

Born free or life behind bars: The subtleties of African large carnivore conservation

Large carnivore numbers are dwindling across Africa and several of the continent's iconic species face imminent extirpation outside protected areas. The main drivers of this collapse are human-associated habitat loss and direct persecution, largely outside fenced wildlife reserves. Ongoing exploitation of carnivores and rapid human population growth and development in large parts of Africa calls into question the efficacy and longevity of many 'community-led' models being touted as solutions to conserving Africa's carnivore taxa. Decisive intervention is required to reverse the current decline, by way of evidence-based conservation management, enforcement of legislation and environmental education that teaches ethics over economics. The successful protection and connection of free-roaming and fenced large carnivore populations has the potential to create a range of collaborations across communities and borders and represents an opportunity for humanity to show that we are capable of truly valuing nature.

Endangered. Vulnerable. Vulnerable. Vulnerable. These are the International Union for Conservation of Nature (IUCN) Red List categories of four iconic members of Africa's large carnivore guild – African wild dog, lion, leopard and cheetah. The categories are an indication of the pressures acting on a species and therefore its risk of extinction, but the list also highlights current population trajectories. Not surprisingly, these are declining for all four species, in a trend now familiar for many of Africa's terrestrial carnivore taxa.

While this may come as a surprise to some, the collapse of Africa's carnivore populations has been evident for some time. Outside protected areas, carnivores face fragmented landscapes and are easy pickings for hunters and the illegal trade syndicates (Farris *et al.*, 2015). Localized pressure from legal hunting or poaching may also force individuals into sub-optimal habitat where their chances of survival are further diminished. This cycle rapidly results in catastrophic declines in large carnivores across the landscape. African wild dog have been eradicated from North and West Africa and severely depleted in the centre and north-east of the continent (Woodroffe and Sillero-Zubiri,

2020). Cheetah are now missing from more than 90% of their historic range, prompting a call from conservationists to downgrade the species from Vulnerable to Endangered on the Red List (Durant *et al.*, 2015; Durant *et al.*, 2016). Lions have undergone a dramatic range reduction leading to a Vulnerable listing (Bauer *et al.*, 2016), and populations in West and Central Africa are now considered to be at imminent risk of extinction (Riggio *et al.*, 2012). Similarly, the extensive range decline of leopards has led to it being reclassified as Vulnerable (Stein *et al.*, 2020) and there is a distinct possibility that soon even this most adaptable of predators will only exist in fenced conservation areas.

In fact, most of the planet's large carnivores are experiencing geographic range contraction and an increased risk of extinction (Wolf and Ripple, 2018). The global loss of large carnivores at landscape scales has long been considered from a predation aspect, but there is now ample evidence showing the direct influence of these taxa on natural processes such as disease control, carbon sequestration and invasive species (Estes *et al.*, 2011). Put more simply, the disappearance of the highest trophic level spells disaster for all life on Earth, including ourselves. There is also a

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moral debate centred on the fundamental value of these species in nature. The challenge for conservationists, and for society, is to try to reverse the current downward spiral, and to shift current perceptions of these species from that of ‘dangerous wild beast’ to functionally critical components of the ecosystem, and archetypal symbols of wilderness. This can only be achieved by addressing two of the main drivers of decline, namely habitat loss and direct persecution (Galvez *et al.*, 2018).

An examination of long-term environmental and biological data reveals a mix of good and bad in this respect. Encouragingly, there has been a substantial increase in global protected area coverage over the course of the last few years (United Nations Environment Programme, 2019) and although driven largely by momentum in the marine sector, is evidence that certain parts of the world are committing to conservation at the highest level. Conversely, land use change and the loss of natural habitat is accelerating in many biodiversity-rich regions (*e.g.* South America and West Africa) and it is estimated that 93,000 km² of forest has been lost or transformed last year alone (Global Forest Watch, 2020). This has obvious repercussions for biodiversity loss. Rates of biodiversity decline in Africa (65%) and South America (94%) are particularly high, with the two standout drivers again being habitat loss and species overexploitation (WWF, 2020).

Fenced in or free: What does the evidence tell us?

