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Monitoring Bird Populations by Point Counts



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Abstract

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This volume contains in part papers presented at the Symposium on Monitoring Bird Population Trends by Point Counts, which was held November 6–7, 1991, in Beltsville, Md., in response to the need for standardization of methods to monitor bird populations by point counts. Data from various investigators working under a wide variety of conditions are presented, and various aspects of point count methodology are examined. Point counts of birds are the most widely used quantitative method and involve an observer recording birds from a single point for a standardized time period. Statistical aspects of sampling and analysis were discussed and applied to the objectives of point counts. Symposium participants agreed upon standards of point counts that should have wide applicability to a variety of habitats and terrain.

Retrieval Terms: Bird counts, bird populations, census methodology, evaluation, monitoring, point counts, sampling of populations, standards of censusing

Technical Editors:

C. John Ralph is a Research Wildlife Biologist at the Station's Timber/Wildlife Research Unit, Redwood Sciences Laboratory, 1700 Bayview Drive, Arcata, CA 95521. John R. Sauer and **Sam** Droege are Research Wildlife Biologist and Wildlife Management Biologist, respectively, at the Patuxent Wildlife Research Center, USDI National Biological Service, Laurel, MD 20708.

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Monitoring Bird Populations by Point Counts

C. John Ralph
Technical Editors

John R. Sauer

Sam Droege

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Preface

Point counts of buds are the most widely used quantitative method and involve an observer recording buds from a single point for a standardized time period. In response to the need for standardization of methods to monitor bird populations by census, various investigators met in Maryland in late fall 1991 to evaluate point counts. Their objectives were to present data from various investigations working under a wide variety of conditions, and to examine various aspects of point count methodology. This volume contains the papers given at the workshop, as well as a few additional relevant papers that subsequently have been submitted to the technical coordinators. Statistical aspects of sampling and analysis were discussed and applied to the objectives of point counts. From this base, at interactive sessions the participants discussed and agreed upon standards of point counts that should have wide applicability to a variety of habitats and terrain. The final chapter presents these standards and their applications to point count methodology.

Why Do We Count Birds?

Birds are salient features of North American environments. Their frequent song during the summer, their bright plumages, and their visibility attract even the urbanites' attention and inspire many to pursue their study. Despite high visibility, counting birds can be a frustrating business: territorial behavior keeps populations uniformly, but thinly, distributed; dense vegetation can hamper visibility; and a myriad of songs and calls is challenging to learn.

The study of these birds is an old science, but quantification of their abundance is relatively young. Only a few enumerations of birds can be found before the 1940s. What good data occur usually involve those species of management concern, especially ducks and geese, or easily counted, highly colonial species. Smaller species of birds, often referred to as "non-game," or in a more positive sense, often known as "landbirds," include most species found in any area of the world. They are difficult to count, being dispersed, often cryptic, and small. However, much work has been done in the past 50 years to advance counting methods.

Very recently, interest in this subject has been heightened with the recent concern over possible decline of neotropical migratory landbirds, those birds breeding in North America, and wintering to the south. Among the possible explanations for a decline is deforestation of sub-tropical and tropical America, as well as removal of large regions of the northern coniferous forest. This concern has kindled the spark of interest in landbirds into a flickering flame, known as "Partners in Flight—Aves de las Americas," an integrated program of inventory and monitoring of these many and varied species. Among the several aspects of this work, involving both population sizes, trends, and demography, is the counting of the birds.

The Use of Point Counts

Many methods, and modifications thereof, have been used in the past for counting buds to estimate their relative abundance and population trends. Most of these were examined in detail in the various papers found in Ralph and Scott (1981) and by Vemer (1985) in his important evaluation. Among the methods, modifications of the unlimited distance point counts (Blondel and others 1981) often represent the best compromise between economy of collection effort and precision and accuracy of the estimates of population trends or population indexes (Vemer 1985).

Organization of the Workshop

As a result of this interest and concern, we convened the workshop to investigate the design and analysis of the point count method, as well as its applicability to a nation-wide program of inventory and monitoring. On November 6-7, 1991, 38 researchers' came together in Beltsville, Maryland, at the Agricultural Library of the USDA Agricultural Research Center. The workshop was co-hosted by the Redwood Sciences Laboratory of the Pacific Southwest Research Station of the USDA Forest Service, and the Patuxent Wildlife Research Center of the USDI National Biological Survey. It was designed to bring together a group of biologists actively involved in research and monitoring programs using point counts. We wished to develop the components of point count methodology sufficient to: (1) provide trend data for monitoring population changes; and (2) predict population responses to habitat manipulations. Each of the 25 papers given at the workshop addressed specific aspects of the methodology. By presenting these papers on monitoring programs, and discussing procedures, we hoped that a consensus would be reached on the proper procedures for point counting.

