

BREEDING BIRDS IN MINNESOTA, 1975 - 1979:

**Abundance, Distribution,
and Diversity**



**Minnesota
Department of
Natural
Resources**

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Breeding Birds in Minnesota,
1975-1979: Abundance, Distribution, and Diversity

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ABSTRACT

From 1975 through 1979, up to 52 United States Fish and Wildlife Service Breeding Bird Survey (BBS) routes were run 175 times in Minnesota. A five-year total of 150,428 birds composed of 203 species were counted on 4,375 miles of routes. The average number of birds per hundred miles of route was 3,438. Ten species accounted for 75,348 (50 percent) of the birds encountered: red-winged blackbird, common grackle, house sparrow, starling, western meadowlark, mourning dove, American robin, cliff swallow, common crow, and common yellowthroat. The distribution of each species encountered has been analyzed according to 14 regions in the state and densities have been plotted in terms of birds per hundred miles of route. The lowest number of species counted in one region was 74 and the highest number of species counted in one region was 126. This analysis will be carried out every five years to monitor long term trends in the abundance, distribution and diversity of Minnesota birds.

INTRODUCTION

The primary purpose of the Breeding Bird Surveys (BBS) is to determine the population trends of North American bird species. Analysis of population trends is carried out by the Migratory Bird and Habitat Research Lab, U.S. Fish and Wildlife Service, at Laurel, Maryland. Results of that analysis are available at that office.

Since the initiation of the U.S. Fish and Wildlife Service Breeding Bird Surveys in 1966 in the midwest, these annual surveys have served as the single most important source of population trend data for many species of birds. Janssen (1979) and Zimmerman (1978) have both reviewed the history and techniques employed to conduct the surveys.

Danny Bystrak is in charge of the national BBS program at the Migratory Bird and Habitat Research Lab at Laurel, Maryland, and Robert Janssen is in charge of coordinating Minnesota's 52 routes. Dr. Walter Breckenridge was in charge of the Minnesota program from 1967 until 1977.

This report analyzes the composite results of the BBS data from 1975 through 1979. A five-year total of 150,428 birds of 203 species was counted on 175 routes. Each route is actually 24.5 miles long, but 25 miles is used in all calculations for the sake of simplicity, giving a total of 4,375 miles. The average number of birds recorded per 100 miles of route was 3,438. These results have been analyzed several ways to provide birders, professional ornithologists, environmental planners, and other biologists with information on the abundance, distribution and diversity of Minnesota birds.

METHODS

Data were taken from copies of the summary sheets from the routes run from 1975 through 1979. These and county maps showing each route were supplied by the U.S. Fish and Wildlife Service at Laurel, Maryland. The locations of Minnesota routes are shown in Figure 1.

Each one degree block of latitude and longitude (about 55 miles wide, east to west, and 70 miles long) is sampled by one or more random transects, or routes. Minnesota has two routes per degree block. Starting points and compass directions have been determined at random. Each route is covered once in June or the first week of July. Observers begin exactly one-half hour before sunrise and make 50 stops at one-half mile intervals. They count all birds heard at each stop or seen within one-fourth mile during a 3-minute watching and listening period. One observer must do all the observing on a given route, but he may have an assistant to help with recording or driving. Unless driving conditions are very poor, most routes should be completed in 4 to 4½ hours.

The results of each route were broken down to the county where the observations occurred. Each summary sheet for a route had five subtotals, one for each ten counting sites in each five miles. Where a route crossed a county line, the ten site increment where the crossing occurred was analyzed to see which county contained most of that ten site segment. The tally for that subtotal was then recorded for the county with more than 5 sites of the route.

For analytical purposes the state was divided into 14 regions which correspond to the six Department of Natural Resources administrative regions and to smaller units that are considered according to major drainage basins and general vegetation type. These regions are shown in Figure 2.

Bird tallies were compiled by region, species, and by several general categories: native game birds, introduced game birds (ring-necked pheasant and gray partridge), native nongame birds, and introduced pest birds (house sparrow, starling, and rock dove). All counts were then converted to the number of birds per hundred miles of route and these results were mapped by region. All values less than one were rounded to one.

Species-Distance Curve Analysis

Analysis of the species - distance curve for several of the BBS routes was carried out to determine if the random routes were accounting for most of the species which would be anticipated in each respective region and to determine if the mileage driven for each region was adequate for recording the presence of most bird species.

The curve used to fit the data is the so-called Monod curve which is used to describe enzyme kinetics. The function is written as:

$$S = \frac{S_{\max} \cdot M}{M_{\frac{1}{2}} + M} \quad (1)$$

where S = the cumulative number of species observed.

M = the miles of route.

S_{max} = the total number of species which would be observed on an infinitely long route.

M_½ = a constant, the value of which tells you how long a route must be to observe ½ of all species:

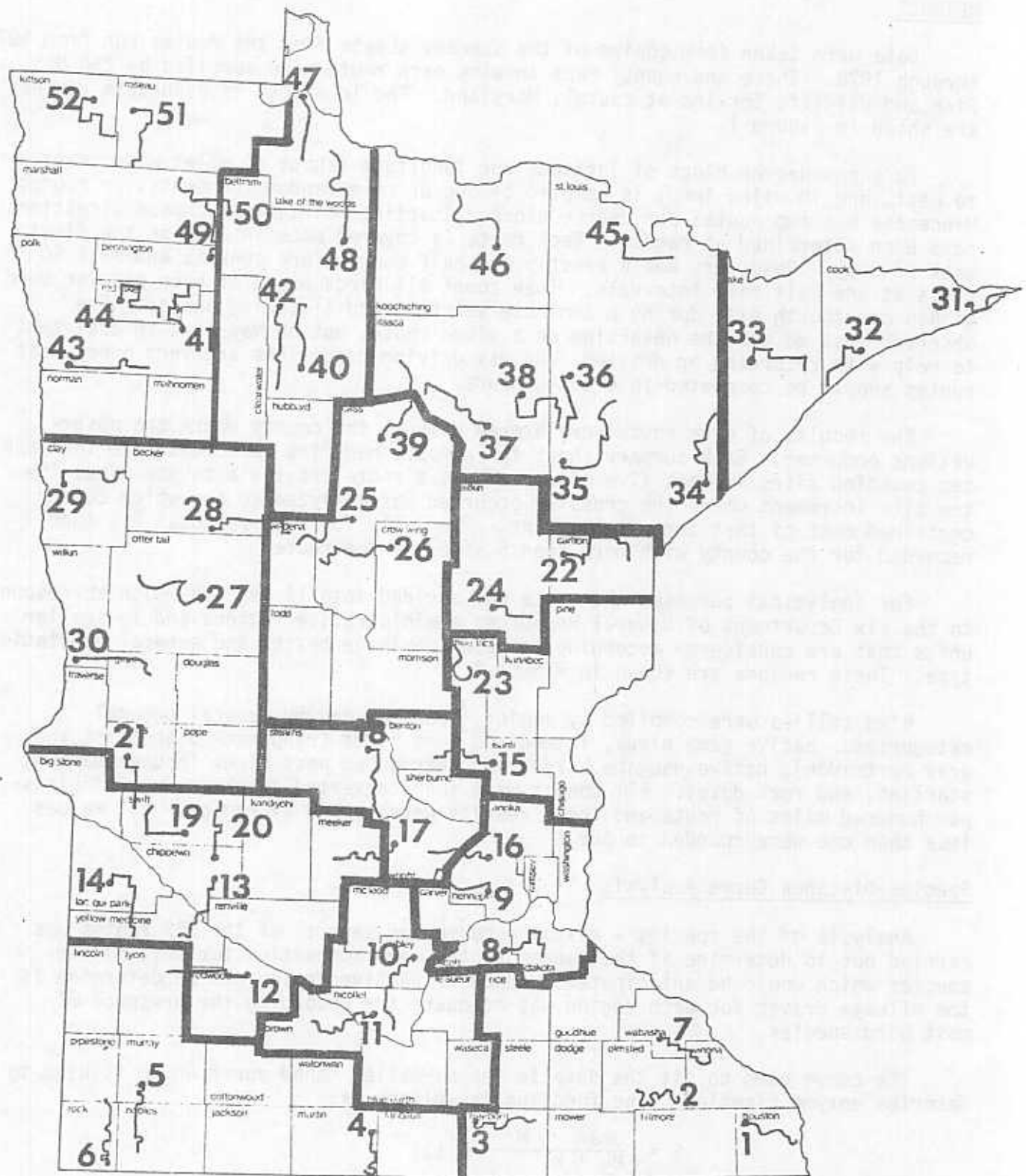


Figure 1. Breeding Bird Survey Routes.

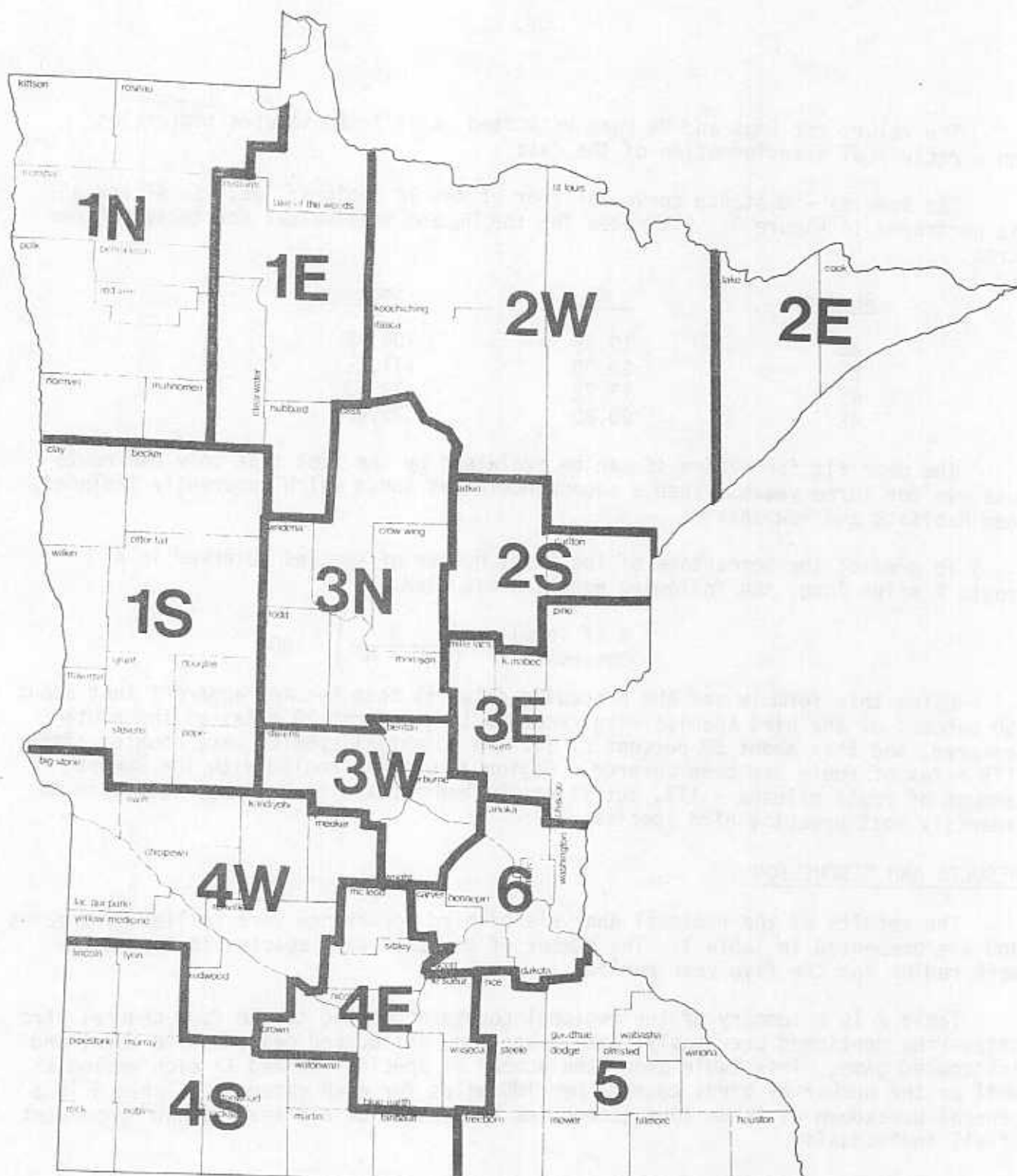


Figure 2. Regions used for analysis of breeding bird distribution.

The values for S_{max} and $M_{\frac{1}{2}}$ were estimated using least squares regression on a reciprocal transformation of the data.

The species - distance curve for four of the 14 regions: 2E, 2S, 4E and 4S is portrayed in Figure 3. Estimates for the $M_{\frac{1}{2}}$ and S_{max} values for these regions are:

<u>Region</u>	<u>$M_{\frac{1}{2}}$</u>	<u>S_{max}</u>
2E	19.56	109.89
2S	20.00	111.11
4E	17.72	73.53
4S	20.80	72.46

The poor fit for Region 4E can be explained by the fact that only one route was run for three years. Then a second route was added which apparently included new habitats and new species.

To predict the percentage of the total number of species observed in a route M miles long, the following equation was used.

$$\frac{\% \text{ of Total}}{\text{Observed}} = \left(\frac{M}{M_{\frac{1}{2}} + M} \right) 100$$

Using this formula and the preceding data, it then becomes apparent that about 50 percent of the bird species were recorded in the first 20 miles of the route covered, and that about 89 percent of all the potential species were counted after 175 miles of route had been covered. Region 4E was the region with the lowest amount of route mileage - 175, but it still then appears to have been adequate to identify most breeding bird species.

RESULTS AND DISCUSSION

The results of the regional analysis of bird occurrence were tallied by species and are presented in Table 1. The number of birds of each species is listed for each region for the five year period.

Table 2 is a summary of the regional counts according to the four general bird categories mentioned previously; native nongame, introduced pest, native game, and introduced game. This table shows the number of species counted in each region as well as the number of birds counted per 100 miles for each category. Table 3 is a general breakdown of those four categories by percent of all species and by percent of all individuals.

