Environmental Conservation **32** (1): 93–99 © 2005 Foundation for Environmental Conservation

BOOK REVIEWS

doi:10.1017/S0376892905212080

The Promise and Performance of Environmental Conflict Resolution

EDITED BY ROSEMARY O'LEARY AND LISA B. BINGHAM

xxvii + 368 pp., 23.5 × 15.5 × 1.5 cm, ISBN 1 891853 64 3 paperback, US$ 34.95, Washington, DC, USA: Resources for the Future Press, 2003

Conventional resolution of environmental conflicts in the USA has historically involved considerable acrimony and litigation. However, during the last 25 years, governments and other stakeholders have promoted consensual processes for resolving such conflicts. Their aim in doing so has been to reduce the negative effects of litigation on relationships between parties, cost and time efficiency, and subsequent environmental harm. The term 'environmental conflict resolution' (ECR) refers to such participatory consensual processes that have been tried as an alternative to confrontational approaches such as litigation.

The editors of this volume have a distinguished record of following environmental conflicts, and provide a retrospective on the relative success of unconventional participatory techniques. The book begins with a foreword from Gail Bingham, a notable conflict resolution consultant who first documented the performance of such techniques in 1986, 10 years after their first use in the USA. From the outset this book does not pretend to offer new techniques for resolving disputes for the public, but rather to provide an evaluative exposition of their application. Thus the readership of the book is intended to be academics, conflict resolution practitioners and policy-makers.

The chapters follow the pattern of policy development and implementation. After the introductory chapters that define environmental conflicts, the remaining material is organized into segments of 'upstream', 'midstream' and 'downstream' conflict resolution processes. While this categorization is somewhat ambiguous and confusing, given the use of these terms in other environmental contexts, the authors' aim here is to highlight the hierarchy of conflict resolution programmes in the policy realm. They also intend to define: tiers of evaluation from the participants in the process; the process formulators, facilitators or mediators; and the eventual implementation and outcome of the programme. Research and compilation of this volume was largely funded by a grant from the William and Flora Hewlett Foundation, whose programmes have focused primarily on drawing evaluative lessons. The level of detail in the evaluative process is impressive but sometimes tedious to follow because of a paucity of detailed case examples (chapter 7 presents two cases from a companion volume edited by Lewicki *et al.* 2003).

The authors even challenge some of the conventional indicators of success in conflict resolution, such as participant satisfaction. A notable critic of ECR, Cary Coglianese has a chapter in the book provocatively titled 'Is satisfaction success?' wherein he argues that the use of such metrics can overlook 'the broader public interest'. Indeed, the larger public interest in environmental conflicts is often predicated in physical constraints about resource use. This brings up a noticeable deficiency in the volume since the role of scientific expertise in environmental conflict resolution is neglected. The only chapter which deals with the role of science is aimed at an 'Assessment of environmental outcomes'. However, the author, Mette Brogden, concludes the chapter by saying that the aim was to 'review the reasons why we do not know the environmental outcomes of the ECR process'. There is however, a growing literature on how scientific expertise is used in and out of the courts which could have been further developed in this volume (for example the writings of Connie Ozawa).

Any evaluative study of this kind must also discuss the alternatives that exist and the negative consequences of those alternatives. While there is valuable empirical information in this volume about ECR processes, there is an absence of sufficient comparative empirical information about alternatives, such as litigation. Only by having a parallel comparison can we fully appreciate the value or lack thereof of ECR processes. There is also a tendency to overanalyse some of the variables. For example in chapter 8, detailed regression analysis is presented to query correlation between 'facilitator traits' and 'issue intractability' on 'perceived facilitator effectiveness.' Variables as subjective as these are probably better understood through qualitative methods and are also more easily evaluated through in-depth case ethnographies. Another related deficiency of the book is that the data are almost entirely from North America and international experiences with collaborative and consensual processes are not discussed. The physical presentation of the book is generally adequate, though a bibliography at the end would have been useful in navigating the literature that is scattered across chapters.

