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Wildlife-habitat Relationships: Concepts and Applications

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Abstract

The study of wildlife populations often includes a habitat component, and understanding the functional relationship between a species and its habitat is challenging. The theoretical and analytical tools for doing so are many, and there are numerous texts that focus on but a fraction of this material. Morrison et al. provide a broad yet thorough overview of wildlife-habitat relationships in a well organized and easy to read book that includes background material, summarizes contemporary techniques for measuring these relationships, and offers links to management strategies.

Keywords

wildlife populations, population genetics, landscape ecology

Disciplines

Natural Resources Management and Policy | Population Biology

Comments

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BOOK REVIEWS

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Wildlife-Habitat Relationships: Concepts and Applications.—Michael L. Morrison, Bruce G. Marcot, and R. William Mannan. 2006. Third Edition. Island Press, Washington, DC. 493 pp. ISBN 1-59726-094-0. \$90.00 (cloth), \$45.00 (paper).

The study of wildlife populations often includes a habitat component, and understanding the functional relationship between a species and its habitat is challenging. The theoretical and analytical tools for doing so are many, and there are numerous texts that focus on but a fraction of this material. Morrison et al. provide a broad yet thorough overview of wildlife-habitat relationships in a well organized and easy to read book that includes background material, summarizes contemporary techniques for measuring these relationships, and offers links to management strategies.

The book is organized into three broad sections that include 12 chapters, an Afterword, Glossary, and Index. References follow each individual chapter. This is the third edition, updating the second edition published in 1998, so I was expecting a different look to this edition. I was not disappointed. The text follows the same general organization as the second edition, but new examples are included and the literature is completely updated. The organization into three sections follows a logical flow from basic concepts to methods for measurement and analysis to their application to conservation and management. New material in this edition emphasizes contemporary issues such as population genetics and landscape ecology, and these themes are evident throughout the text. Examples from the published literature are cited throughout the text and nicely complement the written material. I was not surprised that many of the examples dealt with birds, a hint at the wealth of well-designed studies of this taxonomic group.

Part I covers the central concepts of wildlife-habitat relationships in three chapters. Chapter 1 provides a brief yet informative historical summary of the topic. Although I was already familiar with much of the material, I enjoyed reading a concise synopsis of the subject. In Chapter 3, I found a nice section on population perspectives. The chapter begins with a discussion of habitat, introduces the niche concept, and then broadens the discussion to include population perspectives such as population viability and population genetics. The short discussion of population viability analysis (PVA; Box 3.3) is well written and appropriately identifies the distinction between modeling actual estimates of abundance versus suitable habitat or some other surrogate measure. There, the authors briefly mention applications of the Breeding Bird Survey to

understanding bird population distributions. In the same discussion, I found it interesting that the authors incorrectly referred to the BBS as a census, despite the more appropriate term “survey” in the title. As a population biologist, I was also pleased to read the authors’ justification for managing populations and habitat jointly, rather than taking the more traditional view that emphasizes the latter.

In Part II, which comprises the bulk of the text, the focus is on measurement of wildlife-habitat relationships. The foundational chapters (Chapters 4–7) remain similar to those in the previous edition, albeit with many new examples. And while all of this material is important, I believe Chapters 5 and 6 are a must-read for anyone interested in the study of wildlife and their habitats. Too often I see studies that de-emphasize a priori thinking about theory and processes in favor of data dredging and post-hoc thinking and inferences. A quick read of these sections will reacquaint the reader with the importance of understanding the applicable theory to a question, designing an appropriate sampling scheme, and using the appropriate statistical methods for analysis and inference. Seemingly straightforward topics such as spatial scale, habitat gradients, and habitat sampling techniques are just some of the other topics covered here in detail.

The book also covers (Chapter 6) the importance of having an adequate number of samples, and how to approximate the number of samples needed in a study. One sentence caught my eye: “Regardless of the care taken in designing a study, all is for naught if an insufficient number of observations are made” (p. 187). This is a real problem for some studies and can result from logistical issues (e.g., the time constraints of a three- to four-year graduate program), because the species is rare, or as a result of poor planning. This statement is followed by a brief but useful discussion on how to calculate the number of samples needed beforehand, and why this is so important.

Perhaps one of the more important topics covered is modeling wildlife-habitat relationships (Chapter 10). Modeling tools have a long history in wildlife ecology, although they are increasingly used to answer complex questions and make predictions about the future. The text covers a wide range of topics related to modeling in general, including the definition of a model (a simple, yet often misunderstood, term), model selection, uncertainty, and error, and a rather long list of some of the types of models used in the wildlife profession (e.g., GAP analysis and Habitat Suitability models). The section on models for conservation is especially well-written

and I believe that scenario modeling will see increased use as we are asked to optimize management benefits to aid the design of conservation reserves. The chapter ends with a brief discussion of a general approach to model validation, a key step in the modeling process that is often overlooked. This section will certainly help the reader better understand modeling in general, but definitely stops short of the many mathematical details behind concepts such as model selection and parameter estimation.

The final section of the book, Part III, contains just two chapters that pull together details from the first two sections and point to the future. The focus of the first chapter (Chapter 11) is on managing wildlife habitat in multiple contexts. Readers will find the discussion of ecosystem management particularly informative, primarily because this approach is the current trend. But what is an “ecosystem”? And how can we effectively manage all the complex interactions therein when we still understand so little about them? The authors briefly review the definition of an ecosystem and then delve more deeply into management strategies, including the study of environmental correlates and key ecological functions (Table 11.2). This logically leads to a discussion of ecosystem services and, ultimately, to adaptive resource management, all of which is covered in some detail. The final chapter (Chapter 12) looks to the future. What are some of the areas that need further research? How can we expand our understanding of habitat selection, particularly as it relates to spatial scale? Other topics relate more directly to management. What is, and should be, the role of restoration ecology? And finally, how can we translate research into management? This last point is an important one—too often a well-designed research project stops short of providing the appropriate level of detail important to a manager. The chapter concludes with a short section covering the authors’ views about future efforts to educate wildlife professionals. With respect to graduate education, their recommendations include courses in general and research philosophy and theory and hypothesis development in science, in addition to more traditional courses in study design, data analysis, and modeling. Educators and students alike will find this section an interesting read.

The book provides a concise synthesis of concepts shaping our understanding of wildlife-habitat relationships, and as such is suited to a broad audience. The range of material covered is extensive, from basic definitions of habitat to their interaction with individuals and populations, from behavioral ecology to landscape ecology, and finally ending with a look into the future of educating people about wildlife habitat management. The stated audience of “advanced undergraduates, graduate students, and practicing professionals” (p. xix) matches well the material covered in this book—it’s relatively easy to read, yet informative and with a level of detail needed to thoroughly understand most concepts. Its use as a text seems best aimed at an overview course, as many quantitative approaches (e.g., resource selection functions) are omitted or receive abbreviated

coverage. Overall, the authors have raised the bar once again in providing a well-written text with thorough coverage of the many concepts needed to understand and manage wildlife and their habitats.—STEPHEN J. DINSMORE, Department of Natural Resource Ecology and Management, 339 Science II, Iowa State University, Ames, IA 50011. E-mail: cootjr@iastate.edu