A total of 150,428 individuals of 203 species was counted during the five-year period. Ten species accounted for 50 percent of the birds counted: red-winged blackbird, common grackle, house sparrow, starling, western meadowlark, mourning dove, American robin, cliff swallow, common crow, and common yellowthroat.

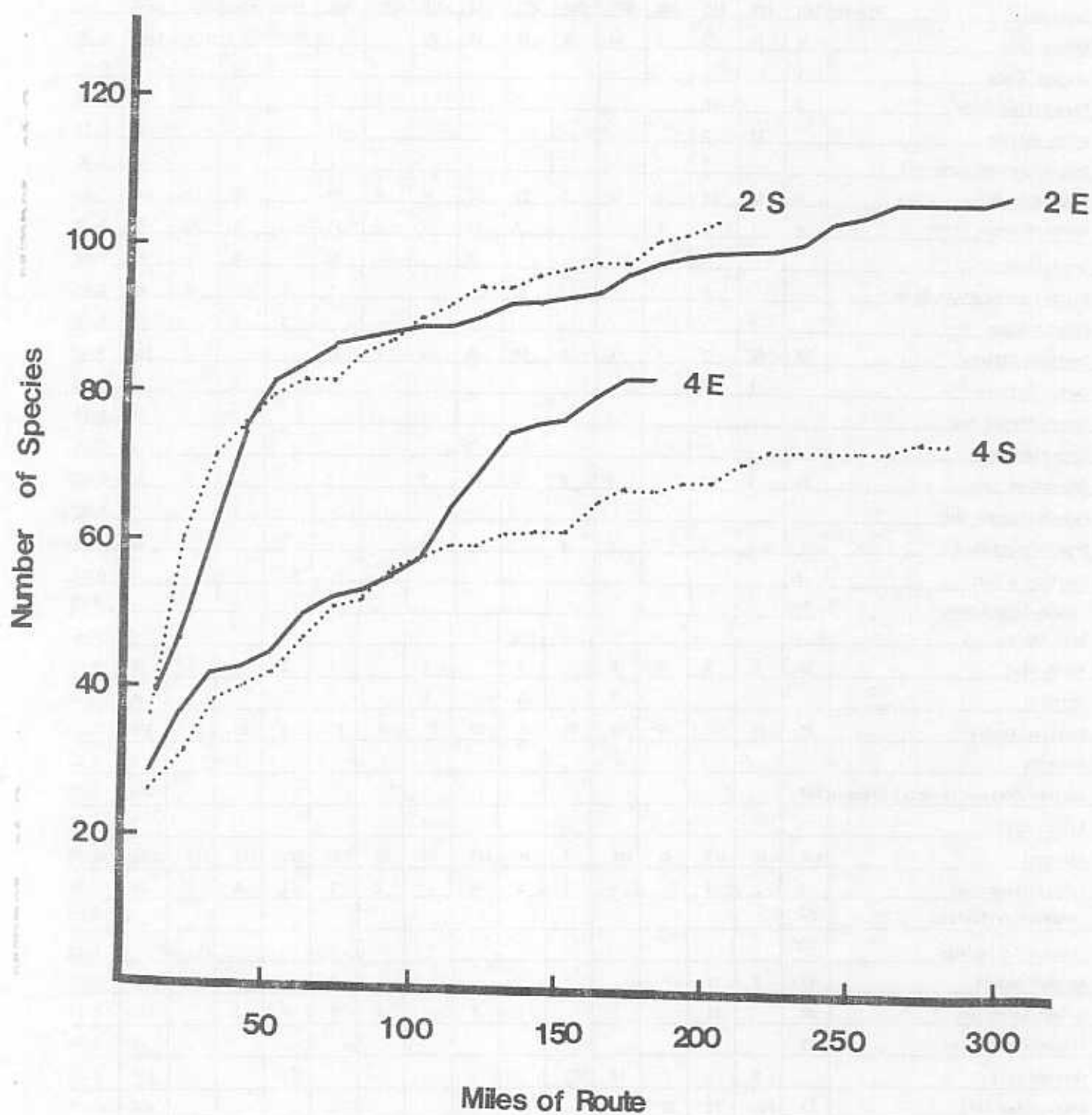


Figure 3. Species-Distance curves for four example regions of BBS analysis: 2E, 2S, 4E, and 4S.

Table 1. Regional Counts of Breeding Birds by Species, 1975-1979.

Species	Region Mileage	Total Birds Counted															5-Year Composite	
		1N	1E	1S	2S	2W	2E	3E	3W	3N	4E	4W	4S	5	6	Total	Birds/ 100mi.	
		480	195	240	200	605	300	225	240	310	175	360	285	475	285			4375
Common Loon		5	15	13	2	43	55	13	10	29		2			5	192	4.39	
Western Grebe		1														1	0.02	
Pied-billed Grebe		3		16				2	3	1	9	8		1	7	50	1.14	
White Pelican			13	8								11				32	0.73	
Double-crested Cormorant				9					1			7				17	0.40	
Great Blue Heron		8	16	55	3	12	8	25	83	34	6	49		18	19	336	7.68	
Northern Green Heron		8	1	1	5			7	16	7	2	11		8	10	76	1.74	
Great Egret									3			33		6	1	43	0.98	
Black-crowned Night Heron				2								5	6		8	21	0.48	
Least Bittern			2						1				1	2		6	0.14	
American Bittern		13	26	3	5	6	8	16	15	18	2	31			4	147	3.36	
Turkey Vulture			1											6		7	0.16	
Sharp-shinned Hawk						3	2			1						6	0.14	
Cooper's Hawk		1							1							2	0.05	
Red-tailed Hawk		15	3	3		3	4	3	1	9		3		12	6	62	1.42	
Red-shouldered Hawk														1		1	0.02	
Broad-winged Hawk			3	1	7	6	8			5						30	0.69	
Swinson's Hawk		2														2	0.05	
Rough-legged Hawk		1-A														1	0.02	
Bald Eagle								2								2	0.05	
Marsh Hawk		12	4	5	3	5		1		2		1	1		1	35	0.80	
Osprey						2		1		1						4	0.09	
American Kestrel		36	14	23	9	38	11	25	20	22	16	25	8	25	51	323	7.36	
Bobwhite														1		1	0.02	
Eastern Greater Sandhill Crane		144														144	3.29	
Yellow Rail										3						3	0.07	
Killdeer		456	76	177	46	160	7	96	144	89	96	238	121	153	193	2052	46.90	
Spotted Sandpiper		3	2	1		5	1	5	4		2	1	1	6	3	34	0.78	
Greater Yellowlegs		2-C														2	0.05	
Lesser Yellowlegs		1-C														1	0.02	
Marbled Godwit		67	2	29								3				101	2.31	
Upland Sandpiper		24		11				1	5		14	9	34	3		101	2.31	
Wilson's Phalarope		15														15	0.34	
Herring Gull			2			14	103									119	2.72	
Ring-billed Gull		11	318	91	20			7	1			2				450	10.29	
Franklin's Gull		553	3	45							4	9	8			622	14.22	
Forster's Tern			1	1												2	0.05	
Caspian Tern					1-A											1	0.02	
Black Tern		16	1	55		14		16	53	16	5	53		3	24	256	5.85	
Band-tailed Pigeon									1-A							1	0.02	
Rock Dove		210	5	88	9	8		105	63	4	317	239	243	744	376	2411	55.11	
Mourning Dove		1412	100	480	78	29	2	243	330	131	522	1214	486	552	601	6180	141.26	
Yellow-billed Cuckoo			4	11				1	4		3	1	2	8	1	35	0.80	

Table 1. Continued

Species	Region	1N	1E	1S	2S	2W	2E	3E	3W	3N	4E	4W	4S	5	6	Total	Birds 100mi
Black-billed Cuckoo		206	66	29	40	141	21	20	20	63	17	37	3	5	7	675	15.43
Screech Owl														1		1	0.02
Great-horned Owl		14							1	1		3	5	2	3	29	0.66
Barred Owl			2				1	1		3				1		8	0.16
Short-eared Owl		2														2	0.05
Saw-whet Owl										1						1	0.02
Whip-poor-will			2													2	0.05
Common Nighthawk			3		1	3	4	2		1		4			2	20	0.46
Chimney Swift		5		14	2	9	9	4	51	21	20	13	27	78	39	292	6.67
Ruby-throated Hummingbird		2	1	1		6	5	1		8				2		26	0.59
Belted Kingfisher		5	3	1	4	16	3	6	6	4		4	3	16	7	78	1.78
Common Flicker		114	22	50	22	126	48	36	44	26	59	103	64	118	63	895	20.46
Pileated Woodpecker		2	4		7	6	3	3	4	3				4	1	37	0.85
Red-bellied Woodpecker									6					40	1	47	1.07
Red-headed Woodpecker		26	1	19	3			27	42	20	68	93	85	139	19	542	12.39
Yellow-bellied Sapsucker		25	11	4	2	42	85	1	3	9				6		188	4.30
Hairy Woodpecker		16	5	8	3	32	1	10	4	16	1	5	2	6	1	110	2.51
Downy Woodpecker		15	4	5	11	34	41	4	8	8	12	17	1	12	10	182	4.16
Eastern Kingbird		167	45	25	17	68	14	39	34	79	13	57	37	52	35	682	15.59
Western Kingbird		47		26				1	1			1	5		3	84	1.92
Great Crested Flycatcher		69	79	67	45	67	6	71	67	134	29	28	4	43	36	745	17.03
Eastern Phoebe		11	22	4	2	26	1	14	13	32		2	1	15	2	145	3.31
Yellow-bellied Flycatcher			1		4	6	66									77	1.76
Alder Flycatcher		57	75	13	49	75	124	32	3	164		1		2		589	13.46
Willow Flycatcher				2		3			3		1	2	7	2	4	21	0.48
Empidonax spp.						3			3			1		2		10	0.23
Least Flycatcher		86	139	43	68	321	208	25	3	109	3	4		8	6	1023	23.38
Eastern Wood Pewee		26	19	30	13	32	23	29	25	75	11	4	2	52	11	352	8.05
Olive-sided Flycatcher			13		6	11	16									46	1.05
Horned Lark		419	16	173		1		6	48	4	243	283	122	65	57	1437	32.85
Tree Swallow		38	173	29	71	260	103	36	46	102	6	47		53	105	1069	24.43
Bank Swallow		223	26	16	63	7		16	33		34	58	9	174	48	707	16.16
Rough-winged Swallow		60		3	4	2		7	19	1	6	4	23	187	4	320	7.31
Barn Swallow		379	116	247	66	73	8	193	166	221	452	582	525	454	423	3905	89.26
Cliff Swallow		3564	410	159	134	417	31	133	72	186	18	20	39	6	18	5207	119.02
Purple Martin		62	16	112	77	51		43	61	124	28	42	47	61	37	761	17.39
Gray Jay						13	16									29	0.66
Blue Jay		93	87	42	74	228	73	109	75	118	34	72	35	158	59	1257	28.73
Black-billed Magpie		13	2													15	0.34
Common Raven		1	16		7	56	115			1						196	4.48
Common Crow		556	196	226	196	388	62	332	283	293	254	349	248	649	279	4311	98.54

Table 1. Continued

Species	Region	1N	1E	1S	2S	2W	2E	3E	3W	3N	4E	4W	4S	5	6	Total	Birds 100mi
Black-capped Chickadee		8	19	20	12	77	28	8	8	44	12	11	4	34	30	315	7.20
White-breasted Nuthatch		9	4	7	1	12		11	17	9	16	5		82	27	200	4.57
Red-breasted Nuthatch			3		8	30	30			7						78	1.78
Brown Creeper						3										3	0.07
House Wren		285	35	99	17	60	3	60	118	90	147	225	155	431	149	1874	42.83
Winter Wren			6		12	21	58									97	2.24
Long-billed Marsh Wren		6		10			1		31	8	2	46		2	11	117	2.67
Short-billed Marsh Wren		36	28	21	15	98	9	63	13	58	8	32		28	71	480	10.97
Gray Catbird		67	57	42	35	75	7	92	47	71	15	27	11	156	57	759	17.35
Brown Thrasher		73	15	30	13	30	8	37	33	30	26	89	66	81	46	577	13.19
American Robin		430	158	249	350	860	546	263	345	225	241	413	308	580	553	5521	126.19
Wood Thrush		1	71	1	33	14	9	2	1	1	1			2	1	137	3.13
Hermit Thrush			10		24	174	104			1						313	7.15
Swainson's Thrush			32			21	61									114	2.61
Veery		56	182	20	218	1009	419	179	23	215						2321	53.05
Eastern Bluebird		16	1	8	3	4		15	3	18			1	22	2	93	2.13
Blue-gray Gnatcatcher														4		4	0.09
Golden-crowned Kinglet						5	23									28	0.64
Ruby-crowned Kinglet			5			25	23			3						56	1.28
Cedar Waxwing		37	85	12	36	131	57	14	7	76				18	1	474	10.83
Loggerhead Shrike				1				3							3	7	0.16
Starling		377	41	204	84	233	16	321	511	104	788	664	778	1364	1545	7030	160.69
Bell's Vireo														2		2	0.05
Yellow-throated Vireo		11	4	8	1			19	20	7	1			6		77	1.76
Solitary Vireo			2		3	25	11			1						42	0.96
Red-eyed Vireo		71	271	81	202	1084	563	267	75	302	8	4	2	10	9	2949	67.41
Philadelphia Vireo					1-8		12					1				14	0.32
Warbling Vireo		111	23	49	6	27	1	23	14	25	15	16	9	36	48	403	9.21
Black and white Warbler			25	4	8	122	95	5		8						267	6.10
Golden-winged Warbler			4	2	10	5				25					1	47	1.07
Blue-winged Warbler														5		5	0.11
Tennessee Warbler			1			5	3									9	0.21
Nashville Warbler		1	36	3	71	593	404			31						1139	26.03
Northern Parula			2	1	9	29	22			2						65	1.49
Yellow Warbler		183	93	50	29	130	2	109	30	139	3	19	5	24	27	843	19.27
Magnolia Warbler						100	127									227	5.19
Cape May Warbler						17	1									18	0.41
Black-throated Blue Warbler							7									7	0.16
Yellow-rumped Warbler			6	1	4	72	84			3						170	3.89
Black-throated Green Warbler			1		15	42	71			5						134	3.06