Despite these deficiencies, O'Leary and Bingham have provided a much-needed reminder that we cannot simply accept consensual approaches as a panacea to resolving conflicts, especially when larger societal goals such as environmental conservation are at stake. This challenge to conventional assumptions is itself a valuable contribution and should lead to further comparative studies and case analyses.

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doi:10.1017/S0376892905222087

Feed or Feedback. Agriculture, Population Dynamics and the State of the Planet

BY A. DUNCAN BROWN

432 pp., 22 × 15 × 3 cm, ISBN 90 5727 048 X paperback, US$ 29.95/GB£ 17.95, Utrecht, the Netherlands: International Books, 2004

It appears Duncan Brown aspires to be a nuisance. He has the audacity to open the book with a declaration of nine 'laws', as if to suggest

these canons of ecologically sensitive behaviour have been tested and have wormed their way into the mainstream consciousness of the ecological sciences. Clearly, he assumes rhetorical licence, and since the 'laws' are those of 'ecological bloodymindedness' he tends to his subject and its dark implications with some humour. Since, as I understand it, bloodymindedness (a term absent from the American lexicon) suggests a sort of defiance for its own sake and to no particular end, Brown is the very best kind of nuisance because his intentions are good. So, in fact, is his book.

While most of his themes are familiar and widely discussed, Brown must tell the entire story with all its apparent digressions in order that his conclusions warrant serious consideration. To really make his case is no small task. He charts the path of human food-system development from hunter-gatherer to modern industrial agriculture. He outlines relationships between relative population density, sanitation, disrupted nutrient cycling, phosphorus extraction for chemical fertilization, and water scarcity in arid agricultural regions. These conditions are directly related, perhaps causally, to human population expansion and the earth's carrying capacity. Again, except perhaps for that of phosphorus, these are all stories we've heard, but this telling is fresh and urgent.

The thrust of his argument resides in the inherent global unsustainability of modern agriculture. Brown highlights many vulnerabilities in vast simplified monoculture ecosystems, all of which loom on the horizon. With so many humans precariously dependent on these systems, the risk is potentially catastrophic. Most discouraging, perhaps, is the difficulty of informing the public about seemingly intangible dangers, particularly when the solution encompasses societal sea change. Change is also required of corporate institutions which exist within a leviathan network of global capital. Since sceptics can point to the conspicuous failure of any number of environmental doomsday predictions, any new warnings are patently dismissed. Further, they will insist that the free market will create opportunities for technological remedies.

What then of Brown's remedies? Essentially, on a global scale, human food systems must be restructured in such a way as to restore small, organic, localized, fossil-fuel-independent farms with very complex ecosystem management, intercropping large varieties of crops in balance with manageable and diverse livestock populations. Meanwhile, we overcome the sanitation obstacles and compost our food waste, our excrement and our bodies (once we've finished with them) to fertilize the local soils from whence we came. What's the big deal? There is much capital tied up in global food production and transportation systems. Brown challenges the most fundamental ethos of global economics, the 'unlimited growth' economy.

Brown is not unrealistic about the barriers to true sustainability. His closing chapter offers a sober commentary on such barriers, only the smallest being the degree to which most of us are distracted by more immediate problems. He does not end with false hopes, yet neither is he darkly pessimistic. I wonder, however, just when we average folks might see concrete evidence of these global agricultural failures. Might not other forces mitigate the collapse of the food system infrastructure and the overall economy? Brown admits that fossil fuel scarcity is too large an issue to resolve in this book. Yet we would expect that oil scarcity could sooner generate global economic instability than phosphorous, that is if 'Peak Oil' scholarship is worth its salt. Either way, the solutions are the same and difficult to swallow.

Finally, a note on mechanics. I confess I'm a sucker for clear engaging prose. Brown writes well and he is occasionally very funny. I find his argument compelling, and his analysis sound and well reasoned. His reliance on an enormous volume of historical data is both his strength and his vulnerability. Any work that relies on this kind of scholarship faces the appearance of tailoring history to fit the argument. When the argument confronts the basic tenets of advanced capitalism, the allegations will fly, and with voices far more powerful than the general readership of *Environmental Conservation*. Ultimately, Duncan Brown tells a story that must be told. He makes it accessible without undermining its depth, and in so doing, he makes a perfect nuisance of himself.

