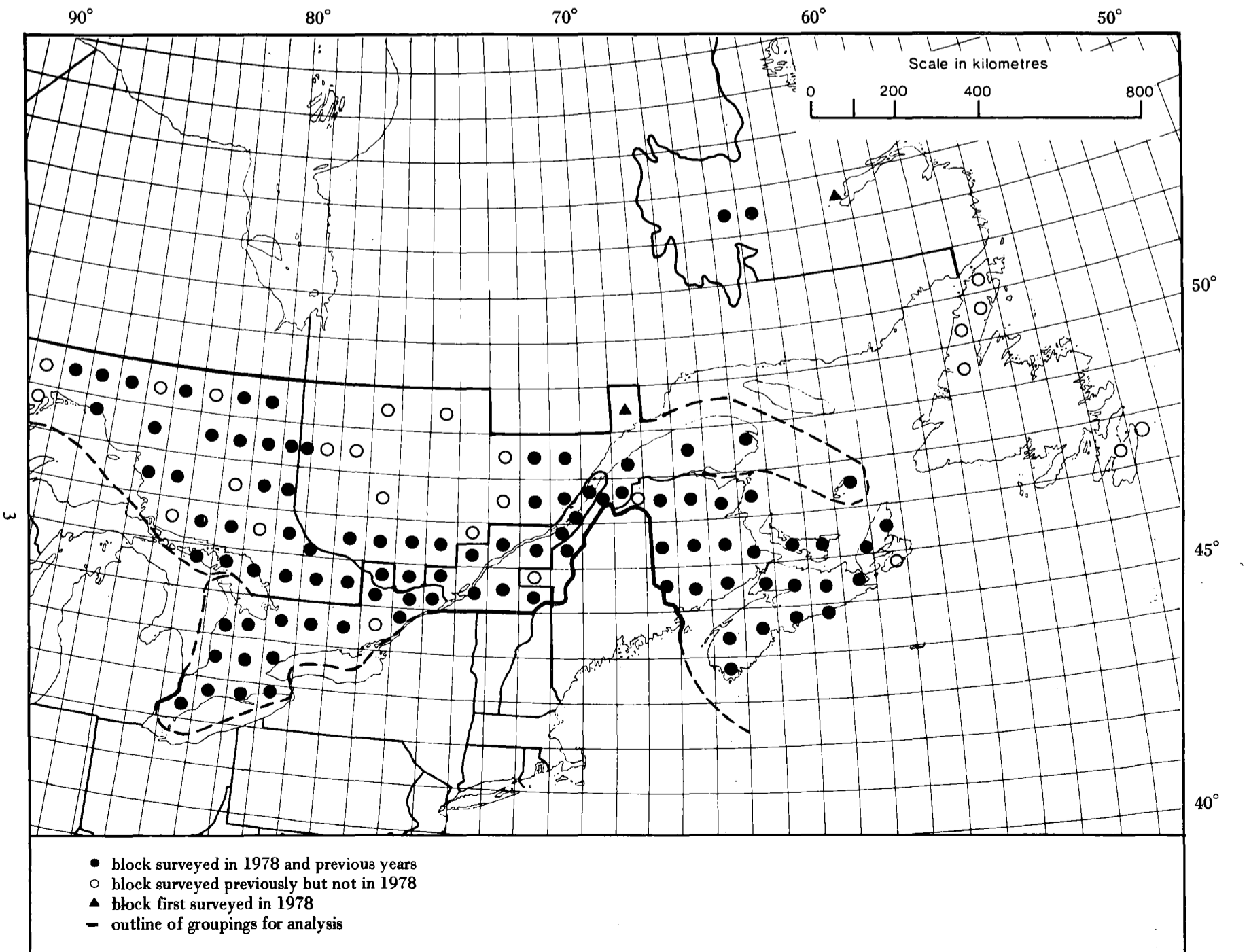
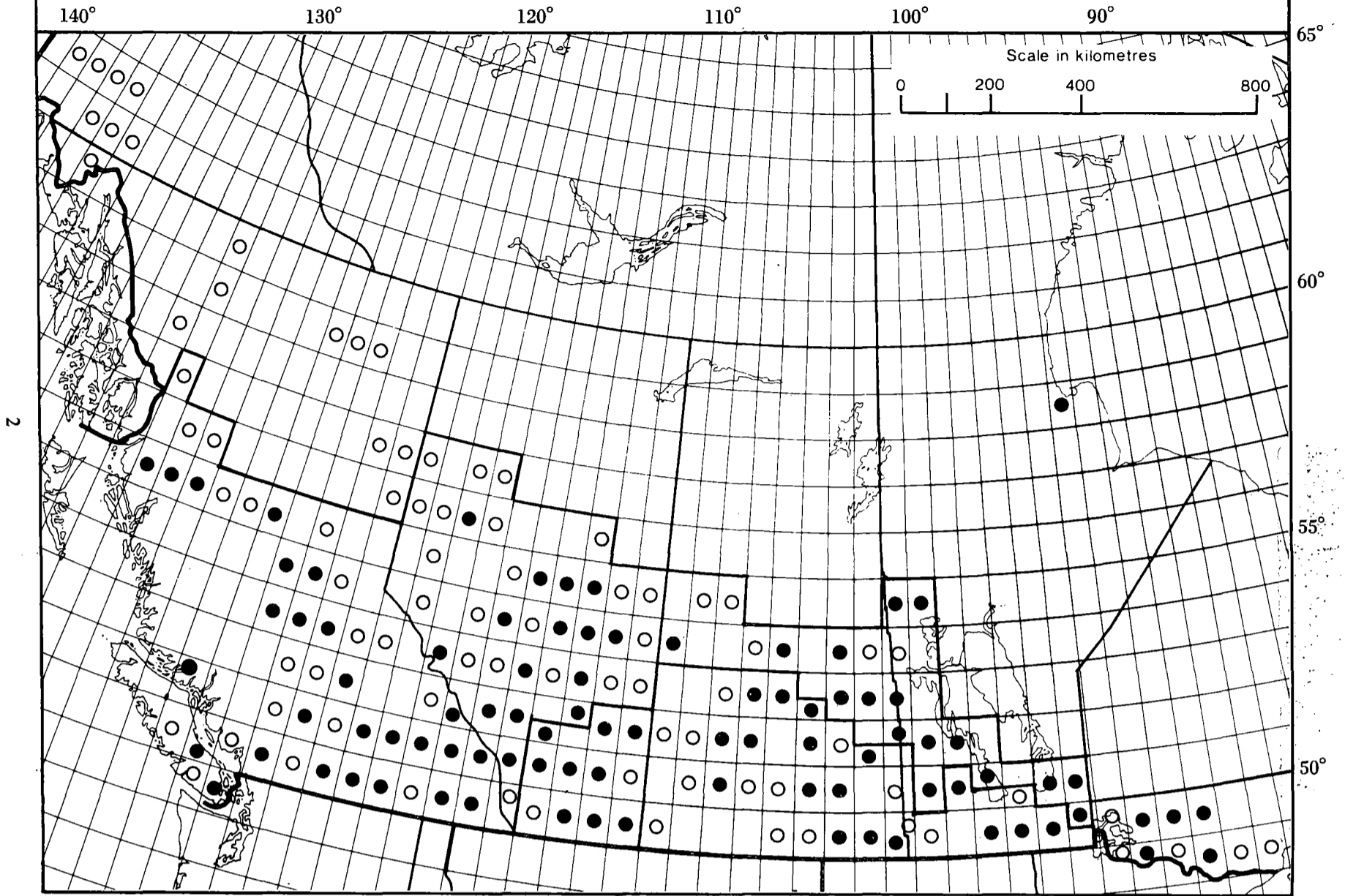
Of the 188 routes covered in both 1977 and 1978, 77% were comparable. However, only 58% of the routes in central Ontario and central Quebec and 69% of those in British Columbia were comparable. Of the 43 non-comparable routes which were surveyed in 1977 and 1978, 19 (44%) had observer changes. Survey dates differing by 20 or more days between years accounted for seven routes not being comparable and another six were disqualified because one or both of the survey dates fell outside the allowable period (28 May to 7 July). The remaining 11 were rejected for a combination of reasons, including weather and a lack of adherence to one or more rules. The collection of useful data will be ensured if there are few observer changes and if co-operators survey their routes in strict compliance with the rules.

