

AN ASSESSMENT OF THE WHITE-BREASTED NUTHATCH AND RED-BREASTED NUTHATCH ON RECENT NEW YORK STATE CHRISTMAS COUNTS

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The White-breasted Nuthatch (*Sitta carolinensis*) and the Red-breasted Nuthatch (*S. canadensis*) are forest-dwelling species found throughout most of New York state. The former is both a sedentary and migratory species, favoring deciduous forests as well as parks and wooded suburban areas (Bull 1964, 1974; A.O.U. 1983). The latter is a resident of higher elevations, favoring coniferous forests, from which it periodically irrupts to become numerous in habitats unlike the spruce-fir forests from which it comes (Bull 1964, 1974; A.O.U. 1983; Bock and Lepthien 1972, 1976). I have assessed changes in the abundance of these two species on New York state Christmas Bird Counts over the 26-year period from 1960 to 1986. I also have analyzed certain changes Christmas Bird Count coverage within the state over the same period.

Methods

Christmas Bird Count data published in *Audubon Field Notes* and its successor, *American Birds*, for the period 1960 through 1985 were collected from all counts bearing a location name solely within New York state. A single data point was derived for each species for each year by totalling the numbers reported for each species of nuthatch on all qualifying counts and dividing that total by the accumulated statewide "total party-hours" of observer effort, computed in an analogous fashion, in units of 100 hours. This gave a normalized value of reported birds per 100 party-hours. These values were plotted over the 26-year period and subjected to regression analysis to determine trends in population size.

Due to variation in the number and location of the counts reported each year, this analysis was repeated using only data from a core group of 35 counts that had a very high rate of repeated annual coverage. Every count in the core group was reported in at least 24 years of the 26-year period. Overall, they reported data for 98.68 percent of the counts theoretically possible in that period.

In addition, the number of reported counts, the annual total party-hours for all counts, the annual total party-hours for the core counts, and the total party-hours per count were assembled, plotted and also subjected to regression analysis.

Because the Red-breasted Nuthatch does not breed uniformly throughout New York, and because of its irruptive migratory behavior, a more detailed geographic analysis was conducted by separating Long

