

Deciding What to Save: Trade-offs in Conservation

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Introduction

Conservation action inevitably involves choices, between the populations of different species and the states of various ecosystems, between preservation and transformation by economic forces, between the needs of people and those of other species, between the interests of some people over others. However, these choices are rarely explicitly recognized or debated by practising conservationists (Mace *et al.*, 2007). To encourage further improvements in their professional practices, conservationists need to be more explicit about what hidden choices are made in their conservation policies. Furthermore, conservationists need to carefully weigh up the trade-offs that they make every day in deciding what to save.

Setting goals and policies for conservation is increasingly seen as a scientific activity, where outcomes should follow rational, indeed evidence-based, choices (Sutherland *et al.*, 2004). However, different kinds and pieces of evidence may suggest different strategies, and conservation planners rarely



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have full information. In practice, different factors or philosophical positions may constrain or influence the choices made. Very often trade-offs are made, whether consciously or unconsciously, for example by selecting some species and ecosystems for conservation action, while abandoning others, or by taking one approach to conservation while ignoring others.

Such trade-offs are surprisingly common, indeed probably universal, in conservation. However, practitioners may be slow to recognize them, and often reluctant to draw attention to them as would be necessary to understand them better. But does this matter? The answer to that question depends on what further biodiversity is being lost because of the trade-offs conservationists make. Conservationists certainly need to understand how and why trade-offs are made, and need to think very hard about what, if anything, to do about them. These are the questions that this book seeks to address. More specifically, the book explores how to manage conservation responsibly in a world of trade-offs. In particular, we wish to ask:

- Are choices in conservation explicitly recognized or debated?
- What choices remain hidden in conservation policy?
- How can the trade-offs that are made daily be carefully weighed up?

The evidence of trade-offs is everywhere once you look. By way of an everyday example, a visitor display board has been erected on a boardwalk at Heron's Carr, a not greatly inviting woodland edge of a not particularly well-known area of wetland in Britain's Norfolk Broads. This board (Figure 1.1) notes that '*London Zoo has about 690 species of animal and that's including everything!*' The board goes on to say '*The scientists who studied this wood before the boardwalk was built reckon there are more than 1500 different sorts of invertebrates – that's insects, spiders, beetles, flies, snails, worms and so on – jumping and creeping and flying and crawling and swimming around. This means Heron's Carr is a real wildlife treasure house.*' In seeking to further emphasize the importance of Heron's Carr, the board also notes that only 210 different breeding birds and 1400 flowering plants are recorded in the whole of the British Isles! This display board unfolds a whole series of subtle trade-offs to Heron Carr's advantage, those between *in situ* and *ex situ* conservation, those between the attention devoted to more charismatic species than to creepy crawlies, and to those between local and national conservation objectives.

This chapter outlines the thinking behind this book, and the original symposium upon which it is based, held in November 2007 at the Zoological





Figure 1.1 A signboard at Heron's Carr in the Norfolk Broads, UK, that outlines a series of subtle trade-offs to the advantage of Heron's Carr. (Photograph by Nigel Leader-Williams.)

Society of London. Here, we seek to ensure that the title of the volume and the issues it addresses are understood. This first section of the book explains some of the terms that appear throughout this volume. The second section seeks to understand some of the current approaches and toolkits used in conservation. The third section examines the influence of different value systems in setting conservation objectives. The fourth section examines issues related to economics and governance. The fifth section addresses some key institutional constraints. The final section examines emerging drivers of biodiversity loss.

Understanding terms

The first key term to understand is that of *conservation*. A simple definition suggests that '*conservation comprises actions that directly enhance the chances of habitats and species persisting in the wild*'. However, this definition does not

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help explain: *why* should we conserve; *what* should we conserve; *how* should we conserve; and, *how* much should we pay to conserve? The Convention on Biological Diversity (CBD), agreed at the World Summit on Sustainable Development in 1992, provides some aspirational guidance for international efforts to conserve biological diversity worldwide. For example, Article 1 notes that the overall goals of conservation are to:

- maintain biological diversity;
- allow sustainable use of its components; and
- promote equitable sharing of its benefits.

