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Overpopulation within Arabian Oryx collections in the range states: a review

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This position paper was circulated to representatives of all range states with the aim of establishing a unified position on overpopulation control of Arabian Oryx in the range states. We would like to thank all members of the Coordination Committee for the Conservation of the Arabian Oryx (CCCAO) that have reviewed this paper and provided their input. In particular, we would like to thank Dr. Mansoor Al Jahdhami, Declan O'Donovan, Justin Chuvén & Myyas Al Qarqaz for their comments on this position paper.

1 Introduction

Over the last 30 years, the Arabian Oryx was brought back from the brink of extinction in several parts of its range in the Arabian Peninsula. This has been largely due to captive breeding which played a pivotal role in providing source individuals for *in situ* conservation, as well as significantly contributing to establishing Oryx populations in their original habitats. Thanks to these conservation efforts, the Arabian Oryx is currently listed as a vulnerable species on the IUCN Red List, downlisted from endangered in 2011. By 2013, the Arabian Oryx disease survey, initiated by the General Secretariat for the Conservation of the Arabian Oryx (GSCAO), recorded 9706 Oryx individuals in several breeding and release programs in the range states (Lignereux & AlKharusi, 2015). However, increasing numbers of Oryx doubled with space constraints poses a substantial challenge to conservation management. Many collections in the region are experiencing overpopulation, which may have adverse ecological effects on species survival in the long-term and on habitat conservation and management.

2 Objective of the review paper

Through recent individual and group discussions, the GSCAO has realized that overpopulation poses a substantial challenge to local Oryx conservation institutions in the region. It has thus drafted this technical paper to facilitate discussions on this critical issue (i.e. overpopulation) and investigate possible intervention options that can be applied in the region and be considered as effective in reducing Oryx numbers in both breeding facilities and protected areas. This draft paper is circulated to conservation managers, experts and wildlife veterinarians working with Arabian Oryx facilities either in the range states or globally in order to get their feedback and share experiences and perspectives on the issue of overpopulation.

3 Why does Arabian Oryx overpopulation occur in the region?

Overpopulation occurs when numbers of a particular species exceeds the carrying capacity of the area or habitat available within conservation institutions (Graham, 1996). In such a situation, high population levels will show density dependent effects (e.g. competition for resources) that can affect the individual productivity and hence population growth. As far as the Arabian Oryx is concerned, the key factor

contributing to overpopulation is the perception of collection owners that possessing a large number of this iconic species is a great success to the conservation program. The cultural value of the species encourages private collection owners in Arabia to own as many individuals as possible, so that they can enjoy high social status amongst other collectors in the society. Many Oryx herds in the region are managed in private facilities and emphasize numbers (quantity of Oryx) over herd health or genetic 'quality'. As a result, the annual performance for most if not all of Oryx collections in the region is based on breeding records and other parameters become marginal in the assessment process (e.g. genetic fitness).

4 Ecological and socio-cultural impact of Overpopulation

Overpopulation can cause disease, injury, starvation and a subsequent dramatic reduction in population numbers if not handled immediately and appropriately. A classic case of Arabian Oryx population affected by overpopulation was reported from Saudi Arabia where some 560 Oryx died in the fenced *Mahazat As-Sayed* reserve in Taif as the population ran out of food resources which in turn caused individuals to live in stressful conditions (Zafar-ul Islam et al. 2010). Other effects of overpopulation include male aggression towards each other (e.g. for dominance and females) and towards calves (Harding et al. 2007). Mortalities or disease spreads arising from crowding can politically and publically damage the reputation of conservation management as decision makers and the public consider conservationists as professionals who effectively apply sound strategies and techniques to protect this rare charismatic species from extinction.

5 Intervention options

The key objective of regulating population sizes within captive or semi-captive populations is to maintain their numbers within the capacity of the breeding or reserve facility. Intervention options can be classified based on their practices into non-consumptive and consumptive uses of wildlife. The first classification involves using wildlife resources without affecting their survival (Oryx watching tourism, education and display in zoological institutions). Arabian Oryx has become an attractive destination for local and international tourists and many nature-based tourism projects in the region base their marketing strategies entirely on Arabian Oryx. The consumptive use of wildlife, however, involves hunting individuals. It is practiced in many forms including culling and trophy hunting. It is widely used in