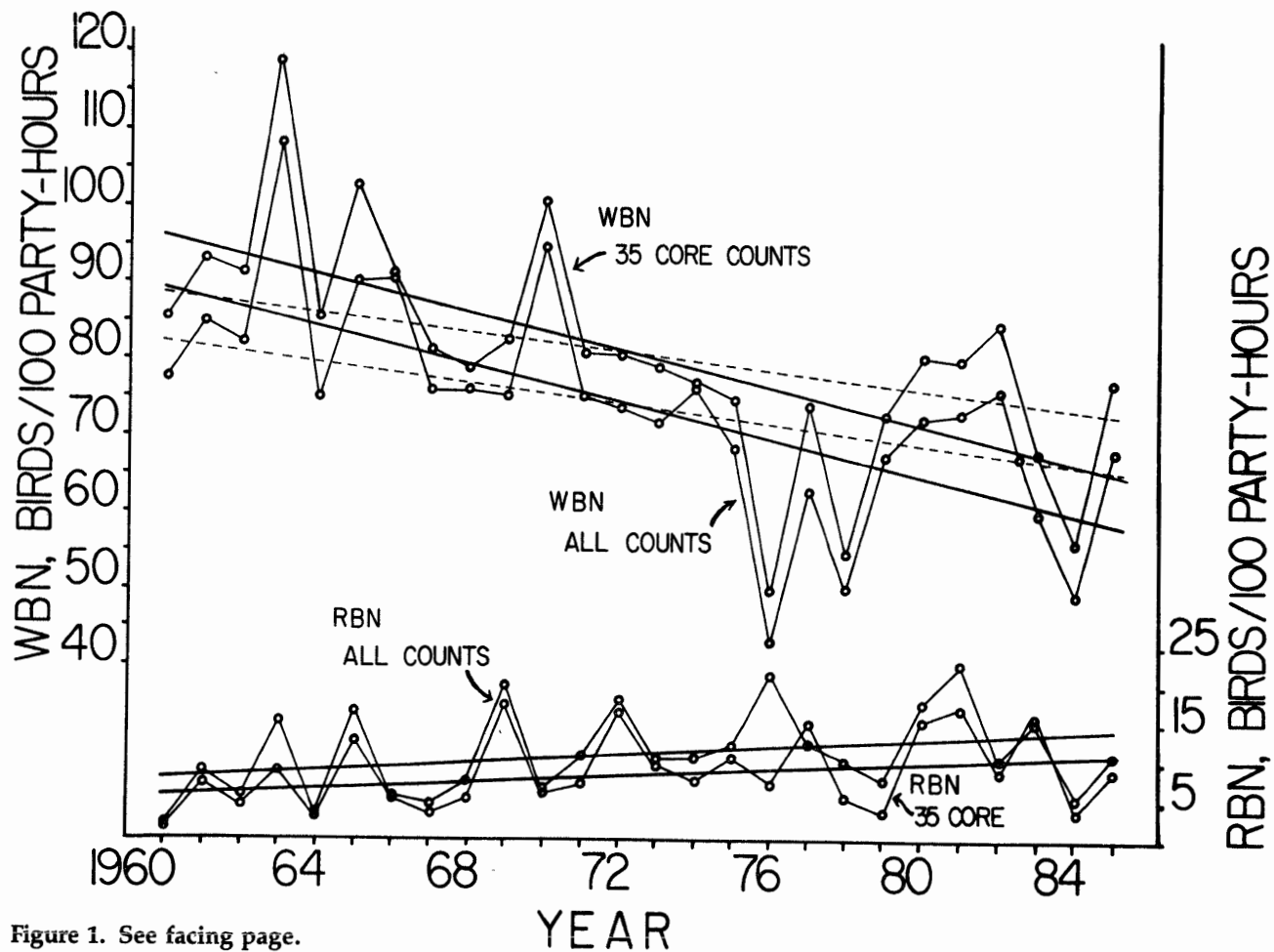


Figure 1. See facing page.

Island count data, and Adirondack count data from the statewide total. This left a residual body of data which was referred to as "rest of the state." Some of these results were plotted and analyzed also.

Results and Discussion

The annual reported abundances for both species are represented in Figure 1. Two regression analyses were run for the Red-breasted Nuthatch data to reflect the results from all counts, and separately the results of the 35 core counts. The White-breasted Nuthatch data were treated similarly. The regression parameters are given in Table 1. The more geographically detailed analysis of Red-breasted Nuthatch data appears in Figure 2. The changes in Christmas Count coverage over the 26 years are summarized in Table 2 and Figure 3.

Table 1. Regression analysis of White-breasted Nuthatch and Red-breasted Nuthatch Counts.

Regression equation: Birds/100 party hours = a + b(year)					
Case	a	b	r ²	F-ratio	p
White-breasted Nuthatch					
All counts	161.400	-1.207	0.429	18.04	0.00028
All counts less three highest and lowest totals	121.307	-0.650	0.507	18.54	0.00043
35 core counts	170.395	-1.235	0.418	17.23	0.00036
35 core counts less three highest and lowest totals	125.702	-0.618	0.535	20.73	0.00025
Red-breasted Nuthatch					
All counts	-7.872	0.263	0.122	3.33	0.0806
35 Core counts	-0.638	0.224	0.118	3.21	0.0859

Year is calendar year - 1900, i.e., 1960 = 60, 1961 = 61, etc.

Figure 1. Annual New York State Christmas Count abundances of White-breasted Nuthatch (WBN) and Red-breasted Nuthatch (RBN) for the period 1960-1985. The open circles connected by solid lines represent annual data points expressed as birds/100 party-hours. For each species, two sets of data are presented, representing abundances found on all counts in the state, and on a core group of 35 highly repetitive counts. Each species is also represented by two solid regression lines, one for each of the data sets using the parameters in Table 1. The dashed lines for White-breasted Nuthatch represent regression analyses which exclude the three highest and three lowest totals referred to in the results.

White-breasted Nuthatch: This species showed wide, erratic fluctuations in annual abundance. In all years the abundance on the core counts slightly exceeded those for the entire state. Generally, the fluctuations and trends represented by the core counts are similar to those for all counts. The long-term trend of these counts was negative. Using the regression line values for 1960 and 1985, the total decline in birds/100 party-hours was 32.1 percent for the core counts and 33.9 percent for all counts. To determine the impact of extreme values on these results, additional analyses were made ignoring the three highest (1963, 1965 and 1970) and the three lowest (1976, 1978 and 1984) totals. Analysis of these data after removal of the extreme values also yields a decline, but of lesser magnitude at 17.4 percent for core counts and 19.7 percent for all counts.

