



Perspective

Ten lessons for the conservation of African savannah ecosystems



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ABSTRACT

Knowledge of the success or otherwise of conservation interventions is often locked within localised networks, resulting in mistakes being replicated unnecessarily. The savannahs of eastern and southern Africa are home to spectacular ecosystems with similar ecology yet markedly different conservation practices between the two regions. Pressures on east African ecosystems are rising in ways similar to those of southern Africa several decades ago. Conservation practitioners and researchers from southern and eastern Africa came together for a 5-day workshop to identify by consensus a short list of 10 most important lessons for management of savannah habitats learnt from the southern experience. The lessons identified concerned (1) protected area design, (2) community relationships, (3) buffer zones, (4) the importance of migrations and corridors, (5) river catchment management, (6) law enforcement, (7) invasive plants, (8) road planning, (9) loss of heterogeneity, and (10) communication between researchers and practitioners. The lessons learnt from southern Africa can prevent many mistakes being made in east African protected area management, providing they are implemented on the ground.

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1. Introduction

When conservation managers make decisions they draw on a combination of personal experience, ecological understanding and political expediency. Often, the outcomes of management decisions are noted only informally or in internal reports and are not widely available to others. Recently, there has been a push to record and share management interventions and their consequences, enabling learning from experiences elsewhere that may have relevance to local situations (Sutherland et al., 2004). Evidence-based conservation, with centralised databases such as conservationevidence.com provide a valuable contribution to this process (Sutherland et al., 2004). However, in most of the world, the problem persists that knowledge of successful or unsuccessful conservation actions remains localised and tacit within the memories of experienced conservation practitioners and ecologists. We brought together a number of experienced ecologists and conservation practitioners from Southern and Eastern Africa to explore lessons that could be learnt from the contrasting experiences of the two regions.

The savannah systems of Eastern and Southern Africa are similar in their ecological processes, function and structure and share many animal and plant taxa (Fritz and Duncan, 1994; Deshmukh, 2008). However, conservation paradigms are famously different: traditionally, Southern African protected areas (encompassing South Africa, Zimbabwe and Namibia) are perceived as highly managed systems often with fences, artificial water holes, strict fire regimes and culling programmes (Pienaar, 1983), whereas East African (here meaning Kenya, Tanzania, Uganda, Rwanda and Burundi) protected areas are mostly unenclosed and have traditionally had a 'hands-off' management policy (Newmark, 2008).

In South Africa, the Kruger National Park had its western boundary completely fenced by 1961, as a veterinary cordon to restrict the spread of disease from wildlife to cattle (Joubert, 2007), while Hluhluwe-iMfolozi was completely fenced by 1965, to prevent wildlife from spreading into the densely settled surroundings (Brooks and Macdonald, 1983). Unfortunately, hard boundaries around protected areas led to an array of cascading ecological issues that required further interventions to reverse population declines and habitat degradation: e.g. fences blocked the wildebeest migration in the west, leading to the culling of the wildebeest to contain the perceived overgrazing that resulted within the park, plus widespread provision of artificial waterholes inside the park with ramifying consequences (Pienaar, 1983; Whyte and Joubert, 1988; Owen-Smith, 1996; Smit et al., 2007). With the benefit of hindsight, some of these earlier interventions and the philosophies behind them are now being reviewed and reversed: fences have been removed, water holes closed (Smit and Grant, 2009) and fire regimes altered from rotational block burning (van Wilgen et al., 2008). With similar population and land-use pressures growing in Eastern Africa to those that resulted in an interventionist prerogative in South Africa several decades ago, many of the same 'solutions' (with unintended negative consequences) are likely to occur unless planners make use of lessons learnt elsewhere. As important as unwelcome interventions can be the lack of timely intervention where threats are not realised: lack of action on invasive plants is a classic example (de Lange and van Wilgen 2010).

Already, Kenyan national parks such as Nakuru and the Aberdares have been fenced both to protect wildlife within the parks from humans, and to protect people and crops from wild animals (Gross, 2009). Even without fences many boundaries are becoming harder for animals to cross as large, settled, agricultural populations replace nomadic lifestyles in the surrounding areas (Newmark, 2008; Western et al., 2009). Typical of the increase of agriculture is the expansion of cultivated land around Kenya's

Masai Mara Reserve from 4,875 ha in the mid-1970s, to over 50,000 ha 20 years later (Serneels et al., 2001), associated with substantial declines in large mammal populations (Ogutu et al., 2011). There is also growing human-wildlife conflict: in Tanzania, lion attacks on humans have increased dramatically since 1990 (at least 563 people were killed between 1990 and 2004), particularly in areas where natural prey is scarce (Packer et al., 2005). Poaching within and around protected areas is a serious threat and understood to be the primary cause of several reduced and declining mammal populations (Hilborn et al., 2006; Stoner et al., 2007; Newmark, 2008). These problems are replicated in savannahs globally: Brazil's Cerrado is heavily converted for agriculture and under pressure from invasive species (Klink and Machado, 2005); India's savannah reserves are increasingly isolated (Vidya et al., 2004) and an interventionist strategy is increasingly applied (Madhusudan and Shankar Raman, 2003); Australian savannahs are suffering biodiversity losses from lost heterogeneity (Bird et al., 2008).

Despite the fact that some 20% of East African lands are officially protected (IUCN and UNEP, 2009), most of East Africa's wildlife depends at least partly on land outside protected areas: many migratory ungulate populations (including the Serengeti migration) spend periods outside protected areas, and significant animal populations utilise village lands year round (Caro et al., 2009). Compared with southern Africa, fewer significant corridors and dispersal areas between protected areas have been completely lost (Jones et al., 2009), with important benefits for animal populations: e.g. an estimated 2000 wildebeest and 3000 zebra recolonised Kenya's Amboseli NP following a catastrophic drought in 2009 (Worden et al., 2010). In East Africa, therefore, there remains a (shrinking) opportunity to maintain fully functional ecosystems containing diverse large mammal communities for the long term. To do so, however, requires not just commitment and funding, but also understanding of how savannah ecosystems function, and how losses of functioning can be prevented, minimized or mitigated through informed management and through turning it into an economic benefit for local people (Mangel et al., 1996). Many of the problems that have occurred in southern Africa are now developing in East Africa and savannahs globally; shared experiences should benefit all areas.

At a workshop in the Serengeti in November 2010, eight conservation managers and researchers working in southern and eastern Africa came together to identify ten conservation activities (or inactivities) that occurred in southern Africa but which, with the benefit of hindsight, should not be repeated or should be adapted to avoid negative consequences for biodiversity. Invitations were sent to a range of prominent researchers and conservation managers active in eastern and southern Africa (the list of authors identifies those organisations and individuals who responded). The primary focus was on how to ensure the ecological integrity of "open" systems as human pressure increases within these systems. A range of topics identified by participants were consolidated into 18 lessons, combining variations on the same issue where possible. Each topic was then discussed to clarify its impact, before participants rated each issue by priority: high (having the potential to result in ecosystem collapse), medium (risking serious damage to the ecosystem) or low (important, but not as potentially serious). Brief discussion usually resulted in unanimous ranking. After all 18 lessons were rated discussions focussed on ranking the medium importance issues in order to identify two to include with the eight high ranking lessons to generate a final list of 10. A further discussions provided unanimous agreement on the top 10 and consensus decisions on relative ranking within these. We recognise that some interventions now perceived as errors were themselves only carried out in an effort to correct the consequences of earlier decisions (i.e. there are cascading consequences): if the earlier errors can be avoided, subsequent problems may never arise. Thus, we attempt

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