many parts of the world and in many species as a conservation tool to bring wildlife numbers to sustainable levels as well as generate revenue for conservation and local communities (e.g. Lindsey et al. 2007). Provided that it is well-managed and practiced within sustainable levels and according to strict criteria and licensing mechanisms, hunting can generate more revenue for conservation than other non-consumptive forms of wildlife utilization. In Tanzania, for example, revenue figures for conservation lands from 2006/2007 to 2012/2013 showed that trophy hunting of many species such as zebra, Oryx, wildebeest and impala provided considerably more money for conservation than photographic tourism (Table 1; Ministry of Natural Resources and Tourism, 2013). The Suleiman markhor (*Capra falconeri jerdoni*) and Afghan urial (*Ovis orientalis cycloceros*) have significantly benefited from controlled hunting as populations of both species increased between 1994- 2005 from 1171 to 2541 individuals for the Suleiman markhor and from 695 to 3146 individuals for the Afghan urial (Frisina & Tareen, 2009). Eighty percent of the revenue generated from the trophy hunting programme of these two species went to the local community and the other twenty percent to government (Shackleton, 2001).

Table 1. Financial income accrued from trophy hunting and wildlife photographic tourism from 2006/2007 to 2012/2013 in Tanzania.

Year	Trophy hunting (\$USD)	Photographic tourism (\$USD)
2006 / 2007	12,030,510	623,645
2007 / 2008	14,704,370	664,736
2008 / 2009	19,760,812	2,387,728
2009 / 2010	18,444,881	2,706,603
2010 / 2011	23,536,347	2,863,287.24
2011 / 2012	15,062,217.75	2,080,978.00
2012 / 2013	15,917,430.93	3,904,808.35

As far as Arabian Oryx is concerned, there are so far no published cases on the use of sustainable hunting as a tool to keep Oryx numbers within the carrying capacity level of facilities or managed reserves. Table 2 provides some intervention options that are commonly carried out in populations of other species around the world to control and maintain their numbers to sustainable levels, with a list of the advantages and disadvantages of each option.

Table 2. Proposed management options that can be applied to regulate Arabian Oryx overpopulation in the range states.

Management option	Advantages	Disadvantages	Has it been done in any Oryx project in the region?	References
Sex separation	<p>Non-lethal option</p> <p>Effective in population control</p>	<p>Not ethically accepted by local communities (Oman as an example); not effective particularly for already overpopulated herds, expensive and labour / time demanding; needs to be done regularly to ensure no adult individuals exist in the herd, might require the capture of animals.</p>	<p>Oman Al Deleika</p>	<p>Al Jahdhami et al. 2011</p>
Control breeding groups	<p>Breeding males are rotated 1-3 years to maximize genetic diversity of the herd and to assure equal chances of breeding for non-dominant males.</p>	<p>Involve intensive monitoring as managers need to keep an eye on every single male; prevents natural selection of the species as breeding is determined by management.</p>	<p>Al Ain Zoo</p>	

<p>Translocation* or exchanges</p>	<p>Effective as short-term rescue operation</p>	<p>Space limits, expensive, new site needs to have optimal or minimum requirements for new individuals to survive, requires capture of animals, needs healthy habitat at translocation site or feeding interventions and additional manpower and financial resources</p>	<p>Reintroduction/Release is part of conservation translocation and is widely practiced in the region (e.g. Oman, UAE, Saudi Arabia Jordan, Syria)</p>	<p>Al Zaldaneen & Al Hasaseen, (2008); Kiwan et al. 2008; Ostrowski et al. 1998; Stanley Price, 1989</p>
<p>Fertility control (contraception and sterilization)</p>	<p>Surgical sterilization (e.g. male castration) is effective on the longer-term.</p> <p>Melengestrol acetate (MGA) & Zona pellucida (PZP) vaccine</p>	<p>Ethical considerations, Irreversible techniques; inappropriate practices can affect the sexual characteristics of the animal and hence its social behavior, requires capture of the animal, might be expensive and risky.</p> <p>With frequent uses of PZP over years, the period of infertility might become permanent.</p>	<p>No information is available from the region on the use of contraceptives in Oryx facilities.</p> <p>No</p>	<p>Patton et al. 2007</p> <p>https://www.stlzoo.org</p>
<p>Controlled hunting</p>	<p>Effective to curb increasing numbers via removing surplus individuals in short timeframe, provides substantial</p>	<p>Involves killing the animal, it might raise ethical and political issues locally and internationally, has many legal and technical requirements, needs close monitoring of the</p>	<p>As an ancient practice, local <i>bedu</i> in several parts of Arabia (e.g. Oman, Saudi Arabia) used to hunt wildlife in limited numbers including Arabian Oryx for their livelihood.</p>	<p>Carruthers, 2012; IUCN SSC, 2012, Kingdon, 1991)</p> <p>Stanley Price (1989);</p>

