Biological Conservation 220 (2018) 29–36

Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

Perspective

The rapid expansion of Madagascar's protected area system

Charlie J. Gardner[a,*], Martin E. Nicoll[b], Christopher Birkinshaw[c], Alasdair Harris[d], Richard E. Lewis[e], Domoina Rakotomalala[b], Anitry N. Ratsifandrihamanana[b]

[a] Durrell Institute of Conservation and Ecology (DICE), School of Anthropology and Conservation, University of Kent, Canterbury, Kent CT2 7NR, UK
[b] WWF Madagascar, BP 738, Antananarivo 101, Madagascar
[c] Missouri Botanical Garden, Madagascar Research and Conservation Program, Lot VP 31, Anjohy Ankadibevava, BP 3391, Antananarivo 101, Madagascar
[d] Blue Ventures Conservation, Level 2 Annex, Omnibus Business Centre, 39-41 North Road, London N7 9DP, UK
[e] Durrell Wildlife Conservation Trust, Lot II Y 49 J Ampasanimalo, BP 8511, Antananarivo 101, Madagascar

ARTICLE INFO

Keywords:
Community-based conservation
Conservation finance
Governance
Poverty alleviation
Sustainable natural resource use

ABSTRACT

Protected areas (PAs) are our principal conservation strategy and are evolving rapidly, but we know little about the real-world management and governance of new forms. We review the evolution of Madagascar's PA system from 2003 to 2016 based on our experience as practitioners involved. During this period PA coverage quadrupled and the network of strict, centrally-governed protected areas expanded to include sites characterized by: i) multiple-use management models in which sustainable extractive natural resource uses are permitted, ii) shared governance arrangements involving non-governmental organizations (NGOs) and local community associations, and iii) a management emphasis on livelihood-based approaches and social safeguards. We discuss the principal challenges for the effectiveness of the expanded system and detail management/policy responses. These include i) enhancing stakeholder participation, ii) ensuring financial sustainability, iii) enforcing rules, iv) ensuring the ecological sustainability of PAs faced with permitted resource extraction, v) reducing the natural resource dependence of local communities through transformative livelihood change, and vi) developing long-term visions to reconcile the differing objectives of conservation NGOs and other stakeholders. In general PAs have had limited effectiveness in reducing deforestation and other threats, which may be related to their rapid establishment processes and the complexity of management towards multiple objectives, coupled with insufficient resources. While Madagascar's achievements provide a basis for conserving the country's biodiversity, the challenge faced by its protected areas will continue to grow.

1. Introduction

Covering 15% of the Earth's land surface and 7% of the oceans, protected areas are our principal tool for the conservation of biodiversity (WDPA, 2017). However, while much conservation research is carried out within PAs and the study of where to establish them – systematic conservation planning – has become one of the most sophisticated and productive fields of conservation science, we know little about the realities of PA governance and management on the ground. This knowledge gap is a particular concern given that recent decades have seen the rapid evolution of both protected area theory and practice (Dudley et al., 2014; Watson et al., 2014), and a progressive global transition from centrally-governed, strict PAs managed for conservation, research and recreation to more complex institutions managed for multiple conservation and human development objectives through shared-governance structures. For example, almost 40% of the global PA estate is now managed in multiple-use categories (i.e. IUCN category V and VI, UNEP-WCMC & IUCN 2016), and 25% of sampled PAs in sub-Saharan Africa are administered by institutions other than State agencies (Belle et al., 2015).

An improved understanding of contemporary PA management is critical to inform policy, orient research agendas and generate best practice, and thus ensure that PAs are effectively managed in line with requirements of the Convention on Biological Diversity (CBD; Watson et al., 2016). This is particularly pressing as CBD signatories are expected to extend their PA portfolios to cover 17% of terrestrial and inland water areas and 10% of coastal and marine areas by 2020 (CBD, 2010). Meeting this target will require the most rapid expansion of PAs in history (Venter et al., 2014), and will largely be achieved through the establishment of multiple-use PAs (McDonald and Boucher, 2011): however, recent experiences with the implementation of such PAs have been poorly documented. Here we review Madagascar's efforts to expand its protected area system in the period 2003–2016, based on our experience in policy development and the establishment and

* Corresponding author.
E-mail address: C.Gardner-399@kent.ac.uk (C.J. Gardner).

https://doi.org/10.1016/j.biocon.2018.02.011
Received 15 September 2017; Received in revised form 25 January 2018; Accepted 5 February 2018
Available online 08 February 2018
0006-3207/

management of a range of PAs throughout this period. Specifically, we highlight three major changes in PA policy and practice, and discuss six principal challenges for current and future management.

2. Madagascar context

Madagascar is a top global conservation priority with unparalleled endemism rates at species and higher taxonomic levels (Brooks et al., 2006). However the country is extremely poor, and its predominantly rural population is characterized by low education levels, rapid population growth and high dependence on small-scale agriculture and natural resources for food, fuel and income (Fritz-Vietta et al., 2011). As a result remaining forests are highly threatened by shifting cultivation, charcoal production, artisanal (and industrial) mining, bushmeat consumption and overharvesting of varied resources (Cook and Healy, 2012; Fritz-Vietta et al., 2011; Razafimanahaka et al., 2012; Urech et al., 2015); wetlands are threatened by overfishing and riziculture (Bamford et al., 2017); and coastal areas suffer from overfishing, destructive fishing and environmental change (sedimentation, bleaching) (Harris, 2011). Additionally, certain high-value resources (e.g. rosewood, tortoises, sea cucumber, shark fin) are increasingly threatened by intensive illegal collection fuelled by foreign (particularly Chinese) demand (e.g. Barrett et al., 2010; Cripps and Gardner, 2016; Randriamalala and Liu, 2010).