The observed annual fluctuations appear consistent with Bull's (1964) comment about this species in the New York City area, "Like many species, this bird is subject to fluctuations, some years appearing in large numbers, other years in small numbers." In an attempt to gain insight on what might explain either the reporting extremes or the decline, I consulted the field note sections of *The Kingbird*. The weather summaries and the species reports that appeared quarterly gave no suggestion about events in those years of extreme high and low abundance that might help explain a possible cause. If anything, this species is invisible in these quarterly reports, because of the lack of attention and detail that is paid to its presence, a fate all too often suffered by what is perceived to be a common, resident species. Lacking the glamor of an exotic species, or lacking appearance on an extraordinary date, little attention is paid to detailed or quantified reporting of changes in its status. Because of this kind of failing in the current field note reporting system, data gathered in a more regimented manner, such as on Christmas Bird Counts, take on more value. Their continued collection should be encouraged, and some comparable type of collection should be expanded to other seasons of the year.

A comparison of the fluctuations in the White-breasted Nuthatch abundances in Figure 1 with those of the Red-breasted Nuthatch shows a low degree of synchrony between these species. Some of the annual increases of the early 1960's occurred synchronously, but there are few other similarities. On the contrary, the 1969 increase for one species and the 1970 increase for the other were out of phase, and the lowest occurrence of White-breasted Nuthatch in 1976 coincided with the second highest occurrence of Red-breasted Nuthatch. While Red-breasted Nuthatch irruptions have been related to cone crop failures in boreal forests (Bock and Lepthien 1972, 1976), there does not appear to be a similar cone-related impact on the White-breasted Nuthatch, perhaps due to its association with deciduous forests.

