

Winter Population Trends in the Red-shouldered Hawk

by Woodward H. Brown*

*“a decrease in the . . . winter populations
in all states except California,
where there has been no significant change,
and West Virginia, where there has been an increase”*

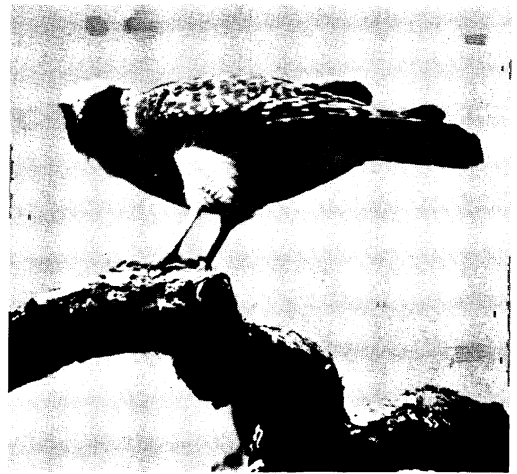
The Red-shouldered Hawk (*Buteo lineatus*) was a common breeding bird in central and southern Iowa in the early 1940's, but in the ensuing years a decrease in its numbers became apparent. In addition, reports in Audubon Field Notes from various sections remarked upon the increasing scarcity of this species. Peterson (in Peregrine Falcon Populations, J. J. Hickey, ed., U. of Wisc. Press, 1969) said “The Red-shouldered is the one to watch. In New England it has dropped precipitously in numbers.” In order to learn what population changes have taken place, the Christmas Count reports for the years 1950-1969 in Audubon Field Notes have been analyzed.

METHODS

With the year-to-year growth in the number of counts analyzed from 360 to 1950 to 652 in 1969, the use of raw figures as a measure of the population would be meaningless. Accordingly, the number of birds seen has been shown as a function of the number of party-miles traveled by the count participants. The weather on count days was assumed to be a factor because of its effect upon both the visibility and the behavior of the hawks, and the data have been divided to show the results on fair or “clear” days, and on dark, rainy, or “cloudy” days.

The figures have been summarized according to the territories of three of the five races of *B. lineatus*. Table I reflects the winter populations in the following 25 northern and eastern states which are the territory of the

partially migratory *B. l. lineatus*: Arkansas, Connecticut, Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, Tenn., Virginia, W. Virginia, and Wis., plus the District of Columbia. Table II shows the corresponding figures in the seven southern states: Alabama, Florida, Georgia, Louisiana,



Photo; Duryea Morton from N.A.S.

Mississippi, South Carolina, and Texas which are the territory of *B. l. alleni*, and where wintering *B. l. lineatus* may occur. The totals for Texas and Florida also would include

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any *B. l. texanus* and *B. l. extimus* found. The figures for California, which is the territory of *B. l. elegans*, are shown in Table III. As birds are not limited by the boundaries of political subdivisions, any separation of territories must be only an approximation.

POPULATION CHANGES

The numbers of Red-shouldered Hawks found in the northern and eastern states are shown in Table I to have decreased markedly from 1.4 per hundred party-miles on clear days in 1950 to 0.4 in 1969. The corresponding figures for cloudy days also show a steady decrease from 0.9 to 0.3. Fig. 1 shows the five-year moving averages of numbers found per hundred party-miles. Population trends for individual states in this group have been determined by comparing the results in the 1950-54 period with the corresponding figures for 1965-69.