Subsequent articles elaborate some of the measures that conservationists might take to achieve each of these goals. Article 8a stresses the importance of ‘*establishing a system of protected areas or areas where special measures need to be taken to conserve biological diversity*’ to *in situ* efforts to conserve biological diversity. Meanwhile, Article 8j notes that ‘*... subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity ...*’, while Article 11 notes that: ‘*... as far as possible and appropriate adopt economically and socially sound measures that act as incentives for conservation and sustainable use ...*’.

Professional conservationists, however, often adopt polarized positions over how to implement these sometimes apparently opposing aspirations. The one goal to which most committed conservationists aspire is that of conserving as much biodiversity as feasibly possible. Nevertheless, all conservation entails some form of cost for someone, somewhere. Meanwhile, resources to offset these costs are limited, and so choices are socially determined, often with little or no consensus over understanding what this goal means. By way of another example, a tiger *Panthera tigris* (Figure 1.2) might conjure up the image of a flagship species for armchair conservationists in developed countries, or threat to life and livelihood for farmers and agriculturalists living cheek by jowl with tigers (Leader-Williams & Dublin, 2000).

Some have likened the choices that conservationists and wider society now face to those that faced doctors manning the trenches in the First World War, where the French coined the term *triage* to help guide choices over which wounded soldiers should be treated. Currently, *Webster’s Dictionary* contains two definitions for *triage*. The first reflects the origin of the word in the trenches, where ‘*triage comprises the sorting and allocation of treatment to*



Figure 1.2 A Sumatran tiger *Panthera tigris* caught in a camera-trap in Kerinci Seblat National Park in Sumatra. Tigers can be a flagship species for conservationists, but a source of conflict for neighbours of protected areas in Asia. (Photograph by kind permission of Matthew Linkie.)

patients to maximise numbers of survivors. A second generalizes the original and highly specific definition of triage to one with which conservationists, seeking to answer some of the questions outlined above, might well identify. Thus triage can also comprise '*assigning priority order to projects on basis of where funds and other resources can best be used, are most needed, or are most likely to achieve success*'. The practice of triage is likely to become increasingly important for conservationists (Bottrill *et al.*, 2008). However, we have instead adopted the term *trade-off* for the title of this volume, which Webster's defines as '*a balancing of factors all of which are not attainable at the same time*'. In seeking to make explicit some of the many trade-offs that conservationists face, we hope this volume will contribute to the process of conservation getting itself increasingly into position to practice more effective triage. We now outline our logic behind why we asked our authors to write different chapters for different sections of the book.

Current approaches and toolkits

In Chapter 2, Wilson *et al.* discuss how decision theory may allow the more explicit formulation of conservation problems and the optimizing of trade-offs in conservation. These authors recognize that conservation is not just about protected areas, and that there is more to conservation than the underlying patterns of biodiversity. Furthermore, shortage of data is often not the problem that many conservationists claim it is, when suggesting that further research is needed before a particular problem is addressed. Instead, Wilson *et al.* stress the critical importance of clearly defining problems, and ensuring decisions are explicit, based on the data that are available.

At its 5th Conference of the Parties in 2000, the CBD adopted an ecosystem approach to conservation. Many international non-governmental organizations (NGOs) had already identified global conservation priority regions, including Conservation International's Biodiversity Hotspots (Myers *et al.*, 2000) and WWF's 200 Ecoregions (Olson *et al.*, 2001), to better guide the considerable investments they made in global conservation. These global priority regions were basically designed to protect the maximum biodiversity per dollar spent. However, returns on investment in biodiversity represent a trade-off between costs and conservation achieved, as Murdoch *et al.* discuss in Chapter 3.

