

BOOK REVIEWS

Wildlife, Fire and Future Climate. A Forest Ecosystem Analysis

BY BRENDAN MACKEY, DAVID LINDENMAYER, MALCOLM GILL, MICHAEL MCCARTHY AND JANETTE LINDESAY

viii + 188 pp., 25 × 17.5 × 1 cm, ISBN 0 643 06756 6 paperback, GB£ 34.50, Collingwood, Australia: CSIRO Publishing, 2002

This book has a very general title, and most readers would expect a treatise on wildlife, fire and climate interactions globally, or at least for a large range of ecosystems. However, the book is actually a case study of two catchments in the central highlands of Victoria, Australia. There are six chapters plus two appendices. The first two chapters involve general discussions of forest refugia and the significance of refugia for arboreal marsupials. Fire enters into the discussion in Chapter 3 and includes basic concepts on fire behaviour parameters as well as fire cycles. Chapter 4 presents a landscape analysis for the two study catchments, whereas Chapter 5 presents climate relationships for a larger study area, including regional climate model simulations. The concluding chapter presents some views on the future of these refugia, given changes in the forest caused by the replacement of natural fire with clear-felling practices. The appendices provide more detail on the development of the spatial database and analysis of the climate models. The chapters are well-referenced and there is a suitable index at the back.

The book is suitable for undergraduate students, or students who are unfamiliar with this field of study. It describes many of the basic concepts in wildlife habitat and the principles of fire ecology. However, the details are specific to *Eucalyptus* forests, especially those occurring in a small geographical area. Hence, the book will have limited appeal to students interested in other parts of the world. I would not recommend the fire behaviour/ecology section as a general overview that could be used for other ecosystems.

This book is an ecosystem case study, but only deals with certain aspects of the ecology of the central highlands of Victoria. Arboreal marsupial habitat is highlighted, and the influence of fire and logging on the forest structure required to support these animals is one of the main thrusts. Overall biodiversity is not treated fully: insects, birds, non-arboreal marsupials, and surface vegetation are largely ignored. Hence, there is insufficient information to evaluate the true ecosystem impacts of a changing fire or climate regime. The book's usefulness is restricted, and a much better title would be 'Habitat for Arboreal Marsupials in the Central Highlands of Victoria, Australia: impacts of fire, logging and future climate'. The book does a good job at addressing issues related to this title, and will appeal to environmental conservationists interested in this particular subject.

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Riparian Areas. Functions and Strategies for Management

BY COMMITTEE ON RIPARIAN ZONE FUNCTIONING AND STRATEGIES FOR MANAGEMENT, WATER SCIENCE AND TECHNOLOGY BOARD, NATIONAL RESEARCH COUNCIL

xii + 428 pp., 23.5 × 16 × 3 cm, ISBN 0 309 08295 1 hardback, Washington, DC, USA: National Academy Press, 2002

The authors of *Riparian Areas* have undertaken a formidable task: 'to recognize and identify the attributes of riparian areas and make recommendations for managing and maintaining these attributes [throughout the United States]'. Underlying everything that follows is the 'overriding' recommendation that 'Restoration of riparian functions along America's waterbodies should be a national goal'.

The book consists of a comprehensive summary of the entire work, an introduction, and four additional chapters that address in both breadth and depth the following aspects of riparian areas: structure and functions, human alterations, existing legal protection, and management strategies. Each chapter is essentially an extensive review of the literature dealing with that aspect of riparian areas. Indeed, one of the most useful components of this study is the comprehensiveness and currency of the References sections.

Based as it is on a review of existing literature, there may be few new insights for those already deeply involved in riparian ecology or management, although the breadth of the studies drawn upon should prove informative even for such individuals. The real audiences for *Riparian Areas* are political and administrative decision-makers at all levels, from federal to local, and the interested general public. *Riparian Areas* would also serve as an excellent text for undergraduate courses on riparian ecology, management, and policy, and its extensive references could provide invaluable assistance to graduate students, especially in the areas of riparian ecology and management (including restoration).

