

temperate rainforests has been challenged. The tropical-subtropical rainforests of north-eastern Australia are recognized in the new edition as having "characteristic features of their own", resulting from their unique palaeoecological history. However, their distribution under various climatic regimes (Nix 1982) and their environmental relations (Webb 1968) have been overlooked.

Secondary and deflected successions are restricted to areas of human impact (Chapter 18) though their separation from regeneration following natural disturbances is somewhat arbitrary. There is obviously much more information relating to human impacts today than four decades ago. Professor Richards' prediction (in Introduction) that old secondary forest and "true" primary forest can become indistinguishable "if undisturbed" for up to 200 years or more is a generalization fraught with political and legal overtones. In a Court of Inquiry (1980-81) into logging at Terania Creek in Whian Whian State Forest, northern New South Wales, forestry authorities tendered evidence by radiocarbon dating of wood and charcoal that mosaics of old secondary forests can persist for at least 1300 years. Forestry prescriptions permitted logging in such "non-rainforest" types with desirable "hardwood" trees. However, such types are deemed integral ecologically in the development phases of "true" rainforest. The World Heritage values of rainforest areas now include such processes and are managed accordingly.

The future of tropical rainforests is discussed as a postscript, in which Professor Richards casts grave doubts about sustained-yield forestry based on natural regeneration, which does not give such quick financial returns as clear-felling. He forecasts that "there will be a gradual replacement of long-lived primary forest species by shorter-lived seral trees" and considers it "unrealistic to expect that the careful management necessary for sustained-yield forestry can be maintained indefinitely".

As in the first edition, Professor Richards stresses our scientific ignorance about these most complex terrestrial ecosystems, and the need for thorough

research, not only of commercial wood products, but also of "useless species . . . of unsuspected value". Besides economic and utilitarian benefits, the author claims that the disappearance of complex tropical rainforests at lower altitudes will adversely influence species evolution. Less quantifiable commercially is the role of "beautiful and bizarre forms of life" as a source of "wonder, enjoyment and instruction" and loss of "a vast realm of potential human experience". These are all admittedly anthropocentric, and there is no mention of intrinsic values of natural forests themselves, in contrast to the writings of tropical botanists such as John Corner and Marius Jacobs.

Two appendices are added in the new edition. One describes tree species recognition in the field and the use of vernacular names and the other, by Peter Greig-Smith, deals with quantitative numerical methods in rainforest vegetation analysis. Following 502 pages of text, references are meticulously listed in 38 pages (about 80% are new) and botanical names are indexed in 18 pages. The general index occupies 17 pages at the end of the book. The book is suitably illustrated and well produced. The quality of pictures is generally improved in the new printing of old photographs though there are some exceptions (e.g., Figs. 12.1, 15.1).

As the author states this is not a book of reference to be used as an encyclopaedia, nor is it a treatise only for seriously minded students of tropical rainforest ecology. It is a book to be read pleasurable by those who have any interest at all in the living environment of the humid tropics via their profession, recreation or conscience.

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## Conserving Biodiversity: Threats and Solutions

Edited by R. A. Bradstock, T. D. Auld, D. A. Keith, R. T. Kingsford, D. Lunney and D. P. Sivertsen, 1995. Surrey Beatty & Sons, Chipping Norton, New South Wales.

Hardcover, 297 × 206 mm, 428 pages with 25 colour plates, and numerous black and white figures and tables. ISBN 0949324590  
RRP Aud \$93.00.

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**T**HIS book records the proceedings of a similarly titled conference organized by the New South Wales National Parks and Wildlife Service in June 1993. According to the editors, the book is a "systematic

attempt . . . to cover the current and future threats to biodiversity" in New South Wales and Australia, and "highlights the range of solutions needed to conserve biodiversity". The book contains 35 chapters structured in seven sections (conserving biodiversity, habitat loss, degradation and pollution of water resources, weeds and feral animals, commercial use of native biota, changes to fire regimes, can governments solve the problems?), with two to eight chapters in each. The book is a scientific treatise, chapters being written with other researchers and scientifically trained government officials in mind.

I had access to a copy just after putting together a set of readings for senior undergraduates and postgraduates for a course in Park and Wildland

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Management, and while writing a consultant's report on fire management guidelines for heritage conservation in a New South Wales national park. I could thus assess the book in terms of its value to tertiary educators as well as to consultants/researchers. The book passed both general (former) and specific (latter) tests well. Chapters I would have liked to include as topical readings were Burbidge and Wallace's systematic overview of how to go about conserving biodiversity (a course outline in itself!), Papps and Wilson's perspective of the changing role of the NSW National Parks and Wildlife Service in the face of evolving community expectations (good for several classes!), Panetta and Scott's discussion of future weed introductions and what to do about them, Nias's review of the role of non-government organizations, Breckwoldt's account of the role of local activists, and the two fire chapters (below). In the absence of copyright restrictions, I would choose all these chapters not only for their quality, but because there is nothing similar in the recent Australasian literature.