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doi:10.1017/S0376892905232083

Food Webs at the Landscape Level

EDITED BY GARY A. POLIS, MARY E. POWER AND GARY R. HUXEL

xviii + 548 pp., 22.5 × 15 × 3.5 cm, ISBN 0 226 67327 8 paperback, US$ 36.00, Chicago, USA/London, UK: The University of Chicago Press, 2004

The late Gary Polis and co-editors have brought together authors and studies focusing on the effects and implications of cross-ecosystem fluxes or subsidies of resources and consumers on ecosystems. This idea was particularly novel when Polis and Hurd (1995) first published their study of the effects of marine subsidies on terrestrial and insular spiders, and this book describes advances that have occurred in many ecosystems since that original finding. In fact, the large edited volume contains 26 chapters and 548 pages of text summarizing these advances in some detail. Nonetheless, despite the length, 2004 publication date and the inclusion of a few international investigators, the book has a very 1990s and North American feel, with very little citation of literature from the last few years or from outside North America. So, if you do not know North America or missed the 1990s, this is a good place to learn and catch up on some of the important ecological history of that decade. If you doubted the importance of ecological subsidies before reading this volume, you are likely to be a weary believer by the end.

Like many edited volumes, it includes many authors and this leads to repetition of concepts and citation of literature, making the book difficult to read from cover to cover, particularly if you have been following the primary literature. Most readers will want to start by reading some of the final five synthesis chapters and then backtrack to chapters that interest them. If they are interested in recent advances in mathematical models that include subsidy parameters and dynamics, then the chapters by DeAngelis and Mulholland, Holt, and Sears and colleagues will be of interest. I, however, found a number of the case studies and synthesis of field studies most insightful, and there are several examples from fresh and saltwater shorelines that will interest readers that wander near and wonder about these fascinating ecotones.

As a conservationist, what most captured my interest was some of the curious and unexpected effects that subsidies can have on ecosystems. This was described well by the case study of Jefferies and colleagues on the effects of agricultural subsidies on the migratory lesser snow geese in the North American migratory beltway, where

geese are transforming wintering coastal habitats because of food subsidies from industrial American Midwestern agriculture. This fascinating description will cause the reader to connect the effects of various subsidies on wildlife, domestic animals and humans on ecosystems. Of course the greatest and primary subsidy today is the petroleum-based subsidy of the human economy from past geologic eras, which is having even more widespread effects on most of the Earth's ecosystems. The volume did not miss this subsidy, and Riley and Jefferies' chapter on global change briefly summarizes many of the human effects of which we are aware. It did not, however, produce any particularly new insights into the causes and consequences, and this is where the volume leads the reader to wonder what the full consequences of subsidies across time and space will be in transforming the ecology of the planet. The book, therefore, sets the stage for future investigations into the full causes and consequences of subsidies, and will hopefully stimulate the next round of investigations.

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doi:10.1017/S037689290524208X

Mediated Modelling: a Systems Dynamic Approach to Environmental Consensus Building

MARJAN VAN DEN BELT

xxi + 339 pp., 50 figures & 12 tables, 25.5 × 18 × 1.5 cm, ISBN 1 55963 960 1 paperback, US$ 35.00, Washington, DC, USA: Island Press, 2004

A challenge for the twenty-first century is how to integrate science and deliberation with ordinary citizens, says Thomas Dietz in the Introduction, and Marjan van den Beldt sets out to show us one way of doing just that in relation to environmental issues in this book. 'Mediated modelling' is a form of participatory modelling, involving systems dynamics simulation approaches to aid the process of public discussion aimed at arriving at a consensus on environmental issues. Facilitated by a 'mediated modeller', and focusing on a specific environmental problem, stakeholders are guided through a number of sessions in which they arrive at an agreed conceptualization of the system in question, develop a computer simulation model of it within a graphical modelling environment, and finally use the resulting model to explore various solutions to the problem.

