

Over 20 years of re-introducing the Arabian oryx in fenced and free-range protected areas of Saudi Arabia

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Introduction

The Arabian oryx or *Al Maha* in Arabic (Endangered & CITES App. I), is the smallest member of Oryx genus which is native to desert and steppe areas of the Arabian Peninsula and was declared extinct in the wild in 1972 in Oman. In Saudi Arabia the oryx the re-introduction program was started in 1989 by the Saudi Wildlife Commission. Concurrent conservation programs for the protection of large areas within the former range of the Arabian oryx, and the captive breeding of oryx at the NWRC in Taif have together enabled the restoration of the species in the Kingdom. The first re-introduction took place in Mahazat as-Sayd Protected Area (2,244 km²) which was completely fenced in 1989 to prevent access by poachers and livestock.

The founder herd was as diverse as possible and comprised animals from national and overseas collections as well as the NWRC herd. The second release site is 'Uruq Bani Ma'arid (UBM) (12,600 km²) situated on the western edge of the Empty Quarter. A total of 82 oryx (with almost equal sex ratio) have been released since 1990 to 2009 in Mahazat and since 1995 a total of 174 oryx (79 males:95 females) have been translocated. One hundred and forty-six originated from the NWRC captive breeding while 28 came from the Mahazat.



Collared Arabian oryx in Mahazat © M. Z. Islam

Goals

- Goal 1: To re-establish wild and self-sustaining populations of Arabian oryx in Saudi Arabia.
- Goal 2: To develop breeding techniques in semi-captive herds so as to allow the production of fit individuals.
- Goal 3: Studying the most suitable habitats and establish protected areas in which vegetation can recover.
- Goal 4: Managing the re-introduction of the herds in the protected areas.
- Goal 5: Re-introducing in suitable habitats, oryx from the “World Herd”, in order to improve their genetic variability.
- Goal 6: Studying the ecology and biology of the oryx in protected areas.

Success indicators

- Indicator 1: The captive-breeding program at NWRC has achieved its expected goals.
- Indicator 2: The captive herd at NWRC is maintained for re-introduction programs for other protected areas.
- Indicator 3: The re-introduction of Arabian oryx in Mahazat as-Sayd for more than 20 years which now has a significant self sustaining population is considered to be a success.
- Indicator 4: After 14 years of re-introduction in UBM is also considered as successful as that also has a free-ranging population.
- Indicator 5: A website dedicated to Arabian oryx is hosted by the NWRC (www.arabian-oryx.gov.sa).

Project summary

Released animals were marked with suitable tags for identification and some fitted with radio collars to enable them to be relocated after release. The post-release progress of oryx has been carefully monitored and the information gained from early releases utilized in planning subsequent attempts where appropriate. We studied the behavioral ecology and reproductive physiology of the animals and as populations increased and animals dispersed into many small groups it become increasingly difficult to account for all the oryx each day. Monitoring of re-introduced populations is a key factor to evaluate the success of re-introductions and to implement management policies.

Population in Mahazat: The animals have been monitored since the beginning and population growth is monitored each year since 1988 to 2008. The numbers of animals present (including additional releases described above) since 1988 to 2008 are 9, 19, 31, 42, 89, 128, 170, 221, 285, 355, 409, 415, 413, 469, 523, 547, 529, 605, 613, 550 and 324 respectively. Population declines resulting from food shortages or poor habitat are characterized by an increase in mortality among younger animals and a similar mortality pattern was observed both in Arabian oryx and Reem gazelles in Mahazat (Islam *et al.*, 2007). There was a sharp decline in the oryx population of Mahazat in recent years during the summer months or in drought like situations. The rainfall in 1999, 2001, 2007 and 2008 were 4.27 mm, 11.45 mm, 0.01 mm, and 5.60 mm respectively, which has not

been sufficient for the vegetation (grasses and trees) to regenerate. From 1998 to 2008, the number of dead oryx was 30, 34, 26, 35, 20, 37, 36, 12, 46, 71, and 159. In 2008 the skulls were mainly from previous years collected in 2008. Most of the dead animals were adults and also a few calves. Arabian oryx move long distances in search of food and the Mahazat fence prevents its movement especially during the stressful period when the food availability is extremely low. It is noticeable that many animals die near the fence.