Furthermore, the concept of biodiversity is poorly understood, and of limited public appeal, as a goal for conservation. In contrast, a functioning biosphere is vital to human welfare, in terms of providing clean air and water, and for recycling nutrients. Therefore, many have argued that conservation should increasingly focus on the importance of maintaining ecosystem services to broaden support for conservation objectives. However, as Goldman *et al.* discuss in Chapter 4, this in turn can represent a trade-off between different goals in conservation, because areas rich in biodiversity and in ecosystem services do not always overlap.

That said, whatever goals are set for conservation, it is necessary to have tools that can measure the successes and, as importantly, failures of conservation, given that much conservation activity remains unaccounted for in terms of its impact. Many conservation projects can account for their outputs, such as the numbers of vehicles bought and the number of person hours spent on different activities. However, the extent to which impacts, measured in terms of *the chances given to habitats and species persisting in the wild*, are less often considered. In order to optimize trade-offs between different conservation goals, we need to be able to clearly define problems, to ensure that decisions

are explicit, *and* that their conservation impacts can be assessed, as Kapos *et al.* discuss in Chapter 5. Nevertheless, setting goals in conservation can involve socially important value judgments, which the next section addresses.

Influence of value systems

Debates over the conservation of surrogate species continue, and there is now a good understanding of the role and limitations of this approach (Karieva & Levin, 2003). However, many conservationists still continue to focus on the conservation of charismatic or *flagship* species, whose plight might appeal to the general public, and who may not understand fuzzy concepts like biodiversity and ecosystem services. In turn, this can lead to many ignoring the small and uncharismatic species that the visitor board at Heron's Carr sought to highlight. Nevertheless, as Samways discusses in Chapter 6, the conservation of such species is often vital, given that invertebrates make up the majority of the 13 million species estimated to occur on Earth today, and that the ecosystem services they generate are so valuable that the adage 'bugs drive the world' is probably not far from the truth.

Furthermore, the ongoing focus on saving charismatic species can lead to much polarized debate over whether conservation seeks to ensure the welfare of individuals or protect viable populations of species. Hence, many charismatic species attract direct use values as a key part of their total economic value. Indeed, the objectives of the CBD seek to promote sustainable use of components of biological diversity, *and* equitable sharing of its benefits with poor people living among biological diversity. But as Harrop questions in Chapter 7, how does this square with trade-offs between consumptive use and the welfare of the individuals that are the subject of that use? Likewise, Rosser and Leader-Williams discuss in Chapter 8 how to manage trade-offs between conserving charismatic species *and* promoting traditional and well-tried practices of consumptive use.

Given, however, that the CBD supports the principle of sustainable use, Roe and Walpole consider in Chapter 9 how this has been linked to poverty reduction in recent policy debates, and outline possible trade-offs between these two once separate areas of policy. They question how the components of biodiversity, and the services they provide, might contribute to poverty reduction. They also explore situations where local priorities for poverty reduction and international priorities for conserving biodiversity are very different,

and how any resulting trade-offs might be resolved. Likewise, the CBD also supports the importance of tradition in using and conserving biodiversity. Therefore, in Chapter 10, Homewood examines how different local traditions operate within the conservation arena, and suggests that conventional wisdom often overlooks conservation benefits of local land use practices. Equally, conservation initiatives that seek to build on local conservation traditions often face long histories of mistrust through previous misappropriation of resources, stewardship rights and benefits. In turn, this may have resulted in distortions of grassroots democratic processes, making it difficult to implement approaches that might provide local incentives to conserve biodiversity without recourse to the recurrent public funding that is necessary to ensure enforcement of more formal measures to protect biodiversity. In turn, this raises the issue of funding shortages and better selling conservation, which the next section addresses.

