BOOK REVIEWS

Protected Landscapes: A Guide for Policy-makers and Planners. By P. H. C. Lucas. Chapman & Hall, New York, NY. 1992. xvi + 297pp., 11 black and white plates, bibliography, index, appendices. $75.00 (cloth).

This book describes the protected landscapes concept and attempts to provide in-depth guidance for putting it into practice. Overall, the author was successful in achieving his objective, but with a few significant missteps.

On the positive side, the book assists in bridging the great gap between simply understanding a concept and actually implementing it. The author elaborates upon many fundamental elements necessary for effectively setting aside and managing protected areas. Among other things he emphasizes the need for local involvement at the earliest stages of concept development and planning, that planning itself is only a means, not an end, and that ecological concerns must be integrated directly into the decision making process. For the inexperienced manager there are many important discussions such as those on land control devices, the development of regulations to maintain local character, and guidance for undertaking the planning process.

The format is clear and contains numerous boxes that highlight specific guidelines, definitions, or concepts of particular importance. An appendix presents 11 case studies from around the world that describe the successes and failures of the protected landscapes concept under various political and geographic conditions. Finally, there is a substantial appendix, 92 pages long, that provides the addresses of protected area management agencies worldwide.

On the down side, the value of the protected landscape concept is over-stated. Protected landscapes, at best, can serve as poor supplements to true national parks and protected areas. Nevertheless, the author goes so far as to suggest that ". . . the protected landscape provides a clear and legitimate *alternative* to the national park . . ." (5) (reviewer's emphasis) and that " . . there is a view that some managed areas may be more diverse than the natural systems they replace, .. ." (27). Well, if anyone holds the latter view, they obviously know nothing about the true meaning of biological diversity nor have they any background in ecology. Statements such as these, besides being totally inaccurate, are particularly dangerous in a book designed to guide professional planners and policy-makers who might well take them as gospel.

Another significant shortcoming of the book is that it fails to address or even mention some of the most fundamental problems with the protected landscapes concept. The text is full of sonorous phrases such as "harmonious interaction of people and land" and references to the landscapes being in "delicate and dynamic equilibrium," that "cannot be allowed to stagnate or fossilize." However, it never makes the basic point that unless population growth is controlled in these areas, they have little chance for long-term success. Further, regular reference is made to the potential for protected landscapes to benefit from recreation and tourism and to develop in various ways, but there is no mention of the implications of this development in terms of increased resource depletion, particularly of nonrenewable resources and the need to plan for a time when they are no longer available.

Some of the protected landscapes described in the case studies are simply communities in transition that, 50 years from now, will be unrecognizable from the way they are today. Even the most stable of the protected landscapes described somehow seem to be on the precarious edge of increased development and change. Perhaps all that should be hoped for is that as this change occurs, it be undertaken in a most sensitive and environmentally considerate manner. *Protected Landscapes* does not provide a solution to the globe's biological diversity crisis, nor does it claim to. Rather, it offers a practical mechanism for sustaining at least a small portion of the earth's great natural richness.

I recommend the book as a useful tool for the policy-makers and planners for whom it was written. However, I caution that the conservation potential of the protected landscape concept as it relates to living resources is somewhat overstated. Consequently, users must be aware of this and realize that the approach must be carefully integrated into other efforts to more comprehensively conserve biological diversity—**Herbert A. Raffaele**, Office of International Affairs, U.S. Fish and Wildlife Service, Washington, D.C. 20240.

Wildlife-habitat Relationships: Concepts and Applications. By Michael L. Morrison, Bruce G. Marcot, and R. William Mannan. The University of Wisconsin Press, Madison, WI. 1992. xix + 343pp., 55 figures, 31 tables, illustrations, literature cited by chapter, index. $26.95 (cloth).

The intended audience for this book is advanced undergraduate and graduate students majoring in the wildlife sciences. The authors' goal was to write a book that provides a thorough discussion of the concepts fundamental to the development of reliable wildlife habitat relationships knowledge. To write such a book requires in-depth coverage of many topics, including both relevant theoretical and empirical studies, experimental design, quantitative methods in data exploration and of model building, the iterative feedback between model projections and field validation, and the emerging recognition of the importance of characterizing habitat pattern at a landscape scale to fully understand wildlife population dynamics. Also, to be successful, the book must candidly discuss why wildlife-habitat relationship (WHR) models have such a legacy of failure, and what needs to be done to improve their reliability.