Grouping of routes for analysis

The northern boundary of the central Ontario and central Quebec region was extended to include degree-block 49°N by 68°W (covered for the first time in 1978). The Magdalen Islands were also included in this region (Figure 1). The central Prairies region was extended in Manitoba to include the route in Riding Mountain National Park (50°N by 100°W). This route was surveyed in 1977 but the data were received too late to be included in the analysis (cf. Figure 1 in Finney *et al.* 1978 and in this report). A similar discrepancy is evident in Nova Scotia (cf. 44°N by 64°W) and Alberta (cf. 52°N by 110°W, 52°N by 112°W, 53°N by

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Figure 1
Extent of coverage in 1978 and additional coverage
in 1966-77 Breeding Bird Survey.



111°W). In previous years, three routes in the Maritimes region were surveyed but included with routes from adjacent degree-blocks for representation in Figure 1. In the present report these routes are represented in the degree-blocks in which they occur (namely 46°N by 61°W, 44°N by 62°W, 47°N by 64°W).

Changes observed

In every region more species decreased than increased significantly in numbers. In total there were 57 cases where a significant change occurred; 47 of them were decreases while only ten were increases (Tables 10 to 15). In the Maritimes, Common Snipe, Least Flycatcher, Veery, American Goldfinch, Dark-eyed Junco, White-throated Sparrow and Song Sparrow all plummeted dramatically in numbers to their lowest levels since the surveys began in this region (Tables 10 and 16; Erskine 1978). Nashville Warbler also showed a significant decrease while Yellow-bellied Sapsucker, Winter Wren and Common Flicker continued their decline. In 1978, the index of the numbers of Winter Wren was less than 1/3 of that in 1973. Only Herring Gull, Common Crow, Common Raven and Red-eyed Vireo increased significantly in numbers, although Barn Swallow, Blue Jay, Yellow Warbler and House Sparrow also continued their upward trend.

In the central Ontario and central Quebec region, numbers of Yellow-bellied Sapsuckers, House Sparrows, Common Grackles and American Goldfinches declined significantly, reaching their lowest levels since 1969 when the survey began (Tables 11 and 17; Erskine 1978). Two warbler species, American Redstart and Mourning Warbler decreased significantly after significant increases in 1977. Starlings also showed a significant decrease. The numbers of Ruby-crowned Kinglets increased only slightly above the extremely low level reached in 1977 but the Winter Wren population showed marked recovery after a significant decline in 1977. Though its decrease in 1978 was not significant, Song Sparrow numbers continued a downward trend. Magnolia Warbler, Rose-breasted Grosbeak and Red-winged Blackbird indices all increased significantly in 1978 to their highest levels since the survey began (Table 17; Erskine 1978). Evening Grosbeak, American Robin and Hermit Thrush continued their upward trends, Hermit Thrush attaining its highest level yet.

In southern Ontario and southern Quebec, eight species showed significant decreases while only two increased significantly. Of those showing a significant decrease, Eastern Meadowlark, American Goldfinch and Song Sparrow reached their lowest levels since 1968 when the surveys were begun in this region (Table 18; Erskine 1978). Song Sparrow has been slowly declining since 1974 and American Goldfinch has shown a general tendency to decline over the past ten years. Its index has dropped from 202 in 1968 to 73 in 1978. Brown Thrasher, Starling, Red-eyed Vireo and Red-winged Blackbird all decreased significantly in 1978 and House Wren continued its decline with a significant decrease for the second consecutive year. The strong and steady increase shown by both Red-winged Blackbird and Starling over the past ten years (Erskine 1978) was broken in 1978 when both

species decreased significantly. White-throated Sparrow continued a downward trend from the relatively high index level of 211 in 1975. Northern Oriole showed a significant increase reaching its highest level yet. The significant increase in Vesper Sparrow numbers broke its long and steady decline in this region. Rose-breasted Grosbeak recovered after a significant decrease in 1977. Though its annual changes have not been significant, Rock Dove has continued to increase in numbers since 1973, reaching an index of 227 in 1978. Some species such as the American Robin, Common Crow, Common Grackle and House Sparrow show a marked stability over the years. Note that those are also among the most abundant species in the southern Ontario and southern Quebec region (Table 4).

In the southern Prairie Provinces region, significant decreases were recorded for Lesser Scaup, American Coot, Franklin's Gull, Black Tern, Rock Dove, House Sparrow and Brewer's Blackbird, while only Cliff Swallow increased significantly (Table 19). The percent change for most of those species was marked (Table 13). For example, Lesser Scaup numbers dropped by 76% and Cliff Swallow increased by 73%. Most of those species are poorly represented on the Breeding Bird Survey (Erskine 1978, Appendix 3); hence, the large fluctuations in their indices may be of little real significance. The American Coot has declined significantly for two consecutive years reaching its lowest level since the survey began in this region in 1970. This is the second consecutive year Franklin's Gull declined significantly but its numbers are still well above the 1970 level. Sora increased only slightly after its dramatic decline in 1977. American Robin and Chestnut-collared Longspur remained at the high levels reached in 1977. As in 1977, the limited number of comparable routes available for analysis creates difficulties in interpretation of data for the prairie region. This is particularly evident for the Lark Bunting (Tables 3 and 19). Even though nine Lark Buntings were seen in 1978 and 11 in 1977, they were not included in the analysis since they were observed on non-comparable routes.

In the central Prairie Provinces region, eight species decreased significantly (Table 20). The index for Pintail dropped to 15, the lowest level since 1971, when the survey began in this region (Table 20; Erskine 1978). Though the decline in 1978 was sharp, a similar decrease occurred in 1972. Numbers of Northern Shovelers also plunged after reaching a record high level in 1977. Since 1973 Lesser Scaup populations have shown a strong and steady downward trend to a record low index of only 15 in 1978. American Coot also decreased significantly. Those wetland species, along with most other species of waterfowl, showed downward trends in 1977 and 1978 in both the central Prairies and southern Prairies regions. That suggests that 1977 and 1978 were poor years for waterfowl production in the Prairies. This observation is supported by data from the Waterfowl Breeding Pair Surveys and Waterfowl Production Surveys conducted by the Canadian Wildlife Service and the United States Fish and Wildlife Service. Drought conditions in the Prairies from 1975 through 1977 resulted in the disappearance of many ponds with subsequent poor waterfowl production. Conditions were particularly poor in 1977. For example, in early May 1977

the pond count in southern Saskatchewan was down 47% from 1976 and 46% below the 10-year average. The breeding population estimates for American Coot in southern Saskatchewan were down by 70% from 1976 to 1977. This decrease is paralleled by the Breeding Bird Survey data for the southern Prairies region. Erskine (1978) found generally poor comparisons between BBS and USFWS data except in 1974 when both indices showed general increases in waterfowl numbers after an abundance of water in 1974 following record snowfalls. Perhaps the two sets of data parallel each other only when environmental factors determining waterfowl population densities are extreme. Thus, the exceptionally high and low production in 1974 and 1977 respectively, are reflected in the data of both the BBS and the USFWS surveys. Killdeer and Common Snipe numbers have remained stable since 1973 and the Franklin's Gull index is unchanged at a low level of 31. Tree Swallow increased, though not significantly in 1978, to a record high level of 325. Four species of Fringillidae decreased significantly. Pine Siskin plummeted to an index of only 18 while recording a significant decrease for the second consecutive year. However, extreme fluctuations in population indices are not unusual for this species. From 1975 to 1976 its index increased from 38 to 255. White-throated Sparrow decreased to its lowest level since the survey was begun in the region. American Goldfinch and Savannah Sparrow complete the list of species showing a significant decrease.