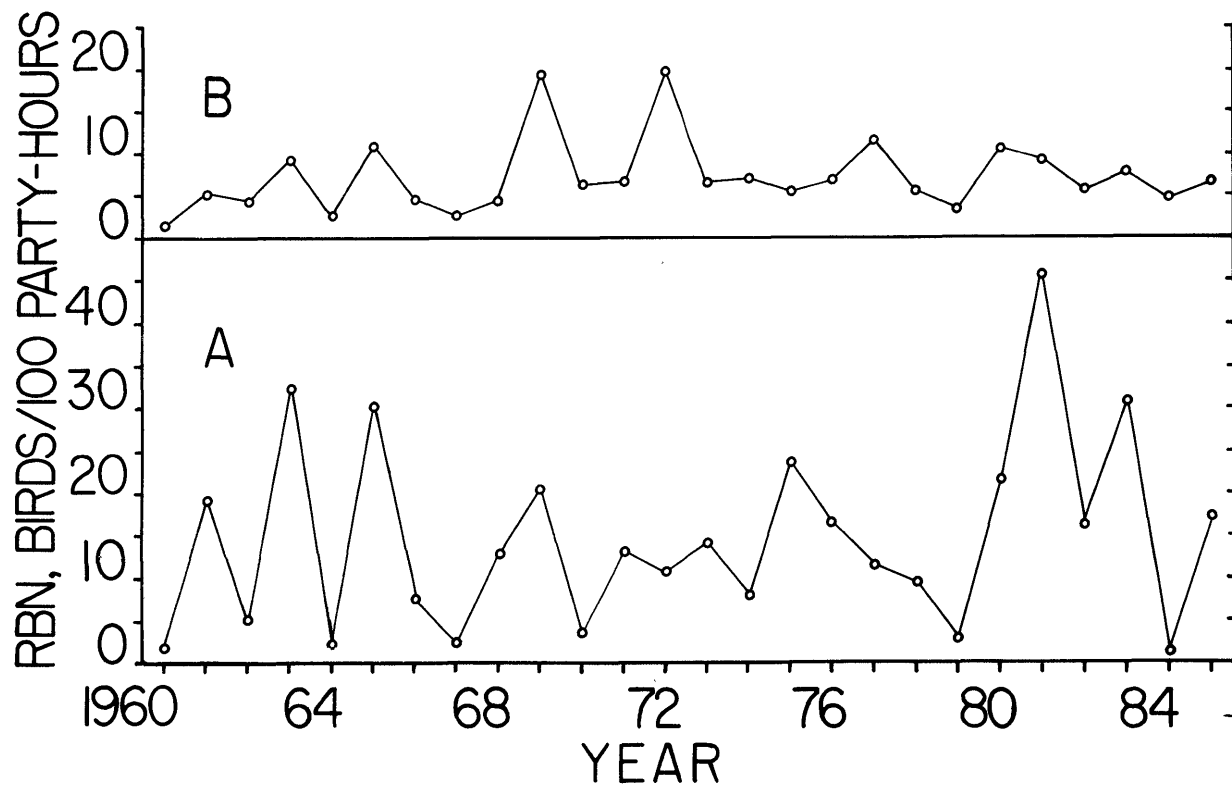


Figure 2. Annual New York State Christmas Count abundances of Red-breasted Nuthatch (RBN) for the period 1960-1985 for Long Island only (A), and for the rest of the state, excluding Adirondack count data (B).

Whatever the reason for the suggested reporting decline of this species on Christmas Counts, this species deserves further study to confirm the status of its abundance at other times of year, such as during the breeding season, to more fully assess what changes might be occurring in this population.

Red-breasted Nuthatch: Results for this species differ in several ways from those for the White-breasted Nuthatch. Its abundance was about one-fifth to one-tenth that of the White-breasted Nuthatch; the long-term trend in its numbers appeared positive; the pattern of variations in abundance was consistent with its irruptive character, approximating a biennial rhythm; and with only two exceptions (1977 and 1983) the abundance on all state counts exceeded that on core counts. Using the regression values for 1960 and 1985, the increase in birds reported/100 party-hours was 113.6 percent for the core counts, and 83.3 percent for all counts.

The irruptive status of this species was examined further by separating data from the three Adirondack counts within the species' breeding range, the Long Island counts, and the "rest of the state." On Long Island the species is known almost exclusively as a migrant and wintering species (Bull 1964). Only one breeding report, occurring in 1975, is known (Bull 1976). Here, the species shows a nearly perfect biennial rhythm of alternating increases and decreases varying in magnitude (Figure 2A), except for 1967, 1977 and 1979. The 1960-1970 data are consistent with the pattern found for all of North America by Bock and Lepthien (1972).

Peak count years are partially but not completely synchronous between Long Island (Figure 2A) and the rest of the state (Figure 2B). Long Island counts are further distinguished by showing greater amplitude between years of high abundance and years of low abundance, and by greater abundance in birds/100 party-hours when compared to the rest of the state. In non-irruptive years, minimum abundances on Long Island were 2-5 birds/100 party-hours, similar to the 2-7 birds/100 party-hours for the rest of the state. Long Island maxima in years of irruption were 15-45 birds/100 party-hours, or about double the 10-22 birds/100 party-hours recorded in the rest of the state. Only in 1972 was its abundance on Long Island substantially less than elsewhere in New York.

Coverage of the three Adirondack counts (Elizabethtown, Old Forge, and Saranac Lake) was variable until the 1970's, and so it is difficult to draw many conclusions about them. While the results are not presented graphically here, they showed only slight suggestion of a biennial rhythm in annual abundance over the 26 years, but clearly, as of 1970, they represent the highest abundance of any counts in the entire state.

Count minima from 1970 to 1985 were in the range of 30-65 birds/100 party-hours, while maxima were usually in the range of 100-165 birds/100 party-hours. The greatest Adirondack count totals occurred in 1976 and 1978 with 480 and 227 birds/100 party-hours, respectively. These numbers in 1976 caused the peak in the state total for 1976 in Figure 1, which is missing in Figures 2A and 2B.

In 1976, the Saranac Lake count located 311 Red-breasted Nuthatches in 49 party-hours for a yield of 634.7 birds/100 party-hours, the state record during this 26-year period! These Adirondack counts within the species' breeding range have been areas of greatest abundance during Christmas Count time, followed by Long Island, then the rest of the state in an approximate ratio of 12:2:1, respectively. This finding differs from part of Bull's (1974) assessment about statewide status prior to the generation and examination of these Adirondack data, wherein he stated, "Variously rare to very common migrant, most numerous in fall along coast; much less common in winter."

