BREEDING BIRD CENSUS

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INTRODUCTION

Recognizing the importance of long-term studies for improving our understanding of changes in distribution and abundance patterns of avian communities, the former U.S. Bureau of Biological Survey initiated the concept of a Breeding Bird Census (BBC) in 1914. These censuses were initially administered by the Biological Survey into the 1920s. Between 1937- 1984, the National Audubon Society sponsored the program and published the annual results in American Birds and its predecessor publications. Since 1985, the BBC has been administered by the Cornell Laboratory of Ornithology. The results were not published for several years during the 1980s, but have appeared as a supplement to the Journal of Field Ornithology during the 1990s.

The Breeding Bird Census program is based on individual study plots established within a single habitat type. Standardized methods are followed to collect data on the avian and vegetative communities. Over a period of years, these data provide insight into the changes occurring in the breeding avifaunas within these communities.

BBC METHODOLOGY

The exact location of each BBC plot and the habitat studied within the plot are at the discretion of the individual cooperator(s), although they must meet certain requirements established by the program. No random selection process is involved in the establishment of their locations. Most plots are located at sites that are relatively free from disturbance, such as parks, nature preserves, and wildlife refuges, although a number have also been established on private property. The continental distribution of these plots reflects the distribution of people willing to conduct these censuses. No detailed analysis of their geographic placement has ever been conducted. Preliminary studies indicate that the BBC plots tend to be grouped within a relatively small number of states and provinces primarily in eastern North America, while there are large areas where few censuses have ever been conducted.

The exact size and dimensions of the study plot are also at the discretion of the cooperator(s), and may be influenced by the amount of effort required to obtain complete censuses. However, minimal plot sizes are recommended by the BBC of 10 hectares in closed habitats and 40 hectares in open habitats, although some plots may be smaller than these recommendations. Most woodland plots are smaller than 30 hectares in size, while plots in open habitats may be as large as 100 hectares.

A summary of the habitats censused by the BBC has never been prepared. However, the vast majority of BBC plots have been established in forested communities. At the initiation of each study plot, quantitative data are collected to describe the species composition and vegetative structure of the community. Standard methodologies are followed so the data are comparable between plots (James and Shugart 1970). Subsequent

changes in the structure and composition of the vegetative community are frequently described in subjective narratives, although some plots will repeat the quantitative surveys at periodic intervals.

The BBC employs the spot-mapping methodology to estimate population densities for each species present in the study plots (Robbins 1970). This methodology has only been slightly modified since it was initially described in detail by Williams (1936), allowing for between plot comparisons. This methodology maps the locations of all singing males and pairs present in the plot on different days during the breeding season. When these locations are combined for the entire season, each territory can be identified with reasonable accuracy. Assuming that each territory is occupied by a pair of that species, the number of territories can be translated into the number of breeding pairs on a plot during each year. A minimum of 8 visits are normally required each breeding season to accurately map the territories of all species. These visits should be spaced throughout the season, including censuses during spring for species breeding early in the year. Rules for interpreting these spot-maps are also defined in this methodology, although these rules do not completely eliminate all of the individual interpretation of the data.

BBC RESULTS

The BBC results are provided as the total number of territories for each species present in each plot during each year. These results are also standardized as the number of territories per 40 hectares for species with 3 or more territories on a plot. The numbers of nests and fledglings recorded during the censuses are also provided for each species. A list of species considered to be "visitors" is provided separately from the list of breeding species. In the published accounts, a remarks section provides brief comments concerning the importance of the year-to-year changes and long-term trends for species on the plots, as well as other information relevant to the censuses. Portions of the BBC database have been computerized and can be accessed via ftp.

USES OF BBC DATA

An under-utilized database, the full potential of the BBC remains to be explored. Only a relatively small number of studies have been published using BBC data, and most of these studies have shown long-term trends of species at individual plots or at a selected group of plots (see bibliography below for some examples). These analyses have generally required consistent data collection over a period of years or decades, although some studies have examined population changes from a small number of censuses separated by 30-40+ years. While the BBC provides habitat-specific data on the composition of bird communities, aspects of bird-habitat relationships have not been examined using this data set.

LIMITATIONS OF THE BBC DATA

A number of factors could potentially limit some of the uses of BBC data. At larger geographic scales, the most important question concerns how representative are the BBC plots of the habitats and avian communities in an area? Whether or not the temporal changes in the bird communities are representative of the trends of the entire area is also questionable. The factors used to select each site are largely unknown, but may include ease of access, proximity to the observer's residence, or the fact that the sites are known to be "good birding areas". Hence, using BBC data to draw conclusions beyond the boundaries of the individual plots may be rather tenuous.

Other factors complicate the ability to compare data from individual plots. Minor differences in the sizes of the plots, geography, and structure and composition of the plant communities may not be apparent in the descriptions of the plots, yet could potentially be responsible for major changes in the composition and trends of the bird communities. Additionally, changes to the surrounding habitats could also have an important influence on the trends of bird populations, but changes to surrounding habitats are seldom described for the individual plots.

Additional factors need to be considered when examining the data from individual plots (Johnson 1990). These factors may limit the utility of these data, and include:

- the aperiodicity of the data from some plots
- annual variation in census effort
- inadequate vegetation-site description during the first census
- biased estimates of population density, such as the assumption that a singing male truly represents a

breeding pair, or under-estimating the population density if some males were not singing regularly
- failure to describe any changes occurring within or immediately adjacent to the plots
- variation in observer competency, and changes in observer competency over time
- variation in the interpretation of the census data when preparing the spot maps

For more information about the BBC, instructions for establishing BBC plots, or to obtain instructions and data forms, please contact:

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