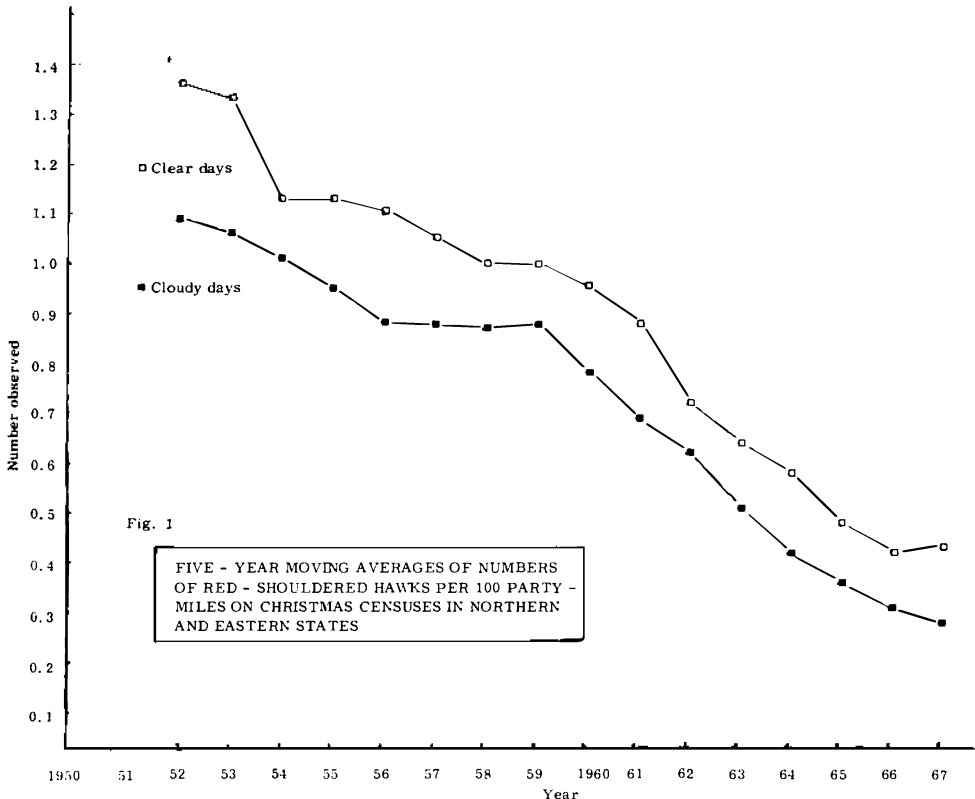
Rhode Island, with 95 per cent, shows the highest rate of loss. With an average of slightly better than 1 bird per 100 miles in the 5 earlier years, only 1 was recorded in 4200 miles in the latest 5 years. The rates of de-

crease for the other states are:

- 85-94% Connecticut, Illinois, New York, Wisconsin, Iowa.
- 75-84% Indiana, Kentucky, Massachusetts, Michigan, New Jersey, Oklahoma, Pennsylvania, Tennessee.
- 65-74% Arkansas, Dist. of Columbia, North Carolina, Ohio.
- 55-64% Delaware
- 45-54% Maryland
- 35-44% Virginia

Figures for Missouri are not comparable, and the numbers seen in Kansas, Minnesota, and Nebraska were so few that comparisons are unimportant. The rate of decrease follows no geographic pattern, although the larger losses have been in the northern states.

Surprisingly, West Virginia, instead of showing a decrease, recorded a 22 per cent increase, which warrants analysis. In the two 5-year periods, reports were received from a total of 14 areas, 4 of these reporting only in the earlier period, and 5 only in the later period, with 5 reporting in both. Not only did the 5 stations reporting only in the later period have higher populations than the 4



reporting only in the earlier period, but the 5 reporting in both periods had larger populations in the late 60's than in the early 50's.

The numbers found in the southern states are shown in Table II. Here the decrease is from 8.0 per 100 party-miles on clear days in 1950, to 3.9 in 1969, and the decrease on cloudy days was from 3.8 to 2.2. Fig. II shows the 5-year moving averages of numbers per 100 party-miles. The percentages of loss by states were: Mississippi, 89%; Alabama, 73%; Texas, 54%; South Carolina, 39%; Florida, 42%; Georgia, 34%, and Louisiana, 27%. Thus the three most easterly states and Louisiana had the smallest rates of loss.

WEATHER EFFECT

In the northern and eastern states the party-miles traveled on clear days were 50.6 per cent of the total, but 58.7 per cent of all Red-shouldered Hawks seen were observed on these same days. In the southern states, 61.0 per cent of the mileage was traveled on clear

days, and 69.3 per cent of the total hawks were counted on these days. However, on the California counts, 73.6 per cent of the mileage was covered on clear days, but produced only 74.4 per cent of the birds seen.

There is considerable fluctuation in the year-to-year comparisons of numbers seen on clear and cloudy days because of the uneven distribution of the hawk populations in some states. There are several where a large percentage of the hawks are found in one or two areas, and the clear- and cloudy-day totals are greatly affected by the type of weather encountered on count days in these few areas.

