

Chapter 14

The Influence of Changing Conservation Paradigms on Identifying Priority Protected Area Locations

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ABSTRACT

Conservation planning for climate change adaptation is only one in a long sequence of conservation paradigms. To identify priority locations for protected areas it must compete with three other contemporary paradigms: conservation of ecosystem services, optimizing conservation of ecosystem services and poverty alleviation, and reducing carbon emissions from deforestation and forest degradation. This chapter shows how conservation paradigms evolved, discusses the merits of different approaches to modelling potential impacts of climate change on biodiversity, and describes the hybrid BIOCLIMA model and its application to Amazonia. It then discusses conservation planning applications of the three other contemporary paradigms, illustrated by examples from Amazonia and Kenya. It finds that rapid paradigm evolution is not a handicap if earlier paradigms can be nested within later ones. But more sophisticated planning tools are needed to identify optimal locations of protected areas when climate is changing, and to use protection to mitigate climate change. These should encompass the complex interactions between biodiversity, hydrological services, carbon cycling services, climate change, and human systems.

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1. INTRODUCTION

The potential impacts of global climate change on biodiversity could be catastrophic. According to one early estimate, up to 35% of all species could be committed to extinction by 2050, six times the impact if habitat loss continues at current rates (Thomas *et al.*, 2004). More detailed studies are needed at national and regional scales to assist pro-active conservation planning to ameliorate harmful impacts (Thuiller *et al.*, 2008). The need for preventative measures is particularly urgent in the humid tropics, which contains half of all species in the world (Pimm, 2001).

But how can we identify the optimal locations for protected areas when climate is changing, and also use this protection to help in mitigating climate change? One answer may lie in the fact that facilitating adaptation of biodiversity to global climate change is only one of a sequence of paradigms that have emerged during the evolution of conservation planning. Despite its recent origin it must compete for research funding and attention from policy makers with three alternative paradigms. These are: (1) conservation of ecosystem services; (2) optimizing conservation of ecosystem services and poverty alleviation; and (3) reducing carbon emissions from deforestation and forest degradation - the REDD scheme of the UN Framework Convention on Climate Change.

This chapter reaches two main conclusions. First, the rapid evolution of conservation paradigms is not a handicap if earlier paradigms can be nested within later ones. Second, more sophisticated tools are required to indicate how conservation planning should encompass the complex interactions between ecosystem services, biodiversity, climate change and human systems.

2. CONSERVATION PLANNING AND BIODIVERSITY

Conservation planning paradigms in the tropics have evolved rapidly in the last 50 years, superseding the 'recreational' paradigm that dominated conservation since its birth in temperate countries in the nineteenth century (Adams, 2008).

Conservation in the 1960s generally followed the 'reservation' paradigm. The boundaries of national parks and other protected areas were legally identified, local people were excluded from using them, and the general public were allowed varying degrees of access for recreation. Criteria used to select where to site protected areas included size, remoteness, natural beauty and the need to maintain the habitats of threatened animal species. The latter was assisted by regular publication of ('Red') lists of threatened species by the International Union for the Conservation of Nature (IUCN) (Vie *et al.*, 2008).

In the 1970s, a new 'conservation and development' paradigm became widely accepted, since social exclusion had not improved protection on the ground. In 'biosphere reserves', established within the Man and Biosphere Programme (MAB) of the UN Educational, Scientific and Cultural Organization, core protected areas were surrounded by 'buffer zones' of strictly limited use, negotiated with local people (Batisse, 1990). Funds were also made available to improve the productivity of adjacent areas designated for sustainable use.

In 1980 a 'globally structured' paradigm was advocated by the IUCN World Conservation Strategy (WCS). Each country was now advised to protect representative areas of key ecosystems and concentrations of endemic species, to ensure that globally important species and all of the world's major ecosystem types would be sustained in some form (IUCN, 1980).

The 'globally structured' paradigm marked the switch from paradigms initiated solely by

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