

BOOK REVIEWS

Conservation Science and Action

EDITED BY WILLIAM J. SUTHERLAND

x + 363 pp., 103 figs, photos and tables, 24 × 17 × 2.5 cm, ISBN 0 86542 762 3 paperback, £24.95, Oxford, UK: Blackwell Science, 1998

It seems rather paradoxical to spend the time and energy coordinating a global list of authors to write a book and then hope its very creation will lead to the extinction of both the book and the whole field of conservation science. But this is Bill Sutherland's altruistic hope. This book outlines the theoretical issues in the various disciplines including biological, economic, political and educational and then develops the theory to show how it leads to practical approaches to conservation action. In order to cover such a daunting range of topics the editor has persuaded an impressive list of 16 internationally recognized authors to author a total of 14 chapters.

The book begins with eight chapters focusing on biological conservation, with the remaining six chapters outlining the various practical and human issues essential to successful conservation action. The first chapter defines the basic units of biodiversity, and is an update of earlier attempts to describe the various concepts encompassed by this term. This chapter then describes the various ways in which biodiversity can be measured and addresses the biodiversity issues in a conservation context by asking questions such as, how much biodiversity is there, where is this biodiversity and why does it matter. Chapter two addresses the key issue in the conservation of biodiversity – extinction rates. Stuart Pimm quantifies the increase in extinction rates attributable to humans and then identifies causes of the elevated extinction rates. The next three chapters elaborate on human causes of population declines and extinctions. The first addresses the role of introductions and presents a theoretical framework in order to understand why relatively few of the invaders persist, and attempts to determine which traits facilitate persistence and spread of the invaders. Chapter four draws strongly on the excellent case studies of the effects of pesticides on bird populations to tackle further issues such as oil spills, lead poisoning, acidification of wetlands, eutrophication and global warming on populations. Exploitation and sustainability are examined with a review of pertinent models, mainly of fisheries origin, but also including some insightful terrestrial examples. The authors then discuss socio-economic and environmental causes of over-exploitation and important issues such as bycatch and the genetic implications of harvesting and suggest some solutions.

Once harvesting or impacts have depleted a species to very low population levels, the conservation issues of their persistence and recovery are reviewed in chapters six and seven. The first of these looks at the risks posed to small populations due to environmental extremes and also looks at the genetic issues raised by a limited gene pool and introduces the role of spatial dynamics in the persistence of small populations. The spatial aspects of population dynamics are expanded upon and the next chapter shows how metapopulation concepts can be applied to the conservation problems of habitat loss, fragmentation and ecological disturbance. It also shows how such concepts can be abused in conservation planning. The next chapter

suggests that in the absence of historical information 'management simply becomes a matter of taste' and illustrates why we need an understanding of history in order to correctly identify and categorize habitat units of true conservation value.

Chapter nine begins to address the practical issues faced in mediating the biological issues raised in the earlier chapters. Colin Bibby presents a framework by which areas can be prioritized for conservation, and outlines the various criteria used to prioritize areas and examines biogeographical and national priorities and finally examines the aims and designs of protected areas. Once such an area has been chosen, there is the problem of maintaining the conservation value of the habitats and species within; this is the focus of chapter ten. It begins with a call to set management objectives in order to facilitate decision-making processes, particularly when the utility of management practices are poorly documented. The chapter then shows how the theory presented earlier in the book, such as persistence of small populations and metapopulation dynamics, can be used to help prioritize and manage areas according to the conservation objectives. Bill Sutherland also reviews the available options for maintaining species, including captive breeding and translocation and the problems and perceptions associated with these methods. The economics of conservation are addressed including an introduction to the use of cost-benefit analyses to provide conservation valuation and management advice. Nick Hanley then demonstrates how this framework can be applied and then discusses some perceptual and mechanistic limitations of economic analysis. However even if one has sufficient funds for implementation, without the understanding of local people associated with the object of conservation, such as species or habitats, there is little scope for creating the willingness and support essential for sustained conservation. In one of the cases presented the authors show how education was crucial in reversing declines of Canadian seabirds. Chapter thirteen begins by showing that the scale of conservation problems is generally large enough to warrant local, national and international governmental intervention. Graham Wynne discusses some of the international treaties, concepts, principles, policy tools and economic incentives that can be drawn upon to guide conservation at these levels.

