

plans, including useful advice on how to buy time, assessing vulnerability to climate change, developing strategies to reduce vulnerability, and emphasizing the role of models and technology. Part 2 has five chapters on taking action, including strengthening protected areas, addressing the needs of species, the role of connectivity in the landscape, habitat restoration, and dealing with the problem of invasive species. These are mainstream conservation actions familiar to resource managers but here seen through the lens of climate change. Part 3 has four chapters on governance issues, including regulating harvest of energy, regulating pollutants, integrating the needs of nature and people, and adapting governance for change. Again, much of this is familiar ground for readers of this journal but enriched with climate change concerns added to the usual responses.

The Afterword contains some additional useful advice, presented in a semi-light-hearted way that is very welcome after a fairly depressing prognosis of the impacts of climate change, using headings borrowed from a renowned American philosopher, including: 'The future ain't what it used to be', 'When you come to a fork in the road, take it', 'You can observe a lot by just watching', 'We make too many wrong mistakes', 'If you don't know where you're going, you might not get there', 'If the world was perfect, it wouldn't be', and 'It ain't over 'til it's over.'

Most of the book's prescriptions are sensible and would be useful advice for resource managers even if climate change were not such a worrying concern. For individuals working in conservation this is an excellent and balanced discussion of the kinds of climate-related issues they are likely to face in the coming years. But some minor problems creep in: some suggested approaches to adaptation are in fact more like mitigation (e.g. 'reduce the rate and extent of local and regional climate change'); the discussion of the Amazon Basin should have mentioned that while this vast forest may support its own climate, in some recent drought years it has been a net producer of carbon dioxide rather than a carbon sink; more advice on converting knowledge about rates of change into action to address these would have been useful; and more citations would be helpful (for example, the alleged case in which a World Health Organization van was burned in an Indian village because its caduceus-like symbol with a snake was despised by villagers).

But the book also has a few more fundamental limitations. Firstly, it defines adaptation in solely human terms, explicitly

excluding evolutionary or biological adaptation even though it discusses the latter forms in some detail and says relatively little about how to change human behaviour. Secondly, the book is specifically aimed at resource managers as if they were major players in the climate change issue. Whilst of course everybody must contribute, and maintaining biological diversity is the best insurance for adapting to changing conditions, the most important actors are surely on other stages, and expecting resource managers to 'reduce the rate and extent of global change' (p. 83) or stopping the Chinese from building dams on the upper Mekong River (p. 190) is hardly realistic. Thirdly, the book is written from an American perspective, although with some international examples well integrated throughout; but nowhere does it mention the sad reality in the USA that politics is the key constraint to progress, with one political party, whose name cannot be mentioned, being led by Senators who steadfastly deny even the reality of climate change, much less the need to do anything about it. Fourthly, the book lacks the historical perspective that might have provided important insights about how people have actually adapted to major climate changes throughout history without the wise guidance of resource managers; this provides the 'evolutionary and reverential literature' that the authors say is lacking, instead charging the IPCC of forcing adaptation on us 'almost by edict'. The reality is that both ecosystems and humans will adapt, one way or another; the IPCC is just trying to reduce the pain of doing so. Finally, the book includes humans almost as an afterthought, even though modern resource managers deal with the human dimension on a regular basis, and arguably the most important aspect of climate change for people is that historically it has been accompanied by serious human conflicts, even ones that may be existential when applied to modern conditions.

In short, this is a useful handbook for helping resource managers realize some of the challenges that they will need to address in the coming years. The readers of this journal will find it a helpful discussion but, in the end, it feels more like displacement behaviour. It is putting the focus on some of the victims of climate change (species, protected areas, natural habitats) rather than the perpetrators (look in the rear-view mirror of your Land Rover).

JEFFREY A. MCNEELY IUCN, Rue Mauverney
28, 1196 Gland, Switzerland
E-mail jam@iucn.org

Trade-offs in Conservation: Deciding What to Save edited by Nigel Leader-Williams, William M. Adams and Robert J. Smith (2010), xxvi + 398 pp., Wiley-Blackwell, Oxford, UK. ISBN 9781405193832 (pbk), GBP 42.50.