To assist these audiences, the authors not only present their material in language understandable to the educated lay-reader amply supported with data, but also, to compensate for the large quantity of information, provide brief and cogent summaries and recommendations at the end of each section. In addition, the numerous tables, figures, graphs and sidebar examples complement and underscore the text by their appropriateness and their simplicity. Suggestions for research needs not only underscore areas in which current knowledge is inadequate, but provide directions for future efforts.

So inclusive is this study, it is difficult to single out elements that merit special attention, but a brief overview of the main chapters will provide some idea of the sweep. 'Structure and functioning of riparian areas' places riparian areas within their landscape contexts, explains clearly the numerous ecological roles they play, and stresses the links between riparian areas and their surrounding uplands. 'Human alterations' covers the full range of human activities and impacts, from grazing to logging, and mining to recreation, within both historical contemporary frameworks. 'Existing legal strategies' notes not only federal laws, but also approaches state and local governments have available. Their conclusion is that 'existing legal and management protection of the ecological functions and values of riparian areas is inadequate'. 'Management of riparian areas' addresses both passive and active management options, with

emphasis on the value of the former. In a caution to those who see improvements as both simple and quick, the authors stress that 'restoration' may have to assume a variety of forms along a continuum of realistic objectives and that 'patience and persistence ... are required'. Unfortunately, their observations that many projects are focused too narrowly on a single objective (often recovery of a single species) and based on an inadequate understanding of a specific situation are apt to be overlooked by those anxious to 'do something'. As if to emphasize the need for understanding before action, there is an extensive section devoted to methods for assessing riparian areas, including both 'functional assessments' and 'reference-based methods'.

Although the authors point out the need for education and incentives, the emphasis seems to be on legal measures for protection. While such emphasis may well be appropriate, it will, no doubt, influence the receptivity of some of those who need to understand and deal with the information and recommendations. That observation notwithstanding, *Riparian Areas* belongs on the shelf of students, practitioners, administrators, and policy-makers who seek to understand and manage the USA's riparian areas.

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Governing Global Biodiversity: the Evolution and Implementation of the Convention on Biological Diversity

EDITED BY PHILIPPE G. LE PRESTRE

xix + 428 pp., 9 figs., 9 tables, 12 boxes, 22 × 15 × 3 cm, ISBN 0 75461744 0 hardback, GB£ 45.00/US\$ 79.95, Aldershot, UK/ Burlington, USA: Ashgate Publishing Ltd, 2002

Le Prestre and his mainly Canadian-Swiss team provide an overview of the negotiation and workings of the 1992 Convention on Biological Diversity (CBD), which they see as the 'first true sustainable development convention' (p. 1). They consciously strive to address policy analysts, decision-makers and activists as well as academics, but their work is easily accessible only to readers already familiar with the processes of negotiating and implementing multi-lateral agreements.

Aware that 10 years is too short a time for determining whether the CBD has inspired more effective preservation of species, the authors assess whether its provisions have promoted redirection of the behaviour of governments and other actors towards attaining the three CBD goals of species conservation, ecologically-sustainable use, and fair benefit-sharing. Yet the evidence on this point is also fragmentary, leading the authors to develop a primarily normative analysis of the CBD as a vehicle for promoting a new style of global governance. This new style, most vividly portrayed in Figure 12.2 (p. 258), would redefine nature-human relations to emphasize long-term sustainability and human-human relations to emphasize equity and broad participation in governing processes. To their credit, the authors state their preferences clearly and generally acknowledge the strong tensions that exist not only among actors with different beliefs and interests involved in negotiating and implementing the CBD, but also among its conservation, sustainable-use and equitable benefit-sharing goals.