Most of the ecological conservation conferences I have attended leave me feeling it would be more profitable to enter the human side of conservation, as anything we do as ecologists could be confounded by human population growth and the attendant environmental pressures. In the final chapter, the conflicts between conservation are contrasted with the needs of development and expanding human populations. William Adams provides a historical overview of the two fields and then describes their interdependencies and discusses examples of how both have been combined to varying degrees of success. This chapter alleviates my fears and reminds us that all disciplines can make a valuable contribution to successful conservation action.

Each chapter is an excellent introduction and detailed overview of the latest research and thinking in each aspect of conservation science and action. The chapters persuade the reader to look beyond their own speciality and encompass other areas of conservation sci-

ence. As a result this book is likely to become the cornerstone of many undergraduate and graduate conservation science courses, both in biological and the social sciences, and will certainly contribute to successful conservation.

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Global Meltdown: Immigration, Multiculturalism, and National Breakdown in the New World Disorder

BY JOSEPH WAYNE SMITH, GRAHAM LYONS AND EVONNE MOORE

viii + 186 pp., 24.1 × 16.1 × 2.0 cm, ISBN 0 275 95600 8, hardback US\$59.95, Westport, CT, USA: Praeger Publishers, 1998

This is a book of unrelenting despair and doom. The authors unequivocally predict the inexorable approach within the time frame of decades of civilizational collapse if not human extinction. Given the present worldwide state of advanced environmental and social deterioration, the authors conclude that it is already too late to implement ameliorative actions that might prevent their dire predictions, whether such actions be economic, social or lifestyle changes. No matter what, the most favourable possibility that now remains, in the view of the authors, is the collapse of civilization, a state of barbarism, and a vast reduction in human numbers. Their most pessimistic prognosis is the very extinction of *Homo sapiens*. Quite reminiscent of the Norse myth of 'Ragnarok', either outcome of this final destruction of human society would then permit a slow regeneration of the global biosphere.

The authors base their apocalyptic predictions largely on personal observations of what they see as the social and environmental disintegration of Australia, as reinforced by comparable collapses that have been reported for elsewhere in the world. The text is divided into four chapters, the hyperbolic titles of which reflect well the tenor of their feelings: 'The Coming Anarchy: the Collapse of Civilization and the Coming of Hell on Earth'; 'The Ecology of Collapse: Technological and Ecological Mechanisms for the Destruction of Civilization'; 'The Remorseless Working of Things: Population Collides with Environment'; and 'Global Meltdown: a Tapestry of Turmoil at the End of the Modern Age'. The authors, all Australians, are, respectively, a researcher, a businessperson, and a research assistant.

I have to say that the authors do not convince this reviewer about the collapse in Australia of either its society or its environment. Indeed, Australia consistently appears amongst the topmost countries in the world in the various social and environmental indicators routinely compiled by the United Nations Development Programme, the International Bank for Reconstruction and Development (the World Bank), the United Nations Environment Programme, the World Resources Institute, Freedom House and other intergovernmental agencies and non-governmental organizations. Neither does the review of the literature for relevant information about the rest of the world impress me to any great ex-

tent. Of the almost 700 citations upon which the authors rely, well over half are to newspaper articles, radio or television programmes, unpublished lectures and popular magazines. Moreover, virtually no primary sources are relied upon for the data being offered in support of their argument that civilization is hurtling towards its doom; even direct quotations in the text are for the most part taken from secondary or tertiary sources.

There is, of course, no denying that both the human environment and social conditions are deteriorating in many parts of the world, and that these two declines are often intertwined and mutually reinforcing phenomena. However, the thesis has simply not been supported by the authors 'that the world, with Australia as the key case in point, has gone beyond the point of no return'. It is difficult for me to comprehend why the authors have gone to the presumably considerable trouble of compiling this polemic as well as a veritable host of recent other statements. They consider that 'catastrophe is irrevocable . . . that the end is indeed nigh . . . [and that their] arguments can do nothing to prevent the remorseless working of things' (p. 128). The authors explain that the book under review here is meant to develop more fully the argument recently presented by two of them together with another colleague (Smith *et al.* 1997). Indeed, although not so indicated, the present volume is part of a spate of recent works on the same or similar theme by Smith (an adjunct member of the geography faculty at the University of Adelaide) and several of his colleagues (e.g. Lyons *et al.* 1995; Sauer-Thompson & Smith 1996, 1997; Tanton *et al.* 1996; Smith *et al.* 1998).