Trade-offs in Conservation is based on a series of presentations at a 2-day Symposium in Conservation Biology hosted by the Zoological Society of London in November 2007. Notwithstanding an impressive list of delegates and contributors I must admit that my first thought on reading this in the Preface was that the book would suffer from the common problems that beset proceedings of meetings: contributors and content are largely dependent on who is available for the meeting, proceedings papers are often rushed and of varying quality, and it can be difficult to achieve a coherent narrative. I'm delighted to say that, in the case of this book, this is emphatically not the case. Either everyone in the world who knows about practical conservation was in London in November 2007 or the editors have done an excellent job in filling in the gaps and ensuring high quality. I suspect the latter.

The book is divided into five parts: I, Current Approaches and Toolkits; II, Influence of Value Systems; III, Economics and Governance; IV, Social and Institutional Constraints; and V, Future challenges. The first section gives examples of conservation dilemmas as applied to decision-making frameworks and methodologies. The authors don't pull any punches and I was particularly interested in the chapter on global hotspots and other prioritization methodologies that seek objectivity but suffer from lack of data, arbitrary cut-offs and, in application, often fail to take into account basic business principles such as cost-effectiveness. The conclusion that proactive conservation is more effective than reactive conservation is hard to argue with. There is also a useful chapter on biodiversity versus ecosystem service approaches, the conclusion being that there are plenty of win-win opportunities even if the two approaches are often not synonymous. The final chapter in this section on defining and measuring success in conservation is a must read wherever you are on the conservation spectrum.

Part two looks at value systems and includes a chapter on evaluating and articulating the importance of invertebrates and other organisms that we regard as creepy rather than cuddly. The second chapter expands on this theme by examining the different perspectives and trade-offs between

animal welfare and conservation. Then, of particular interest to those of us who have followed the protection or use debate over the decades, is a chapter looking at the nuances of trade-offs between these two approaches. As most of us have suspected all along, protection and use often work best in tandem and are context specific. The chapter is well argued, although I doubt it will lay the issue to rest. The next chapter looks at trade-offs between biodiversity and poverty reduction, and calls for greater collaboration between the multitude of players in the conservation and development worlds, the conclusion being that, again, there are synergies to be found. Finally, the power of traditions in conservation are explored through a case study of the Maasai. The author finds a complex array of interactions between traditional practice and conservation, reflecting a broad range of attitudes and drivers against a background trend of waning traditional land use.

Part three starts with an excellent chapter on the hypothesis that too much conservation funding is spent on planning, workshops and modelling to the detriment of the more mundane necessities (e.g. vehicles and uniforms for park rangers). Again, pragmatic trends and remedies are suggested. Further chapters cover marketing approaches and dilemmas, trade-offs between conservation and extractive industries, and conservation as a positive force for peace in conflict areas.

Part four starts with a chapter that examines the differences between 'knowing' and 'doing'. The authors advocate 'consilience'—a trans-disciplinary approach—but acknowledge the inevitable compromises and trade-offs that occur in any conservation programme in practice. This is followed by a chapter that will make most readers squirm—path dependence in conservation—those bandwagons that we so readily climb aboard and that self perpetuate. Directions on how to avoid or get off are helpfully supplied. The final chapter in this section examines the politics of knowledge, and makes recommendations about how to recognize the objectivity (or subjectivity) of knowledge that frames the questions that drive both policy and trade-offs.

The final section sits oddly given what has come before. The previous sections suggest that conservation practice works best when it is pragmatic, adaptive and context specific. Climate change will create massive conservation challenges but the evidence for which, where and how is still too unclear to enable us to define the actions needed. Apart from a few other quibbles (no abstracts and an overwhelmingly in situ

focus) I have no hesitation in recommending this book. As a distillation of the complexities and dilemmas associated with conservation in practice it is enlightening and reassuring but, much more useful than this, its contributors bring a wealth of experience and thought to actually dealing with the problems. I suggest you buy it.

