

THE FEEDER SURVEY AND TRENDS IN CENTRAL NEW YORK CARDINAL POPULATIONS

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INTRODUCTION

Observations based on our Feeder Survey have been mentioned briefly in the Regional Reports from Region 5 for many years. The present article has two objectives: to describe our method for evaluating trends in winter bird populations, and to show the validity of this method by applying it to a *known* population trend, the increase in the population of Cardinals (*Cardinalis cardinalis*) in our region in recent years. A brief report will also be given of changes in the Cardinal population at feeders from month to month during the winter.

THE METHOD

The Feeder Survey method enlists the cooperation of readers of a "Bird Notes" column in the *Syracuse Sunday Herald American*. During a designated week the participants report the maximum number of birds of each species observed at or near the feeder at any one time. This procedure yields a definitely *known* number of birds and avoids the danger of counting the same bird more than once. It involves, of course, only a sample of the population in the region. That is, it does not provide the total number of birds living in a given area, but, as with all survey methods, the observed trends and changes in the sample should reflect the trends and changes in the population.

The region covered by the survey is determined primarily by the circulation of the newspaper and covers an area of central New York about 50 miles in radius around Syracuse. It does extend, however, about 120 miles northeasterly into the sparsely settled Adirondack region. In terms of the Reporting Regions listed on the inside back cover of *The Kingbird*, the data are drawn largely from Region 5, but with quite a few cases from Region 6 and some from the northern part of Region 4 and the eastern part of Region 3.

After all the reports for the week have been received, those from obviously incompetent observers are discarded and then a random sample of 100 is drawn for analysis.

Data have been gathered for the winter populations during the first week of November, December, January, February, March and April beginning with November, 1959. The data through April 1979

provide a sample of 12,000 reports for analysis.

With the 100 reports for a given week, the "known" numbers for a given species are totalled to yield a November total, a December total, *etc.* The sum of the six monthly totals yields what we call the winter total for a given year.

POPULATION CHANGES FROM YEAR TO YEAR

While trends in bird populations can be detected by informal observations and impressions gained from field trips, more useful data can be obtained, as in the Feeder Survey, by using many more observers who count the numbers seen in one standardized way. The validity of the Feeder Survey can be evaluated to some extent by applying it to a population trend that is already known.

It is generally accepted that the Cardinal has increased and spread markedly in New York State, especially within the past two or three decades (Bull, 1974). It would thus be worthwhile to inspect the Feeder Survey data for the Cardinal and see if they reflect this trend.

The winter totals described above are computed for the Cardinal and are plotted in Figure 1. Years are on the horizontal axis and winter totals on the vertical axis. While there are fluctuations from year to year, the upward trend of the curve is apparent. The average winter total for the 20 years is 1303. The upward trend may be shown more clearly by fitting a straight line (regression line) to the curve by the method of least squares—the heavy straight line in the figure. The slope of this line is 38.4. This slope is statistically significant (t -test, $p < 0.001$). This means that the total for the winter increases by 38.4 birds each successive year. Putting it another way, the 38.4 is 2.95% of the average 1303. Thus the winter population has increased by about 3% each successive year.

During the last 15 years of this general trend, there is a suggestion of a somewhat regular cyclic change. Peaks in the population occur every four or five years and each of these is followed by a very low population the following winter. Then there is a slow increase over the next four or five years until the next peak is reached. The cause of the cycles is not clear. We are not aware of any corresponding cycle in food supply.

The plotted data appear to rise less rapidly in the later years of the Survey. This may be shown by obtaining a regression line for just the last eleven years. Its slope is only 1.2% of the average and

