necessarily preclude the use of prepackaged models, but it does suggest that caution must be exercised. No particular package is strongly promoted, despite the authors' association with the RAMAS family of ecological models (Exeter Software, 100 North Country Rd, Setauket, NY, USA 11733). This book is in no sense a RAMAS manual.

Good as it is, the book is not without faults. Robert Lacy, who has been prominent in the development and application of PVA models, and has authored VORTEX (Lacy 1993), perhaps the most widely used PVA model, does not appear in the bibliography. To my taste, the book concentrates too much on the "how to" aspects of risk analysis to the detriment of "why". The authors clearly expect that once people know how the models work, they will discover how to use them appropriately. This is probably true to some extent, but I think it may be over-optimistic. Throughout the book, there are "boxes" briefly describing case studies. While these are certainly useful, most simply report findings and conclusions, rather than analysing them critically.

Perhaps the most crucial question in a review of a methodological book is how well it addresses the needs of its various reader constituencies. Professional modellers are a small market, but will find much of use to them here, particularly in the second half of the book. Postgraduate students exploring any form of single-species ecological modelling will find the book indispensable: I expect it will rarely be on the shelves of any academic library which buys it. It would prove an excellent text for a high level undergraduate or postgraduate course, but students would baulk at paying nearly Aus $120.

Wildlife managers who use PVA models need to read this book. Manuals to software packages cannot contain the detail necessary for models to be used properly. Few managers will want to write models from scratch, but a broad understanding of what the model is doing should help in appropriate selection of models, valid parameter inputs and critical interpretation of model results.

REFERENCES

Bayliss, P., 1989. Population dynamics of magpie geese in relation to rainfall and density: implications for harvest models in a fluctuating environment. *J. Appl. Ecol.* **26**: 913–24.

Caughley, G., 1994. Directions in Conservation Biology. *J. Anim. Ecol.* **63**: 215–44.

Lacy, R. C., 1993. Vortex: a computer simulation model for population viability analysis. *Wildl. Res.* **20**: 45–65.

Biological conservation, monitoring and assessment

Ian F. Spellerberg and Steven R. Hardes. 1992.
Biological Conservation.
Cambridge University Press, Cambridge, UK.
123 pp + vi, ISBN 0-521-39786-3.
RRP P/b £7.25 (US $15.95).

Ian F. Spellerberg. 1993 (1991).
Monitoring Ecological Change.
Cambridge University Press, Cambridge, UK.
334 pp + xvi.
H/b: ISBN 0-521-36662-3. RRP £50.00 (US $84.95);
P/b: ISBN 0-521-42407-0. RRP £16.95 (US $29.95).

Ian F. Spellerberg. 1992.
Evaluation and Assessment for Conservation.
Chapman & Hall, London, UK.
260 pp + vi, ISBN 0-412-44270-1.
RRP H/b £29.95.

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OF the three books Ian Spellerberg published from his broad experience in biological monitoring and conservation, *Biological Conservation*, co-authored by Steve Hardes, is the most elementary, dealing with practical conservation in concise form. It is published in the Biology in Focus series to supplement mainstream textbooks for senior biology students.

The aims of the book are "to give an insight into the importance of biological conservation, to describe why conservation is important, to give examples of conservation and, perhaps most importantly, to generate enthusiuasm, discussion and action." One-third of the book is allocated to ecological and international perspectives of biological conservation, highlighting significant environmental issues historically, and exploitation of biological diversity globally. The main part of the book offers examples of conservation in practice, ranging from ethnobotanical surveys to biological restoration in natural and human-induced ecosystems. Rehabilitation of degraded natural areas and maintenance of biodiversity for sustainable use of resources are preached as a means of stabilizing the supply assuming that the human population and its demand can be stabilized in future. An appendix provides exercises in practical management problems taken from terrestrial communities and landscape conservation. This small book gives an amazingly broad coverage without losing focus and serves as an excellent introduction to biological conservation.

The aim of *Monitoring Ecological Change* is to provide "a basis for practical applications of monitoring from the most basic to the more complex." As Dr Holdgate, Director-General of IUCN, points out in the Foreword, "living organisms integrate the impact of many variables" and "their biological efficiency, productivity or balance within the ecosystems they compose indicate the overall health of the system." This is the basis of biological monitoring, which Ian Spellerberg so adroitly applies to environmental quality, biodiversity and ecosystem processes.