In British Columbia, several species showed a significant decrease while only one increased significantly. Rufous Hummingbird and Traill's Flycatcher each declined significantly to their lowest levels since 1973, the first year of BBS comparisons in British Columbia (Table 21). Cliff Swallow, Starling and Warbling Vireo all declined significantly after reaching record high levels in 1977. Song Sparrow and Pine Siskin each decreased significantly for the second consecutive year to reach their lowest recorded levels. The index for Pine Siskin in 1978 was only 35. A significant decrease also occurred in Brown-headed Cowbird numbers and Cedar Waxwing continued its slow but steady decline. The single significant increase was observed in Orange-crowned Warbler. That species showed a marked recovery after suffering a significant decrease in 1977. The four other species of warblers analyzed have exhibited marked stability over the past three years. Though their increases were not significant in 1978, Golden-crowned Kinglet and Winter Wren each attained record high levels. Common Raven continued its upward trend reaching a record high index level of 273 in 1978. Black-capped Chickadee numbers remained low after a significant decrease in 1977.

Birds were breeding in fewer numbers again in 1978 throughout Canada. Several species mentioned above reached record low index levels in the different regions. American Goldfinch populations decreased in five of the six regions

with the decrease being significant in four of these. Generally, changes in densities of a species are restricted to regional populations with few trends being evident across Canada. Populations of many species (e.g., Pine Siskin, American Goldfinch, Winter Wren, Evening Grosbeak) are characterized by extreme fluctuations in numbers. The steady upward trend in index numbers for Red-winged Blackbird populations across Canada from 1966 to 1975 (Erskine 1978) has levelled off. Only in central Ontario and central Quebec was there a significant increase in 1978.

Acknowledgements

We wish to thank all observers and assistants plus the regional co-ordinators for their fine efforts and urge them to recruit competent observers, especially in regions where route coverage is low.

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

References

- Erskine, A.J. 1975, 1976, 1977. The co-operative Breeding Bird Survey in Canada, 1974, 1975, 1976. *Can. Wildl. Serv. Prog. Notes* Nos. 45, 60, 74, 19, 15, 15 pp. respectively.
- Erskine, A.J. 1978. The first ten years of the co-operative Breeding Bird Survey in Canada. *Can. Wildl. Serv. Rep. Ser. No. 42*. 61 pp.
- Finney, G.H.; Freemark, K.E.; Erskine, A.J. 1978. The co-operative Breeding Bird Survey in Canada. 1977. *Can. Wildl. Serv. Prog. Note No. 84*. 21 pp.

Table 1

Number of routes completed in the Breeding Bird Survey, Canada 1973-78, compared to all routes surveyed in 1966 through 1978

Province	Total routes surveyed in 1966-1978	No. routes surveyed*					
		1973	1974	1975	1976	1977	1978
Nfld.	10	2	4	6	4	2	3
P.E.I.	4	4	4	4	3	4	4
N.S.	24	20	19	17	14	19	17
N.B.	27	22	21	16	18	19	19
Que.	48	24	21	24	21	20	36
Ont.	72	55	58	61	65	63	56
Man.	19	13	14	13	13	16	16
Sask.	32	28	19	19	20	21	18
Alta.	47	36	31	33	29	21	24
B.C.	79	38	53	50	42	34	34
Yukon	8	5	7	5	6	0	0
Total	370	247	251	248	235	219	227

*The figures in bold type represent the greatest number of routes surveyed in one year for each province. P.E.I. also had four routes surveyed each year in 1967-69; N.S. had 23 routes surveyed in 1972; N.B. had 24 routes surveyed each year in 1971-72; Quebec had 33 routes surveyed in 1970.

Table 2

The 20 species recorded in greatest numbers in the Breeding Bird Survey, Maritime Provinces, 1978; the mean number of each per route; and the percentage of routes on which they were found. Forty routes were surveyed, with a mean of 761 birds noted per route

Species	Mean no. per route	% of 40 routes
American Robin	53.3	100
Starling	48.1	100
Common Crow	45.8	100
White-throated Sparrow	36.9	100
Song Sparrow	30.0	100
Bobolink	27.7	85
Red-winged Blackbird	26.7	95
Common Yellowthroat	25.1	100
Common Grackle	24.4	100
Herring Gull	23.2	73
Red-eyed Vireo	22.0	100
Barn Swallow	21.3	100
American Redstart	20.3	98
House Sparrow	18.7	85
Bank Swallow	17.8	70
Alder Flycatcher	15.5	100
Tree Swallow	14.5	100
Swainson's Thrush	13.9	95
Yellow Warbler	13.8	95
Savannah Sparrow	13.8	83

Table 3

The 20 species recorded in greatest numbers in the Breeding Bird Survey, central Ontario and central Quebec, 1978; the mean number of each per route; and the percentage of routes on which they were found. Fifty-four routes were surveyed, with a mean of 642 birds per route

Species	Mean no. per-route	% of 54 routes
White-throated Sparrow	46.5	100
American Robin	33.8	100
Red-eyed Vireo	30.0	94
Starling	24.8	78
Red-winged Blackbird	22.3	96
Common Crow	21.5	98
Song Sparrow	19.8	93
Swainson's Thrush	19.5	80
Veery	18.9	89
Ovenbird	18.6	91
Herring Gull	17.9	52
Tree Swallow	15.6	93
Savannah Sparrow	14.4	76
Chestnut-sided Warbler	14.1	91
Chipping Sparrow	13.7	91
Ring-billed Gull	13.5	20
Common Yellowthroat	13.1	98
Barn Swallow	12.9	78
Common Grackle	12.9	89
Bobolink	12.3	57

Table 4

The 20 species recorded in greatest numbers in the Breeding Bird Survey, southern Ontario and southern Quebec, 1978; 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 1181 birds noted per route

Species	Mean no. per route	% of 38 routes
Red-winged Blackbird	184.6	100
Starling	154.1	100
Common Grackle	67.1	100
House Sparrow	66.5	97
Bobolink	59.5	97
Savannah Sparrow	55.7	97
Common Crow	49.8	100
American Robin	49.6	100
Barn Swallow	42.7	100
Bank Swallow	39.7	74
Song Sparrow	32.4	100
Brown-headed Cowbird	25.5	100
Eastern Meadowlark	21.9	97
Rock Dove	21.5	84
Killdeer	20.9	97
Ring-billed Gull	18.7	45
American Goldfinch	15.2	100
Tree Swallow	14.0	97
Mourning Dove	13.8	89
Common Yellowthroat	12.9	95

Table 5

The 20 species recorded in greatest numbers in the Breeding Bird Survey, southern Prairie Provinces, 1978; the mean number of each per route; and the percentage of routes on which they were found. Twenty-six routes were surveyed, with a mean of 936 birds per route