Table 1. Continued

Species	Region															Total	Birds 100 ⁻¹
	1N	1E	1S	2S	2N	2E	3E	3W	3N	4E	4W	4S	5	6			
Cerulean Warbler								2							2	0.05	
Blackburnian Warbler		1		10	87	34				8						140	3.20
Chestnut-sided Warbler	6	15	4	99	717	665	22	2	119							1649	37.69
Say-breasted Warbler					4											4	0.09
Pine Warbler		8			8		2		25							43	0.9
House Warbler		1														1	0.0
Ovenbird	13	125	18	139	1169	547	23		162		1			7		2204	50.38
Northern Waterthrush		6			20	14										40	0.91
Connecticut Warbler		6		8	20	12			3							49	1.12
Mourning Warbler	1	19	14	81	501	291			46							953	21.78
Common Yellowthroat	352	288	265	203	609	136	352	295	313	113	380	239	320	372		4237	96.85
Canada Warbler		9		2	46	98			1							156	3.57
American Redstart	10	21	18	14	65	134	34	9	41		1		14	2		363	8.30
Dendroica spp.		1														1	0.02
House Sparrow	570	18	213	122	59		157	363	87	783	994	680	2729	779		7554	172.66
Bobolink	594	180	192	54	84		104	148	103	195	208	104	252	193		2411	55.11
Eastern Meadowlark	4	20		69	16		43	4	15	1	1		82	22		277	6.33
Western Meadowlark	1411	141	445	7	5		261	579	58	546	713	819	793	489		6267	143.25
Yellow-headed Blackbird	198	1	410	3			6	221	20	99	548	31	32	81		1650	37.71
Rusty Blackbird						3										3	0.07
Red-winged Blackbird	2028	436	1294	829	578	21	1207	1720	667	697	2137	650	2396	2405		17065	390.06
Orchard Oriole	5		1									8	1			15	0.34
Northern Oriole	145	32	69	38	49		49	85	71	34	32	20	137	44		805	18.40
Brewer's Blackbird	152		105	16	104	1	48	11	121	18	5	15	1	26		698	15.95
Common Grackle	590	23	707	148	85	4	344	628	139	941	2226	1773	2408	1960		11976	273.74
Brown-headed Cowbird	374	150	315	57	414	40	123	112	178	283	483	417	261	193		3400	77.71
Scarlet Tanager	4	18	20	6	21	7	11	11	23				3	3		127	2.90
Cardinal							3	10		3	4	4	183	36		243	5.55
Rose-breasted Grosbeak	51	115	45	70	237	149	46	31	105	34	28	6	132	30		1079	24.66
Blue Grosbeak												17				17	0.39
Indigo Bunting	8	4	58	4	8	3	51	72	94	37	46	15	168	54		622	14.22
Dickcissel	19		2				1	29		125	21	256	161	27		641	14.65
Evening Grosbeak					95	26										121	2.77
Purple Finch	3	12		5	103	8			16	1-8		1-8				149	3.41
Pine Siskin					6	7			2							15	0.34
American Goldfinch	201	19	35	32	145	35	85	65	70	43	115	74	172	111		1202	27.47
Red Crossbill					2	3			1							6	0.14
Rufous-sided Towhee	1	2	2						32				9			46	1.05
Savannah Sparrow	953	221	92	62	188	3	46	82	53	122	113	127	204	60		2326	53.17
Grasshopper Sparrow	41	6	47		1		3	23	4	16	21	87	18	25		292	6.67
Spizella spp.		1														1	0.0

Table 1. Continued

	Region	1N	1E	1S	2S	2E	3E	3N	3N	4E	4N	4S	5	6	Total	Birds 100-1	
Species																	
LeConte's Sparrow		9	28		1	5				3					46	1.05	
Henslow's Sparrow											2				2	0.05	
Sharp-tailed Sparrow		4													4	0.09	
Vesper Sparrow		320	22	240			1	70	199	97	483	503	325	254	115	2629	60.09
Lark Sparrow		12		1												13	0.30
Dark-eyed Junco						8	10									18	0.4
Chipping Sparrow		44	50	77	35	265	87	52	89	179	49	65	29	101	122	1244	28.43
Clay-colored Sparrow		331	72	115	19	88	4	44	23	119	3	36	1	1	32	888	20.30
Field Sparrow		2	5	5	1			2	7		3	52	1	161	1	240	5.49
White-throated Sparrow		2	62		115	809	668			21						1677	38.33
Lincoln's Sparrow						11	2									13	0.30
Swamp Sparrow		1	16	2	25	106	48	20	16	13	3	33		18	14	315	7.20
Song Sparrow		248	213	140	106	684	136	155	111	178	58	302	167	335	210	3043	69.55
GAME BIRDS																	
Canada Goose		30		5	188			1	10			1		3	15	83	1.90
Mallard		145	52	126	22	27	11	68	61	97	76	182	39	23	290	1219	27.86
Black Duck												3				3	0.07
Gadwall		2	3	5							2	2				14	0.32
Pintail		5		13								9				27	0.62
Green-winged Teal		4		4			2-8					4				14	0.32
Blue-winged Teal		24	12	43	8		1	45	18	14	6	23	5	6	40	245	5.60
American widgeon				15												15	0.34
Northern Shoveler		4		5						1		1				11	0.25
Wood Duck		15		17	6	1	1	16	12	6	2	8	5	10	35	134	3.06
Redhead				41							7	5		2		55	1.26
Ring-necked Duck		5								1						6	0.14
Canvasback				10												10	0.23
Lesser Scaup		2	10							2						14	0.32
Common Goldeneye							1									1	0.02
Ruddy Duck				13	1						2				3	19	0.43
Hooded Merganser		5														5	0.11
Red-breasted Merganser							14									14	0.32
Ruffed Grouse		17	34	3		5	2	2		19				2		84	1.92
Sharp-tailed Grouse		19	8													27	0.62
Ring-necked Pheasant				27	4			107	186		148	294	84	210	428	1488	34.01
Gray Partridge		10		2							11	67	30	7	1	128	2.92
American Coot		1		38					8	3	62	42	1		3	158	3.59
Virginia Rail						1		2	1	1						5	0.11
Sora		8	4	11				8	8	12	2	11		2	7	73	1.67
American Woodcock			4		3	2	4	1		1			1			16	0.37
Common Snipe		51	110	15	31	96	33	37	29	68	1	15		6	20	512	11.70

Table 2. Summary of Regional Counts of Breeding Birds, 1975-1979.

State Summary																
Region	1N	1E	1S	2S	2W	2E	3E	3W	3N	4E	4W	4S	5	6	Total	
INTRODUCED PEST BIRDS																
Number of Species	3	3	3	3	3	1	3	3	3	3	3	3	3	3	3	
Number of Individuals	1157	64	505	215	300	16	583	583	937	1888	897	1701	4837	2700	16995	
Birds/100 miles	241	33	210	108	50	5	259	243	302	1079	249	597	1018	947	388	
NATIVE NONGAME BIRDS																
Number of Species	105	115	99	94	111	98	90	89	105	69	85	65	91	83	173	
Number of Individuals	18650	5785	7845	4564	15123	7282	6042	7206	6699	6392	12515	7709	13363	9877	129052	
Birds/100 miles	3885	2967	3269	2282	2500	2427	2685	3002	2161	3653	3478	2706	2814	3466	2950	
(Native and) TOTAL NONGAME BIRDS(Introduced)																
Number of Species	108	118	102	97	114	99	93	92	108	72	88	68	94	86	176	
Number of Individuals	19807	5849	8350	4779	15423	7298	6625	7789	7636	8280	13412	9410	18200	12577	146047	
Birds/100 miles	4126	2999	3479	2390	2549	2433	2944	3245	2463	4731	3727	3302	3823	4413	3338	
INTRODUCED GAME BIRDS																
Number of Species	1		2	1			1	1		2	2	2	2	2	2	
Number of Individuals	10		29	4			107	186		159	361	114	217	429	1616	
Birds/100 miles	2		12	2			48	78		91	100	40	46	150	37	
NATIVE GAME BIRDS																
Number of Species	16	8	18	7	7	10	9	8	12	9	13	4	8	8	25	
Number of Individuals	332	227	379	88	133	70	180	147	225	160	306	51	54	413	2765	
Birds/100 miles	69	116	158	44	22	23	80	61	73	91	85	18	11	145	63	
(Native and) TOTAL GAME BIRDS(Introduced)																
Number of Species	17	8	20	8	7	10	10	9	12	11	15	6	10	10	27	
Number of Individuals	342	227	408	92	133	70	287	333	225	319	667	165	271	842	4381	
Birds/100 miles	71	116	170	46	22	23	128	139	73	182	185	58	57	295	100	
TOTAL BIRDS																
Number of Species	124	126	122	105	121	109	103	101	120	83	103	74	104	96	203	
Number of Individuals	20149	6076	8758	4871	15556	7368	6912	8476	7119	8599	15079	9575	18471	13419	150428	
Birds/100 miles	4198	3116	3649	2436	2571	2456	3072	3532	2296	4914	4189	3359	3889	4708	3438	

Table 3. Summary of BBS counts by four general categories.

	Percent of All Species	Percent of All Individuals
Introduced Pest Nongame Birds	1.5	11.3
Native Nongame Birds	85.3	85.8
Introduced Game Birds	1.0	1.1
Native Game Birds	12.2	1.8
	<u>100.0</u>	<u>100.0</u>

Relative Abundance and Distribution

This analysis also utilizes the data from the BBS to assess the general distribution of bird species in Minnesota and the relative abundance of individual species among the various regions. In this report the term "relative abundance" refers to the abundance of a single bird species in various regions. The term "apparent abundance", which is explained in the following section, is a more general approximation which compares the number of birds seen among bird species.

The data from Table 1 were converted to "birds per 100 miles" by dividing the count for each species in each region by the number of miles driven in that region. This allows the portrayal of a map of distribution and relative abundance for each species. This approach is possible because the routes are all run uniformly. These maps are presented in Appendix I.

It should be emphasized that these distribution maps portray the approximate, not the exact, range for most species. If no number is given for a certain region for a species, it can mean one or more of five things: 1) The species is absent in that region as a breeding species, 2) The species is present in low levels in that region and was not detected due to the randomness of the survey, 3) the species is present, but not detectable by this kind of survey technique, 4) the species is present, but because of specific habitat needs was missed due to the randomness of the survey, and 5) the coverage was inadequate. Either there were not enough routes or observers were not skilled enough to record some species.

Appendix II contains maps showing the statewide summaries for the data in Table 2.

Apparent Abundance of Breeding Birds

Each species of breeding bird is characterized by a different degree of visibility and audibility. This is a reflection of the species' size, activity period, coloration, nesting season phenology, and habitat use with relation to road systems. Comparison of BBS counts among species must therefore not be confused as the exact relative abundance among species. It is actually an "apparent abundance" or detectability that is dependent on the variable visibility and audibility factors. The apparent abundance is still, however, a useful source of data for general comparisons of abundance among species.

For the sake of completeness, it should be mentioned that "flocking" also affects "apparent abundance". Reporting 500 yellowthroats means something quite different from 500 Franklin's gulls. Flocking aspects are not dealt with in this report.

There is also a need to identify Minnesota's most common breeding birds for educational purposes. The "apparent abundance" of Minnesota's 50 most apparent breeding birds is presented in Table 4.

Table 4. "Apparent abundance" of Minnesota's 50 most apparent breeding birds, 1975-1979. These birds accounted for 89.90 percent of all birds counted.

<u>Rank 1-10 (50.09%)</u>	<u>Rank 21-30 (10.34%)</u>	<u>Rank 41-50 (4.56%)</u>
Red-winged blackbird	Killdeer	Purple martin
Common grackle	House wren	Gray catbird
House sparrow	White-throated sparrow	Great crested flycatcher
Starling	Yellow-headed blackbird	Bank swallow
Western meadowlark	Chestnut-sided warbler	Eastern kingbird
Mourning dove	Ring-necked pheasant	Black-billed cuckoo
American robin	Horned lark	Brewer's blackbird
Cliff swallow	Blue jay	Indigo bunting
Common crow	Chipping sparrow	Franklin's gull
Common yellowthroat	Mallard	Alder flycatcher
<u>Rank 11-20 (18.35%)</u>	<u>Rank 31-40 (6.58%)</u>	
Barn swallow	American goldfinch	
Brown-headed cowbird	Nashville warbler	
Song sparrow	Rose-breasted grosbeak	
Red-eyed vireo	Tree swallow	
Vesper sparrow	Least flycatcher	
Rock dove	Mourning warbler	
Bobolink	Common flicker	
Savannah sparrow	Clay-colored sparrow	
Veery	Yellow warbler	
Ovenbird	Northern oriole	

Widespread Species

In addition to a consideration of which birds are more abundant in Minnesota, it is also worthwhile to identify those species that are the most widespread. These widespread species are either adaptable to many varying habitats throughout Minnesota or are found in specific habitats that are distributed throughout the state. Fifty-six species were counted in either 13 or 14 of the 14 regions used for this analysis during the five-year period. This list can be of particular importance to educators. These species are identified in Table 5.

Table 5. Widespread species.