3. The 'Durban Vision'

Madagascar's first PAs were created in 1927 and the network had grown to 36 sites by the mid-1980s when a domestic environmental agenda began to emerge (Kull, 2014). In 1991 the country launched Africa's first National Environmental Action Plan, created the parastatal ANGAP to oversee management of PAs, and began the promotion of community-based natural resource management (CBNRM, hereafter management transfers) through the transfer of limited management rights from the State to local community user associations (Ferguson et al., 2014; Pollini et al., 2014). The policy focus shifted back to protected areas in 2003 when, at the Vth World Parks Congress in Durban, South Africa, the Malagasy government committed to tripling the coverage of the protected area network (the 'Durban Vision', Norris, 2006).

At this time the PA network managed by ANGAP (subsequently renamed Madagascar National Parks (MNP)) consisted of 47 sites covering almost 1.7 million ha, and comprising 'strict' PAs in IUCN categories Ia (Strict Nature Reserve), II (National Park) and IV (Special Reserve) (Randrianandianina et al., 2003). Following the Durban declaration, five working groups consisting of government officials, foreign donors, NGOs and conservation scientists were established to advise on implementing the vision, specifically focusing on management and categorization, biodiversity prioritization, communication, legal frameworks, and funding (Corson, 2014). Systematic conservation planning and gap analyses were carried out to prioritize where new PAs should be created (Kremen et al., 2008; Rasoavahiny et al., 2008), and a number of policy changes were implemented in line with IUCN recommendations. This resulted in the revision of the Protected Area Code (COAP) in 2008, although this legislation wasn't ratified until 2015 due to a political crisis in 2009 (see Section 6. Discussion).

New PAs are established in a two-step process. First, the organization leading the initiative (henceforth 'promoter') applies for temporary protection which grants sites a two-year moratorium on mining under the terms of an inter-ministerial decree negotiated between the Ministry of Environment, Ecology and Forests (MEEF) and the mining ministry. Promoters must then complete all consultative, administrative and planning procedures to gain definitive protection within this two-year window, or request an extension.

By 2016 the PA system had grown to 122 sites covering 7.1 million ha, a growth of 416% in area (Fig. 1; Table 1). Five new PAs were established by MNP (which also expanded nine existing national parks), and the remaining new PAs are largely promoted by NGOs and managed in shared governance arrangements with local communities. Together these two sub-networks (henceforth MNP and non-MNP) form the Madagascar Protected Area System (SAPM), administered by the Biodiversity Conservation/Protected Area System Directorate (DBC/SAP) within MEEF, although marine PAs are administered under the Ministry of Fisheries.

4. Evolving protected area policy and practice

4.1. Expanded objectives and categories

While the pre-2003 PAs were managed for conservation, research and (in category II sites) recreation (Randrianandianina et al., 2003), the objectives of SAPM were expanded to include the conservation of cultural heritage and the promotion of sustainable natural resource use for poverty alleviation and development, in addition to biodiversity conservation. This parallels global trends in PA policy (Dudley et al., 2014), and reflects the realization that most priority sites were home to significant populations of rural people that depended to varying extents on natural resources for their subsistence and income (e.g. Brown et al., 2011; Urech et al., 2015). Thus the establishment of strict PAs was seen as inappropriate for many sites, and the Protected Area Code was revised to permit the establishment of IUCN category III, V and VI protected areas – multiple-use sites in which extractive resource use is permitted (Dudley, 2008; Gardner, 2011). Almost half of Madagascar's PAs are now proposed as IUCN category V[1] or VI (Table 1) and permit sustainable extractive use of natural resources, such as livestock grazing, fuelwood collection, charcoal production, commercial fishing and the harvest of wood, non-timber and marine products, according to a zoning plan.

4.2. Novel governance arrangements

Prior to 2003 all PAs in Madagascar were governed by the State through the parastatal ANGAP/MNP (though in some cases management was delegated to NGOs), but the Durban Vision saw the rewriting of the Protected Area Code to permit actors other than MNP to manage PAs within SAPM. All non-MNP PAs have a legally-recognized promoter, typically international or Malagasy NGOs (although also universities, mining companies and private individuals), but are generally governed in shared governance arrangements incorporating regional authorities and local communities (Alvarado et al., 2015; Virah-Sawmy et al., 2014). These governance structures have evolved iteratively: initial management plans of many sites proposed community management with promoter NGOs limited to a supporting role (e.g. Gardner et al., 2008), however this concealed the reality of promoters as de facto (co)managers, providing funds, technical capacity, direction and drive (Franks and Booker, 2015). In response, promoters must now be named as delegated managers of new PAs with responsibility for management to the State.

Most non-MNP PAs have multi-tiered governance structures incorporating i) an executive body/platform comprising the promoter and a community-based management committee, and ii) an orientation committee grouping regional authorities, relevant ministries and private sector representatives (e.g. tourism operators) (Franks and Booker, 2015; Virah-Sawmy et al., 2014). Depending on their size, the community-based management committees may be based around spatially-nested hierarchies with two or three tiers: local management units (LMUs) are responsible for their own territories but elect representatives to sit on a federation of LMUs covering a larger area, and

[1] Category V PAs as implemented in Madagascar differ conceptually from the model envisaged in the IUCN definition, see Gardner (2011).