



## Book Reviews

### Biological Invasions and the Austral Ark

**Invasion Biology and Ecological Theory: Insights from a Continent in Transformation.** Prins, H.H., and I.J. Gordon, editors. 2015. Cambridge University Press, Cambridge, U.K. 528 pp. US\$115.00 (hardcover). ISBN 978-1-107-03581-2.

**Austral Ark: the State of Wildlife in Australia and New Zealand.** Stow, A., N. Maclean, and G.I. Holwell, editors. 2015. Cambridge University Press, Cambridge, U.K. 637 pp. US\$40.00 (hardcover). ISBN 978-1-107-03354-2.

I always approach multiauthored books with some trepidation. At their worst, they can be loose collections of chapters whose main unifying feature is that they are too dull to find a home in peer-reviewed journals. At their best, they create a special shared vision impossible to achieve in another format. These two recent books from Australasia create something special to some extent but have quite different strengths and limitations.

*Invasion Biology and Ecological Theory: Insights from a Continent in Transformation* (Prins & Gordon) immediately grabbed my attention. Despite its undeniable importance, I generally find invasion biology a somewhat frustrating discipline. I am unfamiliar with most of its vast literature (see Pautasso 2016 for a more informed perspective). However, much of what I have read seems to address rather odd questions or illustrates how sophisticated armchair analyses can demonstrate trends that are already obvious to people working on the ground. *Invasion Biology* tackles this situation head on and is brilliant in its conception. The foreword by the venerable Charlie Krebs crackles as he throws down the gauntlet to the discipline of invasion biology and ecological theory in general.

The concept is explained in chapter 1 by the book's editors. Their idea was to distil invasion theory into 11 key hypotheses, and then invite 20 sets of authors to comment on the usefulness of this theory for explaining invasion biology in Australia. The 20 chapters cover a wide range of flora and fauna throughout the continent, multiple levels of organization, and both ancient and modern invaders. Probably, none of the authors would be specifically labeled an invasion biologist. Instead, the ones I am familiar with are all solid ecologists who have one foot in the realm of theory and analysis and the other squarely in the field. The first seven pages of chapter 1 were a joy to read, particularly in their mention of many

of the great founders of ecology (Grinnell, Tansley, etc.), most of whom I had not thought much about since my student days.

My rampant enthusiasm came to a screeching halt when I read the actual hypotheses. The first one ("A species will not be able to invade an area that has abiotic conditions that are outside its physiological tolerance level.") seemed to be a tautology. Farther down the list, although the issues are all fascinating, the statements are too general to be testable, are obviously condition-dependent, or are further tautologies. There is no obvious structure to the hypotheses (i.e., the extent to which they might be hierarchical, in competition, or complementary). The exception is number 11, "there are no rules concerning whether a species is invasive or not; it all happens by chance," which is suggested as a null hypothesis to the other 10. To my mind, this vague theoretical framework could have used a serious dose of modern ecological methods (i.e., the rather vague hypotheses need to be converted into explicit models that could be confronted with data [Hilborn & Mangel 1997]). Instead, it was largely left to the authors to intuitively interpret the hypotheses and arrive at some conclusions. Not surprisingly, the final chapter reveals that none of the hypotheses receive a great degree of overall support (including the tautologies) and ends with a reemphasis of the importance of natural history and a plea to heed the precautionary principle. I was tempted to throw the book out of my hammock.

While I was disappointed at how the concept underlying this book played out, the chapters make good reading. Indeed, they reveal a lot of interesting natural history and some good theoretical thinking. The authors made a good attempt to grapple with the 11 hypotheses and in doing so not only reveal the limitations of the hypotheses themselves but also gaps in the data. I hope the gauntlet this book throws down will lead to some of these gaps being filled, as well as to a more explicit theoretical framework that will allow the data to be put to good use. Invasion biologists will probably say that this framework already exists.