I believe the authors have only partially succeeded at achieving their goal. With some notable exceptions, I found many of the chapters to be rather introductory and to lack the conceptual depth required of a graduate text. The chapters contain numerous references, but few are discussed with sufficient detail that you could avoid going to the primary literature. Despite the extensive literature cited in most chapters, the relevant work of several key researchers is not discussed. Further, there is a bias toward the bird literature, reflecting the authors' research backgrounds.

Fundamental to the topic of this book are the concepts of habitat, habitat quality, and the evolution of habitat selection. Early in the book, the authors define, correctly, the concept of habitat quality relative to expected values for birth and death rates. However, the necessity to relate patterns of habitat variation to patterns of demographic variation to understand and develop reliable WHR models is not further pursued. Recent work (e.g., Pulliam 1988) has clearly indicated that a reliable understanding of WHR's will require the simultaneous measurement of habitat and some attribute directly relevant to an animal's fitness.

Understanding habitat selection, as a behavior evolved to maximize lifetime reproductive success, is fundamental to understanding a species habitat distribution. Some of the most significant work establishing an evolutionary foundation to habitat selection has been written by D. W. Morris, H. R. Pulliam, M. L. Rosenzweig, and T. R. E. Southwood. However, the relevant work of these authors is not discussed.

The authors recognize that the spatial distribution of habitat is every bit as important as habitat amount--they devote an entire chapter to habitat fragmentation. The effects of spatial distribution of habitat are largely conjectural at this time; still a number of substantive papers have been published in this field. Excluding some of the more quantitative and theoretical work from the discussion (e.g., Patterson and Atmar 1986, Patterson 1987, and Gardner 1990), unnecessarily limited the scope of the chapter to the prevailing concept of fragmentation. In my opinion, one of the most relevant theoretical works on the importance of habitat geometry to species habitat use patterns is not discussed-the significant observation that a species can be severely habitat-limited, and go extinct in the presence of suitable, unoccupied habitat because of the spatial arrangement of habitat across the landscape coupled with the uncertainties of dispersal (Lande 1987). Also, few of the key works in landscape ecology and methods of measuring fragmentation are cited (e.g., O'Neill et al. 1988).

The chapter on measuring habitat is generally descriptive and prescriptive. The importance of measuring at a number of spatial scales, however, is appropriately emphasized. Based on recent advances in animal-habitat models, 2 major aspects of measurement are not discussed. These are measurements that reflect the spatial context and pattern of habitat, and the explicit treatment of habitat (i.e., vegetation) as a dynamic entity. The concept of source/sink habitats is discussed, but the most rigorous treatment of this topic (Pulliam 1988), which clearly establishes the necessity to link demography to habitat use patterns, is not discussed. The authors make an important, and somewhat unique, extension of habitat relationships by stressing how foraging behavior can be used to provide insights into an animal's habitat requirements; this leads to an independent chapter on foraging behavior.

The chapter on foraging has more depth than previous chapters, and provides a convincing argument for the importance of studying foraging behavior to understand habitat relationships. From this chapter on, the authors seem to shift gears from the generalized discussions that characterized previous chapters and provide an in-depth and rigorous discussion of the process of developing and validating predictive models and the usefulness of multivariate statistics in estimating the form of these models. These 2 chapters, along with the one on foraging, are the strengths of the book. For the most part, I found the coverage in these chapters to be lucid and comprehensive. There are some curiosities, however. For example, there is frequent juxtaposition of introductory and advanced, subtle concepts with little transition between them. Further, the authors write about topics (model development and multivariate statistics) that are inherently quantitative, yet they use almost no mathematics! I'm concerned that this gives the wrong message to students in wildlife ecology who, for the most part, are already marginally literate in, and motivated to, study mathematics.

The most regrettable omission from the book was the lack of a concluding chapter pointing the direction towards the future research needed to improve our understanding of wildlife-habitat relationships. Given a legacy of failed models, this is certainly an important topic (see numerous papers in Verner et al. [1986] and Rexstad et al. [1988]).