SUMMARY

Analysis of nearly 10,000 Christmas Count reports in Audubon Field Notes for the years 1950-69 shows a decrease in the Red-shouldered Hawk winter populations in all states except California, where there has been no significant change, and West Virginia, where there has been an increase in recent years.

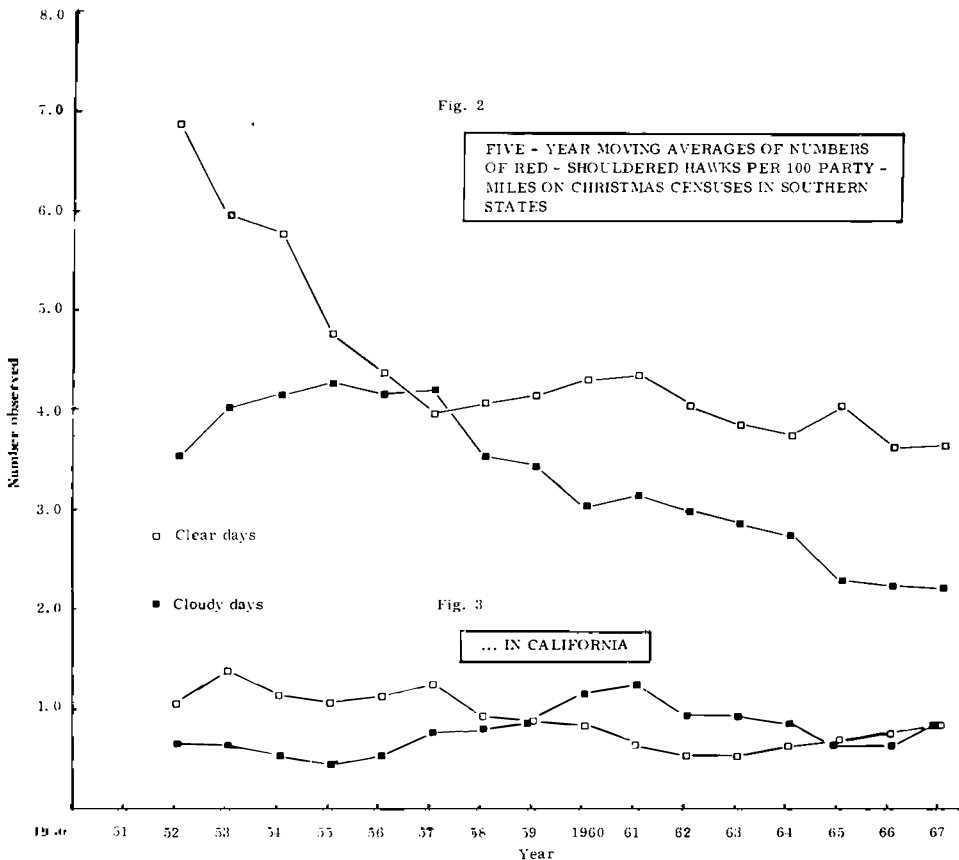


Table I
Red-shouldered Hawks Reported On Christmas Counts
Northern and eastern states

Year	Number of Reports	Party-miles*		Number of Hawks		No. per 100 mi.	
		Clear	Cloudy	Clear	Cloudy	Clear	Cloudy
1950	287	192	112	271	105	1.4	0.9
1951	281	126	178	226	177	1.8	1.0
1952	284	184	175	174	241	1.0	1.4
1953	337	315	126	368	163	1.2	1.3
1954	327	299	186	437	155	1.5	.8
1955	318	317	170	398	139	1.3	.8
1956	334	172	309	137	229	.8	.7
1957	348	381	174	367	186	1.0	1.1
1958	355	378	183	410	168	1.1	.9
1959	357	149	434	172	359	1.2	.8
1960	367	374	242	377	196	1.0	.8
1961	384	405	330	319	255	.8	.8
1962	389	296	439	216	247	.7	.6
1963	398	564	214	401	108	.7	.5
1964	420	271	564	95	263	.4	.5
1965	460	452	527	274	123	.6	.2
1966	459	530	493	262	158	.5	.3
1967	466	607	518	156	145	.3	.3
1968	475	346	722	138	181	.4	.3
1969	485	535	638	198	190	.4	.3
Total	7,531	6,893	6,734	5,396	3,788		