In carnivore conservation circles, the argument often rages around fenced versus unfenced populations. This is because confined and free roaming carnivores have very different management objectives. In fenced protected areas where biodiversity conservation is the main objective, carnivores are primarily managed on their ecological impacts (Funston *et al.*, 2013). Breakouts are rare, and largely dealt with via lethal means, with the result being greatly reduced conflict with people (Mills, 1991). This combination of security, coupled

with a generally reliable distribution of prey often supports healthier and more stable carnivore populations. Lions in fenced protected areas are known to reach and maintain densities twice as high as their free roaming counterparts (Packer *et al.*, 2013) and leopard survival probabilities have been found to decrease substantially with time spent outside fenced reserves (Balme *et al.*, 2010).

When one considers the nature of land use outside formal protected areas it is easy to see why this is the case. These environments comprise a range of anthropogenic activities, some of which are simply not compatible with carnivore presence. The zero-tolerance approach to predators adopted by many livestock and game farmers in southern Africa is a prime example, and has led to local extirpations or suppressed population growth in several protected species (Gusset *et al.*, 2009; Pittman *et al.*, 2016). Despite this, it is estimated that significant numbers of cheetah and wild dog still exist outside conservation areas, often moving through these unprotected landscapes due to their spatial requirements (Durant, 2007).

Variation in operational costs represents another important area of difference. Packer and colleagues (2013) determined that the cost of managing lions at high densities in fenced protected areas averaged out at an annual budget of \$500/km². By contrast, free roaming lions cost significantly more to manage at \$2,000/km² per annum, to attain only half their potential density. This has strong implications for the financing of carnivore conservation in Africa, and across the globe. Securing long-term funding is extremely challenging to say the least, yet it is crucial to the sustainability of effective outcomes for large carnivores.

There is no doubting the inherent value of land outside protected areas for the future of large carnivores in Africa. What is in question is whether we can collectively make all the scattered pieces fit together before it is too late. It is estimated that half of free-roaming lion populations in Africa will be near extinction by 2050 (Packer *et al.*, 2013). It is also highly likely that free

roaming cheetah and wild dogs, which naturally exist at low densities (Durant, 2007), will not be far behind. Any successful management of carnivore species would therefore need to balance social, financial and ecological imperatives to develop an integrated approach (Funston *et al.*, 2013).

‘Sustainable sport hunting’? Ego meets conservation paradox

The hunting of large carnivores is a global industry and is often cited as a method of supporting the conservation of these species. The basic premise is that limited harvests are sustainable, with the objective to increase tolerance and funding for carnivore conservation (Ordiz *et al.*, 2013). Yet the sport hunting sector seldom raises more than \$1,000/km² as a land use (Lindsay *et al.*, 2012) and the question of increased tolerance for carnivores through hunting activities remains highly contentious.

What is clear is that the sector operates on a profit-based model, with little consideration given to carnivore ecology or their intrinsic value in the landscape. Loveridge and colleagues (2007) found that hunting on the borders of unfenced protected areas had a detrimental effect on lion populations, with 72% of tagged male lions that ventured outside the park boundary killed in ‘legal hunts,’ despite bait often being used as a lure. In the South African context, sport hunting is valuable to the economy, yet most of the revenue flows to the agricultural sector (Saayman *et al.*, 2018) and any benefit to the conservation of large carnivores is marginal at best.

International and national frameworks that allegedly regulate the sustainable removal of and trade in carnivores have also been called into question. Flaws have been found in the approach used by the Convention for International Trade in Endangered Species (CITES) in determining the annual hunting offtake for leopard in African states, with quotas based on non-robust data and lacking in scientific rigour (Trouwborst *et al.*, 2020). Government authorities are plagued by a lack of adherence to evidence-based protocols and many conservation departments across

Africa are thus complicit in the decline of large carnivores, through the unregulated issuing of hunting and ‘problem animal control’ permits. For instance, Namibia’s issuing of permits for legal hunts at a time of high lion mortality from human–wildlife conflict appears to have compromised the long-term viability of the desert-lion population (Stander, 2010). In this way, hunting quotas may often reflect pressure on governments to control carnivores rather than to conserve them (Packer *et al.*, 2009).

It is of grave concern that the above has taken place concurrent with the downgrading in conservation status of leopard and lion by the IUCN, and clearly highlights the need for a change in the way these systems operate.