Species	Mean no. per route	% of 26 routes
Red-winged Blackbird	116.0	100
Horned Lark	100.0	100
Western Meadowlark	69.5	100
House Sparrow	63.7	100
Common Crow	41.5	100
Brown-headed Cowbird	34.8	100
Clay-coloured Sparrow	26.8	100
Mallard	26.4	100
Brewer's Blackbird	26.0	100
Yellow-headed Blackbird	25.7	85
Savannah Sparrow	24.5	96
Cliff Swallow	22.8	50
Chestnut-collared Longspur	22.2	39
Vesper Sparrow	24.5	96
Killdeer	16.5	100
Mourning Dove	16.2	81
Barn Swallow	15.8	100
House Wren	13.0	81
Black-billed Magpie	11.3	92
Rock Dove	9.9	73

Table 6

The 20 species recorded in the greatest numbers in the Breeding Bird Survey, central Prairie Provinces region, 1978; the mean number of each per route; and the percentage of routes on which they were found. Thirty-one routes were surveyed with a mean of 754 birds noted per route

Species	Mean no. per route	% of 31 routes
Red-winged Blackbird	67.3	94
Common Crow	43.1	100
Mallard	34.5	77
Clay-coloured Sparrow	33.2	90
Starling	30.0	81
Brewer's Blackbird	24.7	77
Song Sparrow	24.4	94
Red-eyed Vireo	22.1	87
Savannah Sparrow	20.3	81
Cliff Swallow	19.1	39
Barn Swallow	18.2	90
American Robin	17.2	100
House Sparrow	16.0	81
Yellow-headed Blackbird	15.5	55
Black-billed Magpie	15.5	87
House Wren	14.1	84
Franklin's Gull	13.6	39
Western Meadowlark	11.2	48
Least Flycatcher	11.0	94
Vesper Sparrow	10.5	74

Table 7

The 20 species recorded in greatest numbers in the Breeding Bird Survey, British Columbia (west of Rocky Mountains), 1978; the mean number of each per route; and the percentage of routes on which they were found. Thirty-four routes were surveyed, with a mean of 626 birds noted per route

Species	Mean no. per route	% of 34 routes
American Robin	60.9	100
*Crows	43.5	91
Starling	42.7	88
Swainson's Thrush	29.8	97
Barn Swallow	19.1	94
Chipping Sparrow	17.6	94
Brewer's Blackbird	15.5	65
Dark-eyed Junco	15.2	97
Red-eyed Vireo	13.5	85
Tree Swallow	13.0	88
Song Sparrow	11.6	97
Cliff Swallow	10.8	41
Yellow-rumped Warbler	10.3	85
Violet-green Swallow	9.6	74
Yellow Warbler	8.9	82
Red-winged Blackbird	8.9	79
Black-capped Chickadee	8.8	77
Western Meadowlark	8.3	44
Brown-headed Cowbird	8.1	85
Pine Siskin	7.8	79

*Common Crow and Northwestern Crow combined.

Table 8

The 10 species recorded in the greatest numbers in the Breeding Bird Survey, Labrador, 1978; the mean number per route; and the number of routes on which they were found. Three routes were surveyed with a mean of 280 birds noted per route

Species	Mean no. per route	No. of routes
Swainson's Thrush	23.7	3
White-crowned Sparrow	20.3	3
Fox Sparrow	18.7	3
White-throated Sparrow	17.3	3
Dark-eyed Junco	16.3	3
Northern Waterthrush	16.0	3
Wilson's Warbler	15.0	1
Pine Grosbeak	13.7	2
American Robin	12.0	3
Gray-cheeked Thrush	11.0	2

Table 9

The 10 species recorded in the greatest numbers in the Breeding Bird Survey, Churchill, Manitoba, 1978. A total of 853 birds was noted on the one route surveyed.

Species	Number
Arctic Tern	104
Scoter spp.*	67
Lesser Yellowlegs	64
Canada Goose	55
Savannah Sparrow	54
White-crowned Sparrow	41
Common Redpoll	40
Whimbrel	37
Common Snipe	31
Bonaparte's Gull	29

*Scoter spp. includes: White-winged Scoter 9
Surf Scoter 12
Black Scoter 13
Scoter spp. 33

Table 10
Changes in bird population samples for 33 comparable routes, Breeding Bird Survey, Maritime Provinces, 1977-78

Species	Weighted mean no. birds per route		% change (bold) with 95% confidence limits		
	1977	1978			
*Common Snipe	4.69	3.32	-49	-29	-9
*Herring Gull	12.52	21.83	+3	+74	+146
Common Flicker	3.35	2.89	-45	-14	+17
Yellow-bellied Sapsucker	3.97	3.61	-62	-9	+43
Alder Flycatcher	14.21	14.38	-18	+1	+20
*Least Flycatcher	4.11	2.72	-50	-34	-17
Tree Swallow	13.40	15.07	-11	+13	+36
Bank Swallow	13.05	16.06	-49	+23	+95
Barn Swallow	17.54	20.90	-2	+19	+40
Blue Jay	3.43	4.67	-28	+36	+100
*Common Raven	10.22	14.56	+5	+42	+79
*Common Crow	38.44	48.25	+6	+26	+45
Winter Wren	1.25	0.95	-66	-24	+18
American Robin	52.58	51.15	-16	-3	+10
Hermit Thrush	8.93	8.99	-23	+1	+24
Swainson's Thrush	14.61	15.75	-6	+8	+22
*Veery	11.80	9.85	-27	-16	-6
Ruby-crowned Kinglet	6.69	7.30	-11	+9	+29
Starling	47.44	48.88	-16	+3	+22
*Red-eyed Vireo	18.67	22.63	+3	+21	+40
*Nashville Warbler	5.04	3.80	-47	-25	-2
Yellow Warbler	12.68	13.94	-12	+10	+32
Magnolia Warbler	10.63	11.30	-18	+6	+31
Black-throated Green Warbler	5.15	4.63	-42	-10	+21
Chestnut-sided Warbler	6.52	6.09	-24	-7	+11
Ovenbird	14.78	14.24	-14	-4	+7
Common Yellowthroat	27.05	25.07	-19	-7	+4
American Redstart	21.74	21.08	-17	-3	+11
House Sparrow	13.96	15.58	-25	+12	+48
Bobolink	23.58	24.58	-13	+4	+21
Red-winged Blackbird	22.39	22.03	-20	-2	+17
Common Grackle	22.98	20.58	-40	-10	+20
Brown-headed Cowbird	6.77	5.97	-42	-12	+18
Evening Grosbeak	3.44	3.80	-106	+10	+126
Purple Finch	6.51	6.27	-28	-4	+21
*American Goldfinch	11.94	9.09	-44	-24	-4
Savannah Sparrow	11.13	11.29	-25	+1	+28
*Dark-eyed Junco	11.46	8.61	-45	-25	-5
Chipping Sparrow	8.11	9.73	-13	+20	+53
*White-throated Sparrow	46.42	37.99	-26	-18	-10
*Song Sparrow	31.37	27.27	-25	-13	-2

*Change greater than 95% significant.