	economic benefits to conservation, promotes ecotourism which can economically and culturally benefit local communities as well as national income.	hunting ground so that hunting quota is not exceeded, requires statistical calculations to project population increase and the hunting quota, expensive to implement.		
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*Translocation here is defined as the human-mediated movement of living organisms from one area, with release to another for conservation purposes such as improving the conservation status of the focal species locally or globally and / or restoring natural ecosystem functions or processes (IUCN/SS, 2013).

6 Sustainable Hunting as a tool for conservation

Sustainable trophy hunting, when practiced under controlled conditions, has been recognized by the IUCN as a legitimate conservation tool¹, which may help create investment into conservation and reduce the risk of resource degradation or depletion (IUCN, 2012). The key considerations for sustainable wildlife hunting to effectively contribute to biodiversity conservation include:



- Taking into account the biological limitations of the species and their ecosystems when determining the 'supply' of biological products available for consumptive uses
- Ensuring that ecological processes, species, and genetic variability remain above the thresholds needed for long term viability
- Ensuring that the hunted species are free-ranging in their natural habitats
- Implementing consumptive activities such as hunting at an appropriate and adaptive scale




¹ As affirmed in Recommendation 18.24 at the 1990 IUCN General Assembly in Perth and reiterated in IUCN's "Policy Statement on Sustainable Use of Wild Living Resources", adopted as Resolution 2.29 at the IUCN World Conservation Congress in Amman in October 2000, affirming that use of wildlife, if sustainable, can be consistent with and contribute to biodiversity conservation. At the 2004 WCC, the IUCN adopted Recommendation 3.093 stating that it "Supports the philosophy and practice that on state, communal and privately-owned land in southern Africa the sustainable and well-managed consumptive use of wildlife makes a contribution to biodiversity conservation" and further, that it "accepts that well-managed recreational hunting has a role in the managed sustainable consumptive use of wildlife populations".

- Ensuring close monitoring of consumptive activities and implementing an adaptive management mechanism that considers risks and uncertainties
- Ensuring good governance systems that are participatory and include consultations with and empowerment of local stakeholders, as well as the incorporation of traditional knowledge and culture
- Ensuring consistency with national and internal laws governing biodiversity use, and holding the users accountable for the integrity of the resource being used, through a combination of positive incentives and strong sanctions; and
- The distribution of benefits (revenue or other) from the use of the biodiversity resource should be prioritized for biodiversity conservation and effectively contribute to the long-term preservation of the resource.

Table 3 highlights the positions of international conservation organizations and conventions on the issue of trophy hunting or consumptive uses of biodiversity.

Table 3: International conventions stance on sustainable trophy hunting & wildlife resource use

Organization/Convention	Position	Reference
<p>IUCN</p> 	<p>Trophy hunting is likely to contribute to conservation and to the equitable sharing of the benefits of use of natural resources when programmes incorporate the following five components: Biological Sustainability; Net Conservation Benefit; Socio-Economic-Cultural Benefit; Adaptive Management: Planning, Monitoring, and Reporting; and Accountable and Effective Governance</p>	<p>IUCN SSC (2012). IUCN SSC guiding principles on trophy hunting as a tool for creating conservation incentives</p>
<p>CBD</p> 	<p>It is possible to use biodiversity in a manner in which ecological processes, species, and genetic variability remain above the thresholds needed for long term viability, and that all resource managers and users have the responsibility to ensure that such use does not exceed these.</p>	<p>7th Conference of Parties to the CBD (Kuala Lumpur, February 2004), Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity (AAPG)</p>