Most chapters convey a sophisticated appreciation of how these tensions shaped both the lengthy process of negotiating the framework CBD and related protocols, and the ensuing efforts to operationalize and implement those agreements. The convoluted course of negotiations is traced in chapters 1 and 2. Chapters 3 and 4 apply the well-developed political science, policy studies and legal literatures on implementation of multilateral agreements to the CBD as a whole. Following chapters examine the workings of selected parts of the CBD: the information clearing house, the Advance Informed Agreement Procedure for export of genetically modified organisms, and the effort to define the respective rights of bioengineers and of farmers or local communities where species providing the germplasm used in genetic research exist. A third set of chapters examines the impact of sets of ideas (Western-style natural science, local knowledge and economic theories) on issue-definition, negotiations and implementation efforts. One chapter, placed oddly with the chapters on ideas, addresses the thorny problem of coordinating among FAO, WTO and CBD-based rules relevant to ecosystem protection. Two chapters, on Canada and Madagascar respectively, indicate the formidable challenges facing national governments in implementing the CBD provisions.

Because the very brief introduction does not provide enough of a 'roadmap' to the material that follows, readers should skip to Le Prestre's concluding chapter before starting the others. Readers also need to pay close attention to the figures and tables conveying key elements of some of the arguments. Tables 1.1 and 1.2, Figure 10.2, and Figure 11.1 are particularly important and provide significant clarification. Figures 3.1 and 3.2, and Table 6.1 (the last with an odd reverse numbering of items) are also important, but far less effective.

McGraw and Pythoud and Thomas provide good descriptions of the negotiations. Le Prestre's two chapters on implementation and effectiveness place the CBD in a comparative context. Wolf's chapter nicely compares the Biosafety Protocol's Advance Informed Agreement Procedure to similar provisions in the hazardous wastes and toxic chemicals regimes. All the chapters must convey a lot of information and analysis in few pages, but those on the clearing-house mechanism, benefit sharing, and interrelations among different regimes relevant to biodiversity are too schematic to be fully persuasive.

Even readers who do not share the authors' normative preferences or are inclined to think the CBD will collapse under its own complexity will find a lot of useful information in this volume. The 'boxes' summarizing factual data, though frequently disrupting the flow of the text, provide good summaries of events and handy material for presentation or course handouts. The appendices include a fine chronology of the CBD and its antecedents, information on national implementation efforts through 2001, on participation in CBD meetings, and the text of the CBD itself. The volume is not the definitive study of the CBD, but it is an important early assessment.

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New Tools for Environmental Protection: Education, Information, and Voluntary Measures

EDITED BY THOMAS DIETZ AND PAUL C. STERN

xi + 356 pp., 22.5 × 15 × 2 cm, ISBN 0 309 08422 9 paperback, US\$ 55.00/GB£ 39.95, Washington, DC, USA: National Academy Press, 2002

One of the problems in creating a book from a workshop is the uneven quality of the chapters that can result. After all, if you invited someone to present a paper for the workshop, you are largely duty-bound to include that paper in the volume that results. While *New Tools for Environmental Protection* suffers some of this malady (it is based on a workshop sponsored by the Committee on the Human Dimension of Global Change of the National Research Council and supported by the US EPA's [Environmental Protection Agency's] Office of Environmental Education), the volume is essentially a well-written and thoughtful review of alternatives to traditional tools of environmental protection.

The 'new tools' of this book include education and social marketing, the provision of information (as in the USA's Toxic Release Inventory), and voluntary measures in the private sector. The articles in this book reflect an interesting mix of theory, practice and evaluation in several disciplines, including education, economics, social psychology and public policy. The structure is logical. The editors introduce each of three parts to the book, and a concluding chapter interprets the multiple perspectives of chapter authors.