TOTAL OF CARDINALS FOR 6 WINTER MONTHS

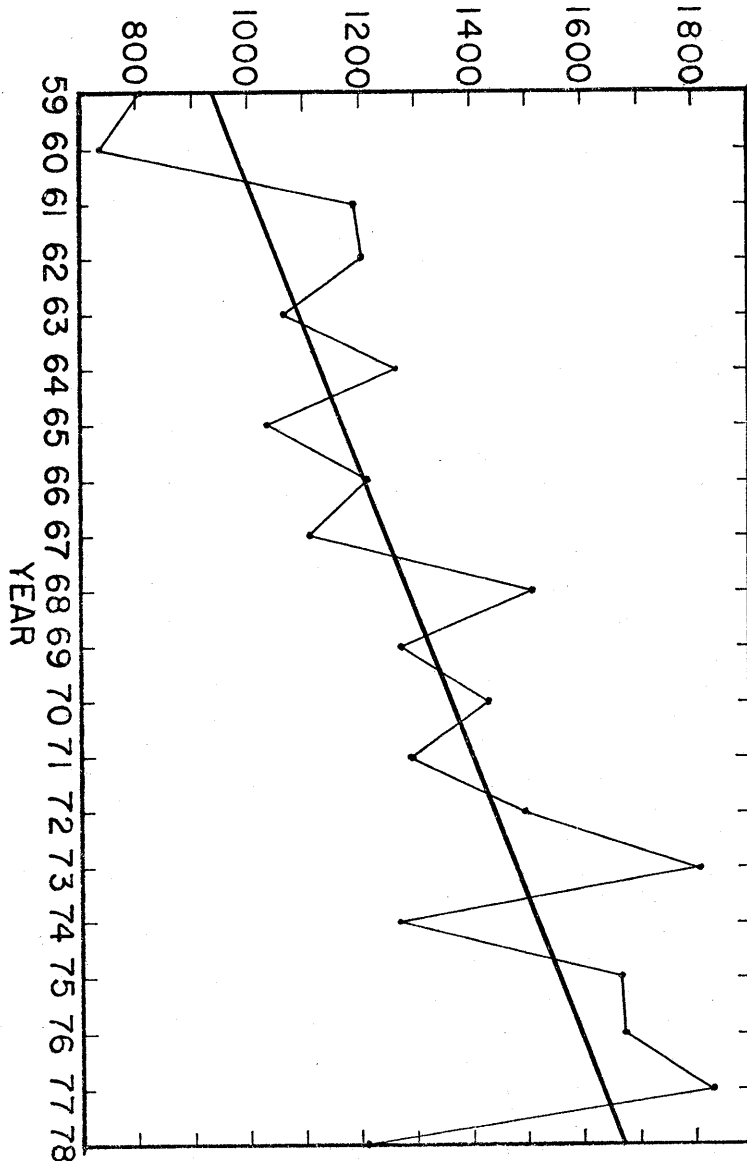


Figure 1. Trends in winter population of cardinals at 100 feeders from 1959 to 1978. The straight regression line was fitted to the data by the method of least squares (the year listed is the year the winter began); i.e., the winter of 1968 is the winter that began in December, 1968.

furthermore is not statistically significant ($p > 0.20$). Evidently, the Cardinal population is beginning to level off.

Another indication of the usefulness of the Feeder Survey is available. The Bureau of Wildlife of the Department of Environmental Conservation in its 1978 Program Management Plan for the Pheasant, notes the decline in the Ring-necked Pheasant (*Phasianus colchicus*) population, particularly in the primary range which lies west of Onondaga County. In our area, the Survey data show that during the past 13 years, the winter population of pheasants has decreased 9½% each successive year. More detail will be published elsewhere.

These two examples showing that the Feeder Survey detects trends that are otherwise known, lends credence to this method.

Another figure of some interest is the number of feeders (out of 100) that report any bird at all of a given species. This figure (percent) indicates how widely distributed a species is in the region. We recorded this figure for only the last eleven years of the project. Averaging the six monthly percents for each year for the Cardinal yields 80 for '68-'69, 69 for '69-'70, etc. with an average for the 11 years of 75. In other words, Cardinals appear at 75% of the feeders. We plotted a curve for the 11 years like that in Figure 1 and derived the regression line, but its slope was not statistically significant ($p =$ about 0.50). Thus the distribution of Cardinals throughout the region did not increase during the 11 years although the number of birds showed a modest increase (supra).

Another useful statistic is the number of birds per occupied feeder. Reducing the average winter population of 1303 to an average monthly figure of 217 and dividing this by 75 gives 2.9 Cardinals at the average feeder simultaneously. This statistic will distinguish species that move about in considerable numbers (flocks) from those that are more solitary.

CHANGES DURING THE WINTER SEASON

The Cardinal population at feeding stations according to the Feeder Survey does not remain constant throughout the winter. Table 1 gives the 20-year average total for each month.

Table 1
Average Monthly Total

November	144	February	292
December	191	March	235
January	261	April	181

There is an obvious increase from November through February followed by a decrease. This is quite consistent through the years, for the December total is greater than that for November in 18 of the 20 years, while January and February are greater than November in all 20 years.

Two factors may contribute to this change through the winter. During the late fall, natural seeds are still plentiful, but with the advent of snow cover, such food becomes more difficult to find and the birds turn more to the feeders. Also young birds of the year may be gradually learning the location of feeders. As the snow melts in the spring and more wild food becomes available again, the birds spend a smaller fraction of their time at feeders.

It should be emphasized that these changes during the winter do not invalidate conclusions as to comparative winter totals like those discussed above. In fact, for the most part a year with a comparatively large November total also has a large December total and *vice versa*.

CONCLUSIONS

The Feeder Survey method for evaluating changes in winter bird populations has been described and it has been found to yield the expected results for the Cardinal where there has been a known increase in the past thirty years. During an average winter the Cardinal population at feeders has been found to increase from November through February and to decline in March and April. Our next step will be to present Feeder Survey data for many other species. In several cases, there has been a steady increase in a given species, and in others such as Evening Grosbeaks, the winter population from year to year is cyclic. Such changes can be clearly seen from data gathered through the Feeder Survey.

LITERATURE CITED

Bull, John. 1974. *Birds of New York State*. Doubleday/Natural History Press, Garden City, NY, pp. 546-7.

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