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Peer reviewed

Ecology of Australian Temperate Reefs

Ecology of Australian Temperate Reefs: The Unique South. Scoresby Shepherd & Graham Edgar (editors), 2013, CSIRO Publishing. 520 pp. AU\$130.00 (hardback) ISBN: 9781486300099;

<http://www.publish.csiro.au/>

This book is a lavishly-produced text that links geological history, oceanography, and biogeography with future threats to Australian temperate marine ecosystems and their biodiversity. The Preface claims that the book is directed at three audiences. One, marine ecologists who want to broaden their background knowledge; the book certainly would be useful in this regard. Two, under- or post-graduate students; the book would be a useful main or supplemental text for a course. Three, as a reference work for “skilled amateur divers and underwater photographers (page xi)”; I disagree, as it's perhaps a bit too detailed for the most part, despite what may have been a Publisher's imperative to sell copies.

There are five main parts to the book. A potted summary of the geology, oceanography and biogeographic history of the Southern Ocean. The ecologies of each of the three main taxa: the algae, the invertebrates, and the vertebrates. The last section covers ecosystems and their conservation.

Part One, the backdrop to modern biodiversity, was very informative and unusual in a text on marine ecology, providing (in the book's Table 1.1) a useful summary of the events from 100 Mya to the present, in terms of climatic, tectonic, oceanographic and biotic events. Given the current concerns about ocean acidification, the section on carbon dioxide in a historic context was very useful in terms of past impacts. The rapid summaries of marine taxa in terms of their evolution and historic constraints quickly gets the reader up to speed, and includes all key fossil taxa that remain today. Table 3.2 lists the main marine taxa, with information on species diversity, endemism and dispersal potential. However, boundaries of the area of endemism are not stated, and whether they are the same for each taxon is unclear, which would be important to know since endemism is related to habitat area. Also, some of the calculations appear to be in error. For instance, the percentage of global species richness in temperate

Australia for molluscs is given as ca. 8% of 96,850 species, but this should be 20% (19,000 Southern Australian species). And 71 of 1250 species of pycnogonids is 6% not 11%. Evolution and radiation of taxa are examined in some detail for many well known—for instance *Haliotis* abalones and cowries—and less well known taxa—such as the odacine marine fishes.

Despite the preface claiming that modeling is not a focus of the volume, Part One ends with several pages comparing the expectations of two key models of southern biodiversity. This may be too much for lay readers but I feel rounds off the section nicely.

Parts Two to Four address higher taxa, in turn algae, invertebrates and vertebrates. In Part Two, the algae chapters, case studies follow two key habitat formers, *Ecklonia radiata* and the giant kelp *Macrocystis pyrifera*. Each case study considers morphology and growth forms, then demographic parameters and their spatial variation. Table 4.1 is a very useful comparison of growth, biomass and survival characteristics around southern Australia for the ubiquitous *Ecklonia radiata*. The relationship between depth and biomass is explored further in Figure 4.3 however the potential confounding effect of latitude (the shallowest sites appear to be at lower latitudes) isn't discussed. The giant kelp's role in the ecosystem is emphasised including interesting facts such as its ability to enhance lobster puerulus (larvae) retention. Pages 99–104 contain an extensive examination of the role of exposure and water movement on algal species distribution across the region. While interesting, I felt that it probably could have been summarised in a table and in shorter prose. As in previous parts, there is a synthesis and modelling section at the end, although the very simplistic state-change model shown in Fig 5.16 could probably have been described in a sentence instead.

Part Three covers the marine invertebrates, with Table 8.4 a nice summary of size and diet of many molluscan taxa. Applied aspects such as fishery catch versus adult density of abalone (Figure 9.5) are of interest although this figure lacks any indication of variation. The inclusion of succinct tables (e.g. Table 8.3 for mudworms and their hosts, Table 8.4 for a range of small gastropod families, Table 9.1 of abalone species life histories) summarise key demographic parameters. Some exquisite insights are given into cryptic taxa, for instance Chapter 9 details a number of octopus species and their reproductive habits and other life history data, such as for the closely-related blue-ringed and blue-lined octopuses. Chapters 11 and 12 give an excellent summary of the biodiversity and life history of temperate reef seastars and urchins, and the ecological impacts of urchin grazing, a dynamic process currently influenced by climate change. Interesting insights such as the close jellyfish associations with fishes (Table 14.1) keep the reader fascinated.

The next section, Part Four, on marine vertebrates, addresses a disjunct but fascinating array of topics, including diel patterns of herring gale activity, growth rate and dietary comparisons of several unrelated but coexisting species, and growth comparisons between two unique fishes: the leafy and weedy seadragons. Some tables and figures seem not as rigorous as others, e.g. Figure 16.4 has no representation of associated errors so we cannot evaluate any differences. A theme across these chapters is the comparison of growth rates (using age versus length plots) among related taxa, although as in many other figures throughout the volume, there is no indication of individual variation and the reader is unsure of the significance of any differences.

Part Five, the final section on ecosystems summarises trophic interactions, conservation and management issues, and ecological considerations such as dispersal type in planning marine protected area (MPA) networks. It ends with a useful summary of key findings concerning the benefits of MPAs.

Regarding the overall presentation of the volume, one shortcoming was the quality and size

of the colour plates. The white borders occupied more area than the pictures themselves which were slightly fuzzy with only fair colour matching. I didn't feel that these added much to the rest of the book which was otherwise of the highest print quality. A nice touch were the quotes at the start of, and within, chapters – my favourites included Aristotle's comments about mollusc mouthpart function at start of Chapter 9, "...in the whelk (the proboscis) can pierce through baits.". Each chapter has a separate reference section, although I'd prefer a common section at the end for easier reference finding or else that the reference list be made available online. The cover is very attractive, but slightly misleading, given the preponderance of fish images on the cover (including the much-used leafy seadragon photo), when the vast majority of the book looks in detail at non-vertebrate taxa.

Overall, *Ecology of Australia's Temperate Reefs* is a superbly presented and well-written exposé of Australia's temperate reef biota and their life histories and links to the physical and historical ocean, an inspiring text for undergraduate and more advanced researchers.

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