In closing it is thus perhaps appropriate for me to suggest here for those who might wish to avail themselves of more responsible scholarship that other analyses are available which describe the gravity of the environmental situation with some authority in concert with suggested remedies. To that end, several recent thoughtful analyses of the current global predicament combined with proposals for its alleviation can be recommended (e.g. Ehrlich *et al.* 1995; Holdgate 1996; Renner 1996).

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Protection of Global Biodiversity: Converging Strategies

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ix + 429 pp., 23.5 × 15.3 × 3.5 cm, ISBN 0 8223 2150 5 cloth, US\$69.95, 0 8223 2188 2 paper, US\$23.95, Durham, NC, USA: Duke University Press, 1998

Biodiversity, a term virtually unknown little more than a decade ago even to biologists, became one of the central foci of international environmental and political attention at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. Indeed, one of the very few concrete outcomes of the Rio Conference was the Convention on Biological Diversity (UNTS #30619), to which 174 or more sovereign states have now (as of 18 August 1998) submitted, an incredibly high proportion, 91% of all those eligible to do so. These many contracting parties have, in accordance with Article 1 of the Convention, thereby embraced, at least as an objective, the conservation of biological diversity (biodiversity).

The present volume includes 23 essays by 25 authors, not only ecologists, but also lawyers, economists, philosophers and others (amongst them 13 academics, with the others variously from industry, government, non-governmental organizations, foundations and so forth). The compilation derives from a conference held at the University of Arizona in 1994, and all of the contributors were meant to address one aspect or another of fulfilling the broad objective enunciated in Article 1 of the Convention on Biological Diversity. This objective was to a greater or lesser extent diluted or even undermined by the subsequent articles (the full Convention forms an appendix to the book, pp. 393–413).

As might be expected from a collection of conference presentations, they run the gamut from provocative to predictable and from profound to trivial. At least one of the contributions adds unnecessary dissonance. And I must suggest that the subtitle of the original conference 'Exploring the Complexities' might be more nearly appropriate than the one the book now has, namely 'Converging Strategies'.

Four contributions stand out with particular clarity as making this compendium a worthwhile contribution to the now burgeoning literature on biodiversity. In 'On the Uses of Biodiversity' (pp. 265–84), Mark Sagoff offers a brilliant essay that justifies the protection of biodiversity on ethical (intrinsic, non-instrumental) grounds. In the process, Sagoff correctly derides the emphasis of Agenda 21 (one of the two principal hortatory products of the Rio

Conference) for its economic (instrumental) argument to conserving biodiversity.

In 'The Convention on Biological Diversity: a Polemic' (pp. 351–9), the briefest chapter in the book, but one of its most valuable ones, Lakshman Guruswamy explains the counter-productive aspects of the Convention, a retrogression, I might add, reflective of the general trend evident when the outcomes of the Rio Conference are compared with those of the United Nations Conference on the Human Environment held 20 years earlier in Stockholm. Guruswamy points out and explains three major shortcomings of the Convention:

- a) its rejection of the concept of sustainable development;
- b) its denial of state responsibility for damage to the global commons;
- c) its repudiation of the idea that the global biodiversity is the common heritage of humankind, thereby denying the responsibility of the community of sovereign states to protect this heritage.

In the 'Introduction' (pp. 1–9) and 'Conclusion' (pp. 376–91), which should be read in tandem at the very outset, Guruswamy plus Jeffrey McNeely provide a coherent synthesis of most of what is said in the intervening 21 chapters, together with much of what was not but should have been. In these two chapters their two co-authors emphasize that the conservation of biodiversity must be integrated into an overall effort to promote global welfare through international assistance and, moreover, that such conservation calls for fundamental changes in human behaviour. They properly stress the importance of an ecosystem rather than species approach to conserving biodiversity; and they recognize that technological fixes will not really be able to substitute for what the global biodiversity contributes to the functioning of the biosphere. They dwell correctly upon the overriding importance of environmental education for the future of the global biodiversity (which in turn points to one of the substantial omissions amongst the contributions, none of which focuses on this crucial issue).