The book consists of 10 chapters, the first four of which introduce concepts involved in engaging the public in discussion on environmental issues, the role that mediated modelling can play in this process and the mechanics of conducting mediated modelling projects. The role and characteristics of a mediated modeller are discussed, as are the criteria for the success of a mediated modelling project. The next five chapters describe actual mediated modelling exercises in which the author was involved; there are three from the USA, one from Canada and one from Portugal. The final chapter summarizes the lessons the author has learnt from her experiences of mediated modelling. The strength of the mediated modelling approach is that each stakeholder is exposed to other viewpoints of the same problem, it forces them to confront the 'facts' of the system, and these are expressed explicitly in the form of a simulation model which can then be used to test different hypotheses they may have. The emphasis is on mutual understanding of the system and identifying the relationships between its components, which are seen as more important goals than exact quantification of those relationships and predicting the future precisely. Participants in one of the case studies commented that the main thing they learnt was an understanding of the interconnectedness of the system and that no part is isolated from another. Downsides of the mediated modelling approach include the time and cost of involving stakeholders, possible bias in the stakeholders selected, lack of academic credibility of the resulting models and the possibility of a poorer representation of the real-world system than if just scientists had been involved. As was evident from one of the case studies, there is also the real possibility that priorities of the research organizations carrying out the mediated modelling exercises may change over the duration of the project, resulting in it never being completed, with all the detrimental effects on the perceptions of the stakeholders that this might have. Difficulties in validating such models are also discussed, but the author makes the point that 'buy-in' and trust in a model by the participants are more important than its numerical accuracy.

Overall the book is well-written and well presented, although some of the figures are screen-dumps of graph output from the modelling software used and therefore not of the same quality as other figures in the book, and there is a tendency for some parts to read more like a recipe and for the material in the case study chapters to be a little repetitive in concepts. As such, it is probably not a book that would be read from cover to cover in one session, but it nevertheless promises to be a valuable resource for those involved in participatory modelling, providing useful practical information on setting up and executing such projects and avoiding the pitfalls associated with them.

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doi:10.1017/S0376892905252086

Alien Species and Evolution. The Evolutionary Ecology of Exotic Plants, Animals, Microbes, and Interacting Native Species

BY GEORGE W. COX

xii + 377 pp., 22.5 × 15 × 2 cm, ISBN 1 55963 009 4 paperback, US$ 40.00, Washington, DC, USA: Island Press, 2004

It is becoming something of a refrain to say that the impacts of introduced (alien, exotic, non-indigenous and adventive) species and habitat destruction are the two most serious factors causing the current rapid decline of biodiversity throughout the world. Perhaps global warming, once understood better, may become the

third participant in this trio of factors causing the world's biota to become a homogeneous set of widespread species tolerant of these anthropogenic changes, while the vast diversity of locally endemic and locally adapted species disappears. Charles Elton (1958) was the first to write a book explicitly focused on alien species issues, but decades lapsed before these issues really caught the full attention of the scientific community, so that it was not until the late 1990s that the journal *Biological Invasions* was started and a plethora of books began to appear dealing with various aspects of the subject. George Cox's first book on the subject (Cox 1999) was one of these, but others included semi-popular books like those of Bright (1998), Lowe (1999) and Van Driesche and Van Driesche (2000), as well as books written by and largely for the scientific community. In some cases these comprised edited multi-authored contributions derived from workshops and published under the auspices of the Global Invasive Species Programme (such as Mooney & Hobbs 2000; Ruiz & Carlton 2003).

So, do we need another book on alien species right now? Those mentioned above have focused primarily on the ecological impacts of alien species; some of them are explicitly geographically focused. So, yes, a book dealing with the increasingly acknowledged evolutionary consequences of the wide and unprecedented introduction of species to biotic communities that are not adapted to them and to which they are not adapted is definitely timely. This book is the first to explicitly focus on these evolutionary consequences. Its target audience, I think, is the interested scientist, including both upper level undergraduate and postgraduate students.

The book is divided into four parts: (I) Basic concepts of alien invasion and evolution, (II) Processes of evolutionary change and adaptation, (III) Evolutionary interaction of aliens and natives, and (IV) Global evolutionary consequences of alien invasions. Let me consider each part in turn.