The book is divided into three parts. In Part A the author introduces the science and art of monitoring using his own experiences of major environmental impacts in the Antarctic. Spellerberg stresses the need for long-term biological monitoring based on well worked variables and processes. This leads to a status

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report on environmental and biological monitoring, mostly in the developed world. All examples are taken from credited national or international organizations.

Part B gives a practical demonstration of ecological principles and illustrates calculations of, for example, niche breadth and overlap, species diversity indices, community similarity indices, and a saprobic index of water quality. Other important monitoring methods, such as biological indicators, ecosystem monitoring and GIS applications, are explained and their limitations noted. However, medical, biochemical, microbial, soil biological, pollution and remote sensing monitoring is excluded.

Part C provides practical examples of monitoring, starting with a conceptual flow diagram to show various phases of monitoring, and then demonstrating actual monitoring of bird populations, freshwater environment, habitat and community fragmentation, land use and landscapes, environmental impact and species populations. Each question is addressed independently and with well referenced materials. Examples are carefully chosen for coverage and challenge, and are well endowed with illustrations supported by references.

The appendix includes selected references for identification of taxa. While some standard references are included, the list is far from up-to-date either for specific taxa or for particular regions of the world. The 1993 edition is a reprinting of the original with only the textual corrections and does not redress this deficiency.

The book is well written and students will find many illustrated methods applicable to their practical assignments.

Evaluation and Assessment for Conservation is said to be "a personal view of ecological evaluation" but follows most ardently the pragmatism and works of respected national (mostly British) and international organizations in conservation. As the subheading describes, it provides "ecological guidelines for determining priorities for nature conservation."

An interdisciplinary approach is taken throughout the book. The first chapter gives justification of biodiversity conservation in terms of its moral, aesthetic, environmental, scientific and economic values. This is followed by species-based methodology for evaluation and assessment of nature. The methodology unfolds further in the next five chapters dealing with economic evaluation of the environment, wildlife laws, ecological evaluation, protected areas and land use planning. In these chapters topical issues are discussed, although biodiversity conservation remains the central theme for evaluation and assessment. As in the other two books the pragmatic approach succeeds in taking readers through the difficult assessment procedures, except perhaps in Environmental Impact Assessment for landscape conservation where a complex network of interactions and the Leopold Matrix has potential for identifying impacts.

In the epilogue the author emphasizes the value of communication, both between disciplines and between nations, in advancing ecological evaluation and assessment. His plea for commitments to improving and maintaining the quality of life on earth is clear in these passages.

The book is well organized; each chapter contains realistic examples (though not as many as in *Monitoring Ecological Change*), boxes for self-contained methods and criteria, conclusions summarizing discussions (sometimes with additional material) and references. The black-and-white photographs that sprinkle the text are not of good quality, while the glossary is mostly much more elementary than the concepts of ecological evaluation and assessment. A few, such as "debt swaps" and "creative conservation", are eyebrow-raisers. The book should reach a wide range of readers looking for checklists of criteria and a balanced approach to the conservation of natural areas.

In recent years there has been a significant shift in ecological and environmental research, from individual efforts of devoted scientists and scientific societies to highly organized programmes involving semi-governmental and governmental institutions. This change has generated much debate on the purpose, time-scale, standardization of methods, data analysis and interpretation for ecological monitoring and assessment. Spellerberg's books give answers to many of these questions at different levels of sophistication and redundancy. Unfortunately, in a fast-changing world of biological conservation, urgency often breeds expediency and our ignorance still remains in the midst of the action. Like the field of biological conservation itself, the NGOs involved are subject to rapid change as new organizations are formed while not so new ones are being dissolved. Some well established organizations change names to create new images in biological conservation. Among the relevant organizations listed in appendices of all three books, the readers will find some acronyms, such as IUCN (World Conservation union), WWF (World Wide Fund for Nature) and ICBP (Birdlife International), no longer standing for the old names.

The Australasian region badly needs books of this nature, which deal with its unique history of biological evolution and large areas of relatively undisturbed ecosystems. Until such textbooks and handbooks become available, readers will find Spellerberg's well digested methodology useful for application in this region.