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Book Review: Sampling Rare or Elusive Species: Concepts, Designs, and Techniques for Estimating Population Parameters

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BOOK REVIEWS

Sampling Rare or Elusive Species: Concepts, Designs, and Techniques for Estimating Population Parameters, edited by William L. Thompson. 2004. 429 pp. Island, Washington, D.C., USA. \$70 (cloth), \$35 (paper). A review by **Stewart W. Breck**.

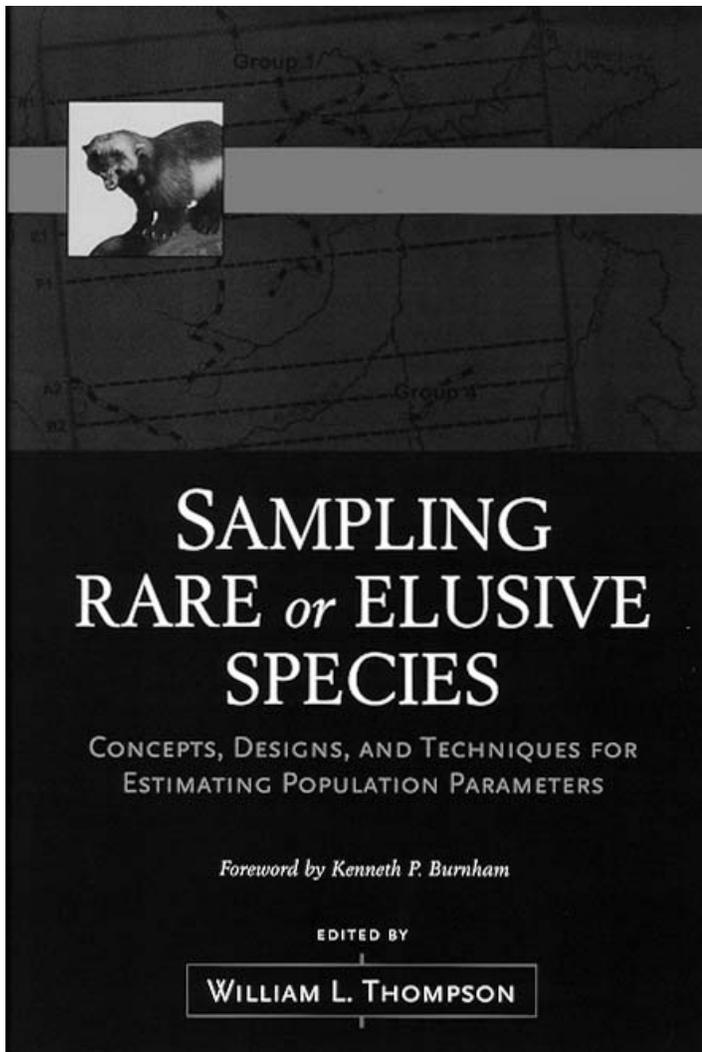
This book contains a collection of articles by Thompson and coauthors with the stated purpose of describing the latest sampling designs and counting (estimation) techniques for reliably estimating occupancy, abundance, and other population parameters of rare or elusive plants and animals. It is written primarily for the field ecologist who has some background in population monitoring and survey sampling but who has not kept current of new developments in sampling and estimation concepts targeted specifically at rare and elusive species. After reading this book, you will have a good appreciation of general difficulties associated with monitoring rare species but also many ideas to accomplish the task.

In general, each chapter follows a similar pattern of presenting an overview of theoretical developments followed by examples of field applications that elucidate these concepts. Given the

potential to fill the book with equations, the authors succeeded in minimizing biometric jargon and keeping most of the book's material within reach of any professional wildlife biologist. There are a few chapters that require some quantitative training or a more persistent reader but, by including examples of field applications, even the most challenging chapters still offer insightful advice. The examples encompass a wide array of species in a diversity of ecosystems; thus, it is likely that after reading this book you will come away with good ideas for monitoring your favorite rare or elusive species. Each chapter has an extensive bibliography allowing interested readers to easily delve into more detail about specific topics. As an added bonus, contact information for all contributing authors and reviewers is included, which will no doubt serve as an important resource for those who adopt the methodology espoused in this book.

The book is divided into 5 parts. Part 1 consists of 4 chapters that, combined, provide an introduction to the unique difficulties of monitoring rare and elusive species and background on key concepts developed to address these difficulties (e.g., spatially clustered populations, double-sampling, and detection probabilities). Chapter 2 is one of the more enjoyable in the book primarily because the author does an excellent job of explaining basic concepts while maintaining a relaxed writing style. The chapter reads as if an experienced colleague is providing a career's worth of advice over beer at a local tavern. Many examples are discussed of both successful and failed monitoring protocols that help elucidate key features of a successful monitoring program. Having failures as examples is a rarity in the published literature and, in this case, is very valuable for learning. Chapter 3 focuses on the problem of monitoring populations where individuals may or may not be available for sampling. This issue is a spin-off of the broader issue of detection probability. The authors assume that readers are familiar with concepts like "distance sampling" and "robust design." Those who are not may find this chapter a bit opaque, though the main point is that probability of being available for sampling has profound importance for properly monitoring many species. Chapter 4 weighs in on the debate of using population indices as surrogates for estimates of population size. Predictably, the authors argue strongly and successfully against indices and, in so doing, provide further justification for understanding basic sampling principles and incorporating them into a properly designed protocols.