Part I is indeed a basic introduction to the issues, discussing in four chapters: the fact that evolution can take place rapidly when an alien species is introduced to a new community; the characteristics (adaptations) required to make an invasive species successful; the consequences of the founder effect and limits to genetic diversity in invasive propagules; and the sources and routes of invasion. To someone already involved in the subject, nothing here is really new or insightful, but there are many interesting examples.

Part II addresses processes, potentially a more interesting section for someone already versed in the basic issues of invasion biology. Hybridization, both between natives and aliens and between aliens themselves is dealt with, and there is an entire chapter on transgenic organisms, which I found to be perhaps the most informative and novel chapter in this section. A chapter deals with a poorly-understood issue, namely the invasion resistance of native communities, but while many examples are given, no real conclusions are drawn, and the reader is left somewhat hanging. The invasibility of islands is given only a very short section, despite islands arguably being model systems for the study of invasion and having attracted significant discussion elsewhere (for example Simberloff 1995). Finally, part II deals with adaptation of alien species to new habitats, in a way leading into part III.

Part III deals explicitly in turn with the multitude of evolutionary adaptations that alien and native plants, animals, herbivores, predators, parasites, diseases and their vectors and hosts exhibit when faced with the new interactions. This is essentially a compendium of examples, a source to be accessed rather than a section to be read from beginning to end. The final chapter of this section, on the accumulation of a complement of herbivores, predators and parasites by alien species following their introduction, is interesting but does not sit entirely comfortably in the book as the mechanisms involved may be primarily ecological rather than evolutionary.

Part IV begins with a recounting of the roles alien species have played in extinction and extirpation of native species, a good summary, but nothing especially novel. Similarly, the next chapter is a good summary of the potential negative consequences of biological-control introductions, including the potential for evolutionary host shifts by control agents in their new environments, but again there is no novel insight. However, the following last three chapters of the book constitute the most thought-provoking and, perhaps for some, contentious, part of the book. First, Cox discusses the community consequences of the introduction of alien species, as a result of co-evolution and counter-adaptation. Most of his examples are taken from natural invasions, including range expansions following the last Pleistocene glaciation, implying that similar, perhaps evolutionary, consequences will in time shape the communities created by the artificial invasions that have been mediated by humans over more recent historical times. The next chapter follows from this to suggest that in the long term (and many of the examples are from natural invasions such as the colonization of the Galapagos by the precursor of Darwin's finches) speciation that results from processes such as hybridization, host shifts and reproductive isolation among numerous widespread founding propagules 'might compensate for the extinctions that are presently resulting from alien introductions'. This will be a red flag to many conservationists, who would argue that an essentially anthropogenic world biota is unacceptable, regardless of the total number of species. Nonetheless, speciation both by alien invaders and within the invaded community is clearly an issue in invasion biology and it is appropriate that it is covered here. The final chapter begins briefly with the creation of entire new biological communities as a result of the invasion of aliens, then includes a short section on 'invasional meltdown' (Simberloff & Von Holle 1999) and finally sets everything that has gone before in the context of global climate change, the modified 'ecological theater in which these evolutionary processes are playing out'. The book ends with three brief paragraphs on conservation. A distinction is drawn between intercontinental invasions (primarily human mediated), which Cox suggests should be restricted, and intracontinental invasions (in many cases natural responses to global climate change), which should not. And finally Cox suggests that 'conservation efforts must be flexible and in tune with biogeographic and evolutionary realities', arguing that the best protection we can give to species unique to particular areas is to allow them 'the potential to adapt by evolution and dispersal to conditions of a rapidly changing environment'.

Overall, the book is full of examples, and many of them are very recent; the bibliography is up to date. As such, it is a good book to turn to for access to the literature, although it is perhaps rather dominated by examples from the USA. However, many of the examples appear more than once and this reflects a feeling that there is a lot of repetition in the book. Although the various sections of it are nominally distinct, I felt that I was reading the same thing many times. Furthermore, I felt some sense of disappointment in the absence of anything dealing with basic theoretical principles, from a strictly theoretical perspective, that is, rather than by the accrual of examples. I also read the book from the perspective of its potential as a class text, perhaps not for a formal course, but for a seminar or discussion group. Again, I felt disappointed because the book does not really address basic principles in depth; it is in a way a long discussion of examples and would not provide enough in the way of contentious theory or new

ideas to stimulate a class discussion (except perhaps Part IV). As a reference it is an excellent source, but there is still room for other contributions on evolutionary issues in invasion biology.

