

HOW MIGHT INTERNATIONAL CONTRIBUTIONS BE MADE TOWARDS CONSERVING AFRICA'S RICH WILDLIFE HERITAGE? SOME SUGGESTIONS

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ABSTRACT: The African continent retains the world's richest large mammal heritage, yet African countries generally have the least capacity to conserve this legacy, which is consequently shrinking. The need for wildlife conservation to be extended collaboratively, across international borders, was raised at the International Wildlife Management Congress held in Durban in July 2012. I propose five ways in which this might be accomplished, entailing (1) improving scientific concepts and models to better accommodate spatial and temporal variability, (2) establishing partnerships between well-endowed agencies or parks and African counterparts, (3) removing barriers to effective ownership of local wildlife by rural communities and ranchers, (4) establishing regular regional meetings bringing wildlife scientists and managers together to address common problems, and (5) promoting the establishment of transfrontier protected areas, integrating protected areas and communally occupied land for shared economic and social benefits.

KEY WORDS: Africa, community-based conservation, partnerships, professional meetings, scientific models, transfrontier conservation areas

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Diminishing populations of large herbivores and their predators even within formally protected areas in Africa have become a source of mounting concern (Caro and Scholte 2007, Craigie et al. 2010). Coupled with this is the fragmentation and isolation of populations increasingly restricted to protected areas (Western et al. 2009) and the disruption of migrations (Harris et al. 2009). The continent's most intensively managed national park, the Kruger National Park in South Africa, has not escaped this problem, with several of the rarer antelope species threatened with extirpation (Harrington et al. 1999, Ogutu and Owen-Smith 2003, Owen-Smith et al. 2012). Is this pattern the beginning of the faunal collapse predicted as an inevitable con-

sequence of habitat fragmentation and range compression, from principles of island biogeography (Soule et al. 1979)? A subtly spreading effect of global climate shifts degrading local habitat conditions (Erasmus et al. 2002, Travis 2003)? Or a consequence of misdirected management interventions, like excessive surface water provision (Owen-Smith and Mills 2006)? Migratory populations are especially at risk when they wander beyond protected area boundaries during part of the year, as demonstrated by the spectacular crashes of wildebeest in Botswana's Central Kalahari region (Williamson and Mbanu 1988) and around Nairobi National Park in Kenya (Ogutu & Owen-Smith submitted). An eternal problem has emerged in acute form, underlain by the enormous value fetched by rhino horns in the Far East: escalating poaching is pushing back the recent gains in rhino numbers in Africa towards prospects of local extirpations.

Africa's wildlife is of international concern because of its exceptional abundance and diversity of large mammals. However, African countries are generally under-resourced economically and socially in their capacity to protect this legacy, most notably with regard to elephants and rhinos (Gillson & Lindsay 2003). If wildlife conservationists elsewhere wish to contribute towards retaining abundant African wildlife, cooperatively and across international borders, how best might they do so? This question was raised in the plenary session of the 4th International Wildlife Management Congress held in Durban, South Africa, in July 2012. Here are my thoughts and suggestions, prompted by this engagement.

The diverse constituencies committed to promoting wildlife conservation must be recognized. Most of Africa's protected areas were established as "game reserves", with some later elevated to the status of national parks. While hunting might be allowed in the former, it is generally excluded from the latter, with visitors thus restricted to wildlife viewing and photography. Especially in southern Africa, much wildlife is also contained in private land, managed as game ranches or amalgamated private nature reserves or conservancies. Rangelands occupied communally by people and their livestock may also retain substantial wildlife populations, potentially providing revenues through community-based resource management. Politicians may perceive wildlife-based tourism as a promising generator of new jobs and economic revenues. However, burgeoning numbers of elephants within and around protected areas have led to damage to crops threatening human livelihoods, plus breakage of fences, water pipes and other structures (Hoare 1999). I identify five challenges in conserving African wildlife that could benefit from international engagement: (1)

improving scientific concepts and models; (2) funding the remedial actions needed; (3) benefitting local stakeholders; (4) increasing the capacity of agency staff; (5) establishing appropriate land-use structures. I will address each of these in turn.