Table 11
Changes in bird population samples for 25 comparable routes, Breeding Bird Survey, central Ontario and central Quebec, 1977-78

Species	Weighted mean no. birds per route		% change (bold) with 95% confidence limits		
	1977	1978			
Killdeer	3.80	5.49	-6	+44	+95
Herring Gull	17.00	11.22	-81	-34	+13
Common Flicker	2.46	2.20	-57	-10	+36
*Yellow-bellied Sapsucker	4.49	2.68	-72	-40	-9
Alder Flycatcher	7.79	7.91	-25	+2	+28
Least Flycatcher	10.87	9.14	-34	-16	+2
Tree Swallow	12.59	14.81	-8	+18	+43
Bank Swallow	5.57	6.36	-56	+14	+84
Barn Swallow	9.78	9.55	-36	-2	+32
Blue Jay	2.07	2.82	-31	+36	+103
Common Raven	7.17	5.77	-72	-20	+33
Common Crow	18.77	20.29	-12	+8	+29
Winter Wren	1.55	2.42	-29	+56	+142
American Robin	32.96	34.44	-9	+4	+18
Hermit Thrush	5.89	6.67	-15	+13	+41
Swainson's Thrush	17.89	16.53	-27	-8	+12
Veery	24.52	22.36	-28	-9	+10
Ruby-crowned Kinglet	2.04	2.45	-23	+20	+62
Cedar Waxwing	6.34	7.22	-31	+14	+59
*Starling	42.32	30.88	-50	-27	-4
Red-eyed Vireo	36.19	36.89	-11	+2	+15
Nashville Warbler	8.07	10.95	-12	+36	+83
Yellow Warbler	3.55	3.99	-23	+12	+48
*Magnolia Warbler	4.91	6.23	+10	+27	+44
Yellow-rumped Warbler	2.88	3.99	-9	+39	+86
Chestnut-sided Warbler	18.76	17.87	-21	-5	+11
Ovenbird	23.35	22.97	-16	-2	+13
*Mourning Warbler	12.68	10.80	-26	-15	-4
Common Yellowthroat	17.91	16.40	-22	-8	+5
*American Redstart	11.66	9.74	-32	-16	0
*House Sparrow	3.49	1.75	-73	-50	-27
Bobolink	13.35	14.27	-35	+7	+48
*Red-winged Blackbird	18.06	21.33	0	+18	+37
*Common Grackle	12.52	8.69	-57	-31	-4
Brown-headed Cowbird	9.36	8.99	-31	-4	+23
*Rose-breasted Grosbeak	7.01	11.08	+10	+58	+106
Evening Grosbeak	7.96	10.47	-37	+32	+100
*American Goldfinch	7.34	4.58	-63	-38	-12
Savannah Sparrow	12.30	13.32	-17	+8	+33
Dark-eyed Junco	2.51	2.01	-69	-20	+29
Chipping Sparrow	14.19	15.23	-13	+7	+27
White-throated Sparrow	43.54	40.55	-18	-7	+5
Song Sparrow	14.65	13.18	-23	-10	+3

*Change greater than 95% significant.

Table 12
Changes in bird population samples for 24 comparable routes, Breeding Bird Survey, southern Ontario and southern Quebec, 1977-78

Species	Weighted mean no. birds per route		% change (bold) with 95% confidence limits		
	1977	1978			
Killdeer	23.26	24.86	-14	+7	+28
Rock Dove	18.32	24.42	-1	+33	+68
Mourning Dove	18.36	15.03	-58	-18	+22
Common Flicker	4.63	3.98	-53	-14	+25
Eastern Kingbird	9.64	11.58	-12	+20	+53
Great Crested Flycatcher	4.31	4.19	-51	-3	+46
Eastern Wood Pewee	3.72	4.73	-15	+27	+69
Horned Lark	7.92	7.27	-31	-8	+15
Tree Swallow	11.88	11.97	-35	+1	+36
Bank Swallow	44.15	44.75	-35	+1	+37
Barn Swallow	51.91	48.11	-26	-7	+11
Purple Martin	3.54	3.19	-42	-10	+22
Blue Jay	3.86	4.63	-45	+20	+84
Common Crow	46.98	51.46	-18	+10	+37
*House Wren	5.45	4.00	-47	-27	-6
Gray Catbird	5.20	4.40	-42	-15	+12
*Brown Thrasher	5.18	4.07	-35	-21	-7
American Robin	52.97	49.09	-21	-7	+6
Veery	5.97	5.71	-42	-4	+33
Cedar Waxwing	6.24	7.65	-47	+23	+92
*Starling	231.78	148.32	-55	-36	-17
*Red-eyed Vireo	8.14	6.59	-37	-19	-1
Warbling Vireo	4.01	5.41	-3	+35	+73
Yellow Warbler	8.28	8.84	-11	+7	+25
Common Yellowthroat	9.30	11.27	-12	+21	+54
House Sparrow	100.22	81.31	-39	-19	+1
Bobolink	63.53	67.47	-11	+6	+24
*Eastern Meadowlark	26.76	20.63	-38	-23	-8
*Red-winged Blackbird	238.26	208.32	-20	-13	-5
*Northern Oriole	8.96	11.92	+8	+33	+58
Common Grackle	84.50	77.64	-20	-8	+4
Brown-headed Cowbird	26.56	28.60	-21	+8	+37
Rose-breasted Grosbeak	5.69	6.96	-8	+22	+52
*American Goldfinch	25.49	14.97	-56	-41	-27
Savannah Sparrow	81.38	70.79	-35	-13	+9
*Vesper Sparrow	7.39	9.90	+7	+34	+61
Chipping Sparrow	12.64	12.29	-16	-3	+11
White-throated Sparrow	6.47	5.48	-42	-15	+11
*Song Sparrow	46.84	34.08	-44	-27	-11

*Change greater than 95% significant.

Table 13
Changes in bird population samples for 18 comparable routes, Breeding Bird Survey, southern Prairie Provinces, 1977-78

Species	Weighted mean no. birds per route		% change (bold) with 95% confidence limits		
	1977	1978			
Mallard	41.71	30.52	-77	-27	+23
Pintail	17.16	10.68	-118	-38	+43
Blue-winged Teal	15.85	11.24	-65	-29	+7
Northern Shoveler	5.06	4.02	-89	-21	+48
American Wigeon	3.54	7.05	-81	+100	+280
*Lesser Scaup	28.11	6.73	-88	-76	-64
Sora	2.34	2.72	-29	+16	+61
*American Coot	8.50	4.40	-97	-48	0
Killdeer	15.17	14.88	-16	-2	+12
Ring-billed Gull	7.87	6.97	-47	-11	+24
*Franklin's Gull	4.55	2.50	-79	-45	-11
*Black Tern	11.27	6.04	-73	-46	-20
*Rock Dove	12.39	7.20	-73	-42	+11
Mourning Dove	12.79	14.37	-62	+12	+87
Common Flicker	2.39	2.95	-18	+23	+64
Eastern Kingbird	6.42	6.08	-32	-5	+21
Least Flycatcher	3.17	3.33	-57	+5	+67
Horned Lark	79.37	76.92	-18	-3	+12
Tree Swallow	4.52	2.67	-84	-41	+3
Barn Swallow	16.06	15.35	-20	-4	+11
*Cliff Swallow	19.02	32.83	+3	+73	+142
Black-billed Magpie	14.19	13.07	-35	-8	+19
Common Crow	48.81	47.51	-15	-3	+10
House Wren	14.85	16.12	-5	+8	+22
American Robin	7.45	7.23	-23	+4	+30
Starling	12.36	21.90	-16	+77	+170
Warbling Vireo	4.26	4.79	-39	+12	+64
Yellow Warbler	4.43	4.35	-36	-2	+33
*House Sparrow	76.31	58.02	-42	-24	-6
Bobolink	3.71	3.15	-54	-15	+24
Western Meadowlark	54.91	58.31	-8	+6	+20
Yellow-headed Blackbird	33.20	29.42	-37	-11	+14
Red-winged Blackbird	138.44	129.39	-23	-6	+10
*Brewer's Blackbird	38.72	27.35	-46	-29	-13
Common Grackle	4.91	7.12	-42	+45	+132
Brown-headed Cowbird	25.04	31.70	-2	+27	+55
American Goldfinch	3.99	4.12	-38	+3	+44
Lark Bunting	0†	0†	-	-	-
Savannah Sparrow	23.78	24.74	-17	+4	+25
Vesper Sparrow	20.17	18.32	-22	-9	+4
Clay-coloured Sparrow	32.12	30.06	-18	-6	+5
Song Sparrow	11.25	8.54	-55	-24	+7
Chestnut-collared Longspur	23.15	22.16	-15	-4	+6

*Greater than 95% significant.

