

TRENDS IN THE NUMBER OF DIURNAL RAPTORS SEEN ON RECENT NORTH AND SOUTH CAROLINA CHRISTMAS BIRD COUNTS

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Abstract. Analysis of 90 Christmas bird counts for the years 1971-1976 reveals a substantial increase in the number of diurnal raptors seen in the Carolinas.

Recent declines in East Coast winter populations of several raptor species, including Red-shouldered Hawks (Brown 1971) and Peregrine Falcons (Hickey 1969), are well documented. In an effort to monitor recent populations of diurnal raptors wintering in the Carolinas, I analyzed data from 66 North Carolina and 24 South Carolina Christmas bird counts conducted during the winters of 1971-1972 through 1976-1977.

METHODS

My analysis is limited to those counts that were initiated at least 1 year prior to the first count analyzed and that were continuous in operation throughout the period surveyed. Fifteen Christmas bird count locations (11 in North Carolina; 4 in South Carolina) met these criteria. Although the coastal plain and piedmont are well represented by a number of counts, only one count location from the mountain region qualified (Fig. 1). The relative population index (Table 1) is based on the number of individuals of each species of diurnal raptor seen per 100 party-miles traveled for each of the winters from 1971-1972 through 1976-1977.

RESULTS

During the six winters surveyed 5,180 individuals of 15 Falconiform species were seen during 21,626 party-miles of travel. A species breakdown is given in Table 1. The most frequently seen species was the American Kestrel, followed by the Red-tailed Hawk, Turkey Vulture, Marsh Hawk, Black Vulture, Red-shouldered Hawk, Sharp-shinned Hawk, Cooper's Hawk, and Merlin. Each of these species exhibited an increase in the number of individuals seen per 100 party-miles traveled during the survey period. The remaining six species were seen infrequently (less than one bird per 1000 party-miles traveled) and sporadically throughout the survey period. Overall, the number of diurnal raptors seen increased steadily, with the exception of the winter of 1975-1976, throughout the early and middle 1970s. By 1976-1977 the number of individuals seen per 100 party-miles had increased 74% over the 1971-1972 level (Fig. 2).

DISCUSSION

One possible explanation for the increase in the number of raptors seen is that there were more observers per party in later years (LeGrand 1978). This does not appear to be the case. The number of observers per party fluctuated considerably during the 6 years, reaching a low of 2.36 observers per party in 1973 and a high of 2.77 observers per party in 1974. However, no trend was apparent, and the number of observers per party was only 4% higher in 1976 than it was in 1971 (2.63 versus 2.74).

Although variations in weather influence the behavior or wintering diurnal raptors (Schnell 1967, Bildstein 1978) and are known to affect the number of Red-shouldered Hawks seen on Christmas bird counts (Brown 1971), weather conditions did not appear to be responsible for the increase in raptors seen during the survey period. The increase in the number of raptors seen per 100 party-miles was not correlated with changes in weather on count days. In fact, overall, weather during the first four winters was quite similar. While the severe winter of 1976-1977 may explain increases in the numbers of Turkey Vultures,

TABLE 1. Number of diurnal raptors seen per 100 party-miles of Christmas bird counts.¹

<i>Species</i>	<i>Year: 1971</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>	<i>6-year mean</i>
Turkey Vulture	2.02 (66) ²	2.60 (87)	2.44 (85)	2.63 (90)	3.97 (166)	4.69 (183)	3.06 (112.8)
Black Vulture	1.22 (40)	2.03 (68)	0.97 (34)	2.30 (79)	4.47 (187)	4.12 (161)	2.52 (94.8)
Sharp-shinned Hawk	0.61 (20)	0.78 (26)	0.89 (31)	1.20 (41)	1.00 (42)	1.28 (50)	0.96 (35.0)
Cooper's Hawk	0.37 (12)	0.39 (13)	0.37 (13)	0.49 (16)	0.57 (24)	0.61 (24)	0.46 (17.0)
Red-tailed Hawk	2.84 (93)	4.36 (146)	5.13 (179)	5.75 (197)	4.97 (208)	5.71 (223)	4.79 (174.3)
Red-shouldered Hawk	0.70 (23)	0.78 (26)	1.12 (39)	1.11 (38)	0.86 (36)	1.41 (55)	1.00 (36.2)
Broad-winged Hawk	0.03 (1)	0.09 (3)	0.06 (2)	0 (0)	0.02 (1)	0 (0)	0.03 (1.2)
Rough-legged Hawk	0 (0)	0 (0)	0.03 (1)	0.06 (2)	0.07 (3)	0.03 (1)	0.03 (1.2)
Golden Eagle	0.03 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.2)
Bald Eagle	0.03 (1)	0.36 (12)	0 (0)	0 (0)	0.02 (1)	0 (0)	0.07 (2.3)
Marsh Hawk	2.66 (87)	2.27 (76)	3.04 (106)	3.62 (124)	2.75 (115)	2.76 (108)	2.85 (102.7)
Osprey	0.03 (1)	0.09 (3)	0 (0)	0.03 (1)	0.02 (1)	0.08 (3)	0.04 (1.5)
Peregrine Falcon	0.06 (2)	0 (0)	0.03 (1)	0.06 (2)	0.02 (1)	0.05 (2)	0.04 (1.3)
Merlin	0.21 (7)	0.24 (8)	0.23 (8)	0.18 (6)	0.29 (12)	0.38 (15)	0.26 (9.3)
American Kestrel	6.69 (219)	5.44 (182)	6.19 (216)	9.71 (333)	7.99 (326)	9.17 (358)	7.50 (272.3)
Unidentified <i>Accipiter</i>	0 (0)	0 (0)	0.03 (1)	0 (0)	0.02 (1)	0.05 (2)	0.02 (0.7)
Unidentified <i>Buteo</i>	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.10 (4)	0.02 (0.7)
All species	17.51 (573)	19.43 (650)	20:50 (715)	27.10 (929)	26.85 (1124)	30.44 (1189)	23.64 (863.3)