*Austral Ark: the State of Wildlife in Australia and New Zealand* (Stow et al.) can also perhaps be described as a work on invasion biology in that it focuses on remnants of a unique fauna drowning in a sea of nonnative invasive species. However, the book has no theoretical pretensions and aims simply to take stock of the state of wildlife in the two countries. Unlike *Invasion Biology*, a quick glance at the book generates no

excitement whatsoever. The foreword by Tim Flannery is accurate but gives no indication that he actually read the book. The introduction, by the editors Adam Stow, Norman Maclean, and Gregory Holwell, is clear and to the point but gives the impression the authors ran out of steam by the time they wrote it. I empathize with them if this is the case, having also been involved recently in the editing of multi-author books. However, I wish they had shared their vision for selecting topics and authors.

Whereas I was half expecting to see a mishmash of conference papers, closer showed the topics and authors had been selected quite deliberately to give comprehensive coverage. Many of the topics are predictable. For example, there are chapters on evolutionary history, various native taxa, invasive plants and animals, climate change, fragmentation, fire ecology, reserves, and a separate chapter for Australia and New Zealand. The two unexpected gems are a chapter on groundwater ecosystems and a chapter on the dissemination of antibiotics and resistance genes into natural ecosystems (equally fascinating and scary). The authors are a good mixture of youth and experience from a wide range of universities and government agencies. A notable omission is the lack of an indigenous perspective, although the critical role of Maori in resource management is featured in the chapter on New Zealand freshwater ecology.

The overwhelming contribution of the book is the wealth of descriptive information on biodiversity and its loss in Australia and New Zealand. The book is full of tables, graphs, and other descriptive data in easily accessible forms. The publication of this information is timely because similar collections of information that I am aware of are all over 20 years old. The book is therefore an invaluable resource for teaching, and I have already used it for this purpose. It will also be invaluable for students looking for conservation-related thesis topics and government agencies trying to prioritize conservation problems.

I would not, however, describe *Austral Ark* as a conservation biology book. The book mainly describes the loss of biodiversity and the ongoing threats. Generally, there is only a short section in each chapter on possible conservation initiatives. There are exceptions. The chapters on New Zealand reptiles and birds have a strong emphasis on conservation theory and innovations, as do the chapters on protected areas. However, the main emphasis of the book is to inform and inspire action rather than lead the way on what those actions should be.

*Invasion Biology* is a bold and brilliant venture that I think ultimately fails. It is an important book for invasion biologists to read due to the challenge it makes, but I suspect it will largely sit neglected on my own bookshelf. In contrast, *Austral Ark* initially appears a somewhat dull book, and rather depressing given its subject matter, but I have already frequently referred to it due to the wealth

of information it holds on Australasian biodiversity and its decline.

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 Pautasso M. 2016. Biosecurity, bibliometrics, and conservation biology. *Conservation Biology* 30:440-442.

### On the Way of Sustainable Agriculture

**Conservation Agriculture. Global Prospects and Challenges.** Jat, R.A., K.L. Sahrawat, and A.H. Kassam. 2014. CAB International, Wallingford, U.K. 393 pp. £160.00 (hardcover). ISBN13 978-1-78064-259-8.

**Conservation Agriculture in Subsistence Farming. Case Studies from South Asia and Beyond.** Chan, C., and J. Fantle-Lepczyk. 2015. CAB International, Wallingford, U.K. 264 pp. £85.00 (hardcover). ISBN-13: 978-1-78064-423-3.

**The Ecology of Agricultural Landscapes. Long-Term Research on the Path to Sustainability.** Hamilton, S.K., J.E. Doll, and G.P. Robertson. 2015. Oxford University Press, Oxford. U.K. 432 pp. £19.85 (hardcover). ISBN 978-0-19-977335-0.

Agricultural practices affect natural resources, including soil and water, and ecosystem services and functions and thus food production and quality. After a long series of technological developments, it became clear during the 20th century that tillage-based agricultural systems do not provide agricultural sustainability because they cause disruption of soil-mediated ecosystem services, reduce soil productivity, increase soil erosion, lead to loss of organic matter, and damage to soil structure. Different practices to mitigate soil erosion were attempted, such as minimizing soil disturbance (reduced tillage or no-till seeding), maintaining continuous organic soil cover of mulch and plants, and crop rotation and diversification. Simultaneous application of all these practices is known as conservation agriculture (CA).