On the fire front, the two chapters on fire management are gems. Gill and Bradstock flag the predicament of woody fire-sensitive perennials that recruit from seed after fire ("seeders"). Nearly all the examples of local fire-caused plant extinctions reviewed by the authors were of seeders. On the other hand, a few rare herbaceous short-lived perennials appear threatened due to too infrequent fire. Bradstock *et al.* develop a strategy of flexible fire management based on the need for variable fire regimes in space and time to conserve full plant diversity, the need to develop fire history and vegetation maps and a plant vital attribute database in order to make fire management decisions to conserve biodiversity, and (recognizing the imperfect state of knowledge) the need to monitor the veracity of assumptions underlying decisions to burn, not burn, let burn or put out burns.

A number of points made me stop and ponder:

- Noble asks, "What constitutes adequate conservation?" What are conservation biologists aiming for, how much is enough, and how do we justify "enough" in the face of competing interests and values? As Young points out, the decision support systems for land use planning are now available that force conservation biologists to make explicit choices about what should and should not be conserved. However, the software is not being widely employed, perhaps because most conservationists are out for everything they can get. The problem with the extremist approach is that it prolongs land use conflict and delays the development and implementation of more objective albeit transparent and conciliatory means of making land use decisions, ultimately to the detriment of biodiversity conservation.
- Callister and Williams estimate that the legal international trade in Australian flora and fauna approaches \$100 million AUS, based on incomplete data, not to mention domestic trade and illegal activities! What an amazing figure!
- Papps and Wilson spell out the need to conserve biodiversity on all lands regardless of tenure and bureaucratic jurisdiction, a point strongly emphasized throughout the conference (Purdie). Farrier (a lawyer) highlights the inadequacies of both command and control regulations and voluntary agreements between private landholders and governments to conserve native vegetation. He indicates that governments need to bite the financial bullet and pay landholders to manage society's interests (such as biodiversity) on private land, the same suggestion proposed by resource management scientists recently (Morton *et al.* 1995). Tooth (a landholder) echoes the point that farmers need financial incentives if they are going to play a greater role in biodiversity conservation. Davidson reviews the woefully inadequate Australian literature on the agricultural value of biodiversity and bushland on farms. Given that 61% of the continent is grazed (Tooth), conservation biologists have a lot of on-farm research ahead before most farmers embrace biodiversity conservation for reasons of financial self-interest.
- Davidson comments that he "would never advocate legislation to compel farmers to cease clearing or to restrict their use of pesticides or compel them to lighten stocking rates or even repair eroded land. Peer pressure alone will shame the farmers who drag their feet . . .". I would advocate legislation, however, and a lot of landholders would agree with me (Anon. 1995). Notwithstanding the amazing changes in values and actions on the part of the rural community in recent years, it is safer to rely on a variety of policy instruments including good regulations. Moreover, the biodiversity crisis is such that future generations will count the cost if peer pressure takes one or two generations of farmers for full effect.

The book contains many other timely or comprehensive reviews, including Sivertsen's maps of native vegetation clearance in the New South Wales wheatbelt (topical given the New South Wales Government's introduction of planning controls); Cullen and Lake's comprehensive review of the impacts and threats to inland waterways; Fox's overview of plants and animals introduced into Australia; Bomford's *et al.* ecological and economic principles of feral animal management; Buchanan's principles and case histories of weed management in Sydney bushland; Friedel and James' review of the concept of biodiversity in the context of rangelands; and Purdie's summary of the major conference themes.

The editors cover themselves from omissions with "While the views presented here are not exhaustive, we consider them indicative of the important elements in the debate". Nevertheless, given the NSW National Parks and Wildlife Service's organising role in the conference, I was surprised not to find chapters on reserve selection or predictive modelling of endangered species, both important tools for better land use decision making. Given recent studies of the importance of grazing (sometimes in association with pastoral burning) in reducing biodiversity values in temperate grassy woodlands (McIntyre and Lavorel 1994; Prober and Thiele 1995), forests (Smith *et al.* 1992, 1994) and sub-alpine and alpine environments (Leigh *et al.* 1987; Wahren *et al.* 1994; Williams and Ashton 1987), a separate review (or reviews) of grazing impacts in the higher rainfall zone was warranted. Tropical Australians will not find many case histories or examples relevant to them, either.

The book is elegantly produced in the familiar Surrey Beatty & Sons hardcover tradition (although elegance has its price). Together with *Conservation Biology in*

*Australia and Oceania* (Moritz and Kikkawa 1993, with which there is some content overlap) and the *Nature Conservation* series (Saunders *et al.* 1987, 1993; Saunders and Hobbs 1991) from the same stable, and the Royal Zoological Society of New South Wales's special publications in recent years (e.g., Lunney 1991, 1992; Lunney *et al.* 1994), Australian educators and students in conservation biology now have an excellent local literature with which to work. The onus remains on conservation biologists to communicate the information contained in this volume to governments and the community. As Purdie summed up: "let us get on with it".

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