¹ Data taken from the following Christmas bird counts: Bodie-Pea Island, Central Beaufort County, Chapel Hill, Charlotte, Grandfather Mountain, Greensboro, Pamlico County, Raleigh, Southern Pines, Wilmington, and Winston-Salem, N.C.; Aiken, Charleston, Columbia, and Pee Dee area, S.C.

² Number seen per 100-party miles (actual number seen).

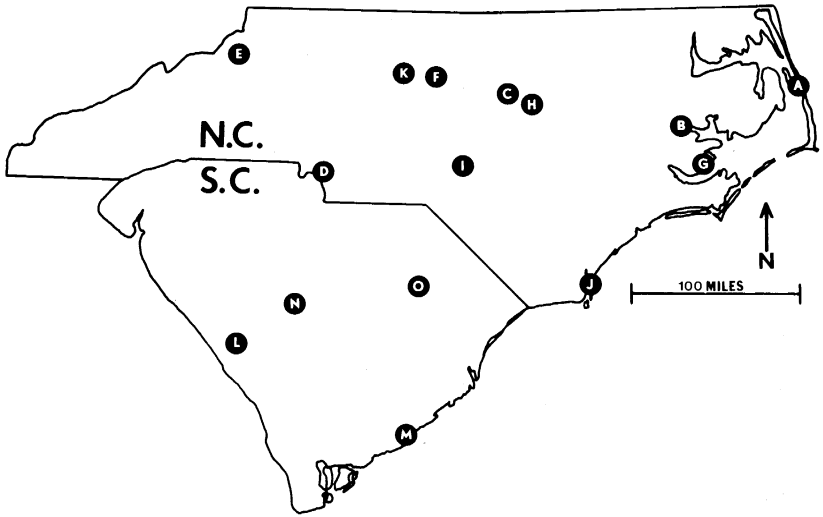


Fig. 1. Locations of Christmas bird counts used. A = Bodie-Pea Island, B = Central Beaufort County, C = Chapel Hill, D = Charlotte, E = Grandfather Mountain, F = Greensboro, G = Pamlico County, H = Raleigh, I = Southern Pines, J = Wilmington, and K = Winston-Salem, N.C.; L = Aiken, M = Charleston, N = Columbia, and O = Pee Dee area, S.C.

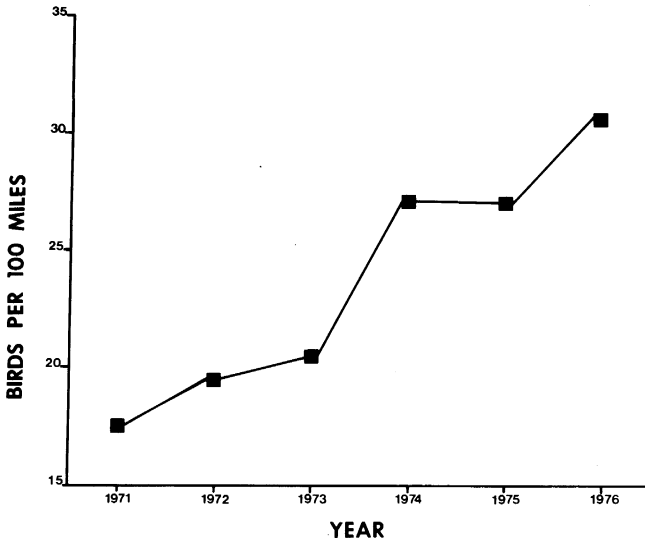


Fig. 2. Number of diurnal raptors seen on 11 North Carolina and 4 South Carolina Christmas bird counts during the winters of 1971-1972 through 1976-1977.

Red-tailed Hawks, Rough-legged Hawks, Marsh Hawks, and American Kestrels, species that normally winter in large numbers north of the Carolinas (Bystrak 1974), it cannot explain the substantial increase in these species between 1971-1972 and 1975-1976.

Harry E. LeGrand Jr. (pers. comm.) suggests that the number of diurnal raptors reported on the Christmas bird counts may be increasing because compilers are assigning the right people to the right territories and the participants are doing a better job of coverage with each additional year of experience. Certainly the "experience factor" cannot be ignored in the analysis of Christmas bird count data. Use of Christmas bird counts as population indices has been vigorously, and quite correctly, criticized (see for example Stewart 1954). Nevertheless, data presented in Table 1 indicate an upward trend in diurnal raptor populations that should be confirmed or refuted by more intensive and extensive surveys.

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