The case for rewilding in Africa

Wolf and Ripple (2018) identified the most suitable areas for large carnivore rewilding across the globe based on species ecology, land use and areas of contiguous low human impact. The majority of these areas lie in large temperate northern hemisphere countries (USA, China, Mongolia, Canada, Russia) with Namibia and Mauritania the only two African countries on the list. A clear pattern emerges from the study – that regions with formalized protected areas, low human population densities and opportunities for expansion offer the best prospect for establishing and sustaining large carnivore populations in the future. Rewilding into unfenced areas may succeed but is strongly dependent on human population densities and the nature of activities (*e.g.* livestock farming or sport hunting versus neutral or conservation-friendly uses).

Large parts of Africa are witnessing an increased human footprint, as a result of rapid population growth and rates of consumption (WWF, 2020). This is coupled with an increase in livestock numbers – with several African nations now hosting over a million head of cattle alone (United Nations Food and Agriculture Organization, 2018). Severe land degradation and collapses in wild ungulate populations is common,

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putting immense pressure on large carnivores (due to the potential for greater human–wildlife conflict), with major implications for their continued existence. Significantly, it has been shown that the intensity of unsustainable lion hunting is highest in countries with the most intensive cattle production (Packer *et al.*, 2009).

Connectivity is also key for reintroduction success, with many protected areas across Africa becoming more isolated as a result of rapid human population growth and development. Mean population growth on the boundary of protected areas has been found to be twice as high as growth across the rest of the rural landscape in Africa (Wittemyer *et al.*, 2008), highlighting the escalating threat faced from human encroachment, and the loss of buffer zones and potential corridors. The long-term success of reintroducing large carnivores is ultimately dependent on the availability of large tracts of unsettled land with healthy populations of suitable prey (Wolf and Ripple, 2018) and it is becoming exceedingly difficult to find areas in Africa that meet these criteria.

The communal conservancy model

Holistic initiatives that incorporate people and wildlife have been implemented at a national level by some African nations. Namibia’s Community-Based Natural Resource Management (CBNRM) approach is a particularly pioneering one, as it evolved during the colonial and apartheid eras. Conservation was dominated by a preservationist mindset, and large fenced wildlife reserves that excluded people such as the Kruger (1926) and Etosha (1907) National Parks were established during this period.

The premise of CBNRM is simple. Local landowners acquire conditional rights over wildlife through the formation of a conservancy that is approved by the state. Income is usually derived through partnerships with private companies, and activities centered around eco-tourism or sport hunting (Owen-Smith, 2010). However, more conventional activities such as livestock farming for profit often persevere. When the model works it ticks

all the boxes: money rolls in, communities are empowered, jobs are created, and both conservation and people benefit. But all that glitters is not gold, and despite the early successes, the model has floundered. A close inspection of annual income for around 80 Namibian conservancies (2010–15) reveals that roughly only 20% made a profit, with many generating no income at all. Such systemic failure can cause major rifts and destabilize the framework of a conservancy, leading to disillusionment with the whole approach.

One of the main drivers of this failure is human–wildlife conflict. Unfortunately, many conservancies simply failed to plan for the increase in carnivore populations that came with better protection. They were also unable to manage activities that were incompatible with wildlife conservation, such as livestock farming. The inevitable result was significantly increased rates of conflict with farmers, ultimately leading to retaliatory killings of carnivores. Stander (2010) notes that over a ten-year period, the primary cause of mortality in free roaming lions of the Kunene (Namibia) was via conflict with local communities. More recently, during my time in Namibia’s eastern conservancies (2016–17), I was provided with details on the illegal killing of leopard, cheetah, hyaena and at least two packs of African wild dog.

Such widespread and intensive hunting of predators under the guise of ‘problem animal control’ can only have one outcome. The irony is that the very same communities then suffer the financial implications of decreased tourism due to a lack of sought after predators, and a negative feedback loop is created. Compensatory payment schemes or livestock insurance can offer a temporary solution to appease farmers but are exceptionally cost heavy and administratively complex, and therefore not sustainable.

Is there a way forward?

All of this may lead one to think that the outlook for large carnivores is rather bleak, and indeed it is. The force of the collective pressures discussed above

means that very little breathing space remains for these charismatic species in Africa. The time for 'well-balanced' strategies and 'measured' approaches is now long past, and we need to act immediately and decisively if we are to reverse the current trends.