†None seen on comparable routes.

Table 14
Changes in bird population samples for 25 comparable routes, Breeding Bird Survey, central Prairie Provinces region, 1977-78

Species	Weighted mean no. birds per route		% change (bold) with 95% confidence limits		
	1977	1978			
Mallard	36.09	43.57	-84	+21	+125
*Pintail	10.38	2.08	-115	-80	-45
Blue-winged Teal	6.94	4.73	-64	-32	+1
*Northern Shoveler	1.97	0.71	-100	-64	-28
Lesser Scaup	7.69	6.26	-66	-19	+29
*American Coot	9.65	5.67	-82	-41	-1
Killdeer	8.54	8.00	-35	-6	+22
Common Snipe	6.99	7.28	-36	+4	+44
Franklin's Gull	15.56	16.18	-64	+4	+72
Black Tern	11.69	9.55	-44	-18	+7
Common Flicker	3.15	2.29	-62	-27	+7
Alder Flycatcher	6.66	6.84	-31	+3	+37
Least Flycatcher	7.50	8.90	-11	+19	+48
Western Wood Pewee	3.11	2.56	-59	-18	+24
Tree Swallow	6.02	7.69	-38	+28	+94
Barn Swallow	15.70	22.41	-14	+43	+100
Black-billed Magpie	14.32	14.32	-45	0	+45
Common Crow	43.24	42.01	-15	-3	+10
House Wren	12.25	13.50	-16	+10	+37
American Robin	19.09	16.68	-32	-13	+6
Starling	15.77	27.95	-47	+77	+201
Red-eyed Vireo	17.99	22.72	-13	+26	+66
Warbling Vireo	4.06	4.36	-26	+7	+41
Yellow Warbler	9.34	9.38	-32	0	+33
Common Yellowthroat	11.22	11.52	-14	+3	+19
*House Sparrow	24.50	18.03	-52	-26	0
Western Meadowlark	6.54	6.46	-48	-1	+46
Red-winged Blackbird	71.58	69.28	-20	-3	+14
Northern Oriole	4.30	5.62	-23	+31	+84
Brewer's Blackbird	32.10	25.25	-44	-21	+1
Brown-headed Cowbird	14.71	12.47	-45	-15	+14
*Pine Siskin	4.31	0.60	-108	-86	-65
*American Goldfinch	7.35	5.37	-46	-27	-8
*Savannah Sparrow	24.37	19.58	-34	-20	-5
Vesper Sparrow	8.63	10.10	-5	+17	+39
Dark-eyed Junco	2.12	2.96	-55	+40	+135
Chipping Sparrow	8.64	12.03	-8	+39	+86
Clay-coloured Sparrow	35.83	32.33	-20	-10	+1
*White-throated Sparrow	10.76	7.98	-38	-26	-13
Song Sparrow	28.74	24.79	-33	-14	+5

*Change greater than 95% significant.

Table 15
Changes in bird population samples for 20 comparable routes, Breeding Bird Survey, British Columbia (west of Rocky Mountains), 1977-78

Species	Weighted mean no. birds per route		% change (bold) with 95% confidence limits		
	1977	1978			
Killdeer	4.13	4.57	-64	+11	+86
*Rufous Hummingbird	1.65	0.97	-63	-41	-19
Common Flicker	7.87	6.85	-31	-13	+5
Yellow-bellied Sapsucker	2.99	3.59	-32	+20	+72
*Traill's Flycatcher	6.13	3.56	-83	-42	-1
Western Wood Pewee	6.88	7.27	-16	+6	+28
Violet-green Swallow	10.66	9.00	-50	-16	+19
Tree Swallow	7.21	7.78	-41	+8	+57
Rough-winged Swallow	4.83	7.29	-18	+51	+120
Barn Swallow	15.88	18.29	-67	+15	+97
*Cliff Swallow	17.61	10.66	-70	-39	-9
Common Raven	6.96	8.68	-58	+25	+107
†Crows	36.85	38.58	-12	+5	+21
Black-capped Chickadee	5.59	5.24	-49	-6	+37
Chestnut-backed Chickadee	7.77	6.89	-48	-11	+25
Winter Wren	3.54	4.32	-4	+22	+48
American Robin	55.18	55.05	-15	0	+15
Varied Thrush	2.52	2.73	-41	+8	+57
Swainson's Thrush	25.10	23.37	-23	-7	+10
Golden-crowned Kinglet	3.58	5.05	-29	+41	+111
Ruby-crowned Kinglet	3.88	5.06	-50	+31	+111
Cedar Waxwing	2.60	2.35	-81	-10	+61
*Starling	54.67	38.47	-58	-30	-1
Red-eyed Vireo	10.39	12.13	-18	+17	+51
*Warbling Vireo	7.19	5.21	-46	-28	-9
*Orange-crowned Warbler	4.88	7.43	+4	+52	+101
Yellow Warbler	6.92	8.54	-3	+23	+50
Yellow-rumped Warbler	9.25	9.36	-23	+1	+26
MacGillivray's Warbler	4.46	4.88	-23	+10	+42
Wilson's Warbler	1.61	1.66	-73	+3	+79
House Sparrow	5.67	5.16	-30	-9	+13
Western Meadowlark	9.47	10.09	-8	+7	+21
Red-winged Blackbird	7.25	9.84	-41	+36	+112
Brewer's Blackbird	14.12	14.04	-28	-1	+26
*Brown-headed Cowbird	10.04	7.37	-44	-27	-10
Western Tanager	6.25	6.26	-33	0	+33
*Pine Siskin	16.03	7.07	-88	-56	-23
American Goldfinch	5.55	4.63	-47	-17	+14
Rufous-sided Towhee	4.01	3.24	-54	-19	+15
Savannah Sparrow	4.24	3.71	-39	-12	+14
Dark-eyed Junco	12.85	13.14	-30	+2	+35
Chipping Sparrow	17.21	18.13	-8	+5	+19
*Song Sparrow	12.24	9.69	-36	-21	-6

*Change greater than 95% significant.

†Common and Northwestern Crows combined.