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doi:10.1017/S0376892905262082

Blood and Oil: the Dangers and Consequences of America's Growing Petroleum Dependency

BY MICHAEL T. KLARE

xvi + 267 pp., 24.3 × 15.9 × 2.7 cm, ISBN 0 8050 7313 2
clothbound, US$ 25.00, New York, NY, USA: Henry Holt & Co., 2004

Advanced societies depend for their well-being on an assured continuing supply of huge amounts of oil (petroleum). What would collapse in particular without oil in an industrialized country is its absolutely vital transportation sector on land, sea and air. So it should come as no surprise that the industrialized countries of the world strive, by fair means or foul, to make certain that they maintain oil imports sufficient to make up for any inadequacies they might well have in their own domestic sources.

The USA is the most voracious user of oil of any country, currently accounting for about one-quarter of all that is expended throughout the world. Moreover, the USA has long since surpassed its domestic abilities to satisfy its ever-growing needs for that precious commodity. The notion that the US demand for oil has had an ever-greater influence on its foreign policy and actions in concert with its increasing need for foreign oil has been carefully examined over the years by numerous scholars (for example Heinebäck 1974; McNaugher 1985).

However, the question being addressed most frequently at present is the extent to which the current US war against Iraq is the result of its huge need for stable foreign oil supplies (see Vidal 2002; Heinberg 2003; Pelletiere 2004). And that is also the primary question being analysed by Michael Klare in this monograph. Klare, a professor at Hampshire College in Amherst, Massachusetts, USA, is a distinguished member of that subset of political scientists who specialize in issues of war and peace. Indeed, the broader question of natural resource needs as a determinant of US foreign policy and actions has been a concern of his for many years now (for example Klare 1972, 2001).

I must state that Klare makes a powerful case for an inexorable US addiction to oil, one that is being routinely satisfied at the expense of an extraordinarily heavy-handed foreign policy to the point of there being no qualms about shedding blood (mostly foreign blood) in its support. In fact, the bloodshed in the current war in Iraq, a war primarily over access to oil, according to Klare, seems to result (beyond all those maimed or otherwise wounded) from as many as 100 Iraqi fatalities for each US fatality. With business as usual, Klare sees no end in sight for what he finds to be the US approach to satisfying its demand for oil. This is so inasmuch as more than half of the oil consumed in the USA will have to continue to come from the handful of capriciously oil-endowed countries. Since many of those oil-rich countries are ruled by autocratic and corrupt regimes, that makes either for unpleasant bedfellows or else for countries to be coerced into cooperation.

For Klare it is thus abundantly clear that the USA must work rapidly toward oil autonomy through a combination of frugality and innovative (and environmentally benign) substitution. With the burning of oil a major contributor to the flagrantly unsustainable discharges of carbon dioxide into the atmosphere, and the USA the world's major (and most recalcitrant) culprit in this unfortunate contribution to global warming, it becomes imperative that Klare's recommendation be heeded. In that regard, it might also be useful to bear in mind the still highly relevant study by Lovins and Lovins (1982).

Klare's examination of what he presents as an oil-driven US foreign policy begins at the end of World War II, although some may find his historical perspective and insights of the early decades of the period under consideration to be somewhat perfunctory. However, he does make a compellingly interesting story out of the unsavoury long-standing US alliance with Saudi Arabia. But the real strength, and best documented, portion of the book deals with the immediate past and present, especially with the flagrant inadequacies and counter-productive nature of what he refers to as the Bush-Cheney energy plan for the USA.

The two political scientists alluded to earlier, namely Heinberg (2003), an academic, and Pelletiere (2004), an expert on Iraq formerly with the US Central Intelligence Agency, both cover pretty much the same ground as Klare, doing so in a similarly scholarly fashion. And, in fact, both arrive at conclusions quite comparable to Klare's. Vidal's (2002) somewhat less authoritative contribution to this field also made the same point. However, if you only have time for one of these four books, Klare's is the one to be recommended, owing to its clear, forceful and graceful presentation.