Great blue heron	Eastern phoebe	Yellow warbler
American bittern	Least flycatcher	Common yellowthroat
Mallard	Eastern wood pewee	House sparrow
Blue-winged teal	Tree swallow	Bobolink
Wood duck	Bank swallow	Western meadowlark
American kestrel	Barn swallow	Red-winged blackbird
Killdeer	Cliff swallow	Northern oriole
Common snipe	Purple martin	Brewer's blackbird
Spotted sandpiper	Blue jay	Common grackle
Rock dove	Common crow	Brown-headed cowbird
Mourning dove	Black-capped chickadee	Rose-breasted grosbeak
Black-billed cuckoo	House wren	Indigo bunting
Chimney swift	Short-billed marsh wren	American goldfinch
Belted kingfisher	Gray catbird	Savannah sparrow
Common flicker	Brown thrasher	Chipping sparrow
Hairy woodpecker	American robin	Clay-colored sparrow
Downy woodpecker	Starling	Swamp sparrow
Eastern kingbird	Red-eyed vireo	Song sparrow
Great crested flycatcher	Warbling vireo	

Uncommon Birds and/or Birds with Limited Distribution

In contrast to a review of the state's most abundant and most widespread bird species, it is important to identify those birds which appear to be least abundant and/or least widely distributed. When those species are then considered with those identified as not being effectively counted by BBS routes (Table 7) and those not encountered on BBS routes (Table 8) it becomes possible to consider the status of our most uncommon birds. Table 6 is a list of the most uncommon and most locally distributed birds in Minnesota according to the BBS surveys from 1975 to 1979. Bird species in Table 7, those not effectively counted on BBS routes, are not included. Uncommon species are those for which 15 or fewer individuals were counted during the five year period and/or those which were recorded in only one or two of the 14 regions.

Table 6. Uncommon Birds and/or Birds with Limited Distribution on BBS Routes from 1975 to 1979.

Western grebe	Yellow rail	Black-throated blue warbler
Least bittern	Wilson's phalarope	Cerulean warbler
Black duck	Forster's tern	Bay-breasted warbler
Gadwall	Short-eared owl	Palm warbler
Green-winged teal	Gray jay	Orchard oriole
American wigeon	Black-billed magpie	Blue grosbeak
Northern shoveler	Blue-gray gnatcatcher	Evening grosbeak
Ring-necked duck	Golden-crowned kinglet	Pine siskin
Canvasback	Loggerhead shrike	Red crossbill
Lesser scaup	Bell's vireo	Baird's sparrow
Common goldeneye	Philadelphia vireo	Henslow's sparrow
Hooded merganser	Blue-winged warbler	Sharp-tailed sparrow
Red-breasted merganser	Tennessee warbler	Lark sparrow
Turkey vulture	Magnolia warbler	Dark-eyed junco
Bobwhite	Cape May warbler	Lincoln's sparrow
Sandhill crane		

Species Not Effectively Counted by BBS Survey Technique

Not all bird species lend themselves equally well to being surveyed by the BBS. Among the bird species counted from 1975-1979 that are not effectively counted by BBS techniques are nocturnal birds, crepuscular birds, gallinaceous birds with early nesting seasons, very small birds with faint calls, and several of the raptors which appear to have low counts either because of early nesting seasons or low flight activity in early morning hours.

A few examples of birds which appear to fall into this category are listed in Table 7. This is not a definitive list. It is admittedly subjective, but it is included to help explain the inconsistent distribution and relative abundance levels reported for these species.

Table 7. Species suggested as not being effectively counted by BBS routes.

Sharp-shinned hawk	Ruffed grouse	Barred owl
Cooper's hawk	Sharp-tailed grouse	Saw whet owl
Red-shouldered hawk	American woodcock	Whip-poor-will
Swainson's hawk	Screech owl	Common nighthawk
Bald eagle	Great-horned owl	Ruby-throated hummingbird
Osprey		Brown creeper

Species Not Encountered on BBS Routes

There are 233 species of birds known or believed to currently breed in Minnesota.

Of the 203 species counted on BBS routes, 197 are breeding species. The tree sparrow, rough-legged hawk, greater yellowlegs, lesser yellowlegs, band-tailed pigeon, and Caspian tern are not known to currently breed in the state.

It is of interest to know what breeding species were not counted on BBS routes. This knowledge can help in identifying priorities for rare birds which deserve consideration for alternative inventory methods.

Table 8 is a list of 36 casual or regular birds known or believed to currently breed in Minnesota which were not counted on BBS routes from 1975-1979.

During the five-year counting period, 197 of 233 breeding species (84.5 percent) in the state were recorded on BBS routes.

Table 8. Birds currently known or believed to breed in Minnesota, which were not counted on BBS routes from 1975-1979.

<u>Wetland Species</u>	<u>Prairie/Grassland Species</u>	<u>Northern Forest Species</u>
Red-necked grebe	Greater prairie chicken	Goshawk
Horned grebe	Burrowing owl	Merlin
Eared grebe	Sprague's pipit	Spruce grouse
Little blue heron	Lark bunting	Hawk owl
Cattle egret	Baird's sparrow	Great gray owl
Snowy egret	Chestnut-collared longspur	Long-eared owl
Yellow-crowned night heron		Boreal owl
Common merganser	<u>Southeastern Forest Species</u>	Black-backed 3-toed woodpecker
King rail	Turkey	Boreal chickadee
Common gallinule	Acadian flycatcher	
Piping plover	Tufted titmouse	<u>Other Species</u>
American avocet	Carolina wren	Western wood pewee
Common tern	Mockingbird	
	Prothonotary warbler	
	Louisiana waterthrush	

Species Diversity

The species diversity of Minnesota birds, both statewide and regionally, is a useful indicator for evaluating the general condition of the environment. More habitat diversity and more complex structure within habitats contributes to greater species diversity. Greater diversity is considered to be a desirable characteristic contributing to greater ecological stability (Dasmann 1968). Unfortunately, man tends to simplify environments or create monocultures (single species environments) for his own benefit. This creates a long term downward trend in species diversity. It also creates favorable habitat for extremely adaptable pest birds like starlings, house sparrows, and rock doves. These birds then become the dominant species in these simplified communities, outnumbering most other birds.

The measurement of such species diversity can include the number of total species, or more complex indicies like the Simpson's index, Shannon-Weiner index, or index of dominance (Odum 1971). Consideration of these various indicies is important as it relates to the BBS surveys. It deserves detailed attention in a separate paper. At this time only the total number of species and index of dominance will be used.

There was a significant difference in the total number of species counted in each region, varying from 74 in Region 4S of southwest Minnesota to 126 in Region 1E in northwest Minnesota. Species diversity was greatest across the forested regions of northern Minnesota and least in the agricultural monocultures of southwest Minnesota. The total number of birds per hundred miles, however, was lowest in northeast Minnesota and highest in southern Minnesota and in the metropolitan area. This is perhaps because the northeast has greater habitat structure, but lower soil productivity. The southwest has greater soil productivity but less habitat structure.

It should be emphasized that the number of species recorded in each region is an incomplete list of breeding species for that region for the five reasons discussed in the section on "Relative Abundance and Distribution". Current routes in Region 4S, for example, failed to record many water birds which are present in that region. These totals should, therefore, be regarded as an index to species diversity rather than the total number of breeding species in the region. Figure 4 portrays the total number of species and number of birds per 100 miles by region. These results can also be reviewed in Table 2 and in Appendix 2 where the results are also broken down by bird category: introduced pest, native nongame, introduced game, and native game.

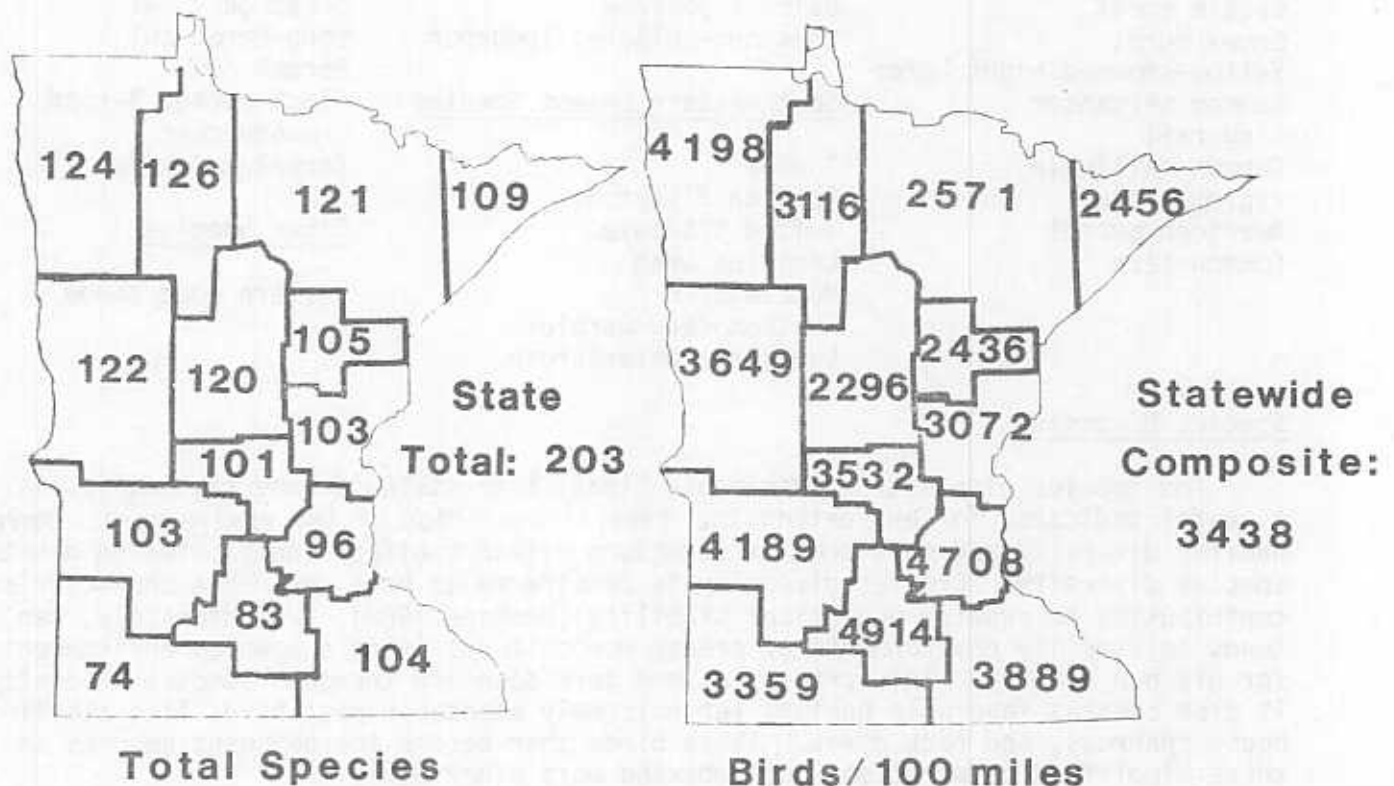


Figure 4. Number of species counted in each region and number of individuals counted per hundred miles in each region on BBS surveys, 1975-1979.

The results of the BBS also allow an examination of the species structure of the bird communities in the various regions of the state. One characteristic is the extent to which a few species dominate the avian community. For example, in Region 6, 49.9 percent of all birds counted were red-winged blackbirds, grackles, starlings, and house sparrows. In contrast, in Region 3N the four most abundant species were the red-eyed vireo, red-winged blackbird, common yellowthroat, and common crow. They comprised only 22.1 percent of all birds counted.

A simple index (c) for dominance is given by Odum (1971). The equation is:

$$c = \sum \left(\frac{n_i}{N} \right)^2$$

where n_i = number of birds of each species counted in each region and N = total number of all birds counted in each region. Figure 5 portrays the index of dominance values for each region. The highest value, 0.081, was in Region 6, the metropolitan region. This high value reflects the dominance by several species. North central and northeast Minnesota were characterized by low species dominance values.

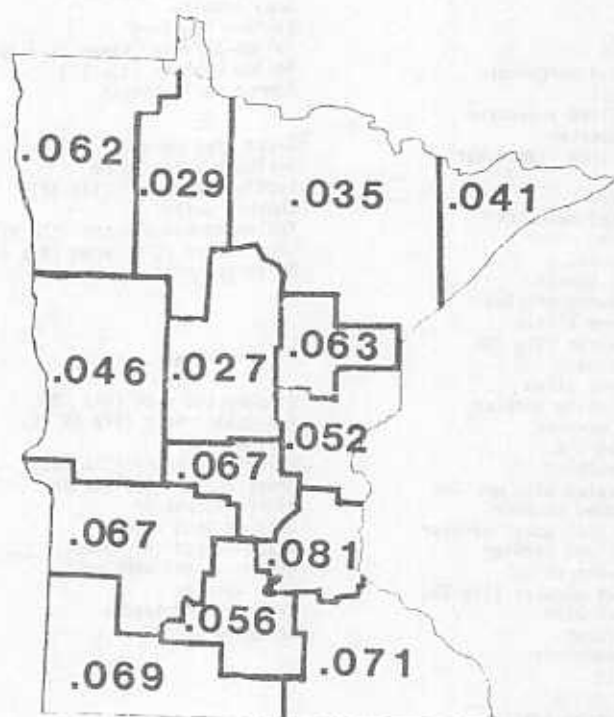


Figure 5. Index of Dominance (c) values for analysis of diversity of Minnesota's avifauna in 14 regions, 1975-1979. Higher values indicate greater dominance by a few species. Lower values indicate greater balance of numbers among species.

Regions in Which Selected Species are Most Abundant

One factor that is apparent from the maps in Appendix I is the region in which a species is most abundant. This has been summarized in Table 9 by region. Some species were deleted from this list when it was apparent that the sample size was too small to distinguish which region had the highest level. Region 2S had only 4 species each which were most abundant, while 33 species reached their highest level of relative abundance in region 2E. Species identified in Table 6 as not being effectively counted by the BBS are not included here.

Table 9. List of regions where selected breeding birds reach their highest level of relative abundance in Minnesota.

