

Preface

It is our privilege to have been employed in Australian universities as teachers and researchers in the fields of plant and animal ecology over many years. Between us, we have lectured in plant and animal ecology and biology at all levels of undergraduate courses. Throughout our teaching careers we were acutely aware of, and frustrated by, the fact that there was no comprehensive ecological text written in an Australian context, and illustrated by Australian examples. This frustration was also shared by many of our undergraduate students.

Our initial enquiries to lecturers in many universities confirmed our view that a good ecological text was desperately needed for Australian undergraduates. It is not that ecological principles in Australia differ from those elsewhere; it is the nature of Australia, its largely endemic fauna and flora, and its major ecological concerns that demand teaching materials that are rather different from those found in the major ecological texts produced primarily for the northern hemisphere.

Our initial discussions with Oxford University Press (OUP) confirmed our view that the book should be comprehensive in its treatment, and that such a treatment would be best achieved through an edited book, with each of the 34 chapters written by experts in the field. These experts were then invited from universities, CSIRO and State and Commonwealth departments around the country.

Our book is structured within sections, or cells (denoted by ✱) so that it is applicable to courses in plant ecology, animal ecology, conservation and natural resource management. We have presented the chapters in a logical sequence, but we do not suggest for a moment that this sequence is the only way that courses

should be structured. The book is flexible enough to be adapted to many courses.

In the first section (●) we provide an introduction to the science of ecology, and an introduction, through palaeoecology, to the evolution of the distinctly endemic Australian biota. The second section (⦿) includes chapters on soil science (with an emphasis on Australia's old and highly weathered soils), on climate (describing the patterns that result in aridity over much of the continent) and on principles and processes of energy exchange. The third section (⦿) deals with the fundamentals of ecology – with population dynamics and regulation, life histories, species interactions, diversity, the niche, succession and disturbance – all treated fully with Australian examples. In the fourth section (✱) we deal with the principal plant and animal communities in Australia. Beginning with classification, we then cover the range of communities from deserts to heathlands, from woodlands to the alps, from lakes and rivers to the intertidal zone. We do not cover the marine habitat, beyond the intertidal, as it is too large a topic to include here.

The fifth section (✱) deals with some of Australia's most pressing environmental concerns. We start with the application of ecological knowledge of the Aboriginal people. We cover the loss of, and current threats to, biodiversity, the fragmentation of ecological communities, and the threats of introduced plants and animals. The rise in the concentration of atmospheric carbon dioxide, and the consequent greenhouse effect, is of global concern. Similarly, the El Niño effect and the depletion of atmospheric ozone are global processes, but with specific effects for the Australasian region. We conclude this fifth section (✱) with an outline of administrative

and legislative arrangements that are relevant to Australia's environmental concerns. Unlike the major texts from the northern hemisphere, we have not covered the problems of acid rain and nitrogen deposition; due to the relatively small land mass, density of population and intensity of industry, these are not problems of major concern in the southern hemisphere. The sixth and last section (*) is an introduction to ecological sampling and experimentation.

Each chapter concludes with a set of review questions and suggestions for further reading. Ecology is not a subject where the student can succeed by rote – by the mere exercise of memory without proper understanding of, or reflection upon, the matter in question. Even in a book of this size, we cannot hope to cover everything. The study questions aim to take the reader beyond simple regurgitation of the text. The questions aim to open new topics, and will require use of resources including the suggested readings, the library and the World Wide Web in the pursuit of further knowledge and understanding. A glossary is also included; glossary terms are shown in bold the first time they appear within a chapter.

The bibliography contains all of the references that are cited within the chapter. Many of the suggested readings at the end of the chapters include additional references with the aim of giving an excellent and readily accessible introduction to the literature.

The companion web site to this text is <www.oup.com.au/cws/attiwill>, and there we invite your feedback on the textbook and information on recent research findings in ecology. You will also find additional references and links to other web sites, as well as teaching and learning support material. We also plan to develop new materials, and we would be most grateful to lecturers and students for suggested topics. For example, population genetics is a rapidly developing field for which teaching

materials could be developed on the web site to complement this text.

As coordinating editors, and in association with Elaine Cochrane (the editor appointed by OUP) we have edited the book rigorously so as to give it a feeling of continuity. We have tried, as far as possible, to ensure uniformity in presentation and style throughout the book without destroying the unique approaches and styles of the various authors. We have aimed throughout to ensure that the book is written in a style and at a level that is readable by, and appropriate to, undergraduate students in ecology, natural resource management, conservation biology, and related disciplines. We have encouraged the use of references where necessary, but not so many references as to make the book like a series of reviews rather than continuous chapters of a text.

We had considerable discussion about the style for common names. In the botanical literature, lower case is most often used. In the zoological literature, common names most often start with a capital. While the distinction seems odd, and there appears to be no authoritative case for either, that is what we have used (for example, mountain ash, but Mountain Pygmy-possum).

We have had great support throughout the long process of bringing this book to its completion. Jill Henry, formerly the academic publisher with OUP, offered a great deal of support (and a good measure of patience) during the first stages of finding authors, expanding the contents, and accumulating and editing the manuscripts. Debra James, higher education (health sciences and sociology) commissioning editor, then took control of the final stages with great enthusiasm and support.

We thank the senior editors – initially Cathryn Game and later Chris Wyness – for directing the production of the book; Stephen Horsley, of *propellant*, for design; Kerry Cooke

for typesetting and figures; Racheal Stines for cover design; Lucy McLoughlin for editorial assistance and Tony Davidson for proof reading. Our association with OUP has been a most happy experience throughout.

We pay special tribute to our editor, Elaine Cochrane. Through her insights and attention to detail, we have avoided some major errors, reduced duplication, added more information where necessary, corrected many of the references, and above all, aimed to ensure that the book is presented in a way that can be read and understood by our primary audience, undergraduate students. Through her demands for detail we can claim to be in a minority of extant biologists who have actually read Charles Darwin's first edition (to ensure that a quote was accurate).

We thank Matthew Learmonth, Parkhouse Pty Ltd, and Chris O'Brien, School of Botany, University of Melbourne, for assistance with putting many of the figures into an appropriate electronic format, and Belinda Appleton (Department of

Genetics, University of Melbourne) who assisted us greatly with the formatting of references.

We thank all of our authors for their contributions, and for their patience and understanding throughout the long process. We thank them too for entrusting us with the job of editing. It would be a game author who claimed an error-free publication. As coordinating editors, we accept responsibility for errors and omissions, and we would be most grateful for feedback from all of our readers so that future editions can be constantly improved.

This book is the product of our experiences over our academic careers, and so we have been greatly influenced by our colleagues, and by our past undergraduate and postgraduate students. Finally, we acknowledge the enormous help and support we have received from our families, particularly over the past few years of intense work in editing and production.

Peter Attiwill and Barbara Wilson