Armed conflict with deadly and destructive intent is certainly a time-honoured approach for one country to gain control over another. At the same time, human numbers and aspirations continue to spiral upward in the face of a deteriorating biosphere and ever more difficult access to the many natural resources necessary for human survival and well-being. So the connection between blood and oil presented so cogently by Klare (and others) provides yet another case history of the more general correlation between war and

environment that has been elucidated so well by various others in recent times (see Gleditsch 1996; Homer-Dixon 1999; Brauch *et al.* 2003).

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doi:10.1017/S0376892905272089

Assembly Rules and Restoration Ecology: Bridging the Gap Between Theory and Practice

EDITED BY VICKY M. TEMPERTON, RICHARD J. HOBBS, TIM NUTTLE AND STEFAN HALLE

xv + 528 pp., 23 × 15 × 3 cm, ISBN 1 55963 375 1 paperback, US$ 45.00, ISBN 1 55963 374 3 hardback, US$ 90.00, Washington, DC, USA: Island Press, 2004

Ecological restoration is applied ecology, the practice of which is supported by the science of restoration ecology. Restoration ecology is rooted in plant community ecology, and in its search for conceptual bases has emphasized the key conceptual frameworks of succession and assembly theory, both of which address the question of how communities are put together.

This latest contribution from the Ecological Restoration Series of Island Press, in collaboration with the Society for Ecological Restoration (SER), is an overview of plant community ecology in restoration in the context of assembly theory. It combines both synthetic conceptual chapters and case studies that are referent to these concepts. As stated by the editors, it will be of interest to academic restoration ecologists and restoration practitioners, as well as potentially for graduate (and undergraduate?) courses in restoration or community ecology.

The conceptual chapters take different approaches to assembly, and even define it differently. Early empirical observations, microcosm experiments, and computer simulations in assembly theory concentrated on the idea that communities in similar sites assemble with similar guild structure (guild proportionality), but that the specific composition of these communities may be stochastically influenced by arrival times and competitive exclusion (priority effects).

This book generally takes a much broader view of assembly theory, defining it as the set of filters that determine community membership. Here, assembly theory encompasses such concepts and fields as dispersal limitation, seed limitation, safe sites, physiological limits (fundamental niches), competition, facilitation, pollination and dispersal limitation, disturbance ecology, succession, biogeochemistry, and even landscape ecology. The book's sense of assembly theory also encompasses deterministic, stochastic, and alternative stable state models of community ecology. In this form, assembly theory becomes less a novel set of concepts or rules, more a conceptual framework that ties together much of traditional and modern community ecology under a shared umbrella. This is a bold proposal, which could have been more explicitly stated, as in the excellent chapter by White and Jentsch.

The case studies highlight the challenge of this approach. Each is an interesting piece of scientific research, but of the usual variable quality. These studies do not test assembly theory or even really inform assembly theory, both rather are interpreted in the context of assembly theory (some more than others). The question arises: would these restoration projects and the scientific studies of them have been done differently, be interpreted differently, or have different impacts without assembly theory? To their credit, Hobbs and Norton (p. 91) raise a similar question. One of the themes of this particular set of case studies is that natural succession is often sufficient for community recovery without intervention, at least in mesic climates. Another theme is the question of how we monitor restoration projects, and what metrics are useful for determining success. These topics are timely indeed.

The title of this book includes 'assembly rules' and the use of the word 'rules' might suggest a set of fairly explicit statements about what can and cannot be done (in this case, as communities assemble). I anxiously anticipated someone proposing such explicit rules, even if for heuristic purposes. It was not until chapter 7 before I saw such a rule, and only Tony Bradshaw in chapter 16 went so far as to attempt a real list. White and Jentsch's 20 'guidelines' in chapter 17 represent a parallel approach. The editors of this book recognize the quandary, and Fattorini and Halle (p. 108) specifically ask whether community ecology is scientifically mature enough for such rules. The editors make a valiant effort in introductory and summary chapters to tie all of the contributions together and to find common ground among these disparate views, asking tough questions about the current status of restoration ecology and assembly theory and where they may be headed.