PAUL SMITH Millennium Seed Bank Project,
Royal Botanic Gardens, Kew, Wakehurst
Place, Ardingly, RH17 6TN, UK
E-mail p.smith@kew.org

The Wolf's Tooth: Keystone Predators, Trophic Cascades, and Biodiversity by

Cristina Eisenberg (2010), xvi + 254 pp.,
Island Press, Washington, DC, USA. ISBN
9781597263979 (hbk), USD 35.00/GBP 22.00.

Top predators are often charismatic but are equally often drawn into human-wildlife conflict scenarios. Consequently, conservation efforts can become more problematic for these species than for those at other trophic levels. Understanding exactly what role top predators play in regulating ecosystems, and in preserving wider biodiversity, is therefore a particularly pressing challenge for conservation science. Furthermore, top predators are increasingly viewed not only for their own inherent conservation value but also for their potential use as ecological tools: in habitat conservation, habitat restoration and habitat creation. Conservation biologist Cristina Eisenberg's colourful summary of the history and concepts behind the science of trophic cascades is, therefore, timely.

Trophic cascades refer to those cases in which significant impacts result from removing or introducing species at the higher levels of an ecological system, often top (or keystone) predators. *The Wolf's Tooth* is ostensibly divided into two parts: first exploring essential concepts relating to trophic cascades, and then their practical applicability. Part One examines examples of trophic cascades in aquatic and terrestrial systems, as well as cascades over longer timescales. Part Two focuses more on the importance of the concept in relation to global biodiversity conservation. However these divisions are blurred, and the book reads as a single continuous narrative; one in which Eisenberg blends anecdotes from her experiences in the field into a synthesis of the science and its historical development.

The author's writing style is readable, enjoyable and occasionally extremely lyrical; furthermore, her own personal experiences of interacting with the species in question make the discussion of the science

engaging. Equally, Eisenberg makes some strong theoretical arguments, backed up with a number of empirical studies, for the significance of top-down effects upon ecosystems. However, whilst reference is continually made to the debate between the significance of top-down and bottom-up effects, there is only limited treatment of the latter, which could have provided an interesting counterpoint and given a more balanced perspective. The book opens with the Robinson Jeffers quotation (What but the wolf's tooth whittled so fine / The fleet limbs of the antelope?) and leaves you wondering what the full answer would be.

Despite *The Wolf's Tooth* being written in a highly enjoyable style there is to some degree a lack of clear structure. Key concepts are repeated numerous times throughout, and the progression does not always appear logical: for instance, the basic definition of biodiversity is not explored until page 147. Nevertheless, Eisenberg demonstrates a considerable expertise, and outlines the key arguments for top-down effects in an authoritative and persuasive manner. Whilst the book is released at a time when these arguments are highly topical, it does not seek to introduce completely new concepts, or to attempt to change any established opinions in the debate. What it does do is identify some very important ideas and make them accessible, which is in itself a useful contribution to the literature. As such, the book perhaps functions best as an introduction to the concept of trophic cascades, and ideal for those with an interest in the historical development of key elements of ecological science.

In summary, this is an extremely interesting and enjoyable synthesis of the science of trophic cascades but one that could potentially have benefited from a more direct treatment of the opposing arguments. However, it is clear that outlining important scientific arguments are only part of Eisenberg's drive: the book is at the same time an ode to the wild and an expression of the author's clear passion for wildlife, as well as a respectful tribute to some of the great minds in the field.

JOSEPH BULL Imperial College London, Division of Biology, Silwood Park Campus, Ascot, SL5 7PY, UK
E-mail j.bull10@imperial.ac.uk

Lemurs of Madagascar (3rd edition) by Russell A. Mittermeier, Edward E. Louis Jr., Matthew Richardson, Christoph Schwitzer, Olivier Langrand, Anthony B. Rylands et al.