Given the exclusion of the Adirondack and Long Island data in Figure 2B, the data for the rest of the state gave a regression line that increased 33.5 percent over the 26-year period, but at very low statistical reliability ($r^2 = 0.021$, $p = 0.479$) due to considerable year to year variability in abundance. Visual inspection suggests no significant, definable trend up or down for this species over this period, and it appears reasonable that the suggested increase in abundance portrayed in Figure 1 is an artifact contributed to in part by increased inclusion after 1970 of highly productive Adirondack counts, and the record 1981 Long Island count. Figure 2B suggests a continued erratic pattern in annual abundance.

Christmas Count Coverage: During the period 1960-1985, Christmas Counts were reported from 74 locations in New York State. Eighteen of these were conducted one to ten times, 15 were conducted 11 to 19 times, and 42 were conducted 21 to 26 times in the 26-year period. Referring to Table 2 and Figure 3, there was an increase of 60 percent in the number of counts reported per year (bottom line in Figure 3) over the period of this study. This increase was eclipsed by a 214-percent increase in annual total party-hours for all counts in the state (top line in Figure 3). The latter increase was due to the growing number of counts reported annually and also to increased party coverage per count.

This latter phenomenon is illustrated by the two middle lines in Figure 3. The total party-hours/count rose 89 percent for all counts (lower middle solid line) and the accumulated total party-hours on the 35 core counts rose 107 percent (upper middle solid line). In both cases, the increases appeared to occur in three incremental steps from 1960 to 1969, 1969 to 1974 and 1974 to 1985. During those periods the total