Part I explores the context for the interest in new tools. One possible explanation of the need for these tools is that while the traditional tools, the command-and-control or market-based approaches, were successful in addressing pollution from point-source industrial polluters, they may be less effective in dealing with nonpoint-source pollution and environmental damage from the cumulative effects of personal consumption decisions. Another possible motivation for new tools is ideological. It may signal the capture of regulatory agencies and policymakers by the regulated industries. Part II focuses on several aspects of education, social marketing and information, including experience in non-environmental realms like disaster preparedness. Part III reviews voluntary measures from the private sector, including industry-wide codes of conduct, environmental management systems like ISO 14000, and voluntary government programme like the US EPA's 33/50 programme.

The strength of this book is the balanced and thorough approach it takes, presenting the theoretical potential of new tools to achieve environmental quality improvements and evaluating the effectiveness of new tools when they have been applied to date. For example, Kathryn Harrison's evaluation of USA and Canadian government-sponsored voluntary environmental programmes is a first rate discussion of the importance and difficulty of effective programme evaluation in this area. Likewise, Herb, Helms and Jensen's evaluation of the USA's Toxic Release Inventory programme is invaluable for anyone wanting to assess the use of information to affect environmental improvement.

This collection of essays should be a first stop for policy makers and academics interested in the potential for new tools. Also, students in upper-level undergraduate classes in environmental management would profit from several of the chapters, particularly in Part III on voluntary measures in the private sector. The book is well edited and the chapters are clearly written. The only desirable editorial improvement would be the addition of an index.

In the concluding chapter, Wilbanks and Stern suggest that, 'Although the potential of the tools discussed in the earlier chapters in this volume are intriguing, the main conclusions are a bit paradoxical' (p. 337). In place of paradoxical, I might say ambiguous. The volume offers the reader both a hope that new tools might be cost-effective alternatives to traditional regulatory and economic approaches and a healthy scepticism that such an outcome could be realized in practice.

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EDITED BY PAUL J. B. HART AND JOHN D. REYNOLDS

856 pp., 25 × 19 × 2.5 cm, ISBN 0 632 06483 8 hardback, GB£ 130.00, Oxford, UK: Blackwell Science Ltd, 2002

Fishery biologists have an unenviable task. They attempt to ensure the long-term continuance of resources that are not only inherently variable, but placed under ever-increasing pressure from exploitation. Thus, deleterious impacts occur much more quickly than information about them is received, and management decisions must often be made based on limited information. It is becoming clear through bitter experience that such reactive, rather than proactive approaches to fishery management are less than effective. To make matters worse, the recommendations of fishery biologists may or may not be implemented, depending on the economic and social pressures prevailing at the time. This book (or rather, books) is a step forward, and reflects a growing awareness of the need to view exploited fish populations in the context of their environment and the management of their exploitation as dependent on more than population dynamics.

Volumes 1 and 2 are subtitled *Fish Biology* and *Fisheries*, respectively, an interesting separation in a publication that seeks to integrate the fields. However, the amount of overlap in subject matter between the volumes is large, and I view the division as merely convenient. This means that the editors have probably succeeded in their aim. Hart and Reynolds have assembled an impressive group of authors, and, as they state in their introduction, have allowed them the freedom to summarize their respective fields. This is a strength of the book, because chapters on similar topics by different authors do not necessarily agree, and the diversity of perspective becomes clear.

Fish Biology (Volume 1) is divided into four parts: Biodiversity, Production and population structure, Fish as predators and prey, and Fish in ecosystems. In the first part, Gill and Mooi provide two very readable chapters that summarize the systematics and biogeography of fishes worldwide. Part 2 comprises seven chapters: The physiology of living in water (Brix), Environmental factors and rates of development and growth (Jobling), Recruitment (Myers), Life histories (Hutchings), Migration (Metcalf, Arnold and McDowall), Genetics (Ward), and Reproductive behaviour (Forsgren, Reynolds and Berglund). All are well written and present critical summaries of those fields. In particular, I enjoyed Myers' call for more attempts to move beyond conceptual models, and his

use of small-scale ecological studies to shed light on recruitment questions. Traditionally, fishery models tended to ignore the 'academic' ecological literature. However, since that chapter was very much written from the fishery biologist's perspective, it might have been edifying to have given the same brief to a field ecologist to see whether the same issues appear in the 'future research' section.