<p>CITES</p> 	<p>Provides for the authorization of trade of trophies in certain specimens of Appendix I-listed taxa for personal use (Res. Conf. 2.11 (rev. CoP 9)). CITES has adopted a series of Resolutions for certain Appendix I-listed species subject to trophy hunting</p>	<p>Res. Conf 10.14 (rev. CoP 14) on Leopard <i>Panthera pardus</i>; Res. Conf 10.15 (rev. CoP 14) on Markhor <i>Capra falconeri</i>; and Res. Conf 13.5 (rev. CoP 14) on Black Rhinoceros <i>Diceros bicornis</i>, which set out quotas and conditions for such trade.</p>
<p>European Bern Convention</p> 	<p>Hunting is one of the oldest forms of consumptive use of renewable natural resources, and has always been an integral part of the cultures and traditions of European rural society. Hunting can be regarded as a form of sustainable development, which is an overarching objective of the Treaty of the EU. There is a need to ensure that all forms of hunting, both by local residents and by tourists, are sustainable relative to ecological, economic, and socio-cultural considerations.</p>	<p>European Charter on Hunting and Biodiversity (ECHB) Adopted by the Standing Committee of the Bern Convention at its 27th meeting in Strasbourg, 26-29 November 2007,</p>
<p>WWF</p> 	<p>Accept hunting only in a very limited number of contexts where it is culturally appropriate, legal and well regulated. It must also demonstrate clear conservation and community benefits</p>	<p>http://www.wwf.org.uk/wf_articles.cfm?unewsid=6766</p>

In the case of the Arabian Oryx, well-regulated and controlled trophy hunting, implemented at a small scale, could act as a significant source of revenue for the continued conservation and research programs needed to protect the species and rehabilitate its wild natural habitat for future reintroductions across the region. In addition, it could help set aside suitable habitat for establishing semi-captive free ranging populations, with land set aside specifically for the hunting activity. With the widespread overpopulation occurring currently across several captive or semi-captive collections, the Oryx may be seen as providing few benefits to local people, imposing substantial costs on breeding and conservation institutions, with a lack of viable and suitable release sites in which to re-establish free-ranging wild populations. Trophy hunting is a possible solution that may help make wildlife be

perceived as more valuable to other forms of land use (such as agriculture or industry or standard tourism), and can help motivate and encourage investment from private and government sectors for wildlife research, monitoring and habitat protection. Several case studies from across the world indicate that trophy hunting when well-managed has often a higher value and lower impact compared to other forms of land use (IUCN, 2012). Figure 1 presents the five key elements that characterize a sustainable hunting activity that effectively contributes to conservation, according to the IUCN's Species Survival Commission (SSC).



Figure 1: The IUCN SSC considers that trophy hunting is likely to contribute to conservation and to the equitable sharing of the benefits of use of natural resources when programmes incorporate the above five components (IUCN, 2012).

7 Key questions and the way forward

The challenge of population management and prevention of overpopulation within regional collections of Arabian Oryx requires careful consideration through the gathering of case studies and experiences from range states. Methods of population management and assessment of carrying capacity need to be described, shared and disseminated amongst conservation managers, through platforms such as the GSCAO. Although trophy hunting has been shown to be potentially beneficial to conservation in other species due to its high economic value, selective nature and low off-take of species, the question of whether it may benefit Arabian Oryx conservation remains to be answered.

The following are key questions that this investigatory paper addresses to range states and regional experts in order to drive the discussion amongst Arabian Oryx researchers, conservation managers and veterinarians on the issue of overpopulation and sustainable hunting:

- Is overpopulation a critical issue in your collection? What are some of the challenges that you face because of overpopulation?
- How do you determine the safe population level/ habitat carrying capacity within your collection?
- How do you, as a conservation manager, deal with overpopulation if it exists in your collections?
- Have management options that you have implemented been effective in controlling increasing numbers of Arabian Oryx in your collection? What are these management options?
- How do you define "surplus individuals" in your collection?
- Do you believe that trophy hunting is justified as a management option to regulate population growth in breeding facilities, and that it may be applied in the region for species such as the Arabian Oryx?
- Do the management and governance structures needed for controlled and strictly regulated trophy hunting exist in your national context? Are the capabilities for implementing sustainable hunting principles available?

In conclusion, overpopulation of Arabian Oryx amongst collections in the region has become a substantial challenge facing conservation managers. Alongside other management options, sustainable hunting is used in global conservation to reduce numbers of overpopulated individuals to sustainable levels to meet allocated resources (i.e. carrying capacity) while providing socio-economic benefits for local

communities and projects. This review paper helps initiate discussions amongst conservation managers in the region on the political, biological and ethical aspects of sustainable hunting and highlights its socioeconomic potential. In its role as a regional information hub and communication platform, the GSCAO will seek to compile data, case studies and views from across the region on the issue of overpopulation and the potential of sustainable trophy hunting. This could eventually lead to the creation of a regional technical advisory group and the development of legal and ethical requirements and agreed regional criteria for establishing hunting reserves, guiding conservation managers on the implementation of sustainable hunting as a tool for conservation.