After starting in the United States in the 1930s, CA is now practiced on approximately 125 million ha of arable cropland worldwide. It is most widely applied in the Americas, Australia, and New Zealand. Recently, it has spread to Asia, Europe, and Africa. Besides retention of soil capacity, CA promises greater productivity

and profit through reduction in inputs (i.e., fertilizers) and greater adaptability of farming to climactic conditions. Despite the difficulties of establishment of CA in the initial years (e.g., control of pests, diseases, and weeds) and perceived risk of loss in productivity in some cases, CA offers great benefits over the long term for rich farmers with large holdings and poor farmers with small holdings because it increases yield and decreases interannual variability. Recently, a multistakeholder CA community of practice has begun to facilitate the uptake and spread of CA internationally (<http://www.fao.org/ag/ca/index.html>), and farmers are increasingly engaged in finding ways to apply CA.

*Conservation Agriculture Global Prospects and Challenges* provides country- and region-specific overviews of the current status and future prospects of CA and discusses CA experiences under different agroclimatic and socioeconomic conditions. Research findings on soil quality, carbon sequestration, crop yield, climate-change mitigation and adaptation, pest and disease dynamics, and economic returns are discussed. The problems encountered in scaling up CA and efforts and political steps required for future development and spread are detailed for large regions with intensive agriculture, such as the United States, as well as for small-scale farming systems in, for example, Southeast Asia. The numerous contributing authors of the book believe that CA-based farming may be the best available option for attaining sustainable food security, alleviating poverty, and enhancing ecosystem services and functions.

*Conservation Agriculture in Subsistence Farming* has its origins in the 2013 conference *Frontiers in Agriculture in South Asia and Beyond* held in Nepal. It introduces results of studies on the potential of CA farming in small households in Nepal, India, and Malawi. Throughout the book, authors provide insight into the world of people who face undernourishment and evidence of the prevalence of underweight and stunted children. CA for poor smallholders in India and Nepal is only now being developed and promoted, and its implementation will be challenging. The research presented shows that CA has a positive impact on soil quality that leads to higher grain production, increased profits, livestock-system intensification, and greater labor productivity. Benefits of CA appear to differ between men and women, but data on this finding are limited. A case study from Malawi indicates that applying CA practices helps create a sense of time and control for women. They became more involved in decision-making processes at the household and community level; therefore, CA may contribute to diminishing the gender gap in agriculture. Some of the main constraints to the adoption of CA in Southeast Asia are the limited availability of agricultural training and inputs due to large infrastructure problems. That CA requires fewer inputs and increases yield should eventually lead to increased adoption of CA by local farmers.

Beyond CA's obvious benefits, CA practices may enhance the ecosystem services provided to agriculture in several ways. For example, ladybugs and bees play essential roles in, for example, pest control and pollination. Their requirements in a managed landscape, however, are often little known, and provision of their highly important services may not be fully effective in such landscapes. The heterogeneous landscape structure of CA may improve functioning of beneficial insects.

*The Ecology of Agricultural Landscapes* describes the long-term (almost 30 years) ecological research at the Kellogg Biological Station. The row-crop agricultural system at the station includes annual and perennial crops and unmanaged reference communities that reflect either a gradient of synthetic chemical inputs or a gradient of successional stages. Delivery of ecosystem services, such as food and fuel provision, biological pest control, clean water, soil fertility, and climate stabilization through mitigation of greenhouse gas emissions, and their interactions in these different systems were measured through long-term observation. An important result, among several, was that rotational management (e.g., legume cover crops and mechanical weed control in the row-crop rotation system) allowed a two-thirds reduction in the amount of synthetic nitrogen and herbicide required to produce high yields. Landscape diversity and heterogeneous land cover around the fields were strongly correlated with aphid suppression because the abundance of natural predators was relatively high. Several economic valuations of ecosystem services are discussed, from simple ones such as the calculation of the lost value of biological control services based on predicted yield loss and associated increased insecticide costs to determining supply and demand for ecosystem services by eliciting information from farmers.

Valuation of ecosystem services needs ecological, economic, and social indicators. As in the case of CA, adoption of new management practices that provide ecosystem services depends on farmers' willingness, their attitudes, awareness, education, and ability to differentiate between private and public goods. Practices that save labor or inputs or improve farmstead water quality, for example, without reducing income are more likely to be taken up by farmers. Farmers may need to be compensated for CA practices that affect profitability over the longer term.