1N	2S	3E	4W
Canada goose	Broad-winged hawk	Blue-winged teal	Great egret
Ring-necked duck (tie 3N)	Pileated woodpecker	Spotted sandpiper (tie 3W)	Gray partridge
Red-tailed hawk (tie 3N, 5)	Connecticut warbler (tie 2E)	Belted kingfisher (tie 2W, 5)	Mourning dove
Marsh hawk	Eastern meadowlark	Blue jay	Long-billed marsh wren (tie 3W)
Sandhill crane		Common crow	Brown thrasher
Killdeer		Short-billed marsh wren	
Marbled godwit		Gray catbird	
Wilson's phalarope		Eastern bluebird	
Franklin's gull		Yellow-throated vireo (tie 3W)	
Black-billed cuckoo		Yellow warbler (tie 1E)	
Short-eared owl		Common yellowthroat	
Eastern kingbird			
Bank swallow			
Cliff swallow			
Black-billed magpie			
Warbling vireo			
Bobolink			
American goldfinch			
Savannah sparrow			
Sharp-tailed sparrow			
Lark sparrow			
Clay-colored sparrow			
1S	2E	3W	4S
Pied-billed grebe	Common loon	Great blue heron	Upland sandpiper
Double-crested cormorant	Red-breasted merganser	Northern green heron	Willow flycatcher
Gadwall	Herring gull	Spotted sandpiper (tie 3E)	Orchard oriole
Pintail	Yellow-bellied sapsucker	Chimney swift	Blue grosbeak
Green-winged teal	Downy woodpecker	Yellow-throated vireo (tie 3E)	Dickcissel
American wigeon	Yellow-bellied flycatcher	Long-billed marsh wren (tie 4W)	Grasshopper sparrow
Northern shoveler	Gray jay		
Redhead	Common raven		
Canvasback	Red-breasted nuthatch		
Ruddy duck	Winter wren		
Sora	Hermit thrush		
Yellow-billed cuckoo	Swainson's thrush		
Western kingbird	Golden-crowned kinglet		
Purple martin	Ruby-crowned kinglet		
Yellow-headed blackbird	Solitary vireo (tie 2W)		
Brewer's blackbird	Red-eyed vireo		
1E	2W	3N	5
White pelican	Philadelphia vireo	Ring-necked duck (tie 1N)	Turkey vulture (tie 1E)
American bittern	Black-and-white warbler	Red-tailed hawk (tie 1N, 5)	Red-tailed hawk (tie 1N, 3N)
Lesser scaup	Nashville warbler	Yellow rail	Red-shouldered hawk
Turkey vulture (tie 5)	Northern parula	Hairy woodpecker (tie 2W)	Bobwhite
Common snipe	Magnolia warbler	Great crested flycatcher	Belted kingfisher
Ring-billed gull	Black-throated blue warbler	Alder flycatcher	Red-bellied woodpecker
Black tern	Yellow-rumped warbler	Eastern wood pewee	Rough-winged swallow
Eastern phoebe	Black-throated green warbler	Black-capped chickadee	White-breasted nuthatch
Least flycatcher	Chestnut-sided warbler	Golden-winged warbler	House wren
Tree swallow	Northern waterthrush	Pine warbler	Blue-gray gnatcatcher
Wood thrush	Connecticut warbler (tie 2S)	Rufous-sided towhee	Bell's vireo
Cedar waxwing	Mourning warbler	Chipping sparrow	Blue-winged warbler
Yellow warbler (tie 3E)	Canada warbler		Cardinal
Scarlet tanager	American redstart		Indigo bunting
Rose-breasted grosbeak	Pine siskin		Field sparrow
LeConte's sparrow	Dark-eyed junco		
	White-throated sparrow		
2E	3E	4E	6
Belted kingfisher (tie 3E, 5)	American coot		Black-crowned night heron
Hairy woodpecker (tie 3N)	Rock dove		Mallard
Veery	Common flicker		Wood duck
Solitary vireo (tie 2E)	Red-headed woodpecker		American kestrel
Cape May warbler	Horned lark		Ring-necked pheasant
Blackburnian warbler	Barn swallow		American robin
Bay-breasted warbler	House sparrow		Starling
Ovenbird	Western meadowlark		Red-winged blackbird
Evening grosbeak	Brown-headed cowbird		Common grackle
Purple finch	Vesper sparrow		
Lincoln's sparrow			
Swamp sparrow			
Song sparrow			

Miscellaneous and Accidental Sightings

Some sightings on the BBS require additional interpretation. These sightings fell into four categories: (A) species not currently known to breed in Minnesota, (B) transient, late migrant, or nonbreeding individuals observed outside their regular breeding range, (C) shorebirds in migrant status, and (D) species whose identification is questionable. Bob Janssen, Kim Eckert, and Janet Green were consulted regarding the disposition of these sightings. Table 10 is a summary of these miscellaneous and accidental sightings and the disposition of each. The miscellaneous and accidental sightings in Table 9 are annotated as appropriate in Table 1 and are not included in the maps in Appendix I.

Table 10. Summary of miscellaneous and accidental sightings for BBS routes, 1975-1979.

Species	Number of Individuals	Region	Route	County	Date	Category	Disposition of Sighting
Canada goose	18	2S	22	Carlton	6-27-79	B	Accepted
Green-winged teal	2	2E	31	Cook	6-06-76	B	Accepted
Rough-legged hawk	1	1N	50	Marshall	6-11-76	A	Submitted to MOU for verification
Greater yellowlegs	2	1N	44	Red Lake	7-01-79	C	Accepted
Lesser yellowlegs	1	1N	44	Red Lake	7-01-79	C	Accepted
Ring-billed gull	2	4W	21	Swift	6-18-78	B	Accepted
Caspian tern	1	2S	24	Aitkin	6-25-79	A	Accepted
Band-tailed pigeon	1	3W	18	Stearns	6-23-75	A	Verified by MOU
Willow flycatcher	3	2W	37	Itasca	6-16-79	D	Probably alder f.c. Placed in <i>Empidonax</i> spp. category
Alder flycatcher	1	4W	17	Meeker	6-20-76	D	Probably willow flycatchers.
Alder flycatcher	1	3W	18	Stearns	6-08-78	D	Placed in <i>Empidonax</i> spp. category.
Alder flycatcher	2	3W	18	Stearns	6-05-79	D	Accepted
Alder flycatcher	2	5	1	Houston	6-14-75	D	Changed to Unident. warbler
Philadelphia vireo	1	4W	20	Swift	6-10-79	B	Changed to Brewer's blackbird
Cerulean warbler	1	1E	40	Beltrami	7-07-79	D	Changed to Unident. sparrow
Rusty blackbird	36	1E	47	Lake of Woods	6-07-78	D	Accepted
Tree sparrow	1	1E	47	Lake of Woods	7-05-79	D	Accepted
Purple finch	1	4E	10	Nicollet	6-21-78	B	Accepted
Purple finch	1	4S	6	Rock	6-26-78	B	Accepted

Categories

- A: Species not known to currently breed in Minnesota.
- B: Transient, late migrant, or nonbreeding individuals observed outside their regular breeding range.
- C: Shorebirds in migrant status.
- D: Species whose identification is questionable.

CONCLUSIONS

The U.S. Fish and Wildlife Service Breeding Bird Survey is an effective technique for assessing population trends and distribution of many species of Minnesota birds. These data can also be useful for drawing general conclusions about apparent abundance among species and species diversity of different regions if the limitations of the survey are recognized. This analysis will be repeated at five year intervals. Older BBS records from 1967 to 1974 will also be utilized as time allows.

Information from this report has been utilized during the preparation of a new publication of "The Uncommon Ones (Moyle 1980)". This publication discusses threatened and endangered species in Minnesota as well as priority species.

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Josephine G. Blanich	Lee H. Grim	Donald G. Mahle
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Doug D. Campbell	Edmund A. Hibbard	Gerald J. Niemi
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Marjorie M. Carr	Bruce A. Hitman	Gary L. Otnes
Bruce S. Davis	Pershing B. Hofslund	Harold T. Peters
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Roger Eliason	Oscar W. Johnson	Terry L. Savaloja
Adela A. Elwell	Frank F. Kelley	John L. Schladweiler
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Jerome J. Gresser		

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- Janssen, B. 1979, Minnesota breeding bird surveys: A Summary. Loon 51(2): 64-70.
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Appendix I. Distribution and Relative

Abundance of Breeding Birds, 1975 - 1979.