Other contributions of merit, especially to those outside the field being addressed, are 'Biological Extinction: Its Scope and Meaning for Us' (pp. 13–32) by Peter Raven and McNeely; and 'Halting the Loss of Biodiversity: International Institutional Measures' (pp. 168–79) by Walter Reid.

As to the mechanics of the volume, most of the chapters begin with a useful abstract and most end with a substantive conclusion. There are refreshingly few typographical and other orthographical lapses, and the book has a pleasing layout. A minor organizational fault is that the 23 contributions have been grouped into seven categories, but fall logically into eight; two of the essays are variously misplaced. Much more seriously, the index, an especially important adjunct to a multi-authored compendium approaching its subject from so many partially overlapping directions, is very poor. It is plagued with some errors of commission and numerous errors of omission. These errors becoming evident in even casual use when attempts are made to compare what different authors have contributed on the same matter, say, on tradable depletion permits, on island biogeography, on nature reserves and refugia, on military issues, or on pollution taxes.

In conclusion, as the editors suggest (p. 2), this book weaves a tapestry out of the collective wisdom of the disparate disciplines represented by the authors, one that is in fact more or less successful. Some readers will benefit from this interweaving, others from the strains incorporated into the tapestry by the conflicting views introduced into the pattern by some of its strands. However, for this

reviewer the real beauty of the tapestry derives from the bold pattern deriving from some of its more prominent strands.

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Invertebrate Surveys for Conservation

BY T. R. NEW

xii + 240 pp., 23.5 × 15.5 × 1.3 cm, ISBN 0 19 850011 4
 paperback, A\$18.50, hardback A\$40.00, Oxford, UK: Oxford University Press, 1998

Whereas T.R. New's book on Butterfly Conservation deals with just one relatively small (*c.* 20 000 species) group of invertebrates, this book on invertebrate surveys widens the scope to not only all terrestrial invertebrates but freshwater and marine species as well.

In assessments of geographical areas for conservation, invertebrates are often excluded and in the first chapter, New explains the problems with studying invertebrates, such as their huge diversity and the difficulties in identifying them. In the next chapter, the sorts of questions that are posed in invertebrate surveys are considered and this is followed by two long chapters on methods of sampling terrestrial and aquatic invertebrates. Chapter 5 is on the assessment of sampling methods: which methods are suitable for which groups, sampling biases and sample sizes. The following chapter is on the processing and interpreting of invertebrate samples: the time it takes and solving the problems of identification. In Chapter 7, factors influencing the selection of target groups are considered.

Chapter 8 is on monitoring of invertebrates over time and concentrates mainly on single species monitoring (some overlap with the butterfly book). The following chapter is on alternative approaches to species-focused conservation showing how invertebrate data such as inventories are important in selecting priority areas for conservation. The analysis of inventory-type data is also briefly considered. The final chapter highlights the need to involve people in invertebrate conservation whether they be amateurs helping professionals or members of the public who need to be made more aware of the importance of invertebrates.

My major criticism of this book is that not nearly enough is said about experimental design, sample sizes, data analysis and presentation of results. These matters are merely touched upon and yet they are critical to the success of an invertebrate survey. Dealing with these aspects thoroughly would have been the one excuse for including marine, freshwater and terrestrial invertebrates all in one book because there are common principles in experimental design and analysis covering all habitats. Instead the book concentrates on the details of sampling devices and sampling problems which have little in common across the three groups.

I could find no significant new insights into how to do invertebrate surveys for conservation: the book is a rather long-winded and poorly structured summary of the subject with little attempt to formulate and recommend new procedures and ideas that will address the somewhat haphazard approach to invertebrate surveys which is all too apparent from reading this book. As with New's book on Butterfly Conservation, I became irritated by the over-use of bullets and num-

bering to categorize topics. The author discusses to the point of repetitiousness the problems of taxonomy and identification and while these are certainly issues, most people reading this book will already be aware of them and will have their pet group (and pet taxonomist).

The most valuable aspect of this book are the references: the author has read widely and there are many useful publications he refers to. However, it can best be regarded as an introduction to invertebrate surveys and while certainly useful, it is not a one-stop indispensable handbook.