Based on an underlying assumption that populations track, to varying degrees, vegetation changes, most models of wildlife-habitat relationships have used biometric approaches to estimate the relationship between variation in some population response (usually abundance, presence/absence) and variation in a large number of habitat variables. A first goal is to explain the maximal amount of abundance variation, for example, in terms of variation in structural and floristic aspects of the vegetation. Given a statistically significant model, predictions are then made as to the likely response to changes in vegetation structure or composition. Judged solely on a criterion of statistical significance, these attempts have been very successful. Judged on criteria of biological insight and predictive power, these approaches have largely been failures. Devoting the final chapter to multivariate statistics encourages a restrictive use of descriptive, biometric approaches to understanding WHR's.

A strict statistical approach, implicitly endorsed in this book, has failed for many reasons. One is that statistical models estimate static relationships, and provide no insights to how animals track vegetation changes, or the length of any time lags in population response. For a threatened species that is habitat-limited, for example, knowledge of the transient behavior of its population during periods of vegetation change may be the most critical information required for its conservation. Thus, the explicit incorporation of vegetation dynamics is a first step towards improved models. A second reason for failure is that

most studies have been conducted at a single scale. Measuring habitat requires measuring many variables at many scales. At least 2 scales are important--the nest site and foraging area at the individual level, and, at the population level, measures of habitat amount and geometry. Thus, the incorporation of scale, in a spatially-explicit format, is a second step toward improved models. A third reason for failure is that we have often studied the wrong response variable. Abundance and presence/absence variables should often be replaced with more direct measures of fitness such as fecundity and survival rates. This change also should lead to improved models. A final reason is that almost all studies have been observational, with inference based on patterns of correlation. Improved understanding of habitat relationships will require greater attention to study design and experimentation.

These approaches to investigating wildlife-habitat relationships are more difficult, and will require greater field effort and better experimental designs. Morrison, Marcot, and Mannan have provided a broad summary of where we are now and how we got there, but they fail to point us in the direction we need to go to improve our ability to forecast the response of wildlife to the inevitable changes that will occur to their habitats.

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Ecology and Management of Coppice Woodlands. Edited by G. P. Buckley. Chapman and Hall, New York, NY. 1992. xii + 336pp., 65 figures, 53 tables, references cited by chapter, bibliography, index. $87.50 (cloth).

This is a well-produced book about a woodland management system which, until recently in Britain in particular, was one of the major methods of exploiting natural forests. The volume is based on a meeting of the British Ecological Society's Forest Ecology Group held in 1990 and as such represents the most up-to-date account of this woodland system.

The practice of coppicing may be unknown to many readers of this review. It is the activity of repeatedly cutting down woodland trees (often growing under a cover of larger trees or 'standards'), which then regrow by themselves, forming a new canopy. As the preface says, the process is almost infinitely repeatable. Some woods have been coppiced in Britain for hundreds or even thousands of years, many having descended from an earlier, primeval woodland cover. The traditional markets for the wood produce, which kept the practice alive for so long, demanded small poles and brushwood for fuel, fodder, thatch, fencing materials, charcoals and hand tools. The larger trees were grown over the 'underwood' for construction timber to build, for example, ships and houses. Coppicing has therefore created woodlands with a highly specialized ecology but, in the recent past, decline in demand has forced a decline in this management activity. Its recent resurgence in Britain has been largely due to its nature conservation interest and is stimulating local markets once again albeit on a smaller scale than in the past.

The book is about the status, management and ecology of coppiced woodlands. Their inherent diversity has led to their being studied in some detail and the book brings together what is currently known about them. The way forward in these studies is likely to concentrate on how coppicing compares with alternative, less intensive forms of woodland management such as conversion to high forest, the felling of smaller groups rather than 'coupes' of coppice areas, the use of wood pasture in which livestock grazing is integrated within the forest management practice, and simple non-intervention methods where the build-up of coarse woody debris is allowed to develop, the latter having been particularly concentrated upon in the United States.

There are eight sections containing contributions from the 25 authors, all from the U.K. The introduction has a description of coppicing in the lowland landscape, from George Peterken, one of the best known woodland ecologists, showing the contribution made by coppice woodlands to landscape structure by their association with hedgerows, valley grasslands, and other habitat features. The overview of coppice forestry provides an audit of the extent of coppice in Britain and the source of potential future markets.

Section two concerns the physical environment within the coppice system such as growth stages, microclimate, radiation effects on the ground flora, and soil-water relationships, showing how conditions change with the re-growth and then subsequent cutting of the wood, with important implications for managing ground flora for conservation and obtaining the optimum yield from the trees. Section three