**All numbers refer to "Birds
Counted per 100 Miles of Route"**

NONGAME BIRDS



Common Loon



Western Grebe



Pied-billed Grebe



White Pelican



Double-crested Cormorant



Great Blue Heron



Northern Green Heron



Great Egret



Black-crowned Night Heron



Least Bittern



American Bittern



Turkey Vulture



Sharp-shinned Hawk



Cooper's Hawk



Red-tailed Hawk



Red-shouldered Hawk



Broad-winged Hawk



Swainson's Hawk



Bald Eagle



Marsh Hawk



Osprey



American Kestrel



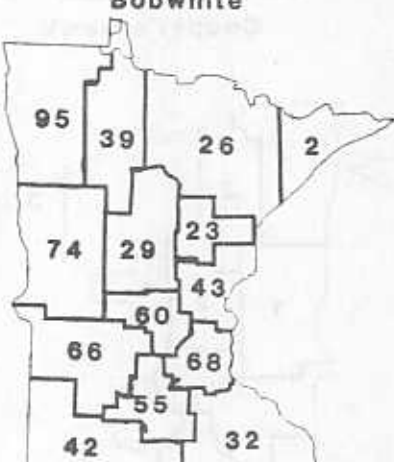
Bobwhite



Sandhill Crane



Yellow Rail



Killdeer



Spotted Sandpiper



Marbled Godwit



Upland Sandpiper



Wilson's Phalarope



Herring Gull



Ring-billed Gull



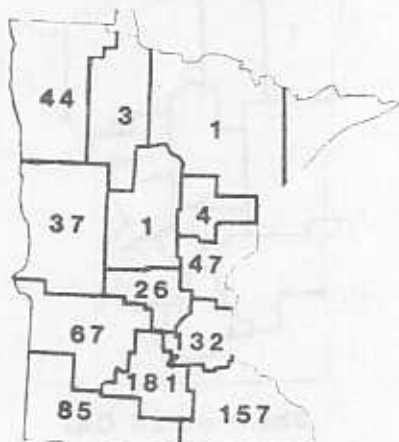
Franklin's Gull



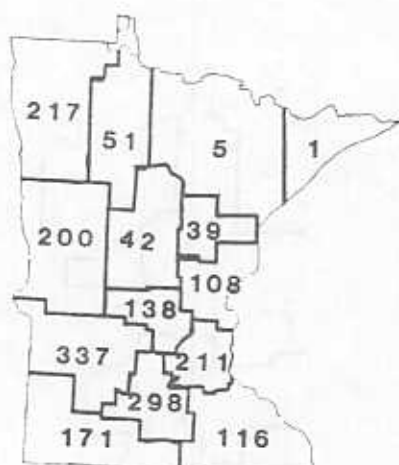
Forster's Tern



Black Tern



Rock Dove



Mourning Dove



Yellow-billed Cuckoo



Black-billed Cuckoo



Screech Owl



Great Horned Owl



Barred Owl



Short-eared Owl



Saw-whet Owl



Whip-poor-will



Common Nighthawk



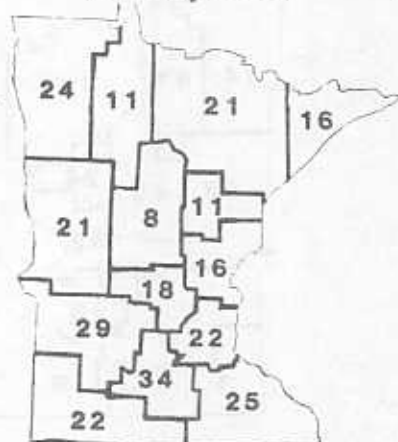
Chimney Swift



Ruby-throated Hummingbird



Belted Kingfisher



Common Flicker



Pileated Woodpecker



Red-bellied Woodpecker



Red-headed Woodpecker



Yellow-bellied Sapsucker



Hairy Woodpecker



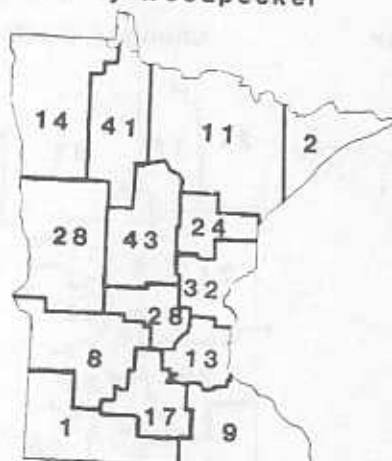
Downy Woodpecker



Eastern Kingbird



Western Kingbird



Great Crested Flycatcher



Eastern Phoebe



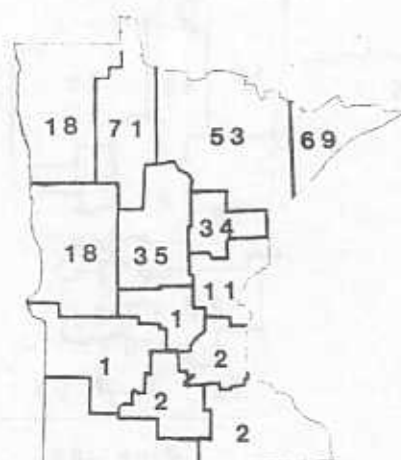
Yellow-bellied Flycatcher



Alder Flycatcher



Willow Flycatcher



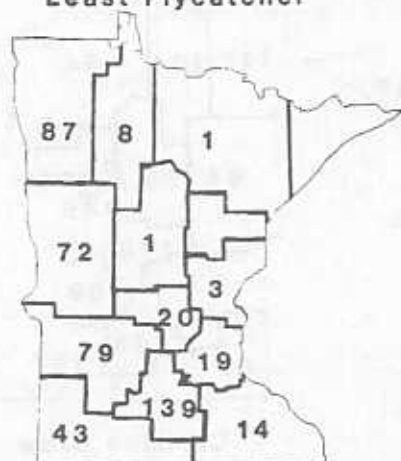
Least Flycatcher



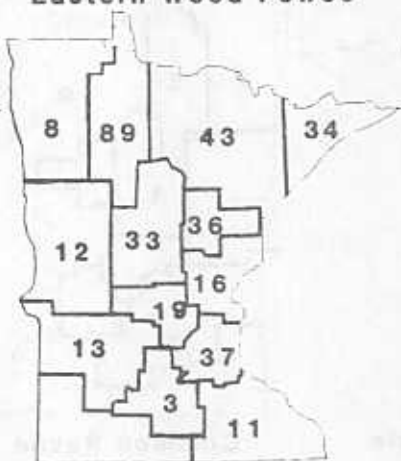
Eastern Wood Pewee



Olive-sided Flycatcher



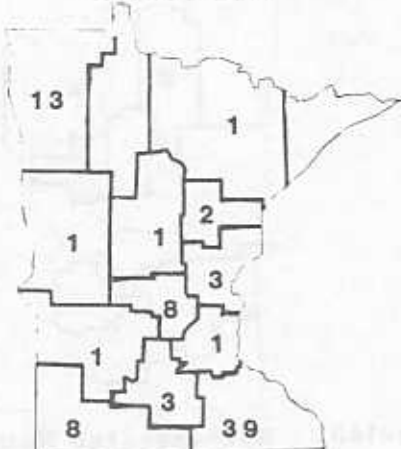
Horned Lark



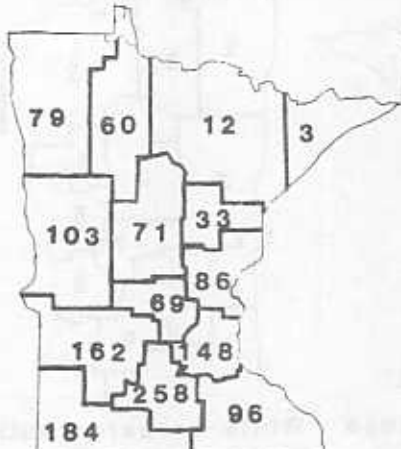
Tree Swallow



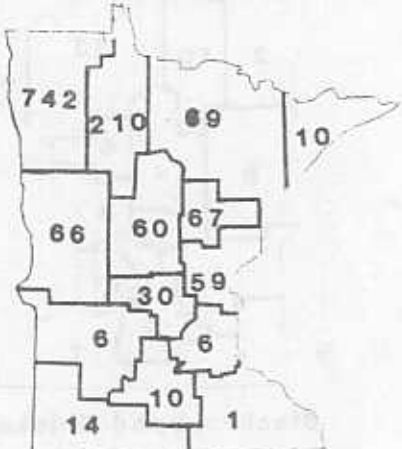
Bank Swallow



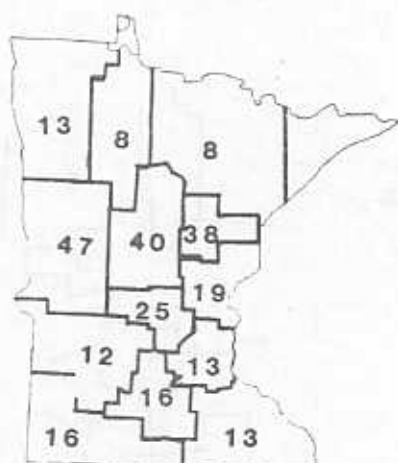
Rough-winged Swallow



Barn Swallow



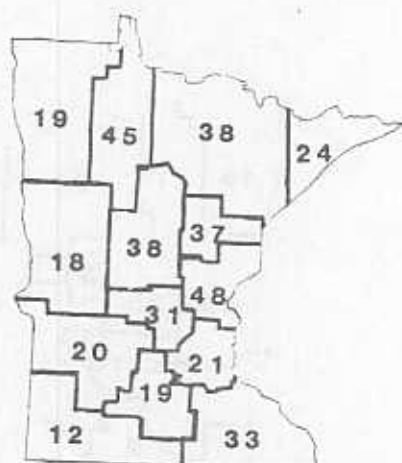
Cliff Swallow



Purple Martin



Gray Jay



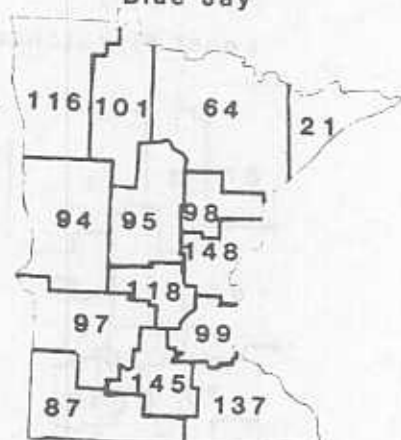
Blue Jay



Black-billed Magpie



Common Raven



Common Crow



Black-capped Chickadee



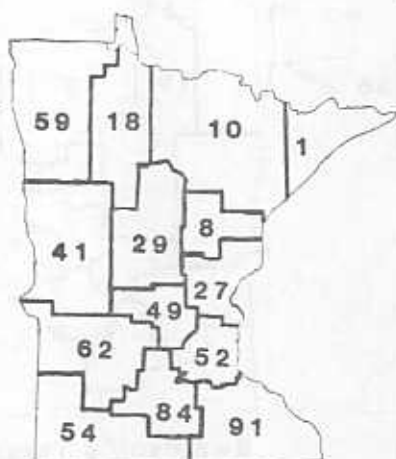
White-breasted Nuthatch



Red-breasted Nuthatch



Brown Creeper



House Wren



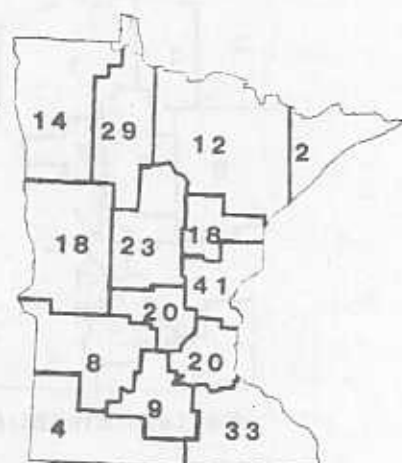
Winter Wren



Long-billed Marsh Wren



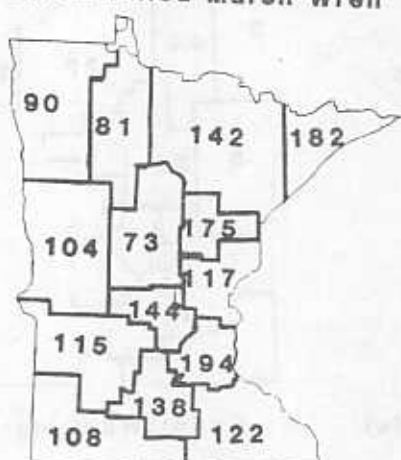
Short-billed Marsh Wren



Gray Catbird



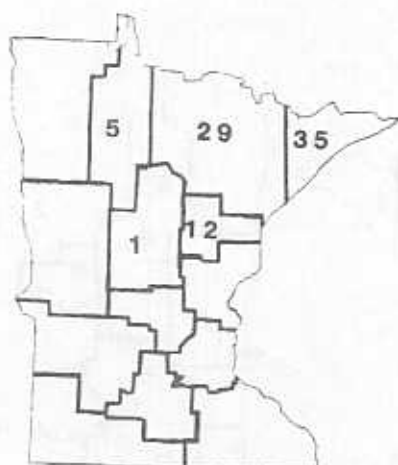
Brown Thrasher



American Robin



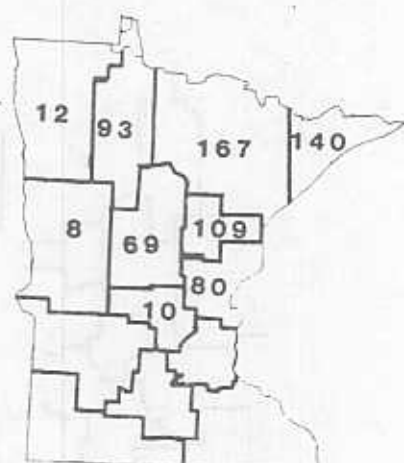
Wood Thrush



Hermit Thrush



Swainson's Thrush



Veery



Eastern Bluebird



Blue-gray Gnatcatcher



Golden-crowned Kinglet



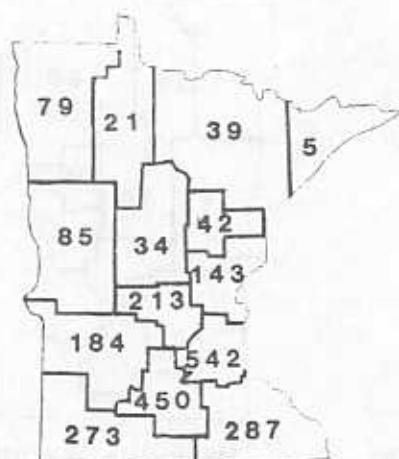
Ruby-crowned Kinglet



Cedar Waxwing



Loggerhead Shrike



Starling



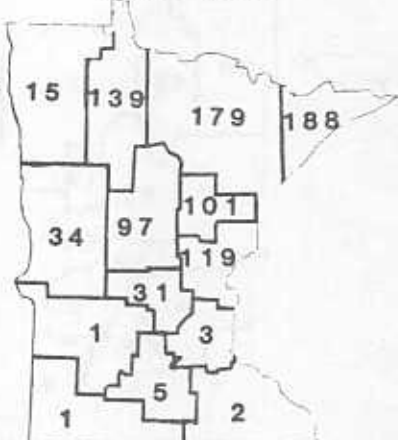
Bell's Vireo



Yellow-throated Vireo



Solitary Vireo