Economics and governance

Most businesses spend 10% of the value of their capital assets on maintaining those assets (Mace *et al.*, 2007). Even though based on very crude estimates of the total economic value of the world's ecosystem services and the money spent formally on protecting biodiversity (Costanza *et al.*, 1997; James *et al.*, 1999), conservation only spends ~0.02% of the total value of its capital assets on protecting the biodiversity that provides those assets. In turn, this raises two inter-related trade-offs: how to circumvent funding shortfalls in a world of trade-offs and how to better 'market' conservation so that it rises higher up political and funding agendas. As Bruner *et al.* discuss in Chapter 11, even though we heavily under-invest in conservation, the funds that are actually spent on conservation are not spent very effectively. Second, as Smith *et al.* address in Chapter 12, there is a clear need to ensure the public and their elected political decision makers realize that conservation is a public good that is vital for their long-term welfare, so conservation becomes better understood and better funded. In other words, conservation needs to be better marketed even though this also creates trade-offs.

Equally, many biodiversity-rich areas are underlain by non-renewable natural resources, where economically valuable extractive industries are, or could be, practiced, often in countries with poor governance. In turn, this can make it exceedingly difficult to achieve effective conservation in the

face of such development pressures. Therefore, Pulgar-Vidal *et al.* discuss in Chapter 13 how trade-offs can be achieved between the development of extractive industries and conservation. Likewise, many biodiversity-rich areas occur in conflict and post-conflict situations, where the immediate priorities of life and death take on much greater precedence than conserving biodiversity and its associated ecosystem services. In situations of conflict, institutions can collapse and protected area staff can face extreme pressures that prevent them from undertaking their normal duties, while local people facing humanitarian disaster can take refuge in areas from which they are normally excluded. Therefore, Aveling *et al.* discuss how trade-offs should be confronted for conservation to succeed in the wake of conflict and disaster, in Chapter 14.

Social and institutional constraints

We have earlier noted that setting goals and policies for conservation is increasingly seen by some as a scientific activity, where outcomes should follow rational choices. However, as we progressed through the papers at the symposium and put together the chapters of this book, it has become increasingly evident that conservation should largely be a social process that engages science, rather than a scientific process that engages society. Nevertheless, as Knight and Cowling discuss in Chapter 15, conservation biologists commonly place great emphasis on collecting more and more biological data at the fine scale, while ignoring rudimentary social data that would allow for more successful implementation of conservation projects. Furthermore, as Adams discusses in Chapter 16, conservationists often lock into particular policy approaches that persist as dominant narratives, whether or not those approaches are successful in conserving biodiversity. Finally in this section, Brosius in Chapter 17 discusses the importance of the politics of knowledge in determining how to frame the concept of trade-offs, which different disciplines frame in different ways. He argues that understanding the politics of knowledge in conservation is key to understanding the processes by which trade-offs are identified, calculated, analyzed and negotiated. He further suggests that effective conservation decision making and calculation of trade-offs requires more than scientific information and must be premised within the broader concept of credibility that recognizes the different contexts in which academics, practitioners, state authorities, community members and other actors interact.

Future challenges

Extinction is a natural process, but the current rates of extinction are hundreds or thousands of times higher than background rates such that Earth now faces the sixth, and possibly greatest, extinction spasm in its history (Lawton & May, 1995). Indeed, the world is changing faster than recently thought and the ‘evil quartet’ of factors that once caused most known extinctions (Diamond, 1989) has now been joined by the additional threat of climate change. As Willis *et al.* describe in Chapter 18, this threat was largely unforeseen when most protected area networks were established, so requiring trade-offs to ensure that protected areas conserve representative suites of biodiversity over the long term. Given that the nature of threats to biodiversity, and the interactions between those threats, are now changing rapidly, Mace asks how the relative importance of drivers of species and biodiversity loss will change over time. Given that we have previously defined *conservation* as comprising *actions that directly enhance the chances of habitats and species persisting in the wild*, Chapter 19 takes a look into the future, to ask whether and how species might increase their resilience and adaptability to each major driver?

Finally, in Chapter 20, Smith *et al.* take a retrospective look over the issues raised in the chapters of this book and a look forward at how conservationists may improve the ways in which they address policy issues in future, in the light of the trade-offs that they have always made in their professional lives.

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