The papers given at the workshop, and the resultant papers contained in this volume, were intended to develop a series of standard procedures for counting small landbirds in any habitat and any ownership. These standards can be used to both minimize variability in results associated with differing experimental designs and provide tips on designing programs for those beginning point count programs.

The Breeding Bird Survey (Bystrak 1981, Droege 1990) is basically such a point count program that has been underway throughout the United States and Southern Canada since 1966. In our deliberations we did not exclude adopting these 3-minute, roadside counts as the recommended standard, but we found some limitations to this method. Besides the potential biases associated with roadside habitats, (the Survey is limited to roads) it was felt to be too short at 3 minutes for many purposes, and it is structured in 50 point clusters. An

¹ Participants in the workshop were: Richard Barter, William Buskirk, Greg Butcher, André Cyr, Deanna Dawson, Barbara Dowell, Sam Droege, Naomi Edelson, Don Fillman, Edward Gates, Leslie Gerstenfeld, James Gibbs, Gary Griffith, Joann Hanowski, Robert Howe, Richard Hutto, Douglas Johnson, Ed Johnson, William Kendall, James Lynch, William McShaw, Scott Melvin, Sandra Orsillo, Jesse Overcash, Diane Pence, Grey Pendleton, Bruce Peterjohn, Dan Petit, Lisa Petit, Jeff Price, C. John Ralph, Janet Ruth, John Sauer, David Smith, Charles Smith, Frank Thompson, Jarge Vega, and Dan Welsh.

important objective was to adapt point counts for a greater variety of uses, such as on trails or cross-country, or for longer censuses (5 or 10 minutes, depending upon travel time). These would make the method more flexible and able to accommodate a variety of objectives. Resolving these various goals was one of our major purposes of the workshop.

Presentations at the workshop fell into three general categories: (1) evaluation of point count methods, (2) statistical aspects of design and analysis of point count studies, and (3) reviews of existing point count monitoring programs. An evening session and final day's highly interactive session provided the basis for the decision-making process that resulted in a set of point count standards, the final chapter in these Proceedings, called "Managing and Monitoring Birds Using Point Counts: Standards and Applications." The reader will note that some of the conclusions of the various papers in this volume are occasionally at some variance with the recommended standards, usually in relatively minor ways. The standards are compromises that essentially all participants agreed upon. Of the 23 standards, the great majority were adopted unanimously, and only one had more than one or two people dissenting. In the interests of uniformity, and with the knowledge that such uniformity will provide the ability to exchange data, the participants agreed unanimously to adopt these standards as a package. The standards were widely circulated, beginning a few weeks after the workshop, and were widely adopted in the field during the next season.

After the workshop, authors of presentations were asked to submit manuscripts for the proceedings, and several additional researchers submitted new manuscripts, many based on ideas developed at the workshop. All manuscripts that were accepted have undergone several rounds of revision and peer review prior to appearing in this volume.

Organization of the Volume

The organization of this volume reflects our view of the needs of researchers interested in designing point count studies. We first present papers dealing with practical aspects of developing point count methods. Most of these papers present empirical studies of aspects of design such as duration of counts at a point and effective radius of counts. A second section looks at differences between on- and off-road counts, considering some topics involving potential roadside bias in sampling. The third section presents discussions of the underlying statistical concerns of point count studies. The concluding chapter provides standards for point counting.

We must note that real differences of opinion exist on the appropriate use of point counts, and these differences exist even among the contributors to this volume. In some cases, concerns voiced by some authors are obviously not of similar concern to other authors. We viewed our role as editors as an opportunity to allow these different views to be voiced, and we hope that the workshop and these proceedings advance the scientific discussion of the appropriate uses of these data in monitoring and ornithological research.

Acknowledgments

We thank the Branch of Migratory Bird Research, Patuxent Wildlife Research Center, USDI National Biological Survey, and the USDA Beltsville Agricultural Research Center, for providing facilities for holding the workshop and lodging the participants. As editors we also thank the many reviewers of the papers in the proceedings, acknowledged in each manuscript. In addition, Linda Long, Sherri L. Miller, and Jason Rucker provided help in bringing the final manuscripts, tables, and figures to a coherent whole for publication.

C. John Ralph, John R. Sauer, Sam Droege
Technical **Editors**



The Forest Service, U.S. Department of Agriculture, is responsible for Federal leadership in forestry. It carries out this role through four main activities:

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The Pacific Southwest Research Station

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