Part 2 focuses on the first stage of a 2-stage monitoring plan, that being selecting appropriate sampling units within the geographical range of the population of interest. It contains 3 chapters all of which focus on a variant of adaptive sampling. For those unfamiliar with this relatively recent development in sampling, chapter 5 serves as an outstanding introduction. This chapter reviews the basics of adaptive sampling, challenges associated with implementing it, and questions to be addressed to determine if this technique is appropriate for particular situations. This chapter also presents 3 case studies that illustrate the application of adaptive sampling and define future needs to make adaptive sampling procedures more useful. Chapters 6 and 7 give details on variants of adaptive sampling (i.e., 2-phase adaptive



stratified random sampling and sequential sampling, respectively). These chapters reinforce the material in chapter 5 but also present situations wherein their respective methodology might be more appropriate.

Parts 3 and 4 focus on the second stage of a 2-stage monitoring program: the estimation of state variables like occupancy, abundance, density, and survival. Part 3 contains 3 chapters that all focus on estimating occupancy (i.e., the proportion of area or sample units occupied by a species). The first two chapters are somewhat challenging and require either some quantitative background or plenty of time for careful reading to thoroughly absorb the information. Chapter 8 is an excellent overview of occupancy models, answering important questions of how and why they might be used and giving detail on their similarities and differences to more familiar abundance estimators. Chapter 9 re-emphasizes concepts in chapter 8, especially the issue of detection probabilities, and then offers a Bayesian alternative to material presented in the previous chapter. The last chapter allows those of us that are less mathematically inclined to breathe a little easier. The chapter focuses on searching for new populations of rare plants and demonstrates the usefulness of taking a systematic approach.

Part 4 contains 6 chapters. The first 4 chapters focus primarily on estimating familiar state variables (i.e., abundance and density) using nontraditional methods (genetics, photography, animal tracks, and hydro-acoustics). These chapters demonstrate the importance of marrying technology and creative sampling designs to help advance our knowledge of species that are difficult to monitor. All four chapters are well written and generally serve as good reviews for their respective subject. Chapter 15 focuses on estimating survival in bats and, as I began reading this chapter, I questioned why it was included in this book. But once I finished the chapter, I had changed my mind. It serves as an excellent review of the difficulties working with bats, but also demonstrates the importance of technology by demonstrating how incorporating new technology can make a traditionally elusive species fairly easy to study. The last chapter in this part focuses on Mexican spotted owls and walks the reader through a pilot monitoring program designed to determine the feasibility of detecting change in the population of owls within a particular recovery unit. It is a long chapter and goes into great detail but probably represents the future for many monitoring plans. I suspect the material presented will serve as a good model for designing similar monitoring protocols on other species.

Part 5 is titled "The Future" and I was somewhat disappointed with this section primarily because there is only one short (8-page) paper that primarily focuses on possible developments within the second stage of a monitoring plan. Though this chapter has interesting ideas, I felt somewhat cheated by the brevity of the material; one short chapter hardly justifies a separate part for the book. Arguably, the material in this chapter could have been integrated into other sections of the book and the entire section eliminated. But, all in all, this is a minor flaw as, in reality, many of the individual chapters discuss future research possibilities and, by doing so, provide the material that this part of the book advertised.

Overall, I highly recommend this book. It is well written and

informative; the authors should be credited for synthesizing very relevant information for a sub-discipline in great need of credible methodology. For the wildlife ecologist tasked with monitoring rare or elusive species, but uncertain how, this book serves as an essential step to achieve success. For students or professionals interested in the science of rare and elusive species, consider this a must-read. For those afraid of another book full of equations, don't be; Thompson and coauthors, though no doubt capable of writing technical jargon, did a fantastic job funneling their knowledge into a very readable, informative and, dare I say, enjoyable book on sampling.

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A Field Guide to North Atlantic Wildlife: Marine Mammals, Seabirds, Fish and Other Sea Life, Noble S. Proctor and Patrick J. Lynch. 2005. 256 pp. Yale University, New Haven, Connecticut, and London, United Kingdom. \$19.95 (softcover). A review by **James R. Gilbert**.

As the wildlife profession has grown and evolved, it has encompassed more ecosystems and more classes of life. We now focus as much on nongame and endangered species as on game species. We also include more groups in our definitions of "wildlife," including some insects and mollusks. Therefore, I thought it fitting that the *Wildlife Society Bulletin* should request a review of a field guide to the significant variety of species found in the North Atlantic.

This field guide is subtitled "Marine Mammals, Seabirds, Fish, and Other Sea Life." The authors state this guide is for "the thousands of people every year who boat, fish, watch whales, look for seabirds, and otherwise enjoy the magnificent offshore environment of the northwestern North Atlantic Ocean..." In the introduction, the authors limit their range to the continental shelf and edge of the northwest Atlantic Ocean from Cape Hatteras to Labrador.

The introduction describes the variety of habitats of this region. Here, the authors also note some conservation issues in the region, including overfishing and pollution. Each species in the region listed in the International Union for the Conservation of Nature's (IUCN) Red List is highlighted with a red name.

The description of each species includes identifying characters and other information that would help an observer distinguish among similar animals. For each species, a seasonal range map is provided that includes, if appropriate, locations where nesting or breeding occurs. Patrick Lynch has provided excellent color illustrations of each species described. In several places, 2-page plates with similar species are illustrated.

The book includes illustrations of the topography of the different groups, showing names and locations of characteristics used in identifying species. The book also includes a species checklist, glossary of terms used, and an index.

Species descriptions are organized by general taxonomic group, with turtles, birds, and mammals receiving complete coverage.