The book is produced well, and a fitting contribution to the great series of reasonably priced books produced by Island Press on the topic of ecological restoration. The figures and photos are nicely reproduced (even a dread gel!), and the text is legible and free from typographic errors. There are separate reference lists for each chapter, and these are rich and useful.

This is a thought-provoking book full of interesting insights and facts, and can be read profitably by practitioners, researchers, teachers and students of community ecology and restoration.

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doi:10.1017/S0376892905282085

The Kruger Experience: Ecology and Management of Savanna Heterogeneity

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xv + 519 pp., 23.3 × 15.6 × 2.8 cm, ISBN 1 55963 982 2 paperback, US$ 40.00/GB£28.50, Washington, DC, USA: Island Press, 2003

The Kruger Experience describes the history and management of the Kruger National Park, from its origins in the late 19th century through to the recent transformation in management approach, which took place almost a century later. It is divided into four sections: part I explains the historical context of the Kruger National Park and introduces ecological heterogeneity as the conceptual framework for the following sections; part II describes the elements of the biogeochemical template, which act as agents, substrates and controllers of Kruger's heterogeneity; part III describes how interactions between plants, animals and diseases respond to, as well as drive, savannah heterogeneity; and part IV explores the linkages between humans and savannahs and the possibilities for reintegrating ecological and social systems. Finally, this concluding section draws on the concepts established in previous chapters to suggest future management approaches, which include both scientific and social concerns.

Anyone with an interest in the Kruger ecosystem, savannah ecology, or the history of conservation in Africa will find *The Kruger Experience* fascinating, but the book also provides valuable case studies of much wider relevance. It offers a rich resource for ecologists, conservation biologists, ecosystem managers and conservation planners, regardless of their geographical focus. Its clarity and accessible style will benefit readers at all levels from advanced undergraduates, to theoretical ecologists and seasoned conservation practitioners. Chapters are concise and consistently structured, the chapter order is logical and the grouping into four sections helps to highlight the main themes. This deft handling helps the reader to easily navigate what could otherwise be an overwhelming scope and detail.

The book succeeds on many levels. First, the heterogeneity framework described in the first section is a fascinating illustration of how new conservation approaches are developing in response to theoretical advances in ecology. This historical and conceptual underpinning permeates all chapters and provides cohesion to the book. Second, the pursuit of this conceptual cohesion does not lead to a sacrifice of ecological detail; the book serves as an encyclopaedia of the history of ecological research and management in one of the world's most famous national parks. As well as chapters which take a refreshing approach to familiar savannah issues such as large herbivores, carnivores, vegetation dynamics and fire, it also incorporates chapters on elements of savannah ecology that are often neglected, like insects, disease and rivers. Third, it views the Park in context; the influence of humans in savannah ecology, the relevance of the Park's human historical background and the social, economic, political and environmental matrix are all considered. Fourth, while recognizing the complexity of ecological systems, it provides a practical approach for developing realistic management plans by integrated science and adaptive management.

Of the many highlights, I particularly enjoyed the opening chapters, which trace a century of changing management, summarize key determinants of savannah heterogeneity and explore the implications of a heterogeneity paradigm for the management of savannahs. The historical overview provides context for understanding the transition from the 'command and control' era to the strategic adaptive management of today, beautifully illustrating the link between politics, underlying ecological assumptions and management goals. These themes resonate throughout the book, and help to orientate the reader throughout the fascinating ecological insights of the subsequent chapters. The chapter on carnivores was another high point, hinting at an intriguing link between rainfall and carnivore prey choice and hence herbivore abundance; the reader is constantly reminded of the myriad processes which drive the heterogeneity of the Kruger ecosystem and the interactions between biotic and abiotic components. In the closing chapters, the combination of careful ecological conceptualization with integrative socio-ecological analysis provided a satisfying synthesis of ideas, as well as an inspiring indication of the future direction of adaptive management in Kruger National Park and beyond.

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