

Book Review

Conserving biodiversity in agricultural landscapes: Model-based planning tools

Robert K. Swihart and Jeffrey E. Moore, *Conserving Biodiversity in Agricultural Landscapes: Model-Based Planning Tools*. Purdue University Press, West Lafayette, IN, USA 2004. 336 pp. illus., maps; 26 cm. Hardcover, ISBN 1-55753-327-X, US\$62.95; Paper, ISBN 1-55753-333-4, US\$26.95.

Conserving Biodiversity in Agricultural Landscapes is written as a road map to enhance our conceptual understanding of the role of conservation within agricultural landscapes. The book's authors and case studies are predominantly from developed United States and European countries, and as such, the book's application in some ways is limited to the same areas, in part due to issues of data requirements, and knowledge of advanced spatial modeling. In addition, the book aims to provide guidelines for researchers to better incorporate and interact with stakeholders, and to produce results which are much clearer, often simplified, and hence, of direct use to these groups. As such, the authors are aiming to stimulate progress of research within the area of 'conservation-based landscape planning,' which is interdisciplinary in approach. One of the book's strengths is that the chapters are truly interdisciplinary in terms of the range of disciplines from which the authors are attributed and also based on a long-term collaboration of these researchers across these distinct disciplinary bounds. This collaboration results in great continuity through the book, rather than being a series of papers put together in a text with little linkage across chapters. These authors clearly have worked on these issues as a group and formulated solutions as a group, all of which is refreshing to see.

The book is structured into three sections. Section one sets up the major themes and objectives for the modeling framework; section two focuses on the development of the model infrastructure, which is composed of spatially structured models; and section three addresses some of the more

practical considerations (such as organization and logistics, which can affect the ease with which such model-based tools can be implemented). The stated audience for the book is upper-level undergraduate and graduate students, as well as practicing professionals. Due to the very detailed modeling incorporated into the text discussions, there is a definite quantitative emphasis which may be off-putting to some readers. A certain level of knowledge of spatially structured models, at a background level (minimum), as well as an interest in the newly developing field of biocomplexity, is required to appreciate this text fully.

Aside from a fairly brief preface, the book does not prime the reader. This underscores that this book is for those already familiar with the subject matter and approach, not for a novice entering this field. One of the huge strengths of this book is the emphasis on the spatial: all data is collected with spatial referencing and then the models used are all spatially explicit. This takes much more time and effort, and is invigorating to see emphasized here within such an interdisciplinary text. The first three chapters serve as topic reviews, although they then build on these backgrounds to begin to establish their own models and improvements to existing techniques, such as their new analytic patch model that synthesizes features of three prior models (by allowing for both spatial and temporal structure in a landscape). The book introduces the new model in chapter four, after a brief review of metapopulation theory from Levin's original model to more recent versions. Throughout this first section of the book there is a strong use of examples and example data sets being shown as illustrations of the methods under discussion. In addition, the authors clearly highlight the advantages and disadvantages of the various methods and techniques reviewed, as well as the limitations, where applicable. This is wonderful. These chapters provide a review of current methods, a discussion of limitations, and a summary of advantages of the different approaches

discussed. While many of these earlier chapters stand alone, the latter half of the book links together. Chapter nine, in particular, provided an especially useful reference back to previous chapter topics, with the development of a simple hierarchical model to simulate the processes governing land use and land cover at both the parcel and pixel levels. Two independent cellular automata models are then used to describe land-use/land-cover change and then link this to species persistence using ecologically scaled landscape indices (ESLI's). In addition, the authors summarize briefly a few notable features of previous reviews of land-use/land-cover change models that provide a context within which their modeling approach can be examined.

Section three is the strongest part of this book. This section deals with practical considerations, and it was useful that such discussion actually takes up a significant portion of a text, not just a single chapter. This section is very useful for both graduate students and practitioners (the main audience for the text). Some of the major issues in this type of research are data availability, data quality, scale, and so on. I found this extended discussion to be exceptionally informative and useful. My favorite chapter of the book is chapter ten, which discusses modeling land use change and social/economic data considerations. This is a huge strength of this book, providing useful insights as to the practicalities involved with such interdisciplinary, data-intensive approaches to research. Chapter eleven focuses on practical discussions for considerations of field studies, including the types of data which are essential for such studies, along with use of GPS and different data collection techniques to form individual mark-recapture techniques.

Chapter twelve, likely the section most useful to graduate students, includes a case study on selecting surrogate species for ecological assessments in land-use planning. The chapter discusses the ideal measures for such research studies, and

how this can relate to the reality of actual data collection in terms of availability, landscape, ease of capture, etc. Such examples are instructive, as the limitations, assumptions and compromises, which must sometimes be made within these research projects, are illustrative and informative. The 'future directions' section of this chapter is particularly insightful and useful. The book concludes with a case study from the Netherlands, looking at interactive planning as a path to sustainable land use. While it was a fascinating case study, I considered it to be a weak ending to the book. There is no final summary, no 'take-home message,' and no 'where do we go next?' section. I would have preferred to see these issues addressed by this diverse group of researchers. In addition, I was doubtful as to how applicable their model would be for other research groups, due to the level of expertise needed, and I questioned how transferable the results were for the non-scientists and non-modelers to interpret. Overall, I felt this is a strong book for those familiar with the methods being employed, and useful to many graduate students beyond this field due to the great sections dealing with practicalities. It may be above many undergraduates, even those in their senior years, and the level of usefulness to practitioners will be a function of their knowledge in the techniques employed. As the authors state, this text does require some knowledge of spatial modeling and quantitative techniques. The book definitely emphasizes developed countries, in part as is required by the data requirements of the analyses, and also the ability to incorporate the results within some form of land use planning system.

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