The section on 'Fish as predators and prey' comprises three chapters. Mittelbach explains the theoretical basis for foraging and relationships with habitat choice, and examines some of the conflict between optimality theory and empirical results. This is followed by reviews of the feeding ecology of piscivorous fish (Juanes, Buckel and Scharf) and fish as prey (Krause, Hensor and Ruxton). If I have any minor quibble here it is that, while the latter chapter is well written, the review is based almost entirely on freshwater literature and ignores the considerable amount of field experimentation done with marine fishes, particularly in the tropics.

Four chapters complete Volume 1. Polunin and Pinnegar summarize the complexity of marine food webs that is known, and draw attention to much that is not, along with the potential implications for our understanding of fisheries. Persson then examines the community ecology of freshwater fishes, and Jones Fitzgerald and Sale examine the community ecology of marine fishes. Finally, Barber and Poulin look at the parasites of fishes, with emphasis on the human implications.

Volume 2 opens with a chapter by the editors that highlights the interaction between human interests and fisheries, which leads nicely into chapters on fishing technology (Misund, Kolding and Fréon), marketing (Young and Muir), a brief history of fisheries and fisheries management (Smith) and data gathering for stock assessment (Evans and Grainger). All are useful and highly readable introductions to their respective topics. What follows is more challenging. Part 2 is subtitled 'Stock assessment', and to the uninitiated presents a daunting array of complex models incorporating more traditional as well as modern approaches to determining how many fish remain to be caught. Schnute and Richards introduce surplus production models, and rapidly move to the cutting edge of the field. Two chapters on dynamic pool models by Shepherd and Pope explain single- and multispecies virtual population analysis, and Pitcher summarizes knowledge with regard to length-based assessment. Pauly and Christensen then introduce ecosystem models based on the Ecopath group of mass-balance models, which contrasts with the next chapter on individual-based models by Huse, Giske and Salvanes. Following a review of the economics of fisheries (Hannesson), Sparre and Hart review fisheries models in general, and tie together the material from the preceding chapters. Several of the authors draw attention to the potential drawbacks of models, and Sparre and Hart take pains to emphasize the need for thought when it comes to selecting appropriate models and parameterizing them.

Several of the chapters in these volumes make brief mention of the possible benefits of marine protected areas (MPAs), and it is appropriate that the first chapter of the final section, 'Fisheries in a wider context', examines this topic. Polunin provides a refreshingly critical and balanced assessment of the possibilities for MPAs to contribute to mitigating damage caused by fishing. Although Polunin lists possible benefits to science in a table of advantages and disadvantages of MPAs, I feel the possibilities for using MPAs to test assumptions made in fishery models are perhaps slightly under-emphasized. Reynolds, Dulvy and Roberts then discuss the effects of fishing in terms of conservation, and the possibility of local extirpations to result in the extinction of rare species in the marine

environment. The penultimate chapter by Kaiser and Jennings succinctly summarizes direct and indirect effects of fishing at the ecosystem level. However, they downplay the possibility for trophic cascade effects resulting from removal of predatory fishes in temperate marine environments, despite recent published evidence supporting top-down control of reef community structure. Finally, Cowx discusses recreational fishing and its management, arguing for a need to assess the social and economic value of this sector. I'm inclined to agree, as where commercial and recreational fisheries overlap, failure to incorporate estimates of recreational take into stock assessments will increase risk of overfishing. Knowing the true value of this sector will justify effort spent in assessing its impacts.

I have only one criticism (and this is more of a wish) in terms of content of this volume, and that is the omission of a dedicated chapter examining the issue of discarding, by-catch and gear selectivity in detail. Although some of the issues are touched upon by Misund *et al.*, and examined further by Pauly and Christensen, Reynolds *et al.*, and Kaiser and Jennings, wastage occurring as part of the fishing process is often not estimated. Incidental mortality of juveniles of fished species caused by fishing gear has potentially important consequences for stock dynamics, and measures for reducing waste may have significant benefits to fished stocks.