Red-eyed Vireo



Philadelphia Vireo



Warbling Vireo



Black-and-white Warbler



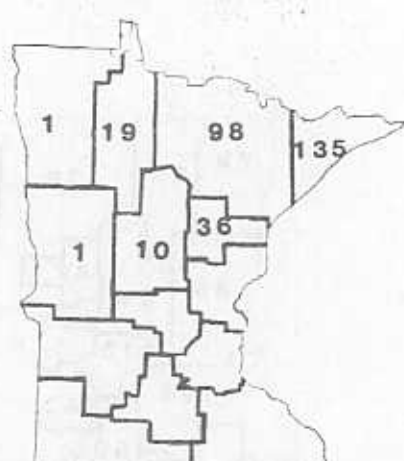
Golden-winged Warbler



Blue-winged Warbler



Tennessee Warbler



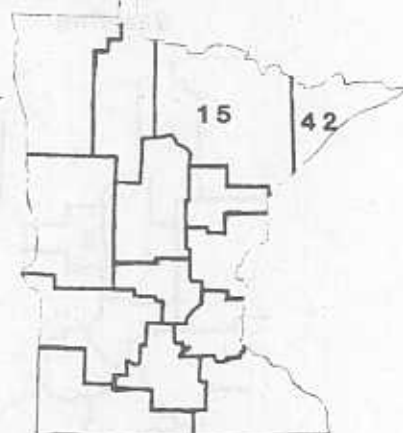
Nashville Warbler



Northern Parula



Yellow Warbler



Magnolia Warbler



Cape May Warbler



Black-throated Blue Warbler



Yellow-rumped Warbler



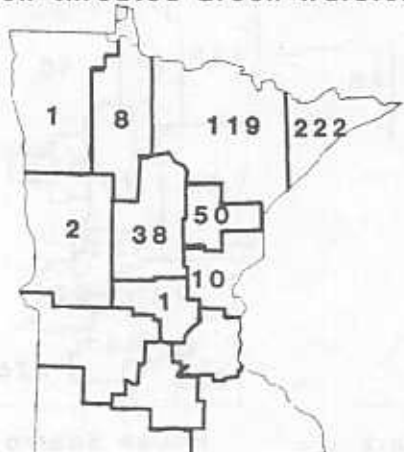
Black-throated Green Warbler



Cerulean Warbler



Blackburnian Warbler



Chestnut-sided Warbler



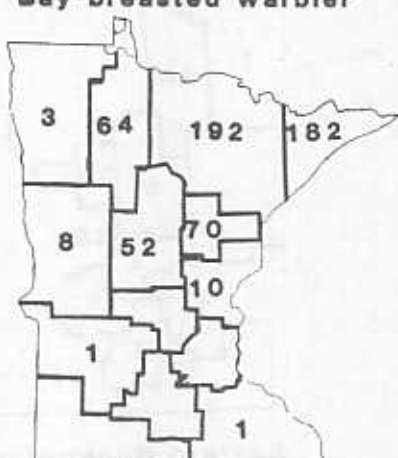
Bay-breasted Warbler



Pine Warbler



Palm Warbler



Ovenbird



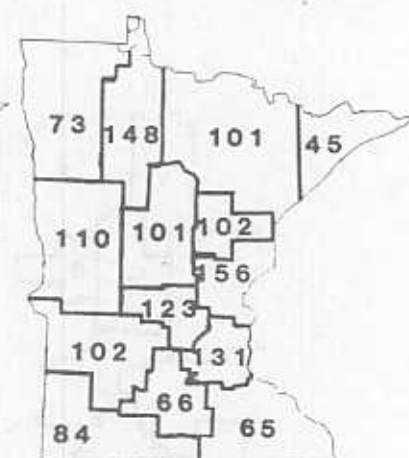
Northern Waterthrush



Connecticut Warbler



Mourning Warbler



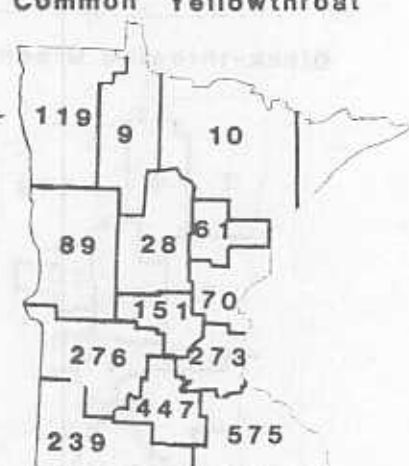
Common Yellowthroat



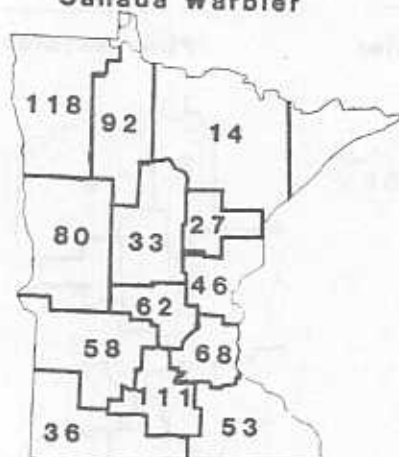
Canada Warbler



American Redstart



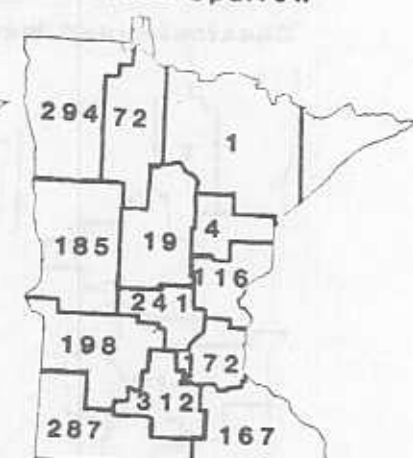
House Sparrow



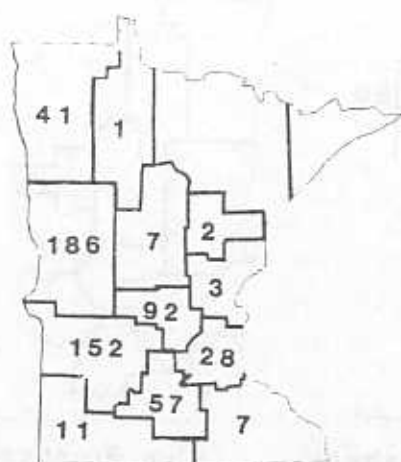
Bobolink



Eastern Meadowlark



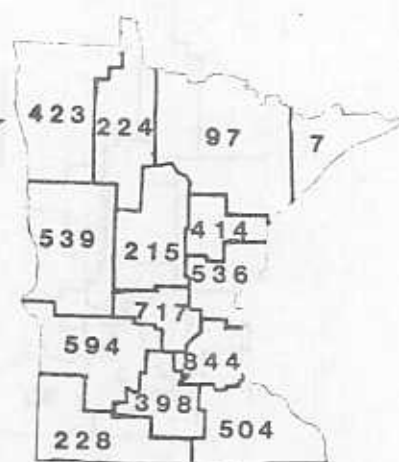
Western Meadowlark



Yellow-headed Blackbird



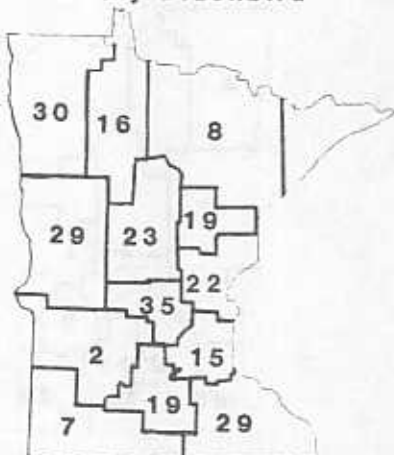
Rusty Blackbird



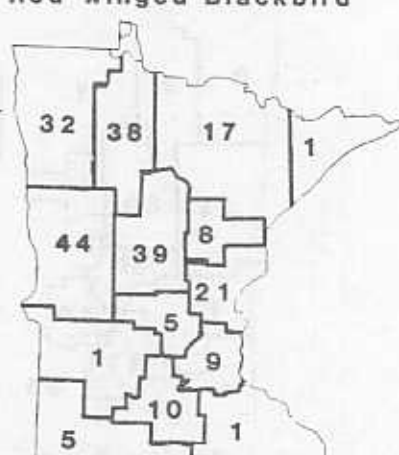
Red-winged Blackbird



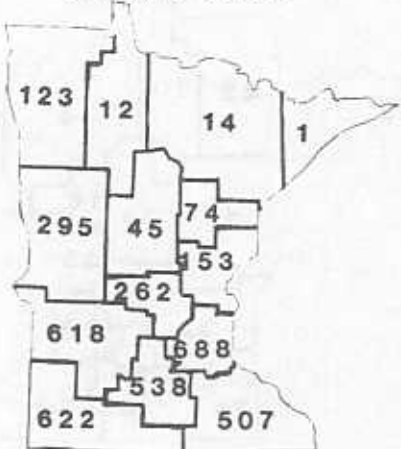
Orchard Oriole



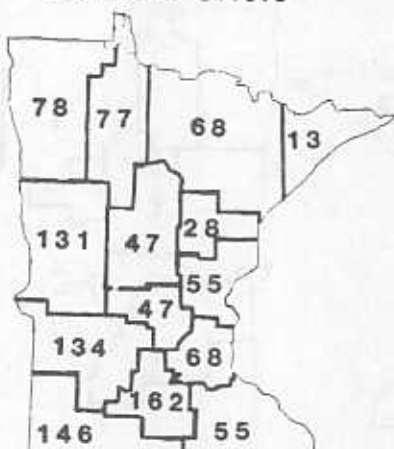
Northern Oriole



Brewer's Blackbird



Common Grackle



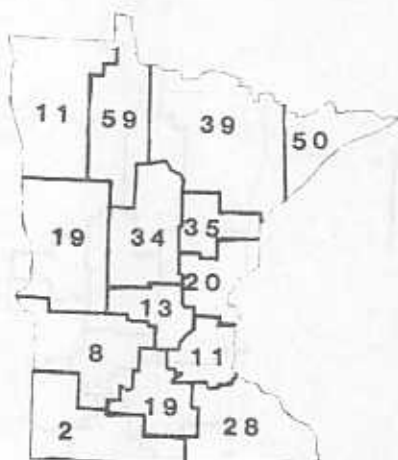
Brown-headed Cowbird



Scarlet Tanager



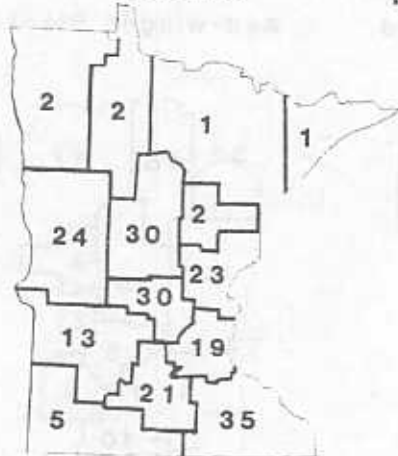
Cardinal



Rose-breasted Grosbeak



Blue Grosbeak



Indigo Bunting



Dickcissel



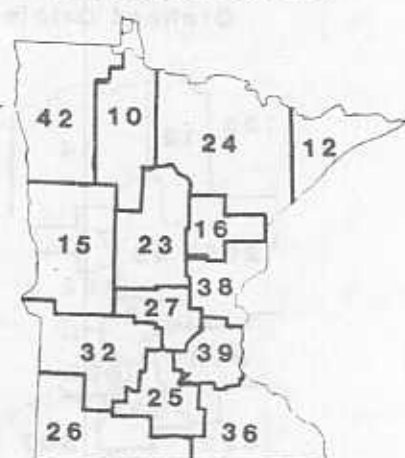
Evening Grosbeak



Purple Finch



Pine Siskin



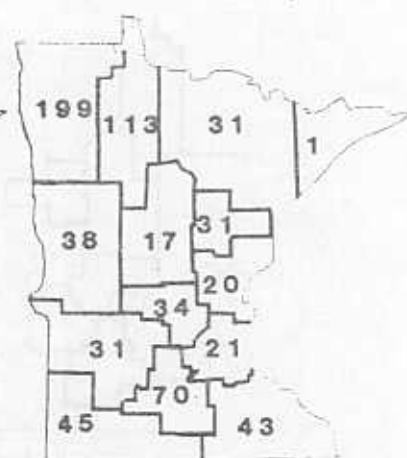
American Goldfinch



Red Crossbill



Rufous-sided Towhee



Savannah Sparrow



Grasshopper Sparrow



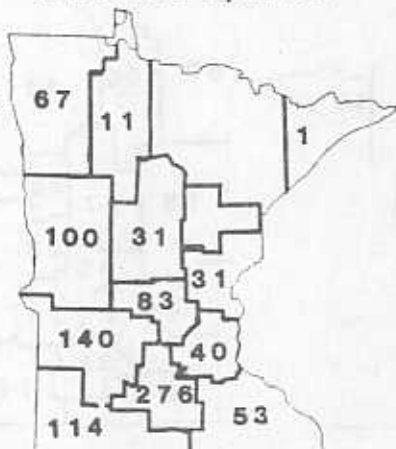
LeConte's Sparrow



Henslow's Sparrow



Sharp-tailed Sparrow



Vesper Sparrow



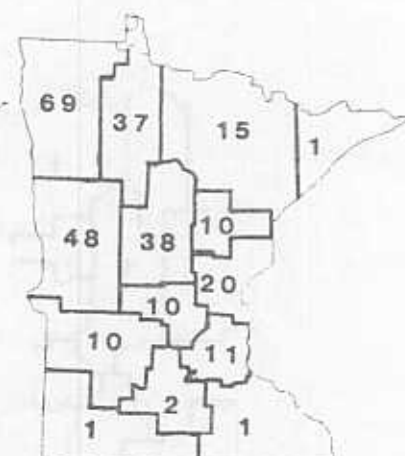
Lark Sparrow



Dark-eyed Junco



Chipping Sparrow



Clay-colored Sparrow



Field Sparrow



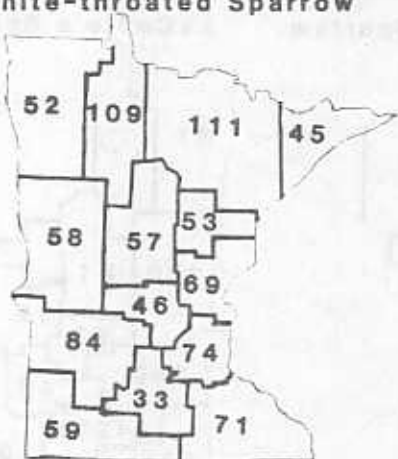
White-throated Sparrow



Lincoln's Sparrow



Swamp Sparrow

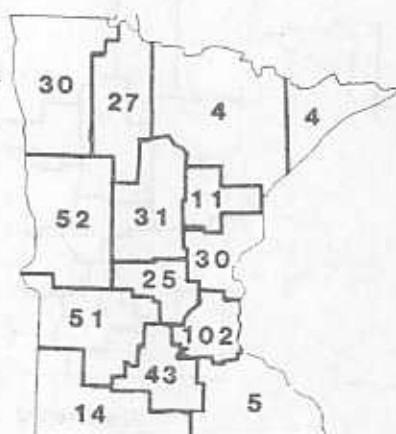


Song Sparrow

GAME BIRDS



Canada Goose



Mallard



Black Duck



Gadwall



Blue-winged Teal



American Wigeon



Pintail



Green-winged Teal



Northern Shoveler



Wood Duck



Redhead



Ring-necked Duck



Canvasback



Lesser Scaup



Common Goldeneye



Ruddy Duck



Hooded Merganser



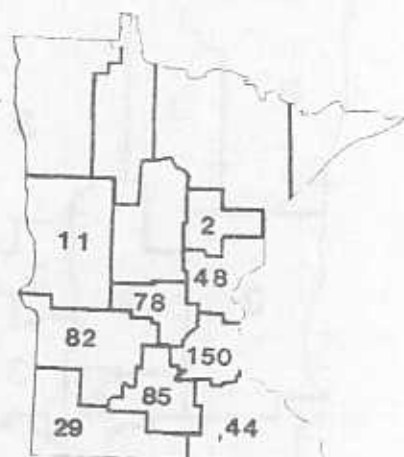
Red-breasted Merganser



Ruffed Grouse



Sharp-tailed Grouse



Ring-necked Pheasant



Gray Partridge



American Coot



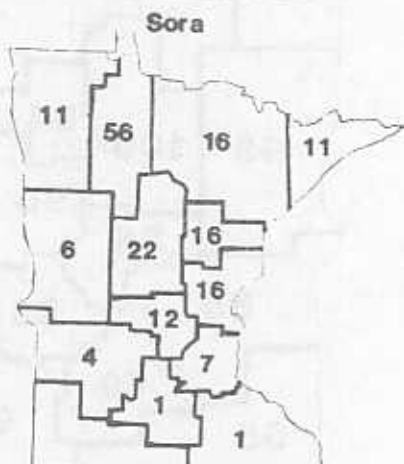
Sora



Virginia Rail



American Woodcock

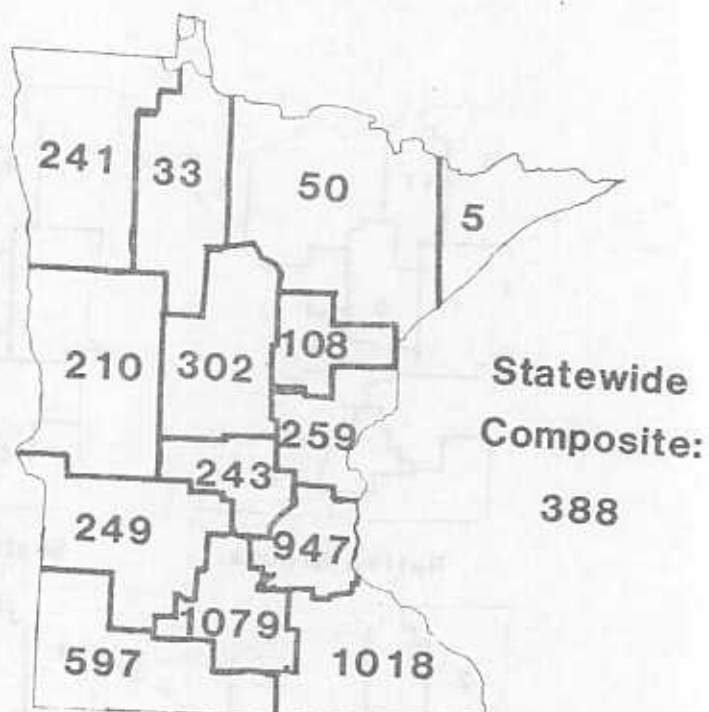


Common Snipe

summaries for Minnesota breeding birds, 1975-79.