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9 References

- Al Jahdhami, M., Al-Mahdhoury, S. & Al Amri, H. (2011). The reintroduction of Arabian Oryx to the Al Wusta Wildlife Reserve in Oman: 30 years on. In *Global Reintroduction Perspectives 2011: More case studies from around the globe* (edited by Soorae, P.S.), Gland, Switzerland: IUCN/SSC Re-introduction Specialist Group and Abu Dhabi, UAE: Environment Agency- Abu Dhabi, p: 194- 198.
- Al Zaidaneen, J. & Al Hasaseen, A. (2008). Re-introduction of Arabian Oryx into Wadi Rum protected area, Jordan. In *Global Reintroduction Perspectives: reintroduction case studies from around the globe* (edited by Soorae, P.S.), IUCN/SSC Re-introduction Specialist Group, Abu Dhabi, UAE, p: 181- 184.
- Carruthers, D. (2012). *Arabian adventure: to the great Nafud in quest of the Arabian Oryx*. Abu Dhabi Tourism & Cultural Authority, Abu Dhabi, UAE (in Arabic).
- Graham, S. (1996). Issues of surplus animals. In *Wild mammals in captivity*. (edited by Devra G. Kleiman, Mary E. Allen, Katerina V. Thompson and Susan Lumpkin), The University of Chicago Press, Chicago, p: 290-296.
- Frisina, M.R., & Tareen, S.A.N. (2009). Exploitation prevents extinction: case study of endangered Himalayan sheep and goats. In *Recreational hunting, conservation and rural livelihoods: science and practice* (edited by Barney Dickson, Jon Hutton, and Willam M. Adams). Wiley-Blackwell Publishing, p: 141-156.
- Harding, L. E., Abu-Eid, O. F., Hamidan, N. & al Sha'alan, A. (2007). Reintroduction of the Arabian Oryx *Oryx leucoryx* in Jordan: war and redemption. *Oryx* 41: 478-487.
- IUCN SSC (2012). *IUCN SSC guiding principles on trophy hunting as a tool for creating conservation incentives*. Ver. 1.0. IUCN, Gland.
- IUCN/SSC (2013). *Guidelines for reintroductions and other conservation translocations*. Ver. 1.0. IUCN, Gland, Switzerland: IUCN Species Survival Commission.
- Kiwan, K., El Alkamy, H. & Al Dhaheri, A. (2008). Reintroduction of Arabian Oryx into Um Al Zomoul, Abu Dhabi Emirate, United Arab Emirates. In *Global Reintroduction Perspectives: reintroduction case studies from around the*

globe (edited by Soorae, P.S.), IUCN/SSC Re-introduction Specialist Group, Abu Dhabi, UAE, p: 177- 180.

Kingdon, J. (1991). Arabian mammals. Academic Press Limited, London.

Lignereux, L. & Alkharusi, Y.H. (2015). Middle East Arabian Oryx Disease Survey Report 2013. Environment Agency- Abu Dhabi (EAD).

Lindsey, P.A., Roulet, P.A. & Románach, S.S. (2007). Economic and conservation significance of the trophy hunting industry in sub-Saharan Africa. *Biological Conservation* 134: 455- 469.

Ministry of Natural Resources and Tourism. (2013). Wildlife sub-sector statistical bulletin. Wildlife Divisions, Dar Es-Salam, Tanzania.

Ostrowski, S., Bedin, E., Lenain, D.M. & Abuzinada, A. H. (1998). Ten years of Arabian Oryx conservation breeding in Saudi Arabia- achievements and regional perspectives. *Oryx* 32: 209-222.

Patton, M.L., Jöchle, W. & Penfold, L.M. (2007). Review of contraception in ungulates. *Zoo Biology* 26: 311-326.

Shackleton, D.M. (2001). A review of community-based trophy hunting programs in Pakistan. IUCN- Pakistan, Islamabad.

Stanley Price, M. (1989). Animal reintroductions: the Arabian Oryx in Oman. Cambridge University Press, Cambridge.

Zafar-ul Islam, M., Ismail, K. & Boug, A. (2010). Catastrophic die-off of globally threatened Arabian Oryx and sand gazelle in the fenced protected area of the arid central Saudi Arabia. *Journal of Threatened Taxa* 2: 677-684.