BETTER SCIENCE AND MODELS

Good science can guide effective conservation action. However, the concepts and models that are commonly invoked are widely recognized as unreliable (Krebs 1995, White 2000, Norris 2004). Logistic models and various modifications thereof assume that density feedbacks restrict rates of population growth as abundance tends towards some carrying capacity. However, in many cases the density dependence of population growth may not be evident until quite high population densities have been attained, as I learnt from my doctoral study of white rhinos (Owen-Smith 1981) and others have found with respect to elephants (Gough and Kerley 2006). Moreover, it is widely recognized that “this thing called carrying capacity“ (Caughley 1979) is widely variable both over space and through time, and subject to manifold influences. Moreover, the effects of crowding on resource access, exposure to predators and susceptibility to diseases differ among members of the population, being most acute for very young animals while hardly affecting the survival of prime-aged animals (Gaillard et al. 1998). Through being selective for age within the adult segment, the impact of cursorial predators on population trends can be very different from that of hunters targeting animals of both sexes (Vucetich et al. 2005). Population growth depends fundamentally on rates of resource acquisition, affecting growth in individual size and hence biomass, as well as vulnerability to predation, but models linking predator or herbivore dynamics to prey or plant populations are highly simplistic and difficult to parameterize (Caughley and Lawton 1981).

The basic shortcoming in all of the standard population models is their failure to accommodate environmental variation in time and space in a meaningful way (Owen-Smith 2011). The abundance level at which population growth rate becomes zero, defining carrying capacity, is dependent on seasonal and local variation in resource supplies and the effects of predation mortality, operating both additively and interactively with body condition and hence resource gains. These considerations are especially relevant for African savanna ecosystems harboring most of Africa’s large mammals, characterized by erratic rainfall, high spatial heterogeneity and an abundance of large mammals. The standard models need to be challenged with data and upgraded accordingly, rather than being applied in fossilized form. This is an endeavor to which all

wildlife scientists should contribute. I have proposed how concepts and models might be advanced, based on my experience (Owen-Smith 2002, 2011). These “metaphysiological” (or biomass-based) models link population change directly to resource gains and the consequences for risks of predation and physiological costs. Rather than being specified arbitrarily, “carrying capacity” becomes a variable dependent on how these influences operate, specifically in regard to seasonal variation.

The task of challenging and improving these models requires long term data on population changes over prolonged periods. Much of the information derived from monitoring surveys becomes buried in archives and hence unavailable for scrutiny. There is a need to develop the cross-disciplinary field of Eco-Informatics (Peters 2010, Michener & Jones 2012), entailing not merely data gathering and storage, but also (a) the management and dissemination of these data, (b) statistical assessment of their information content, (c) modeling the understanding gained by these data, and (d) using findings to support decision-making. Only exceptionally are all of these steps followed through.

FINANCIAL SUPPORT

Conservation agencies in African countries are chronically under-funded and under-staffed. Even the Kruger Park has abandoned the annual total counts of all large ungulates that were conducted between 1977 and 1995 (Ogutu & Owen-Smith 2003). While visitor numbers enable the Kruger Park to operate profitably, it must subsidize other national parks in circumstances where government subvention is being progressively reduced. Few agencies elsewhere in Africa attempt such surveys, and where done the findings are seldom assessed critically. Tourism revenues and jobs created become the main performance indicators, rather than the abundance and diversity of wildlife attracting these tourists. Park fees are commandeered towards meeting national development needs, rather than being fed back into wildlife conservation. This can hardly be faulted, given national priorities to uplift citizens from poverty.

Meanwhile, conservation agencies in Europe and North America have a wealth of resources, in equipment, staff and operating budgets, directed towards conserving relatively few species. This disparity has been recognized through cross-funding initiatives from which some South American countries have benefited. No such scheme seems to be operating effectively in Africa. My suggestion for overcoming the funding barrier is to establish partnerships between well-endowed national parks (or conservation agencies) in wealthier countries and counterpart parks in Africa, like what has been done for cities. This could enable cross-sub-

sidization of operating costs as well as sharing of staff, equipment and expertise. Potential benefits could accrue to both partners.