That said, one of the strengths of this book is the breadth of coverage. Assembling all aspects of fisheries biology into one cohesive publication must have been a difficult task. As Smith (Volume 2, p. 69) states, '... the motivations of fishermen are complex and not always rational', so a real understanding of the problems facing fishery management requires the multidisciplinary approach given here. Most of the chapters succeed in providing a comprehensible introduction to their field for the non-specialist, there are comments and suggestions for new research directions that provide food for thought for more experienced workers. It is much more than a handbook, and despite the fairly hefty price tag I wholeheartedly recommend it to students and professionals alike.

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Making Waves. Integrating Coastal Conservation and Development

BY KATRINA BROWN, EMMA L. TOMPKINS AND W. NEIL ADGER

vii + 164 pp., 23 × 15 × 1.5 cm, ISBN 1 85383 912 4 paperback, GB£ 17.95, London, UK: Earthscan Publications Ltd, 2002

This is an interesting book, dealing with the coastal zone and sustainable management practices. It covers examples of over-fishing, tourism, the legal status of the coastal zone and different approaches to coastal zone management (CZM). There is a substantial section on the different ways decisions on coastal zone issues can be made, from the 'top down' legal and legislative approach through to local agreements and participatory methods. The majority of the examples in the book come from the authors' experiences in the Caribbean (Tobago), where the process of setting up a marine park, the involvement of different groups of organizations and stake-

holders, and the types of issues raised are all clearly described. The authors' case is that many of these lessons can be applied elsewhere and, as such, this is a good primer for the different approaches and tools for establishing criteria for management. As a biologist, I found it interesting to see the methods used within a different discipline to obtain and deal with data. The 'tropical' emphasis of the book does mean that issues pertaining to UK and European waters are not necessarily well covered. It would have been nice to see some well-worked examples from Europe or the USA, where the issues (coastal eutrophication, industrial rather than artisanal overfishing, major developments) and scale are rather different. For examples, shoreline management plans in England and Wales are briefly mentioned (half a page), but there is no critical analysis of examples where these have been shown to be successful, or of how successful schemes differ from less-successful initiatives. Neither is the European Union Water framework directive mentioned, which will be driving much of the integrated CZM in Europe for the next 10 years. Perhaps it is premature to address this issue, but there are good examples of integrated management from Scandinavian countries that could have been dealt with in the European context.

In summary, the book is well written and laid out. It is a useful and topical book for undergraduate and postgraduate students studying the broader aspects of ecological management or marine biology. However, it is very 'tropical' in its use of examples.

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Ecoregion-Based Design for Sustainability

BY ROBERT G. BAILEY

xiii + 222 pp., 23.5 × 17.7 × 1 cm, ISBN 0 387 95430 9
 paperback, US\$ 49.95/GB£ 38.50, New York, USA: Springer-Verlag New York Inc., 2002

This book is superbly illustrated with 100 illustrations, 93 in full colour. Although ecoregions are defined, the book moves well beyond classical ecology and links with environmental sustainability. Bailey's two previous books *Ecosystem Geography* (Springer-Verlag, 1996) and *Ecoregions: The Ecosystem Geography of the Oceans and Continents* (Springer-Verlag, 1998) describe ecoregions in more detail for readers wishing to extend their knowledge of this important subject. The book is a good read, primarily because of the transdisciplinary approach, which includes a glossary with definitions of key terms. The book is not a technical reference that is replete with case histories and the like, but rather takes a systems-level approach designed to broaden perspectives and, arguably most important, to enable those in other professions to incorporate ecoregions into their designs.

Bailey discusses how to improve humankind's relationship with natural systems by designing technologies to mimic natural functions. This concept is the key to sustainable design. He deplores the fragmentation of knowledge that focuses on a system's components almost to the exclusion of the system itself.

