PREFACE

Recent broad-scale declines in bird populations have resulted in an unprecedented level of research into the factors that limit bird populations. While surveys based on bird counts can measure changes in distribution and trends in abundance, these measurements have limited value in identifying factors that directly regulate populations. In addition, measures of abundance can be poor assessments of habitat quality or habitat selection. Investigations of parameters such as productivity, survivorship, and recruitment, as well as factors affecting these parameters, are required for baseline research and successful conservation efforts.

Productivity, perhaps the most variable and important demographic parameter, is measured in both direct and indirect ways. The most common approach is to measure nest survivorship (nest success), where a successful nest is a nest that fledged at least one host young. This approach is one of the best quantifiable measurements of productivity that can be applied at multiple scales. Furthermore, estimates of nest success are commonly used to model population growth and viability, and to develop and evaluate habitat management prescriptions and other conservation actions. Accordingly, interest in estimating and identifying factors influencing nest success has never been greater (Johnson, *chapter 1 this volume*).

Nests of altricial birds are notoriously difficult to locate and typically require a systematic, labor-intensive effort to find. Formerly, one would simply take the number of nests found as the sample size, and using the number of successful nests, calculate the proportion of successful nests, termed apparent nest success. However, the majority of nests are found and monitored after clutch completion, which causes bias in the estimates of nest survivorship—nests that fail prior to discovery generally do not contribute to the dataset—while nests that are found during later stages of nesting are more likely to survive (i.e., have less opportunity to fail). In 1961, Harold P. Mayfield addressed this bias by estimating daily survival based on the numbers of days that a nest was under observation (Mayfield 1961, 1975). Mayfield's simple, yet ingenious solution of treating nest-success data has been widely used in avian demographic studies ever since and has evolved into many of the analytical approaches currently used (Johnson, *chapter 1 this volume*).

A major dilemma with the Mayfield method is that it cannot be used to build models that rigorously assess the importance of a wide range of biological factors that affect nest survival, nor can it be used to compare competing models. Many novel and powerful analytical methods to isolate factors influencing nest survivorship were introduced in the last several years. Accordingly, this has left many biologists confused about which analytical approach should be used and if changes in study design need to be considered. Thus, we hosted a workshop in conjunction with the 75th annual meeting of the Cooper Ornithological Society (15–18 June 2005, Arcata, California) to bring the statistical and biological communities together to evaluate and discuss the uses and assumptions of these new methods in order to reduce confusion and improve applications.

The primary goal of this workshop was to familiarize field biologists with the calculations and appropriate uses of the most recent methods, ensuring that appropriate data that meet the assumptions of the methods of analysis are collected. We also hoped to familiarize the biostatisticians with some of the issues in field data collection. This volume contains some of the key papers from this symposium and a few other invited manuscripts that we felt provided excellent examples on the use of these approaches.

We hope that this volume will underscore the value of consulting statisticians prior to the onset of fieldwork. More importantly, we hope that with the dissemination of the approaches described, we can begin to understand and act on the multitude of factors that limit bird populations.

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