* 00 omitted

Table II
Red-shouldered Hawks Reported On Christmas Counts
Southern states

Year	Number of Reports	Party-miles*		Number of Hawks		No. per 100 mi.	
		Clear	Cloudy	Clear	Cloudy	Clear	Cloudy
1950	53	28	13	225	49	8.0	3.8
1951	49	35	13	175	38	5.0	2.9
1952	55	31	29	233	141	7.5	4.9
1953	60	59	17	361	40	6.1	2.4
1954	61	34	41	263	158	7.7	3.9
1955	67	53	34	180	206	3.4	6.1
1956	63	76	19	295	71	3.9	3.7
1957	77	85	32	220	168	2.6	5.3
1958	74	53	66	224	185	4.2	2.8
1959	84	74	75	400	238	5.4	3.2
1960	90	80	84	348	235	4.4	2.8
1961	90	124	28	521	85	4.2	3.0
1962	85	103	64	340	220	3.3	3.4
1963	89	140	48	641	159	4.6	3.3
1964	100	138	83	528	196	3.8	2.4
1965	110	124	92	429	210	3.5	2.3
1966	123	152	114	552	211	3.6	1.9
1967	117	138	120	662	203	4.8	1.7
1968	113	169	100	417	314	2.5	3.1
1969	120	161	115	625	253	3.9	2.2
Total	1,680	1,857	1,187	7,639	3,380		

* 00 omitted

Table III
Red-shouldered Hawks Reported On Christmas Counts
California

Year	Number of Reports	Party-miles*		Number of Hawks		No. per 100 mi.	
		Clear	Cloudy	Clear	Cloudy	Clear	Cloudy
1950	20	20	2	11	1	0.6	0.5
1951	23	9	23	16	19	1.8	.8
1952	27	15	11	14	11	.9	1.0
1953	27	34	6	37	—	1.1	—
1954	24	39	4	36	4	.9	1.0
1955	22	16	21	33	8	2.1	.4
1956	29	45	3	30	1	.7	.3
1957	30	32	21	21	12	.7	.6
1958	29	31	22	42	8	1.4	.4
1959	33	40	4	55	9	1.4	2.3
1960	36	55	13	28	6	.5	.5
1961	38	41	22	20	17	.5	.8
1962	37	66	10	31	17	.5	1.7
1963	36	54	26	27	27	.5	1.0
1964	34	29	58	19	43	.7	.7
1965	42	86	20	40	7	.5	.4
1966	42	99	16	104	10	1.1	.6
1967	45	103	25	86	8	.8	.3
1968	46	94	36	87	41	.9	1.1
1969	47	115	24	114	44	1.0	1.8
Total	667	1,023	367	851	293		

* 00 omitted

The anticipated relationship between the type of weather experienced on count days and the number of hawks seen was evident in the states other than California, where the weather appeared to have little effect upon the count totals.

It was hoped this analysis would show when the population decline started, but this has not been the case. However, working backward from the 1950 counts the coverage becomes progressively thinner, and the descriptions of the counts showing weather, time in the field, and mileage become more and more imprecise or are lacking entirely. For this reason the study has been limited to the past 20 years.

Dr. Owen Davies, of Lakewood, O., and others have called our attention to the serious error in calculating party hours for Christmas Bird Counts made by a number of compilers for last year's Count. Since most parties work only during daylight hours (no more than 10 or 11 hours), an 8-party Count cannot amass a total of 152 hours, nor can a 10-party Count total 180 party-hours, as reported. This year

The weaknesses of Christmas Counts as population indices are well known; Stewart (Wilson Bull. 66 (3): 184-195) enumerates some of these, and nesting surveys or summer counts would be far more valuable. Unfortunately, these are not available. No attempt is made here to explain these trends, and it is hoped future field studies will be made to provide the answers.

ACKNOWLEDGMENTS.

I am greatly indebted to Richard R. Graber for his helpful suggestions regarding this study, and to Joseph K. Brown for making the graphs.

Counts which report party-hour totals more than ten times the number of parties will be questioned. Accuracy in this detail is essential, since winter range mapping abundance scales are keyed to this statistic. Actual hours afield and observing by each party should be accurately calculated and Count party-hour totals carefully checked.