Linking across scales is one of the primary obstacles in the path to sustainability. The illustrations and examples Bailey uses in this

discussion are both persuasive and diverse. The linking across scales facilitates the assessment of cumulative effects of action at one scale and its effects on others.

Landscape mosaics have received far too little attention in the discussion on sustainability. The hierarchy of ecosystems is well illustrated and discussed in this book. The process of differentiation is especially important since there are prospects of significant global warming. A substantive discussion of ecological thresholds and resilience might have been helpful at this point, but also might not be appropriate for a book of this size.

Bailey's discussion of an ecological approach to sustaining ecosystems might best have commenced with the caveat that there will only be confidence in the attributes of sustainability after it has actually been experienced for at least four or five decades; centuries may be required for robust confidence. Confidence is critical because adaptive management is essential to ecology-based design. The components in Bailey's discussion here, such as history and a sense of place, are presented well and are congruent with the other sections of the book. The inclusion of home design is especially important for the transition to sustainable living. Water and energy conservation, as well as a sense of community (for example, social capital), are important components of sustainability. The discussion on wide-scale ecological processes is far too brief; emphasis should have been given to them as constituting the planet's ecological life support system. Recognition of humankind's dependence upon wide-scale ecological processes may be the major factor that encourages some people to accept sustainability.

An emphasis on the ecological support system should have also been included in Bailey's discussion of ecosystem management and reliable delivery of ecosystem services. The discussion on ecosystem management includes landscaping and restoration, but ecological monitoring (ensuring that previously established quality control conditions are being met), false negatives (nothing wrong when something is actually wrong), and false positives (all is well when it is not) should have been included as essential ecosystem management factors. Pattern-based design is well discussed.

Bailey's discussion on how land-management agencies, conservation organizations and others use ecoregion maps is brief but very useful. A brief discussion could have been focused on how to get diverse special interest groups to synthesize their efforts so that ecosystem integrity is not impaired while permitting use without environmental abuse by a variety of groups and individuals. This problem is complex and multidimensional, perhaps far beyond the limits of a book of this size. The reader could have been made more aware of the problem itself in two ways: (1) a simple list of the groups with special interests in the Thames and Rhine Rivers or the USA Florida Everglades and (2) references that illustrate how synthesis of efforts has been addressed.

The discussion of matching development to the limits of the regions in which people live would have greatly benefited from information from the literature on the 'ecological footprint'. This addition would have made the point that the resources we use come from ecoregions outside those inhabited. Mention of Garrett Hardin's classic paper 'The Tragedy of the Commons' would have identified one of the major obstacles to sustainability, misuse of the commons.

The appendices give useful information. Those not acquainted with the subject will benefit from these sections.

Overall, the book is a 'good read', which even experienced professionals should enjoy because transdisciplinary communication, as well as communication with laypersons, can be vastly

improved. No book (especially 222 pages) on such a broad topic should be expected to cover every component. But this volume covers a large, diverse array of topics quite well.

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Wildlife Restoration. Techniques for Habitat Analysis and Animal Monitoring

BY MICHAEL L. MORRISON

xix + 209 pp., 23 × 15 × 1.2 cm, ISBN 1 55963 937 7 paperback, US\$25.00, Washington, DC, USA: Island Press, 2002

Wildlife Restoration: Techniques for Habitat Analysis and Animal Monitoring is the first in a series of Society for Ecological Restoration books edited by James Aronson and Donald Falk, and published by Island Press. The book is attractive in a softbound format, and its eight chapters and bibliography comprise a volume of 209 pages. A cloth edition is also available. The text is clearly and simply written so that it would fit easily into a university course, such as my own, in Restoration Ecology. It is equally appropriate for courses in Conservation Biology, Ecological Field Methods, or Wildlife Management, and is the best synthesis of its subject I have seen. Each chapter has its own useful topical bibliography, and each has graphs, tables or black and white photographs illustrating central points. The book is applied in orientation; topical reviews are succinct and there is an emphasis upon how to do such things as design a wildlife reintroduction project in a natural plant community stand that was a part of a former range, create and implement a monitoring regime, and even how to design a reserve with sustaining wildlife populations as a priority. Topics such as sampling methods, monitoring design, metapopulations, Wildlands Project kind of linkages, buffers and biological corridors are clearly reviewed. The book is filled with facts, bulleted points and excellently compiled tabular lists, and is a wonderful primer of techniques and methods.