Addressing human-wildlife conflict through integrated approaches is critical. Community outreach programs should incorporate research findings and directly involve farmers in conflict reduction. Improved livestock husbandry and information on carnivore movements for instance, would help pastoralists avoid areas frequently utilized by carnivores (Kissui, 2008). The expansion of human populations on the boundaries of protected areas can also be harnessed for positive outcomes. Growth on protected areas edges is positively correlated with international donor investment and indicates the value of protected areas to local people in terms of job creation and revenue (Wittemyer *et al.*, 2008). These softer approaches also need to be reinforced by hard enforcement measures where necessary. The illegal killing of protected species is a recognized criminal offence and those involved (including farmers) should be charged and convicted accordingly.

Critically, interventions need to be tailored to the situation and implemented at the correct scale to ensure they are appropriate. The CBNRM approach may work in a country as sparsely populated as Namibia (where the population density is only 3 people/km²) yet even there, adaptation and constant management is crucial if it is to succeed. Alternative strategies are likely required in the more densely populated African countries (South Africa = 49/km²; Kenya = 92/km²; Malawi = 203/km²) where people are using every bit of land, right up to the protected area boundaries, and often within.

A beacon of hope in this regard are those exceptional programmes run by world class African NGO's such as Lion Guardians and Ewaso Lions in Kenya. These have succeeded in making coexistence possible, by engaging people and providing tangible (and sustainable!) benefits to communities

living alongside large carnivores as an incentive for conserving them.

The sport hunting industry needs to take responsibility for its current unbalanced effect on carnivore conservation and alter – or be forced to alter – specific policies. In tandem with this, state authorities need to place more emphasis on the intrinsic value of carnivores and enforce top-down regulation on the hunting industry to ensure compliance. Given the role of apex predators in ecosystem functioning, core 'safe' areas should be established within large landscapes where hunting is excluded (Ordiz *et al.*, 2013). The use of baits to lure carnivores should be banned, and 'no-take' buffer zones should be enforced around protected areas (Loveridge *et al.*, 2007). At an individual level, the removal of prime, dominant resident individuals must be avoided, as this has disproportionate ecological effects (Balme *et al.*, 2012; Ordiz *et al.*, 2013). The setting of quotas by states needs to be underpinned by scientific rigour and employ a precautionary and adaptive approach (Trouwborst *et al.*, 2020). Furthermore, regulatory bodies such as CITES should be regularly audited themselves to ensure cross-compliance and evidence-based decision making.

Ultimately, it appears that the conservation of nature comes with a price tag. This is nothing new, but it is sad to note that the only models being trialed are those that arise out of a concept of ownership and commodification of wildlife and wild spaces. Be it consumptive (sport hunting and poaching) or non-consumptive (ecotourism), carnivore conservation is dictated by the utilization of these species for economic gain in some shape or form. I believe that it is this very ideology that has got humanity and wildlife to this precarious position in the first place. The changes I have highlighted above would be fundamental in a system that first considered the ethics of carnivore conservation, rather than the economics of it. Perhaps the only real way forward is to embed nature-first principles in education and in wildlife conservation, and cultivate a new respect and awe for the species we occupy this planet with. ■