Table 16
Index numbers of bird populations, Maritime Provinces, from Breeding Bird Survey, based on 1973 index of 100

Species	Annual indices					
	1973	1974	1975	1976	1977	1978
Common Snipe	100	* 169	* 103	* 84	92	* 65
Herring Gull	100	91	82	50	63	* 110
Common Flicker	100	99	78	73	80	69
Yellow-bellied Sapsucker	100	125	140	* 108	* 63	57
Alder Flycatcher	100	* 149	* 103	* 121	122	123
Least Flycatcher	100	87	71	78	68	* 45
Tree Swallow	100	79	* 56	68	66	75
Bank Swallow	100	96	* 42	* 125	104	128
Barn Swallow	100	* 74	* 53	59	69	82
Blue Jay	100	136	116	139	120	163
Common Raven	100	111	91	86	111	* 158
Common Crow	100	108	* 95	96	114	* 144
Winter Wren	100	* 165	* 101	92	* 41	31
American Robin	100	107	102	104	102	99
Hermit Thrush	100	121	120	127	93	94
Swainson's Thrush	100	90	88	96	92	99
Veery	100	93	77	75	84	* 71
Ruby-crowned Kinglet	100	110	109	136	* 57	62
Starling	100	96	103	92	75	77
Red-eyed Vireo	100	* 137	115	128	147	* 178
Nashville Warbler	100	76	69	87	87	* 65
Yellow Warbler	100	* 79	72	* 89	101	111
Magnolia Warbler	100	* 75	77	* 93	94	100
Black-throated Green Warbler	100	70	65	79	68	61
Chestnut-sided Warbler	100	81	75	77	87	81
Ovenbird	100	119	* 89	92	111	107
Common Yellowthroat	100	* 85	78	77	* 93	87
American Redstart	100	108	104	105	117	114
House Sparrow	100	113	* 89	97	* 126	141
Bobolink	100	* 124	* 104	* 124	125	130
Red-winged Blackbird	100	104	103	118	114	112
Common Grackle	100	* 79	71	87	71	64
Brown-headed Cowbird	100	123	109	* 74	89	78
Evening Grosbeak	100	66	* 103	66	51	56
Purple Finch	100	102	106	90	95	91
American Goldfinch	100	110	107	102	108	* 82
Savannah Sparrow	100	93	95	100	88	89
Dark-eyed Junco	100	102	101	93	105	* 79
Chipping Sparrow	100	83	84	80	72	86
White-throated Sparrow	100	* 106	100	97	99	* 81
Song Sparrow	100	92	88	84	78	* 68
No. routes included in comparison	30	28	25	24	33	

*Index change greater than 95% significant.

Table 17
Index numbers for bird populations, central Ontario and central Quebec, from Breeding Bird Survey, based on 1973 index of 100

Species	Annual indices					
	1973	1974	1975	1976	1977	1978
Killdeer	100	89	115	128	114	164
Herring Gull	100	130	* 62	117	230	152
Common Flicker	100	93	99	* 63	69	62
Yellow-bellied Sapsucker	100	77	98	92	88	* 53
Alder Flycatcher	100	128	116	93	94	96
Least Flycatcher	100	83	86	90	83	70
Tree Swallow	100	82	* 126	112	123	145
Bank Swallow	100	156	* 75	101	105	120
Barn Swallow	100	76	* 101	* 83	76	75
Blue Jay	100	77	82	99	83	113
Common Raven	100	103	106	127	164	131
Common Crow	100	96	* 71	77	89	96
Winter Wren	100	122	* 167	122	* 66	103
American Robin	100	107	104	* 125	130	135
Hermit Thrush	100	94	143	173	180	203
Swainson's Thrush	100	* 86	* 115	115	139	128
Veery	100	92	109	102	126	115
Ruby-crowned Kinglet	100	121	118	116	* 32	38
Cedar Waxwing	100	95	105	96	148	169
Starling	100	86	112	131	118	* 86
Red-eyed Vireo	100	88	* 107	110	114	116
Nashville Warbler	100	101	81	75	68	93
Yellow Warbler	100	66	94	109	83	93
Magnolia Warbler	100	100	115	* 89	101	* 128
Yellow-rumped Warbler	100	85	122	98	110	153
Chestnut-sided Warbler	100	91	101	96	95	90
Ovenbird	100	96	92	94	100	98
Mourning Warbler	100	106	* 142	* 101	* 130	* 111
Common Yellowthroat	100	98	112	97	104	96
American Redstart	100	111	122	110	* 144	* 121
House Sparrow	100	63	115	132	103	* 52
Bobolink	100	* 83	100	98	102	109
Red-winged Blackbird	100	100	106	106	106	* 125
Common Grackle	100	* 72	84	66	86	* 59
Brown-headed Cowbird	100	86	94	* 156	153	147
Rose-breasted Grosbeak	100	84	97	107	89	* 141
Evening Grosbeak	100	* 44	50	51	64	85
American Goldfinch	100	84	95	86	101	* 63
Savannah Sparrow	100	85	105	102	101	109
Dark-eyed Junco	100	77	96	81	91	73
Chipping Sparrow	100	112	109	112	123	132
White-throated Sparrow	100	107	108	102	96	89
Song Sparrow	100	92	101	96	* 81	73
No. routes included in comparison	28	28	33	38	25	

*Index change greater than 95% significant.

Table 18
Index numbers of bird populations, southern Ontario and southern Quebec, from Breeding Bird Survey, based on 1973 index of 100

Species	Annual indices					
	1973	1974	1975	1976	1977	1978
Killdeer	100	89	107	123	* 109	117
Rock Dove	100	115	128	163	171	227
Mourning Dove	100	91	91	* 116	115	94
Common Flicker	100	101	98	94	97	83
Eastern Kingbird	100	96	79	102	80	96
Great Crested Flycatcher	100	* 69	63	* 95	72	70
Eastern Wood Pewee	100	89	* 62	71	60	76
Horned Lark	100	89	138	116	119	110
Tree Swallow	100	* 148	129	141	158	160
Bank Swallow	100	* 47	46	80	61	62
Barn Swallow	100	111	121	127	* 159	148
Purple Martin	100	110	108	122	102	92
Blue Jay	100	82	84	87	* 49	59
Common Crow	100	98	88	95	83	91
House Wren	100	* 120	146	156	* 119	* 87
Gray Catbird	100	* 132	130	151	154	131
Brown Thrasher	100	89	72	76	81	* 64
American Robin	100	105	106	100	98	91
Veery	100	107	139	128	154	148
Cedar Waxwing	100	119	102	74	64	79
Starling	100	104	101	139	154	* 99
Red-eyed Vireo	100	110	* 147	146	140	* 113
Warbling Vireo	100	132	143	177	* 117	158
Yellow Warbler	100	109	89	101	89	95
Common Yellowthroat	100	90	100	102	93	113
House Sparrow	100	97	87	98	99	80
Bobolink	100	118	113	146	134	142
Eastern Meadowlark	100	97	* 80	86	90	* 69
Red-winged Blackbird	100	107	* 138	149	* 158	* 138
Northern Oriole	100	110	102	* 147	* 113	* 150
Common Grackle	100	93	108	110	114	105
Brown-headed Cowbird	100	* 140	115	138	123	133
Rose-breasted Grosbeak	100	107	144	145	* 115	140
American Goldfinch	100	102	122	113	124	* 73
Savannah Sparrow	100	88	104	119	124	108
Vesper Sparrow	100	91	90	76	89	* 119
Chipping Sparrow	100	108	118	101	99	96
White-throated Sparrow	100	* 151	211	* 156	165	140
Song Sparrow	100	103	* 91	89	96	* 70
No. routes included in comparison	26	23	27	22	24	

*Index change greater than 95% significant.