As its name suggests, *Wildlife Restoration* is focused upon 'wildlife', and I think reflects an implicit criticism of much of the ecological restoration field that creates plant community restorations, but then simply hopes that 'build it and they will come' approaches will work for wildlife. This book comes too strongly from the opposite perspective and does not integrate wildlife introduction or colonization with the creation of plant communities in an in-depth manner. The second portion of the title, *Techniques for Habitat Analysis and Animal Monitoring*, is the book's real foundation. Thus, it has limitations in perspective and scope and, though a very valuable tool, ultimately is restricted in application for those actually creating the plant communities in which 'wildlife' lives. *Wildlife Restoration* focuses upon terrestrial vertebrates and provides little real treatment of animal communities as overlays of created vascular plant communities. It does not examine the linkage of created plant community restorations or the timing and other aspects of wildlife population entrance to fledgling habitats. The role animals can play in the evolution of a plant community from

pollination to grazing at a created site or one recovering from anthropogenic damage is not examined. This may be in part because there are few good data available upon the subject, but there is limited information in the book about avian, reptile and amphibian use and occupation of created habitats as they develop. This is an area that really needs more study in all habitats. Morrison's book will tell you how to sample what is there, but not when, how, or what to introduce to created plant communities. What are the differences between 'restoring' an animal species to a natural stand it once inhabited as an historic part of a range and introducing it into a created, developing habitat? Should animals, including invertebrates, be introduced to created plant community restorations? How does the restoration practitioner determine when to do so? In what sequence should vertebrates and invertebrates be ushered into an evolving restoration? Should introduction comprise only herbivores, or should carnivores be introduced as well? How do you go about building a food web? These are tough questions, and are largely unanswered. The differences between introducing as an assembly approach and colonizing wildlife species as the successional alternative in isolated plant community restorations, those extending existing natural habitat, and those linking (biological corridors) natural and created core areas are not really explored to the extent that they should be. I think the techniques described could be applied to the model natural community upon which the design of a created restoration is based to provide some guidance, but how to apply the basic inversion from an existing wildlife population in a natural stand to the restoration of an animal community, and not just a single species, is not probed.

Though frogs and salamanders are mentioned, landsnails, spiders, insects and other invertebrates are omitted, and aquatic ecosystems are not discussed in terms of animal restoration. The rich literature on the restoration and reintroduction of fish and fisheries, from salmon to the many endangered species of the USA Southwest, are not part of the book's discussion, no doubt excluded because they are not terrestrial.

I like this book very much and will use it as a welcome and solid addition to my literature base, as well as in several of my university classes. *Wildlife Restoration* is a readable and well-constructed book that will be a classic for everyone interested in ecological restoration, mitigation, and in conservation biology. I highly recommend it; *Wildlife Restoration* is an inspiration to read and brings current high-quality science to an area that too long has relied upon guesswork in attempting to 'bring back' wildlife populations. I hope that future books in this series will bridge the gap between recreating historic, indigenous plant communities and the sequence of introductions needed or not to restore the complementary animal community in them. Michael Morrison does a superb job of describing how to design a meaningful monitoring programme for wildlife, and clearly presents a broad range of techniques and how to apply them, a long-awaited leap that will enormously increase the scientific robustness of how restorationists evaluate wildlife populations and their environments in created habitats and in the natural models they use in designing them. The future answers to questions about wildlife restoration will flow from the methods so clearly presented in this excellent book.

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