Forum

Attending to the 'biological, technical, financial and sociological factors' of lion conservation: a response to Hunter et al.

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Hunter et al. (2013) dispute the need for restoration programmes using captive-origin lions *Panthera leo*, arguing they are typically nothing more than commercial tourist attractions that add little to the conservation of the species. In contrast, Hunter et al. promote the merits of translocation programmes using wild-born lions. Here we respond to some of the concerns raised and argue that a range of strategies is required to restore lions to the wild.

The criticism of captive-born lion restorations begins by noting some failed attempts (lynx and jaguar) and proposed programmes (tiger and leopard). Two matters are striking. Firstly, none of these programmes concern lions or large social felids. To assume captive-origin lion restoration programmes are failures based on these attempts is speculative. We do not have evidence that lion restoration programmes using captive-origin lions are, or will be, failures. Secondly, past failure is no reason not to try again with a fresh approach. Dismissing programmes that can enhance the toolkit of available conservation solutions shows little foresight of where the African lion could be in a few years' time.

Hunter et al. further argue that captive-origin carnivore restorations are 'profoundly limited by biological, technical, financial and sociological factors'. These are fundamental issues that need to be addressed but evidence is needed to show these are absent from captive-origin programmes. These issues are also relevant to wild-origin lion restorations. There are points in Hunter et al.'s paper where deliberation of these factors seems to be absent from their promotion of wild-origin translocation programmes. For example, if conservationists adopt the strategy proposed by Hunter et al. to move lions to areas where numbers have either become vulnerably low, or the population has been wiped out, then measures need to be taken to ensure the causes of the original decline or loss do not reoccur. There are recent examples where due attention does not seem to have been paid. Anthropogenic factors accounted for all post-release deaths of founders in the case of a reintroduction of lions to Phinda in South Africa, where five lions died in snares and three lions were euthanized after killing a tourist (Hunter et al., 2007). Another case includes the death in a snare of one of four lions translocated to Liuwa Plains National Park in Zambia (African Parks, 2012).

As Hunter et al. also note, diseases within wild lion populations are of concern with respect to translocations and the threat of transmission of pathogens. Specifically, FIV is endemic within lion populations. Hunter et al. suggest that FIV does not reduce the lifespan or quality of life of infected lions. However, this is based on specific lion populations, namely those in the Serengeti and Ngorongoro Crater in Tanzania. As Troyer et al. (2011) note, different strains of FIV result in different outcomes for the lion. Those infected with subtype B do not exhibit the high mortality rates evident in those lions infected with subtypes A and C. They propose that 'this could explain the lack of FIV-related pathology in the lions of the Serengeti, where FIV*ple*-B is the predominant circulating strain'. Hunter et al. make no reference to other strains of FIV, especially FIV*ple*-E, circulating in Botswana, which is acknowledged to be an especially virulent and dangerous form (McEwan et al., 2008). Hunter et al. refer to the two catastrophic CDV outbreaks in the Serengeti (1993–1994) and Ngorongoro Crater (2001) in which particular FIV clades were found to be more susceptible. These outbreaks were only 7 years apart and led to 'unprecedented mortality'. As Troyer et al. (2011) suggest, although FIV was not considered a major factor in these deaths there is evidence to suggest different strains within these populations may have played a supportive role as a result of immune suppression. To make assumptions about the effects of FIV on lions in general based on particular populations, and to judge two outbreaks that occurred closely together in time and space as unusual, is risky. There is perhaps some doubt in the authors' minds about the soundness of such judgements as they retain a cautionary note that FIV may, at some point in the future, be shown to be detrimental to lion populations. Many research groups have already acknowledged this (e.g. O'Brien et al., 2012). A solution proposed by Hunter et al. is to use FIV-negative lions, such as those in Etosha National Park. However, this would mean that the sample of lions being translocated to founder wild populations is small, a point

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that seems to contradict the emphasis on maintaining genetic diversity within populations and attending to a complex array of factors.

We have further concerns with the reporting by Hunter et al. of the presence of bovine tuberculosis in lions. They acknowledge that the effect of *b*TB on lion populations is 'poorly understood' and resulted in 30% of deaths in the inbred Hluhluwe-iMfolozi population in South Africa. The primary reason given by the authors for not translocating infected lions from southern Africa is veterinary restrictions to protect livestock. Surely decisions should also be primarily based on concerns voiced by local communities with respect to their livelihoods, and possible transmission of *b*TB across lion populations. As such, it is unclear how the 'biological, technical, financial and sociological factors' are being addressed here. As Hunter et al. note, diseases in lion populations are not yet sufficiently understood and can cause significant population declines. Therefore we cannot conclude that translocating infected wild lions will not have detrimental affects on lion populations. If we only translocate the few uninfected lions impoverishment of genetic diversity will become an issue.

Hunter et al. further highlight the fact that marked inbreeding depression is known only in two isolated populations, arising from extremely few founders: in the Ngorongoro Crater and Hluhluwe-iMfolozi. They do not indicate how many populations have been assessed for levels of inbreeding and fail to mention that the issue of inbreeding is significant in those wild-born lion translocation programmes touted as being a significant success (e.g. Trinkel et al., 2010).

The behavioural characteristics of captive-origin lions are also questioned by Hunter et al. They comment on the behaviours of one of ALERT's release prides, claiming the lions exhibit maladaptive and aberrant behaviours 'unknown among cohesive social groups of wild founders'. This is not typical behaviour displayed by ALERT prides. Furthermore, behaviours such as filial infanticide are not unheard of in wild social species such as hyaena (e.g. White, 2005). As such we cannot assume these are a consequence of captivity.

The aim of Hunter et al. is to discredit the use of captive-origin lions for restoration programmes. Their attempts to do so exclude a detailed and rigorous evaluation of the programmes targeted. Neither wild-born nor captive-origin translocations can, on their own, resolve the problem of the decline of lion populations, yet both can play a part in an effective strategy to maintain and, where feasible, restore viable populations. Condemning other lion conservation programmes is not going to save the African lion. Rigorous assessment and application of a range of effective conservation strategies could address those complex 'biological, technical, financial and sociological factors'. As the IUCN states: 'The reality of the current situation is that it will not be possible to ensure the survival of an increasing number of threatened taxa without effectively using a diverse range of complementary conservation approaches and techniques including, for some taxa, increasing the role and practical use of ex situ techniques'. (IUCN, 2002).

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