BENEFITTING LOCAL STAKE-HOLDERS

People living alongside protected areas containing large mammals experience the costs of crop damage and killing of livestock, but generally receive few direct benefits from wildlife. Indirect benefits may arise through the job opportunities opened and the skills thereby developed (Hackel 1999, Torquebiau & Taylor 2009). However, most of the financial benefits from wildlife accrue to government revenues and travel companies located remotely in cities. Hence the potential custodians of the wildlife resource have little incentive to conserve it.

The failure of local communities to effectively capture material benefits from wildlife means that wild animals become increasingly confined to island reserves. The crucial step towards resolving this issue is effective ownership of wildlife outside protected areas, because only when ownership is conferred will uses of this resource be promoted in such a way as to be sustainable (Owen-Smith 2012). This is clearly illustrated by failures of the CAMPFIRE program launched in Zimbabwe, because financial benefits became dissipated at district council level, rather than accruing directly to the local people bearing the costs. A striking example of success is demonstrated by Namibia. By passing effective ownership of local wildlife resources to conservancies designated by local communities, subject to democratic controls, these people gained a direct stake in ensuring that the benefits were sustained. This ownership confers the right to exploit wildlife in whatever way seems most profitable – tourism, hunting, cropping, or marketing other products. The result has been the end of previously escalating rhino poaching, and steadily growing numbers of wild ungulates and even predators outside of state protected areas (<http://www.met.gov.na/programmes/cbnrm/cbnrmHome.htm>). Local exploitation of wildlife can be cramped not only by national legislation, but also by international trade regulations formulated under the Convention on International Trade in Endangered Species (CITES). Export barriers have not succeeded in containing the escalating illegal trade in ivory and rhino horn. Restricting the trade to legitimately marketed products would seem more likely to be effective than completely blocking it, and thereby escalating the value of rhino horn into the realm of drug cartels.

Also relevant here are the private owners of game ranches and game farms. Their overall net contribution to wildlife conservation can be questioned in the context of the “canned” lion hunts and dubious permits for

export of rhino horns as “hunting trophies”. However, the contribution that farmed rhinos might make in undercutting the illegal trade in horns, thereby alleviating the poaching pressure on park populations, cannot be discounted. Moreover, success in breeding rarer antelope species like sable and roan antelope means that these species are not endangered nationally, despite their population shrinkage in the wild in South Africa.

Protected areas alone are inadequate to secure sufficient wildlife. Those wanting to make wildlife conservation more widely effective should lobby both nationally and internationally for more appropriate regulation of legitimate uses of wildlife outside formally protected areas.

UPLIFTING PROFESSIONAL CAPACITY

Wildlife agencies in African countries have an increasing complement of well-qualified scientific and management staff, many with degrees from leading universities. However, their functional capacity is restricted by the financial and institutional constraints under which they operate professionally. No conference brings these scientists and managers together to address regional problems on a regular schedule, as happens in North America and Europe. This means that scientists operate largely in isolation from conceptual and technical developments in their field. Even if such meetings were to be arranged, financial resources to cover the costs of travel and accommodation would generally block attendance by most. Few African representatives from outside South Africa attended the 2012 Wildlife Management Congress in Durban, despite its venue being on their continent.

The Southern African Wildlife Management Association holds regular annual meetings, but in practice few delegates from outside South Africa attend, because of the barrier posed by travel costs. Kruger's annual “Savanna Science Networking Meeting” has become a strong draw card for both local and international participation, but intrinsically has a strong local focus.

The lack of academic and managerial exchanges handicaps effective conservation in circumstances where knowledge and understanding are changing, new challenges emerging, and new technologies becoming available. For example, while Kruger Park managers have been closing water points to alleviate adverse consequences for large mammal diversity, in other countries new water points are being established with the short-sighted hope of counteracting local elephant impacts (Owen-Smith 1996).