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References

- Balme GA, Slotow R and Hunter LTB (2010) Edge-effects and the impact of non-protected areas in carnivore conservation: leopards in the Phinda-Mkhuze complex, South Africa. *Animal Conservation* **13**: 315–23.
- Balme GA, Hunter L and Braczkowski AR (2012) Applicability of age-based hunting regulations for African leopards. *PLoS One* **7**: e35209.
- Bauer H, Packer C, Funston PF *et al.* (2016) *Panthera leo*. The IUCN Red List of Threatened Species 2016. Available at <https://is.gd/x2vVAB> (accessed December 2020).
- Durant S (2007) Range-wide conservation planning for cheetah and wild dog. *Cat News* **46**: 13.
- Durant S, Mitchell N, Ipavec A and Groom R (2015) *Acinonyx jubatus*. The IUCN Red List of Threatened Species 2015. Available at <https://is.gd/kzmvZI> (accessed December 2020).
- Durant S, Mitchell N, Groom R *et al.* (2016) The global decline of cheetah *Acinonyx jubatus* and what it means for conservation. *Proceedings of the National Academy of the Sciences of the United States of America* **114**: 528–33.
- Estes JA, Terborgh J, Brashares JS *et al.* (2011) Trophic downgrading of planet Earth. *Science* **333**: 301–6.
- Farris ZJ, Golden CD, Karpanty S *et al.* (2015) Hunting, exotic carnivores and habitat loss: Anthropogenic effects on a native carnivore community, Madagascar. *PLoS One* **10**: 1–20.
- Funston PJ, Groom RJ and Lindsey PA (2013) Insights into the management of large carnivores for profitable wildlife-based land uses in African savannas. *PLoS One* **8**: e59044.
- Galvez N, Guillera-Aroita G, St John FAV *et al.* (2018) A spatially integrated framework for assessing socioecological drivers of carnivore decline. *Journal of Applied Ecology* **55**: 1393–1405.
- Global Forest Watch (2020) Interactive world forest map. Available at <https://www.globalforestwatch.org/map/> (accessed December 2020).
- Gusset M, Swarner MJ, Mponwane L *et al.* (2009) Human wildlife conflict in northern Botswana: Livestock predation by Endangered African Wild Dog (*Lycaon pictus*) and other carnivores. *Oryx* **43**: 67–72.
- Kissui BM (2008) Livestock predation by lions, leopards, spotted hyaenas, and their vulnerability to retaliatory killing in the Maasai steppe, Tanzania. *Animal Conservation* **11**: 422–32.
- Lindsay PA, Balme GA, Booth VR and Midlane N (2012) The significance of African lions for the financial viability of trophy hunting and the maintenance of wild land. *PLoS One* **7**: e29332.
- Loveridge AJ, Searle AW, Murindagomo F and Macdonald DW (2007) The impact of sport hunting on the population dynamics of an African lion population in a protected area. *Biological Conservation* **134**: 548–58.
- Mills G (1991) Conservation management of large carnivores in Africa. *Koedoe* **34**: 81–90.
- Ordiz A, Bischof R and Swenson JE (2013) Saving large carnivores but losing the apex predator? *Biological Conservation* **168**: 128–33.
- Owen-Smith G (2010) *An Arid Eden: A personal account of conservation in the Kaokoveld*. Jonathan Ball Publishers, Johannesburg, South Africa.
- Packer C, Kosmala M, Cooley HS *et al.* (2009) Sport hunting, predator control and conservation of large carnivores. *PLoS One* **4**: e5941.
- Packer C, Loveridge A, Canney S *et al.* (2013) Conserving large carnivores: Dollars and fence. *Ecology Letters* **16**: 635–41.
- Pittman RT, Fattebert J, Williams ST *et al.* (2016) The conservation costs of game ranching. *Conservation Letters* **10**: 403–13.
- Riggio J, Jacobsen A, Dollar L *et al.* (2012) The size of savannah Africa: A lion's (*Panthera leo*) view. *Biodiversity Conservation* **22**: 17–35.
- Saayman M, van der Merwe P and Saayman A (2018) The economic impact of trophy hunting in the South African wildlife industry. *Global Ecology and Conservation* **16**: e00510.
- Stander P (2010) *The impact of male-based mortality on the population structure of desert-adapted lions in Namibia*. Internal Research report. Available at <https://is.gd/vNAfs1> (accessed December 2020).
- Stein AB, Athreya V, Gerngross P *et al.* (2020) *Panthera pardus*. The IUCN Red List of Threatened Species 2020. Available at <https://is.gd/NvHe48> (accessed December 2020).
- Trouwborst A, Loveridge AJ and Macdonald DW (2020) Spotty data: Managing international leopard (*Panthera pardus*) trophy hunting quotas. *Journal of Environmental Law* **32**: 253–78.
- United Nations Environment Programme (2019) *Protected Planet: The World Database on Protected Areas*. Available at <https://www.protectedplanet.net/en> (accessed December 2020).
- United Nations Food and Agriculture Organization (2018) *Africa sustainable livestock 2050*. Available at <https://is.gd/oJolaH> (accessed December 2020).
- Wittemyer G, Elsen P, Bean WT *et al.* (2008) Accelerated human population growth at protected area edges. *Science* **321**: 123–6.
- Wolf C and Ripple WJ (2018) Rewilding the world's large carnivores. *Royal Society of Open Science* **5**: 172235.
- Woodroffe R and Sillero-Zubiri C (2020) *Lycaon pictus*. The IUCN Red List of Threatened Species 2020. Available at <https://is.gd/Zrfp4h> (accessed December 2020).
- WWF (2020) *Living Planet Report 2020: Bending the curve of biodiversity loss*. WWF, Gland, Switzerland.