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The Environmental Dictionary

BY DAVID D. KEMP

xx + 440 pp., figs and tables, 24.6 × 17.4 × 2.5 cm, ISBN 0 415 12753 X
 paperback, £17.99, hardback, £55, London: Routledge, 1998

David Kemp has produced a dictionary covering a wide range of environmental information from a variety of disciplines. It includes entries from the traditional areas of chemistry, physics, geology and biology but also incorporates elements of politics, sociology and economics, reflecting the wider impact of environmental concerns. He has also included references to events which have had a major impact on the environment, explained the role of national and international organizations and has added boxed articles about current issues. The dictionary is cross-referenced throughout and most items also contain references, which range from popular magazines to academic journals, to allow for further study.

The book is intended for a variety of readers, from those who have no formal scientific training and need an explanation of the essential elements to those from the sciences who need an understanding of wider environmental implications. David Kemp's book will appeal to a wide readership, providing a useful reference source for many people. The entries are well organized with conferences and organizations appearing alongside scientific terms and the information is accurate although, as is inevitable with a work of this nature, a few important points are missed.

This is a very useful book for anybody interested in the environment and its scope and use of current information means that it has a valuable contribution to make in facilitating understanding within the disciplines that contribute to the studies of this area. The style throughout is clear and concise as is essential in a work designed for such a wide readership and the absence of typographical errors contributes to its readability. The dictionary is attractively presented with a clear legible typeface and includes black-and-white illustrations throughout. The majority of these are diagrams however, and those that are photographs sometimes lack clarity and this, together with the absence of colour, somewhat diminish from the quality of the book as a whole.

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Ecologists and Ethical Judgements

EDITED BY N.S. COOPER AND R.C.J. CARLING

xiii + 165 pp., 13 figs, 24 × 16 × 1 cm, ISBN 0 412 70980 5
 softback, no price given, London, UK; Weinheim, Germany; New
 York, USA; Tokyo, Japan; Melbourne, Australia; and Madras,
 India: Chapman and Hall, 1996

New Pioneers: the Back-to-the-Land Movement and the Search for a Sustainable Future

BY JEFFREY JACOB

xvi + 262 pp., 18 figs, 23.5 × 16 × 3 cm, ISBN 0 271 01621 3, no
 price given, University Park, PA, USA: The Pennsylvania State
 University Press, 1997

These two books remind environmental conservationists that global sustainability will not be achievable without commitment to strong ethical principles and social justice, and without initiatives to take up environmental responsibility in day-to-day personal activity.

The value of the first, slender volume is that it brings ecologists and philosophers of ethics into working dialogue. A major point of the collection is that ecologists ill-informed about ethics will not make mature judgements about the rights and wrongs of environmental programming, while ethicists knowing nothing of conservationism will be too anthropocentric and lacking in a wider perspective on global needs. Another strong point of the collection is that it does not get bogged down in philosophic theory (even in Jane Howarth's theoretically adept opening chapter). For, the spiritual voice is allowed a strong airing. With a considerable Christian input, we have doses of Biblical prophetic indictment against environmental irresponsibility (as in the piece by Calvin DeWitt), a consideration of Christian doctrinal resources related to the redemption of the cosmos and our part in it (at the hands of Brent Waters), and a healthy challenge about the relationship between environmental needs and social justice (by John Barkham). All the key contemporary issues are traversed – economics (Andrew Brennan), population growth (Susan Power Bratton), biodiversity (David Given), animal welfare and wildlife protection (Rory Putman, Nigel Cooper), even intellectual property rights (Darrell Posey *et al.*). And all authors confirm that the very doing of ecology is morally significant, and disclose the world of ethical premises behind commitment to conservationism.

Jeffrey Jacob's book has a quite different *persona*. It is nonetheless a collection, for as a well known Canadian educationalist highly interested in religious quests, he tells story after story of individuals' and families' commitments to living simply and responsibly on the land in north America. While romanticism and wilful austerity are amongst the characteristics of back-to-the-land homesteaders, Jacob's survey highlights just how important are 'spiritual dispositions' for the success of these activities, the desire for peace, the denial of hectic lifestyles for serenity, the perception of nature as creation, and so on (see especially pp. 92–105), so that serious commitment to environmentalism is not fuelled by detailed scientific knowledge, but rather through scientists' warnings as part of a general ethical challenge for spiritual beings. 'Sustainability', Jacob maintains, 'is more than a technical achievement', even though his book is full of stories about grassroots inventiveness. 'It is also a social product', with neighbours cooperating to promote ecological integrity, and hardworking souls inspired by spiritual insights.