What is needed are regional African wildlife management conferences held every 2-3 years, rotated among various countries. The initial region could be

the countries integrated under SADC, extending from South Africa to Tanzania, although Kenya and Uganda should certainly be tagged on. These countries contain the greatest share of Africa's wildlife wealth. This organizational structure would allow wildlife scientists and managers to meet at regular intervals, joined by international scientists wanting to contribute towards conservation in Africa.

Obviously, there must be institutional structure to take responsibility for organizing such meetings. I suggested a regional focus within SADC, because science promoting initiatives within these countries might be conducive to supporting such meetings. The alternative would be to establish an African affiliate of The Wildlife Society, just as the International Society for Conservation Biology has regional Chapters. However, for local affiliates to be effective some funding must be passed from the wealthy parent body towards the affiliate, most importantly to cover the travel costs of attendance by African colleagues.

APPROPRIATE LAND-USE STRUCTURES

The major threat to wildlife conservation comes from the fragmentation and isolation of protected areas within an unfavorable and hazardous landscape matrix dominated by humans (Ogutu et al. 2011). The vast majority of Africa's protected areas are too small to sustain the large mammal diversity they currently contain in the long term in isolation. The widespread wildlife declines that have been documented across the continent are symptomatic of this (Caro and Scholte 2007, Western et al. 2009). Even Kruger Park's 20,000 km² area cramps the movement patterns of elephants (Waller 2001), and is too narrow to provide a secure core against rhino poaching. Vegetation changes are apparent in the vast Serengeti ecosystem, with unknown consequences for its large mammal diversity (Sinclair et al. 2007). The long-term consequences for biodiversity of burgeoning elephant populations within southern African parks and surrounding areas remain contentious (Kerley et al. 2008).

The most far-sighted initiative addressing this issue is the establishment of Transfrontier Conservation Areas (TFCAs), amalgamating protected areas with intervening regional landscapes including human settlements and exploitative activities (<http://www.peaceparks.org>). The initial developments were simply trans-boundary parks, linking South Africa's Kalahari Gemsbok National Park with the adjoining protected region in Botswana, and Kruger National Park with the newly proclaimed Limpopo National Park in Mozambique. The most ambitious prospect is the Kavango-Zambezi TFCA planned to cover 287,000 km² extending from Botswana and Zimbabwe through Namibia,

Zambia and Angola, including a regional population of over 150,000 elephants.

The problem still to be resolved is how to effectively integrate the people living within the region into such developments. For them to tolerate the costs of wildlife and associated diseases transmitted to livestock spreading from protected areas, counteracting benefits must accrue, as noted above. The implication is that appropriate forms of resource exploitation must be allowed, and the ramifying concerns for CITES, and specifically current bans on trade in ivory and rhino horn, must be confronted. Conservation biologists need to partner with economists, sociologists and politicians in addressing such broader issues. Leading resource economist Paul Collier advanced the thesis that Africa's rural inhabitants should purchase food grown in countries where it can be produced cost-effectively by large agro-businesses, rather than attempting to grow it locally in unfavorable circumstances (Collier 2010). The money for food purchases must come from somewhere, and what Africa has to sell is the world's richest wildlife heritage. This already forms the basis for the ecotourism industry, but currently very little of the wealth generated filters down to local level. This raises the need for structural adjustments both nationally and internationally in world trade arrangements; lobby accordingly.

SUMMARY OVERVIEW

If you, the readers, wish to promote wildlife conservation in Africa, I suggest that you act cooperatively across international borders, as follows:

As scientists, improve the reliability of our concepts, models, tools and information, and make them more relevant to the spatial and temporal complexity of African environments.

To secure funding, promote international partnerships between conservation agencies, enabling those wealthier in finances to contribute where the greatest wealth in wildlife is located.

Socio-politically, promote structures that enable local people to benefit from their local wildlife resources via effective ownership.

Collegially, contribute towards the establishment of a professional body that could host regular meetings addressing wildlife conservation issues within a regional African context.

Internationally, encourage further development of TFCAs and economic contexts that will make them socio-politically sustainable.

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