All three books have a rather scientific style in that they present case studies and detailed overviews of research projects aided by graphs and tables. They cannot be considered easy reading for those unfamiliar with such work, but they will be of value to anyone who wants up-to-date information on CA and research. These publications show that finding the right balance between ecological and economic constraints and benefits is crucial for the wide-scale adoption of sustainable agriculture and

sustainable, long-term conservation of the environment and biodiversity.

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### Winning Hearts and Wallets for Biodiversity

#### Conservation Education and Outreach Techniques.

2nd edition. Jacobson, S.K., M.D. McDuff, and M.C. Monroe. 2015. Oxford University Press, Oxford, U.K. 428 pp. \$64.95 (paperback). ISBN 978-0-19-871669-3.

#### Whale-Watching: Sustainable Tourism and Ecological Management.

Higham, J., L. Bedjer, and R. Williams, editors. 2014. Cambridge University Press, Cambridge, U.K. 387 pp. \$120.00 (hardcover). ISBN 978-0-521-19597-3.

#### Primate Tourism: A Tool for Conservation?

Russon, A.E., and J. Wallis, editors. 2014. Cambridge University Press, Cambridge, U.K. 339 pp. \$110.00 (hardcover). ISBN 978-1-107-01812-9.

If biodiversity conservation is in essence a human-centered challenge, then we need different ways of creating and capturing the different types of value biodiversity that represents to different people. One way to achieve that is conservation outreach, a path that formally started more than a century ago with the nature-study movement and has most recently started to bring into its scope marketing techniques developed in the business sector. The book *Conservation Education and Outreach Techniques*, now in its second edition, has already become a key reference for conservation professionals hoping to dive into the human dimensions of applied conservation. This updated version promises to cement this status.

The book achieves a good balance between theory and practice by dedicating the first 3 chapters, about a quarter of the book, to exploring key concepts and theories of behavior change. This is particularly important as conservation outreach becomes increasingly mainstream and those involved may lack a background on the subject. The following 10 chapters focus not only on the techniques that can be used in conservation outreach such as storytelling or field trips but also on how to conduct activities relevant to different contexts such as rural communities or classrooms.

Yet, beyond the content more commonly associated with outreach, there are a few chapters worth highlighting. The first is the inclusion of a chapter dedicated to art for conservation outreach, a topic often forgotten in books of a more technical nature and where guidance is particularly lacking. The second is the chapter focusing on technology and online platforms, a rapidly evolving

field where much information is available but solid guidance can be drowned in the information flow. The third is the chapter on conservation marketing. Conservationists are increasingly aware of the pivotal role marketing concepts and techniques can play in the context of behavior change (Wright et al. 2015), and their inclusion in this volume broadens the range of tools available to the reader.

The flip side of the very broad scope of this book seems, however, to be exposed with the chapter on networking. This section seems to stretch the most commonly accepted definitions of conservation outreach by including, for example, conferences in its remit. These are largely inward looking events where members of the scientific or conservation community talk among themselves. Their focus is largely on the professional goals of individuals, a characteristic that sets them aside from other types of activities described in the book. It is clear that one book cannot contain all relevant imperforation a practitioner will ever need during her or his career, and future versions of this book may become more helpful to practitioners by narrowing its scope and adding depth.

It is very much worth highlighting the commitment the authors have shown toward evaluation throughout the book. For virtually every approach described, the authors include a section on how evaluation could be implemented, an example I hope will be followed in the future by other authors. In this way, the book shows practitioners how to continue to improve through knowledge of what works and to learn from their mistakes, thereby filling the critical evaluation gap that most conservation activities still suffer from (Baylis et al. 2015).

A path of a more commercial nature that captures the value placed on biodiversity by some people is ecotourism. Since the appearance of the term *ecotourism* in the 1970s, much has been written about the potential for tourism to support conservation (Kruger 2005). Nevertheless, as in many other areas of conservation, the jury is still out on the trade-offs between the benefits and impacts of ecotourism ventures.