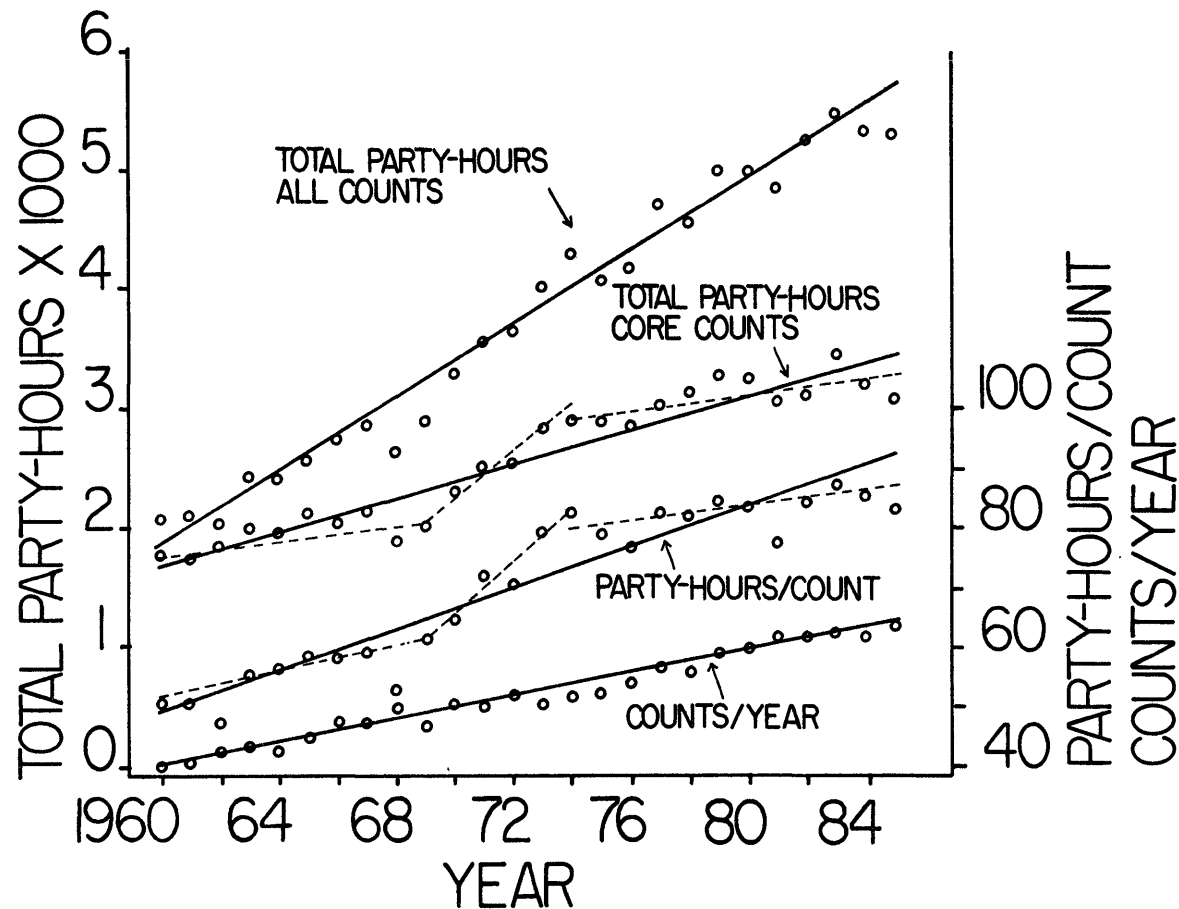


Figure 3. New York State Christmas Count coverage for the period 1960-1985. The open circles represent annual data counts. Solid and dashed lines represent regression lines based on data in Table 2. The top two sets of data use the ordinate to the left, while the bottom two sets use the ordinate to the right.

party-hours/count increased 18.0, 35.3 and 9.7 percent, respectively, and the accumulated total party-hours on the 35 core counts increased 17.6, 44.7 and 12.5 percent, respectively. These incremental increases are shown as dashed lines in Figure 3.

If the 1960 and 1985 values of the dashed lines are used instead of the respective values of the solid lines in the middle two data sets in Figure 3, the increase in total party-hours/count becomes 73 percent, and the increase in accumulated total party-hours of the 35 core counts becomes 86 percent. Since any given 15-mile diameter count circle can be advantageously divided into only a limited number of sectors for coverage by parties of observers (given in part to some observers' perception of territoriality), and since there is a limit to the amount of available daylight, and in some cases human endurance to winter weather, the number of total party-hours/count should reach some limiting value beyond which further increases are not likely. Similarly, some limitation will eventually occur on the number of annually reported counts.

Table 2. Regression analysis of New York State Christmas Bird Count Characteristics.

Regression equation:
Count parameter = $a + b(\text{year})$

Count Parameter	a	b	r ²	F-ratio	p
Number of counts/year	-15.909	0.939	0.970	765.60	<0.00001
Party-hours/count					
1960-1985	-55.482	1.744	0.088	169.89	<0.00001
1960-1969	-10.200	1.013	0.519	8.61	0.01885
1969-1974	-236.538	4.314	0.952	13.00	0.00088
1974-1985	28.067	0.702	0.233	3.03	0.11232
Total party-hours/year					
35 core counts					
1960-1985	-2647.830	72.079	0.091	231.67	<0.00001
1960-1969	-312.040	34.776	0.546	9.61	0.01465
1969-1974	-10843.320	187.540	0.973	145.41	0.00027
1974-1985	457.253	33.450	0.395	6.53	0.02860
All counts	-7579.560	156.840	0.958	545.70	<0.00001

Year is calendar year - 1900, i.e., 1960 = 60, 1961 = 61, etc.

Summary

An evaluation of New York State Christmas Count data over the period 1960-1985 showed that annually reported numbers of White-breasted Nuthatch varied widely and erratically, but overall suggested a decline between 17 and 34 percent, depending on the method of treating the data. A similar analysis showed an apparent increase of 83-114 percent in the reported abundance of Red-breasted Nuthatch. Removal from the analysis of data from Long Island, and highly productive Adirondack areas, reduced this increase elsewhere in the state to 34 percent. Because of this species' irruptive behavior, this apparent reporting increase may be an artifact, and there may have been no significant change in abundance over the 26 years.

On Long Island the Red-breasted Nuthatch appeared to be biennially irruptive but less so elsewhere in the state. Since 1970, it was most abundant on Adirondack Christmas Counts where it is resident, followed by Long Island where it is a migrant and winter visitor, and finally in the remainder of the state in a ratio of approximately 12:2:1. White-breasted Nuthatch reports throughout the state outnumbered Red-breasted Nuthatch reports by about 10:1 in the 1960's and about 6:1 in the mid-1980's. During the 1976 record low count of White-breasted Nuthatches and the near record high count of Red-breasted Nuthatches, the ratio was about 2:1.

Christmas Count activity during the 1960-1985 period increased substantially. The number of annually reported counts rose by 60 percent, the total party-hours by 214 percent, and depending on the method of treating the data the total party-hours/count by 89 or 73 percent, and the accumulated total party-hours on the 35 core counts by 107 or 86 percent.

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