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Butterfly Conservation, 2nd Edn

BY T.R. NEW

xii + 248 pp., 23 × 15.5 × 1.5 cm, ISBN 0 19 554124 3
 paperback, A\$18.95, Melbourne, Australia: Oxford University
 Press, 1997

Butterflies are unusual amongst invertebrates in being familiar and popular and, with the added bonus that they are relatively well known taxonomically, they have become an important flagship group in promoting the conservation of terrestrial environments. Butterfly conservation is now a well established discipline and its tremendous growth in the past few years has necessitated the publication of a second edition of this book which was originally published in 1991.

The book begins by introducing butterflies within the wider context of invertebrate conservation, showing their important flagship status within the terrestrial invertebrates. New then deals with the classification, biology and population structure of butterflies and this is followed by a chapter on the causes of butterfly decline and one on the history and dynamics of raising awareness about butterflies, also including a section on the legislation that helps to protect them. There is a long but useful chapter on procedures and techniques for studying butterflies for conservation and this is followed by one on management of butterflies and their habitats. Chapter 7 presents 23 case histories covering representatives of all major families of butterflies. The following chapter is about encouraging butterflies in your garden and moves from conserving particular species of rare butterflies to encouraging common species to be part of our urban environment.

The final chapter on the future of butterfly conservation also goes beyond the simple conservation of particular species to considering their role as umbrella species and the use of butterflies in defining habitats in need of conservation. Much of this book is concerned with the conservation of butterflies in the developed world, particularly the UK and the United States, where the conservation of a butterfly can be justified simply on its aesthetic value and 'right to live'. In the developing world, the dynamics of butterfly conservation tend to be different and in this final chapter New points out that while it is feasible to use butterflies in developing countries to identify areas in need of preservation, it is an altogether different issue to justify to the local people the need for them to be conserved. In such countries, justification for butterfly conservation comes mainly from showing their value as a resource, for instance their role in encouraging tourism and their capture as specimens for sale to butterfly collectors.

My own interest in the conservation of butterflies stems from my involvement in the conservation of the Brenton Blue butterfly *Orachrysops niobe* in South Africa. Although this butterfly is not mentioned in the book reviewed here, I found that on reading this book that the issues around the conservation of the Brenton Blue are issues common to many butterfly conservation attempts in other parts of the world. New deals comprehensively with these issues and provides a valuable recommended procedure for dealing with the conservation of a butterfly species. In the case of the Brenton Blue,

taxonomy is one of the issues as it might be conspecific with another named species in the region. Another issue is distribution of the Brenton Blue as there has been great difficulty in establishing whether the population in the new township at Brenton-on-Sea is in fact the last remaining population. I found New's linking of the metapopulation concept to butterfly conservation (evidently not covered in the first edition) extremely useful. Many threatened butterfly species such as the Brenton Blue fall easily within the metapopulation model and it is vital that in these cases you do not rely on just one population to carry the species through.

Throughout this book, New emphasizes the need to understand the ecology of the butterfly in order to manage it successfully and in the case of the Brenton Blue, lack of knowledge about the butterfly's ecological requirements has certainly created many management problems.

The final element in the Brenton Blue project that links closely with common themes emphasized in this book, is the people factor. How best do you deal with the numerous interested parties in such a conservation effort? Conservationists have much to learn about how to communicate effectively both amongst themselves and with other parties. New puts it well when he states that 'A major problem, sometimes a weakness in conservation planning, is how to

maintain credibility while attending to the needs for conservation. It is very easy for emotive arguments for the defence of charismatic organisms to misrepresent, or even be substituted for, scientific or factual information'.

My minor irritations with this book included too much categorizing of information using bullets and numbered points, and difficulty in looking up references at the back because the year of publication is placed at the end of the citation rather than after the authors.

I found this book an excellent summary of a subject that has assumed great importance in the conservation of terrestrial environments. It is essential reading to anyone involved in butterfly conservation whether they be scientists or decision-makers as there are many lessons to be learned from the efforts and mistakes of past butterfly conservation efforts.

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