For cetaceans, this cost-benefit relationship has received wide attention. *Whale-Watching: Sustainable Tourism and Ecological Management* provides insights into the historical, social, ecological, and policy contexts of this issue and achieves an unusual, but very much welcome, balance between the social and natural sciences. From the opening chapter, this book sets an open but critical tone to the discussion. The editors challenge some key assumptions relative to the benign impact of whale watching and do not shy away from contentious topics such as the difference between the impacts of whaling and whale watching. In fact, when discussing whaling and its impacts, this volume offers for the most part a refreshingly research-focused set of perspectives.

This first section on the historical and contemporary aspects of whale watching provides the reader with key

insights into the way humans have interacted and later managed cetaceans. Of particular interest are the chapters on threats to cetaceans and on the role of the International Whaling Commission (IWC) in promoting and managing whale watching. In the former, the author takes a well-discussed topic and manages to capture the reader by using an unorthodox interview format to convey the views of 5 experts on different threats to cetaceans worldwide. The latter chapter highlights the role of the IWC in ecotourism, which given the salience of the whaling issue may be unknown to many.

The following section focuses on the human dimensions of whale watching. One key theme of this section is the relationship between whale watching and whaling; 2 chapters focus on this relationship relative to Iceland. This discussion provides plenty of food for thought, although it may have been more interesting if the authors had included other whaling countries. It was also good to see 2 chapters focused on the potential educational value of whale watching, although the authors' largely theoretical focus left unanswered the key question of what these programs are actually achieving.

The third part of the book focuses on the ecological impacts of whale watching across different fields of ecology at different time scales and in different time frames. This emphasizes the multitude of impacts whale watching activities can have, some of which can be particularly changing to monitor and evaluate. The last section of the book, perhaps the only one that does not seem to have a common thread, contains a series of diverse studies that cut across previous themes, which made me wonder why these chapters were not included in the previous sections. This would have made it more intuitive for the reader to find content on a particular subject. Despite this, the chapters in this section contribute to the book because the authors discuss additional research on whale watching from a wider set of world regions, making this volume a more diverse academic contribution.

Primates are another animal group for which ecotourism has been the subject of much debate. *Primate Tourism: A Tool for Conservation?* Contributes to this ongoing debate by presenting case studies of tourism organized based on global regions, namely, Africa, Asia, and the Neotropics. Although, as expected, great apes get a large share of the attention, the editors achieve a diverse taxonomic representation, with chapters focusing on primates as distinct as lemurs, macaques, and marmosets.

Notably absent is, however, the human primate. Although it is obvious throughout that the main audience for this book is primatologists, the book misses the chance to develop an in-depth understanding of the role of tourism in primate conservation because for the most part it leaves tourists out of the equation and focuses

almost exclusively on nonhuman primates. Although a few chapters present some data on tourist behavior, no chapter has its main focus on people and their motivations, values, or behaviors. In an age where conservation issues are increasingly perceived as human-centric, this omission is substantial.

Nonetheless, the book presents a series of interesting reflections on different tourism impacts on the health, behavior, and ecology of flagship species such as gorillas and orangutans. Of particular interest are the discussions of primate tourism and disease transmission, which showcase the double-edge sword of their relatedness to humans. Although anthropomorphism draws humans to visit primate populations, it exposes these species to diseases carried by humans. The book reflects at length on best practice guidelines to manage this issue and thus increase the sustainability of primate tourism ventures, a topic that ecotourism operators will surely welcome. However, editorial coordination could have been stronger because on this topic there is not only substantial overlap among chapters but also points where best practices suggested by different authors do not fully align, which can create confusion. For example, in Chapter 17, it is recommended that visitors wearing masks keep a distance of 7 m, whereas in the following chapter the recommended safety distance is 10 m. Similar discrepancies occur throughout the book relative to the terms used to identify the type of tourism being discussed. Although the editors present their own definition of *primate tourism*, chapter authors use a number of other terms, such as *sustainable tourism*, *wildlife tourism*, and, of course, the ubiquitous *ecotourism*.

All in all, both the tourism books raise critical questions around the sustainability of ecotourism and show that it is too early to declare that this industry benefits both economies and biodiversity. It is thus clear that, similar to conservation outreach, much work still remains in the struggle to win hearts and wallets for biodiversity.

