Book Review

Landscape Ecology and Resource Management: Linking Theory with Practice
John A. Bissonnette & Ilse Storch, eds.
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Researchers and managers working to protect rare species are increasingly becoming aware that the spatial pattern of critical habitats and temporal variation in ecological conditions from disturbance or other processes can have strong effects on focal species' population dynamics. As the "landscape" branch of ecology has grown, many researchers have suggested that this field’s theoretical focus on understanding how spatial and temporal heterogeneity influence species could provide many insights to those working specifically on maintaining viable populations of threatened or endangered species over the long term. Although recent shifts toward larger-scale planning and an appreciation of the importance of the landscape “matrix” (the form of land use or habitat that surrounds a focal patch of habitat), suggest that theories from landscape ecology are influencing management activities, the rate of information transfer has clearly lagged behind recent theoretical developments in the field. This lack of communication is harmful in both directions, as the extent to which conservation efforts are designed without incorporation of potentially useful landscape concepts slows progress in the theory-development side of this branch of ecology due to a lack of field-based evaluations of new ideas. A new edited volume, *Landscape Ecology and Resource Management: Linking Theory and Practice*, by John A. Bissonette and Ilse Storch (2003, Island Press) was designed to help bridge this communication gap between landscape ecologists and conservation practitioners.

The specific goal of *Landscape Ecology and Resource Management: Linking Theory and Practice* is to help those involved with conservation “on the ground” become familiar with and implement concepts and analytical tools from landscape ecology. The first 12 chapters serve as tutorials on particular topics or tools, and the last five chapters comprise a set of case studies. Bissonette and Storch have organized the tutorial section (chapters 1-12) into two parts; the first focuses primarily on tools for analyzing and quantifying landscapes, and the second examines how human actions and values can be integrated with landscape level information.

The first seven chapters of the “tutorial” section address the “Conceptual and Quantitative Linkages” between theoretical principles in landscape ecology, and management challenges faced by practitioners. Here, researchers from Europe and the U.S. present diverse topics in landscape ecology, many of which are likely to be of interest to those working to protect rare species. In particular, chapters on identifying and interpreting spatial patterns of species distributions on the landscape, and the use of fitness landscapes as a tool for predicting habitat use are likely to provide thought-provoking reading for many managers. Throughout these seven chapters, the authors reinforce the importance of explicitly considering both the scale of measurement and data analysis, and the role of spatial and temporal heterogeneity. This section also introduces readers to more specific concepts and approaches such as the potential for thresholds in landscape structure, and many forms of spatial modeling, all within the context of addressing resource management problems. In particular, practitioners working with rare species are likely to appreciate a review of empirical studies testing how well landscape theories can help predict variation in vital rates and an example of how vegetation and wildlife models utilizing data collected at different scales can be merged for the purpose of predicting suitable habitat.

In the second half of part one (tutorial chapters), “Linking People, Land Use, and Landscape Values”, the focus of the chapters shifts from ecological theories and pattern analysis to the importance of considering the role human activities and societal values play in management. These five chapters explicitly integrate human land uses (primarily agriculture, hunting, grazing, and forestry) with landscape processes and patterns, and focus on topics ranging from using management to mimic forest disturbance regimes, a “neuro-fuzzy” habitat model for exploring potential changes in agriculture on target species and challenges to conserving large mammal populations in an Ugandan park. This section contrasts three chapters describing European sites with very long histories of intensive management with challenges
facing regional planners in northern Australia and National Park managers in Uganda. For those primarily interested in the human dimension of resource management challenges, I felt these two chapters describing work in the more “natural” areas of northern Australia and Uganda were most effective at conveying the importance of understanding the culture and values of local people in crafting management strategies. Many North Americans are likely to find Almo Farina’s emphasis on protecting “cultural landscapes” intriguing; in the systems he describes, the long history of land use in Europe has produced heterogeneous landscapes in which species richness is currently enhanced, rather than depleted, by active management.

The final part, “Linking Theory and Application: Case Studies” provides five in-depth examples of potential tests of the value of incorporating landscape ecology into wildlife management. The key word here is “potential”, as these case studies are primarily providing the information (e.g., ecological data and models, cultural history) that would set the stage for implementing a management plan or set of conservation priorities, but are describing cases in which implementation is in progress, or has not yet been attempted. Hopefully this book will help promote the kind of work that will allow future volumes to evaluate case studies in a wider range of stages of implementation so that more information will be available to help practitioners focus in on the most useful tools and concepts to adopt from this diverse field.

A key strength of this book is that Bissonette and Storch have done an admirable job of collecting chapters that represent many geographic regions and approaches to landscape ecology, providing a very broad view of the range of ideas pursued by researchers in this field. Some readers might miss an introductory chapter or two on the “basics” of landscape ecology, however I found the integrated nature of presenting concepts along with relevant examples and potential applications to be very effective. (Most readers involved in endangered species work can probably skip the introductory chapter, as it primarily describes the “biodiversity crisis” as a motivation for incorporating more science into management). An additional strength of this book is that, although the authors clearly have high hopes for applying theories and tools of landscape ecology to conservation problems, the book as a whole presents a balanced picture of this young scientific field. The authors, especially in the first section, have identified areas both of great promise and areas where empirical data do not support current theories or where analysis tools run the risk of becoming more sophisticated without enough reality checks on whether the patterns identified are meaningful. For example, in Chapter 1, Bissonette makes a point of calling in to question the idea that all observed spatial patterns of organisms are necessarily relevant to managers, emphasizing that it is quite possible to detect different patterns for the same species when you examine patterns from different observational scales. By taking this balanced approach, the editors have produced a book with great potential to help facilitate a dialogue between practitioners and researchers that should help to accelerate progress from both the theoretical and applied branches of landscape ecology.