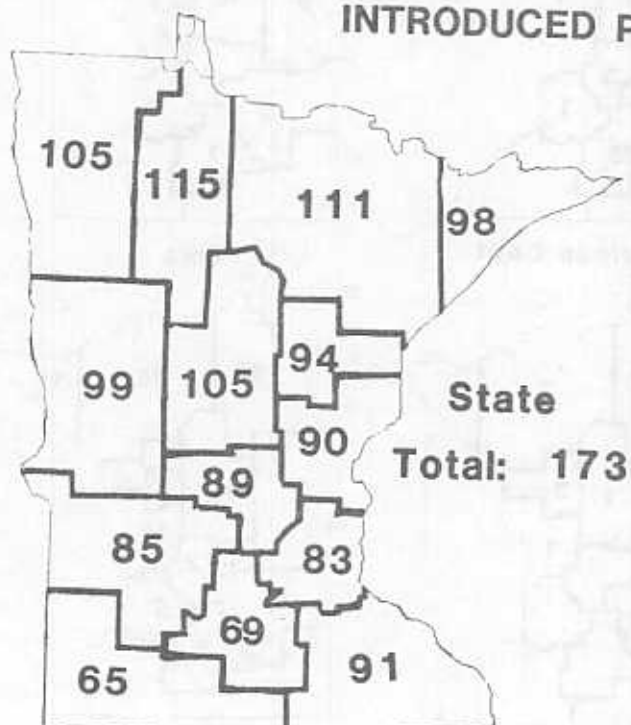


Total Species

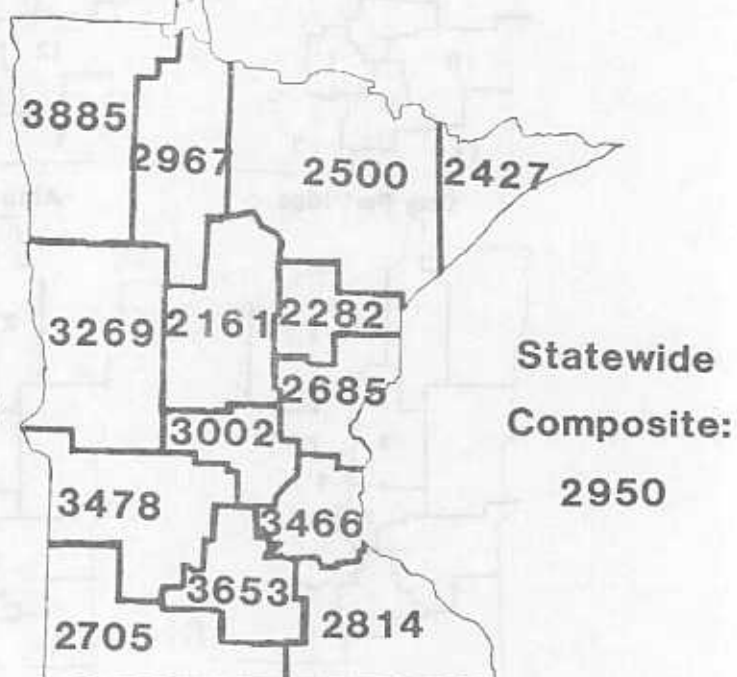


Birds/100 miles

INTRODUCED PEST BIRDS

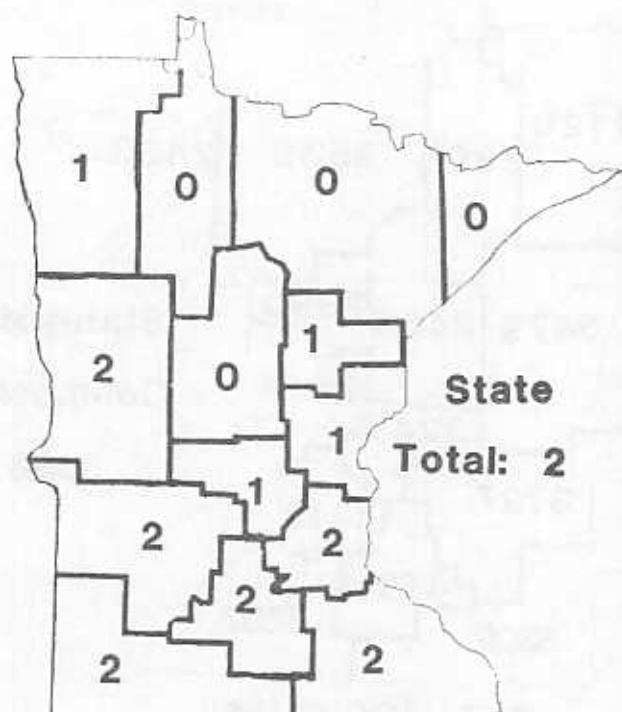


Total Species



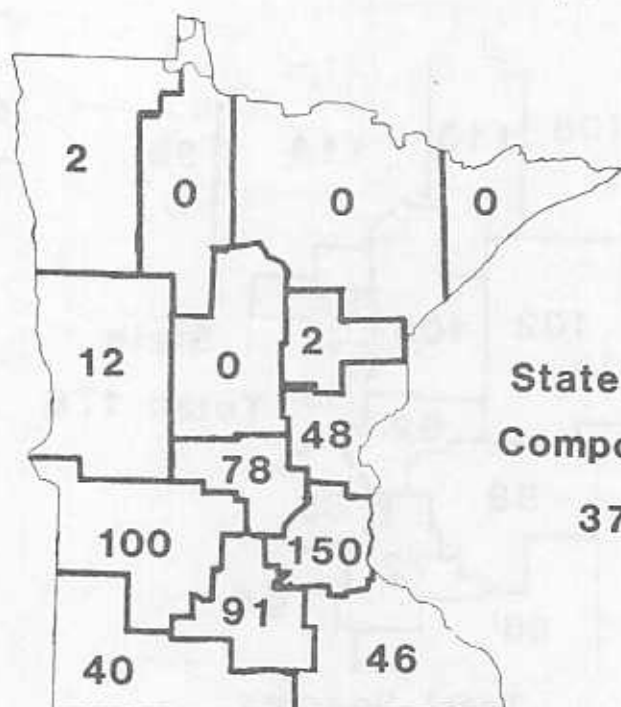
Birds/100 miles

NATIVE NONGAME BIRDS



State
Total: 2

Total Species



Statewide
Composite:
37

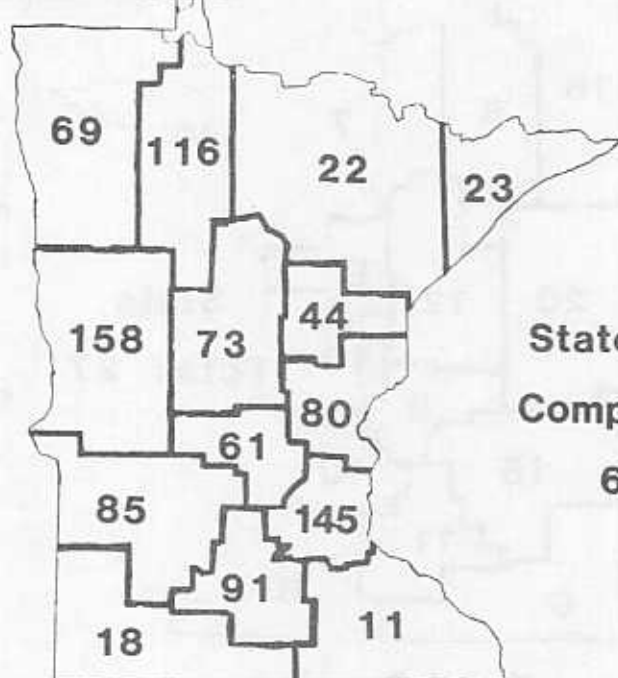
Birds/100 miles

INTRODUCED GAME BIRDS



State
Total: 25

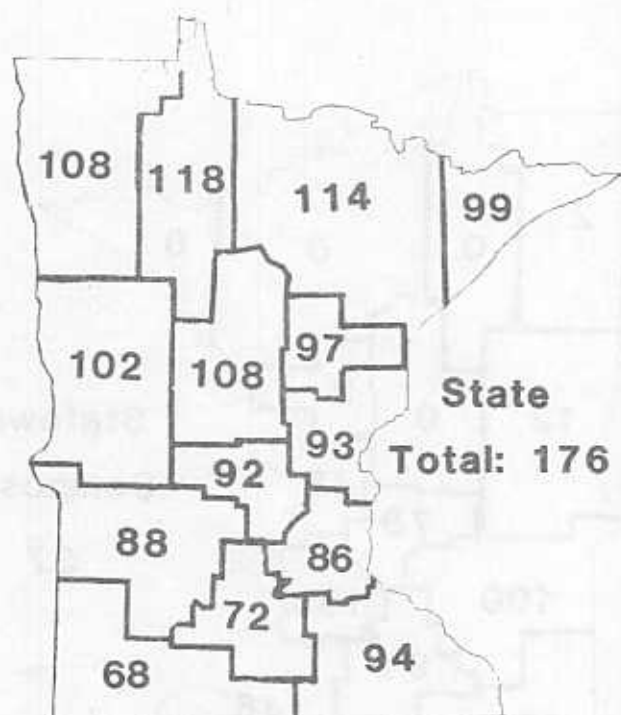
Total Species



Statewide
Composite:
63

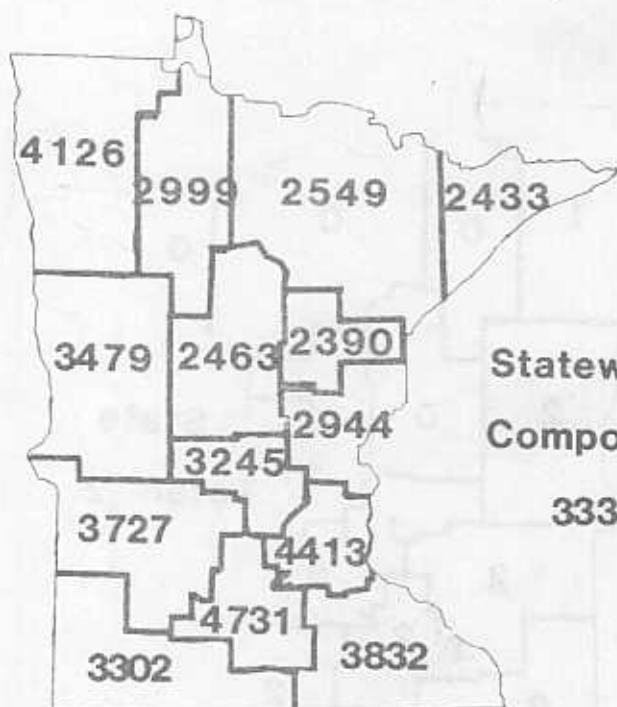
Birds/100 miles

NATIVE GAME BIRDS



State
Total: 176

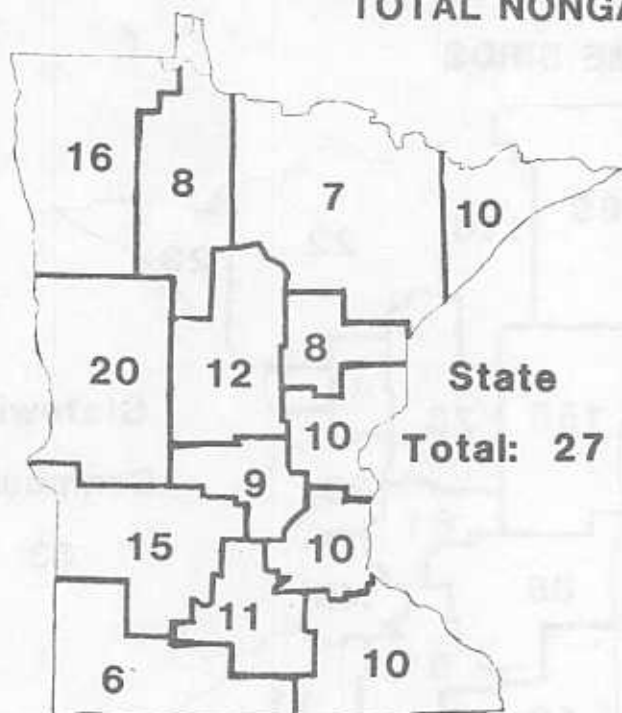
Total Species



Statewide
Composite:
3338

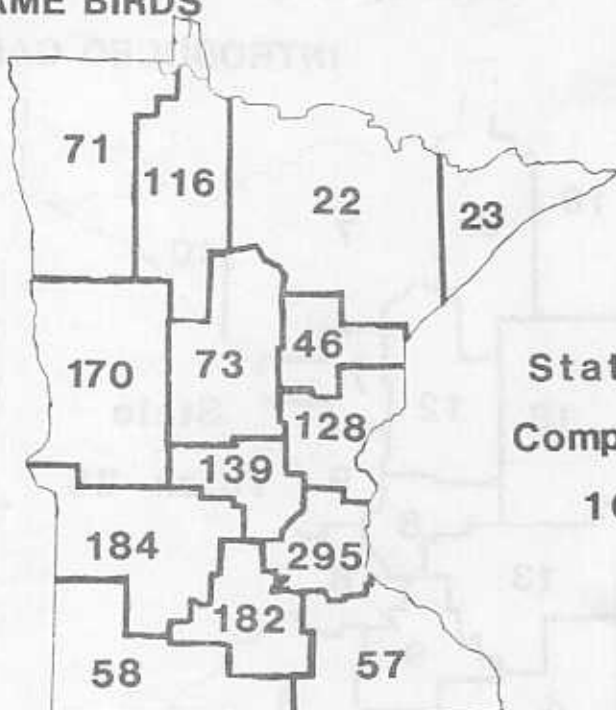
Birds/100 miles

TOTAL NONGAME BIRDS



State
Total: 27

Total Species



Statewide
Composite:
100

Birds/100 miles

TOTAL GAME BIRDS