Table 19
Index numbers for bird populations, southern Prairie Provinces, from Breeding Bird Survey, based on 1973 index of 100

Species	Annual indices					
	1973	1974	1975	1976	1977	1978
Mallard	100	100	116	118	162	118
Pintail	100	163	233	240	166	103
Blue-winged Teal	100	148	171	161	214	152
Northern Shoveler	100	116	* 182	122	112	89
American Wigeon	100	111	143	140	122	244
Lesser Scaup	100	244	176	336	568	* 136
Sora	100	164	218	242	* 75	87
American Coot	100	200	206	319	* 166	* 86
Killdeer	100	114	124	122	111	109
Ring-billed Gull	100	* 42	47	68	41	37
Franklin's Gull	100	178	94	* 311	* 93	* 51
Black Tern	100	77	102	118	92	* 50
Rock Dove	100	* 67	80	* 194	200	* 116
Mourning Dove	100	103	112	* 153	145	162
Common Flicker	100	87	112	123	93	114
Eastern Kingbird	100	91	81	* 105	114	108
Least Flycatcher	100	129	186	147	171	180
Horned Lark	100	113	120	128	131	127
Tree Swallow	100	102	112	327	209	123
Barn Swallow	100	89	98	98	100	96
Cliff Swallow	100	140	153	* 77	89	* 154
Black-billed Magpie	100	90	82	* 129	126	116
Common Crow	100	89	80	* 98	98	95
House Wren	100	91	92	99	102	110
American Robin	100	96	96	130	164	171
Starling	100	129	144	228	* 121	214
Warbling Vireo	100	105	102	96	113	127
Yellow Warbler	100	97	75	82	101	99
House Sparrow	100	82	116	133	165	* 125
Bobolink	100	* 67	79	70	80	68
Western Meadowlark	100	106	95	101	92	98
Yellow-headed Blackbird	100	144	155	208	* 154	137
Red-winged Blackbird	100	96	107	105	106	100
Brewer's Blackbird	100	113	121	100	151	* 107
Common Grackle	100	* 55	86	144	* 86	125
Brown-headed Cowbird	100	120	116	114	117	149
American Goldfinch	100	89	85	94	109	112
Lark Bunting	100	110	* 32	* 209	* 13	†
Savannah Sparrow	100	118	111	103	115	120
Vesper Sparrow	100	109	110	127	116	106
Clay-coloured Sparrow	100	93	82	101	108	102
Song Sparrow	100	124	98	95	112	85
Chestnut-collared Longspur	100	90	102	140	183	176
No. routes included in comparison	28	23	21	18	18	

*Index change greater than 95% significant.
†None seen on comparable routes.

Table 20

Index numbers for bird populations, central Prairie Provinces, from Breeding Bird Survey, based on 1973 index of 100

Species	Annual indices					
	1973	1974	1975	1976	1977	1978
Mallard	100	88	79	95	124	150
Pintail	100	258	178	* 89	77	* 15
Blue-winged Teal	100	166	139	* 89	178	121
Northern Shoveler	100	207	* 134	* 58	* 245	* 88
Lesser Scaup	100	91	83	61	* 18	15
American Coot	100	134	183	* 70	* 240	* 142
Killdeer	100	116	107	100	97	91
Common Snipe	100	108	117	90	89	93
Franklin's Gull	100	139	89	* 41	30	31
Black Tern	100	97	101	125	124	102
Common Flicker	100	97	143	* 103	125	91
Alder Flycatcher	100	139	157	108	111	114
Least Flycatcher	100	92	99	71	75	89
Western Wood Pewee	100	76	103	141	224	184
Tree Swallow	100	103	116	169	254	325
Barn Swallow	100	101	109	105	89	127
Black-billed Magpie	100	80	74	84	* 109	109
Common Crow	100	82	82	76	87	84
House Wren	100	92	99	103	* 149	164
American Robin	100	99	101	101	120	104
Starling	100	* 70	71	146	* 77	136
Red-eyed Vireo	100	* 50	66	79	* 94	118
Warbling Vireo	100	92	* 63	95	101	108
Yellow Warbler	100	116	115	* 86	110	110
Common Yellowthroat	110	115	116	106	135	139
House Sparrow	100	* 73	88	66	88	* 65
Western Meadowlark	100	101	87	92	98	97
Red-winged Blackbird	100	96	102	* 87	* 112	109
Northern Oriole	100	134	110	78	95	125
Brewer's Blackbird	100	137	123	134	155	122
Brown-headed Cowbird	100	* 145	129	130	148	126
Pine Siskin	100	146	* 38	* 255	* 130	* 18
American Goldfinch	100	73	65	79	96	* 70
Savannah Sparrow	100	100	91	112	111	* 89
Vesper Sparrow	100	95	100	88	80	94
Dark-eyed Junco	100	106	133	* 185	* 93	130
Chipping Sparrow	100	137	* 95	80	105	146
Clay-coloured Sparrow	100	103	112	* 94	* 116	104
White-throated Sparrow	100	115	108	103	85	* 63
Song Sparrow	100	95	93	96	85	73
No. Routes included in comparison	23	25	16	16	25	

*Index change greater than 95% significant.

Table 21

Index numbers for bird populations, British Columbia (west of Rocky Mountains), from Breeding Bird Survey, based on 1973 index of 100

Species	Annual indices					
	1973	1974	1975	1976	1977	1978
Killdeer	100	* 64	* 100	152	125	139
Rufous Hummingbird	100	143	123	97	135	* 80
Common Flicker	100	* 78	98	* 163	155	135
Yellow-bellied Sapsucker	100	149	125	151	178	214
Traill's Flycatcher	100	94	100	88	79	* 46
Western Wood Pewee	100	84	50	68	* 46	49
Violet-green Swallow	100	127	76	116	164	138
Tree Swallow	100	96	78	105	93	100
Rough-winged Swallow	100	205	* 96	77	105	159
Barn Swallow	100	101	141	127	113	130
Cliff Swallow	100	75	63	202	283	* 173
Common Raven	100	99	144	168	218	273
†Crows	100	89	103	111	110	116
Black-capped Chickadee	100	* 51	60	54	* 41	39
Chestnut-backed Chickadee	100	64	54	* 84	92	82
Winter Wren	100	113	82	110	158	193
American Robin	100	* 83	80	* 94	* 83	83
Varied Thrush	100	98	146	* 128	* 111	120
Swainson's Thrush	100	98	92	105	99	92
Golden-crowned Kinglet	100	85	72	68	112	158
Ruby-crowned Kinglet	100	87	130	* 92	82	107
Cedar Waxwing	100	79	69	67	57	51
Starling	100	81	103	75	* 133	* 93
Red-eyed Vireo	100	84	75	* 91	109	128
Warbling Vireo	100	104	92	* 145	170	* 122
Orange-crowned Warbler	100	100	85	96	* 66	* 100
Yellow Warbler	100	111	* 88	108	91	112
Yellow-rumped Warbler	100	117	122	101	109	110
MacGillivray's Warbler	100	* 66	57	60	67	74
Wilson's Warbler	100	177	* 81	103	104	107
House Sparrow	100	114	118	144	* 69	63
Western Meadowlark	100	87	* 129	108	99	106
Red-winged Blackbird	100	82	137	* 62	76	103
Brewer's Blackbird	100	79	66	84	77	76
Brown-headed Cowbird	100	116	124	128	124	* 91
Western Tanager	100	104	110	118	111	111
Pine Siskin	100	95	151	163	* 80	* 35
American Goldfinch	100	120	99	126	108	90
Rufous-sided Towhee	100	89	71	* 143	186	151
Savannah Sparrow	100	* 66	71	87	90	79
Dark-eyed Junco	100	120	114	* 168	* 134	137
Chipping Sparrow	100	91	123	105	90	95
Song Sparrow	100	114	* 107	131	* 110	* 87
No. routes included in comparison	27	26	24	23	20	

*Index change greater than 95% significant.

†Common Crow and Northwestern Crow combined.