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## Noted with Interest

**The Passenger Pigeon.** Fuller, E. 2015. Princeton University Press, Princeton, NJ, U.S.A. 177 pp. \$29.95 (hardcover). ISBN 978-0-691-16295-9.

This book tells the story of the Passenger Pigeon (*Ectopistes migratorius*), a now-extinct species that lived in huge numbers in the near past in North America. It is comprehensive and scholarly and details the causes of the pigeon's extinction, but it is not a dry read. Fuller's stories, aided by beautiful color pictures, conjure vivid images of this remarkable bird. He also includes an abundance of material written by famous people who lived in the time of the Passenger Pigeon. The tale of the demise of this bird has been told and retold, yet we have not heeded the warning. May this book serve to wake up our sensibilities to the everyday tragedy of losing species before it is too late.

**The Biology of African Savannas.** 2nd edition. Shorrocks, B., and W. Bates. 2014. Oxford University Press, Oxford, U.K. 95 pp. \$59 (paperback). ISBN 978-0-19-870271-9.

This is the second revised edition in the useful Biology of Habitats series. It encompasses topics from the biology of the best known savannah-living organisms to their sustainable management. The 6 chapters are well interlinked; hence, it is easy for readers to connect ideas. The information on natural history and conservation status of wildlife species of African savannas is supplemented by useful distribution maps and numerous figures and tables that are easily connected to the text. Sustainable management and conservation are well articulated and emphasize the interplay between protected and unprotected areas. Birds seem a little underemphasized, even though their role as predators and scavengers are important in these habitats. Vultures, for example, do not get their due, and their plight is not emphasized sufficiently. There could be more detail on migratory birds because they move considerable biomass seasonally in and out of savannas. The key role of elephants as ecosystem engineers could also have been discussed in more detail. These are minor quibbles on an otherwise readable, well-researched, fine book. Natural history libraries and ecology and conservation biology institutions should have it in their collections, and it would be useful to wildlife students, ecology scholars, as well as tour leaders in East Africa.

**Ten Thousand Birds. Ornithology since Darwin.** Birkhead, T., J. Wimpenny, and B. Montgomerie. 2014. Princeton University Press, Princeton, NJ, U.S.A. 524 pp. \$45.00 (hardback). ISBN 978-0-691-15197-7.

Birkhead and colleagues set themselves to review the history of modern ornithology and use the fact that people like to read about people to advantage. The book scans ornithological knowledge and is organized around 11 thematic chapters, from bird phylogeny ("yesterday's birds") through speciation, migration, breeding, morphology, flight, instinct, behavior, sexual selection, population studies, and finally bird conservation. Anecdotes, personal interviews, and photographs are amply interspersed. The book is fascinating, but has an Anglo-centric view. If we are to believe the authors, ornithology is basically an English and North American occupation, and only about 2 "important" ornithologists per century came from other countries. Of the 20 in-depth interviews, 16 are with English or U.S.-based ornithologists, 1 is with an Australian, and 4 are with ornithologists from non-English speaking countries. Little of the work mentioned was done in Africa, Australia, India, or South America, and virtually no work from China or the Mediterranean is covered. In a few places, personal information becomes just too personal. What is there is good reading; pity for the patronization and bias.

**The Fish in the Forest: Salmon and the Web of Life.** Stokes, D. 2014. University of California Press, Berkeley, CA, U.S.A. 160 pp. \$21.96 (hardcover). ISBN 978-0-520-26920-0.

This book is an excellent guide to the realm (and the fascinating natural history) of the salmon along the northern Pacific coast of North America, known as the "salmon forest." Beginning with enough but not too much scientific theory, the book invites the reader on a journey that follows the salmon through its life cycle. The last 2 chapters show how these fish are so important for the forest ecosystem, including its large carnivores. The role of traditional knowledge gets its proper emphasis, but the salmon's role in ecological networks could be more articulated. The writer strikes a good balance between a scientific text and a popular-science book, and the excellent photographs by Doc White add much to its attractiveness. The content is well supported by references that may lead the reader to start another fish journey.

