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Novel ecosystems: intervening in the new ecological world order

Richard J. Hobbs, Eric S. Higgs and Carol M. Hall (eds), Wiley-Blackwell, Oxford,2013. xi + 368 pp. Price AUD $95.00. ISBN 9781118354223 (hardback, also available as Ebook).

What are 'novel ecosystems'? In brief, they are ecosystems that have been irreversibly altered by human action. And here is an interesting fact: novel ecosystems occupy one-third of the ice-free land of the planet. In many areas, novel ecosystems have been a significant component of the land surface for several thousand years.

So, why has it taken till 2013 for the 'first comprehensive volume' on novel ecosystems to be written? I suggest we have reached a point where the long-standing conservation/restoration paradigm, the 'return to Arcadia', is no longer tenable, given pervasive changes in land use, atmospheric composition, climate and spread of invasive species. What is the point of trying to restore ecosystems to an historical, reference condition, when the fundamental environmental drivers of ecosystems are undergoing unprecedented change?

This paradigm shift has been particularly forced upon ecologists working in ecologically sensitive locations: islands, which are especially subject to the extinction of endemic biota and the introduction of exotic species; and the Arctic, where global climate change has been amplified. However, I suspect that ecologists working anywhere in the world will realise, upon reflection, that a return to the past is impossible. This view is reinforced numerous times in this book, both from a theoretical perspective ('given a sufficiently long-term perspective, all ecosystems are novel') and from examples.

According to the editors, the purpose of this book is 'to provide a clearer picture of the current state of play regarding how we might understand, manage and interact with novel ecosystems.' The book arose from a workshop in 2011 involving several dozen restoration and conservation ecologists, and the odd philosopher, manager and policy wonk. It is dense with ideas: there are 42 chapters by a total of 50 authors. Eight of the chapters are 'perspectives', personal vignettes of an author's engagement with novel ecosystems (e.g. 'Coming of age in a trash forest', 'Moving to the dark side'). Another nine chapters are 'case studies', more detailed accounts of novel ecosystems, amongst which islands figure prominently. The rest of the chapters range over the origins, definitions, practical applications, policy implications and ethical dimensions of the concept.

The wide range of views presented in the book, the variation amongst chapters in style and depth, and the unresolved arguments convey the flavour of a workshop, an intellectual work-in-progress. The editors acknowledge that "the issues covered in many chapters are difficult and at times contentious, and agreement was not always easy... incongruities remain and not all ends are nicely tied up. To arrive at any other outcome would, we feel, not accurately represent the current state of discussion." Nevertheless, the inclusion of several introductory chapters, and a summary written by the editors, mean that the concepts introduced by the book, the debates around those concepts, are intellectually tractable.

If the Arcadian model is broken, what might take its place? The 'classical' alternative is Utopian: designer ecosystems, gardening at a grand scale. Several contributors to this book consider the opportunities offered by designer ecosystems for the provision of particular services. However, most contributors are at pains to state that the embrace of novel ecosystems does not mean rejection of the need to conserve or restore 'natural' ecosystems. Rather, they note that traditional approaches to conservation/restoration will become increasingly difficult (and expensive) as fundamental ecological drivers change and that the objectives of any conservation/restoration project should be determined with explicit consideration of costs and feasibility.

Many of the contributors to this book are prominent restoration ecologists, and the issues raised in this volume reflect a sea-change in the conceptualisation of ecological restoration. For example, the revised edition of the textbook on 'Restoration Ecology' (Van Andel & Aronson 2012; see review by Kanowski 2014) has a chapter on novel ecosystems and concludes with a set of chapters on the topic 'Restoring to the future'. In recent years, the Society for Ecological Restoration has broadened the scope of its guiding definition from 'repairing damage [to] indigenous ecosystems' to 'assisting the recovery of an ecosystem that has been degraded, damaged or restored'. For these reasons, increasing focus on the restoration of ecosystem function, rather than composition, is expected into the future.

Interestingly, ideas raised in this book are also current in the popular literature. The book 'Feral' by science journalist George Monbiot (2013) argues for the 'rewilding' of highly transformed ecosystems, with 'no view about what a "right" ecosystem or "right" assemblage of species looks like... The ecosystems that emerge, in our changed climates... will not be the same as those which prevailed in the past... While conservation often looks to the past, rewilding of this kind looks to the future.'

The convergence of popular and technical literature reinforces the impression that a paradigm shift in conservation/restoration is underway. *Novel Ecosystems* provides an entry to this novel world view.

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