Rangers monitoring Arabian oryx in Mahazat
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Active management plans of the ungulate populations in the Mahazat As-Sayd Protected Area were developed in 2008 and a previous plan was also discussed by the experts including ecologists, biologists, botanists, vets, sociologists and policy and decision makers to minimize periodic large-scale mortalities in the Reserve (Islam & Knutson, 2008). To deal with this situation, it was recommended that as many oryx and sand gazelle be removed from the protected area as possible. There is currently not enough vegetation to support the population and additional deaths appear imminent unless preventative action is taken. Because translocation or other means of removal were not readily available, supplemental feeding and watering is deemed as necessary to reduce the likelihood of mass mortalities.

Population in UBM: Uruq Bani Ma'arid Protected Area is one of the places, where free-ranging oryx population exist. The population of oryx in UBM in December 2008 was estimated as 200 animals by a survey using four fixed transect lines by vehicles and aircraft.

Post release monitoring: Due to aridity of their environments, oryx in the wild usually survive at low densities and therefore estimates of population size have a low accuracy, owing to the small number of individuals encountered during surveys in both the re-introduction sites. We used two methods of population size estimation in Mahazat, i.e., cumulated births and deaths recorded by field workers supplemented by transect counts on 14 lines by cars and aircraft. These monitoring efforts allow us to cross-check convergent indications, and to carry out surveys four times/year. In Uruq, we do intensive post-release population monitoring and also transects by vehicle and aircraft on four pre-defined transect lines twice a year to improve the monitoring efficacy for these large desert antelopes. A computer model was developed to evaluate the probability of

extinction (frequency with which 100 initial population fall to zero within 100 years) of the predator-free Mahazat oryx population under various management options (Treydte *et al.*, 2001). The probability of extinction was high when no management was applied to the population, probability of extinction varied between 0.3 and 0.92 according to combination of assumptions, whereas removing all oryx above 70% of carrying capacity provided the lowest probability of extinction, and the lowest population size variation whatever was the combination of assumptions (Mesochina, *et al.*, 2003 & Islam *et al.*, 2007). It is extremely important that the management of species is to be developed for the long-term solution of oryx in fenced protected area (Mahazat) and at the same time in unfenced or free-ranging re-introduction site (UBM).

Major difficulties faced

- No suitable habitat was available during the initial stages of re-introduction and fencing and protecting re-introduction sites was not possible.
- High mortality rates of adults as well as juveniles during summer in the fenced area of Mahazat as-Sayd is a serious issue and evidence that wild-born oryx are also in a poor condition during this period.
- A species management plan was available, especially for the fenced re-introduction site (Mahazat), but implementation was difficult.
- No study on the genetic diversity of oryx in the released sites has been done in recent years.

Major lessons learnt

- When wide-ranging species are confined to restricted areas, even if such areas are large, it is essential that an effective population management plan is in place BEFORE any re-introduction is carried out and that the plan is properly implemented. If this is not done, large-scale mortalities will occur.
- Prior to any transplantation, range conditions in the release area have to be improved and the area protected from livestock exploitation. Once pasture conditions show adequate signs of improvement and the site is adequately protected, re-introduction of the animals can be contemplated.
- The time of release should coincide with suitable vegetation conditions.
- Keeping the animals in pre-release enclosures within the re-introduction site to get them acclimatized to the natural environment and provide minimal amount of food and water.
- Regulate tourism in re-introduction areas as this can lead to increased habitat degradation.
- Strict law enforcement to minimize poaching of Arabian oryx.
- A public-awareness program had been started to inform citizens of the biological and historic significance of the Arabian oryx in the society.

Success of project**Mahazat as-Sayd Protected Area:**

Highly Successful	Successful	Partially Successful	Failure
	√		

Uruq Bani Ma'arid Protected Area (unfenced):

Highly Successful	Successful	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- The Arabian oryx was considered extinct in the wild by 1972 (Henderson, 1974) from the Arabian Peninsula, now have self sustaining population in Saudi Arabia through the captive-breeding and re-introduction programs.

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References

Henderson, D. S. 1974. Were they the last Arabian Oryx? *Oryx* 12: 347-350.

Islam, M. Z. & Knutson, C. 2008. A plan to reduce the risk of mass mortalities of reintroduced animals in the Mahazat as-Sayd Protected Area in Saudi Arabia. *National Wildlife Research Center, Taif, Saudi Arabia.*

Mesochina, P., Bedin, E. & Ostrowski, S. 2003. Reintroducing antelopes into arid areas: lessons learnt from the oryx in Saudi Arabia. *CR Biologies* 326: S158-S165.

Treydte, A. C., Williams, J. B., Bedin, E., Ostrowski, S., Seddon, P. J., Marschall, E. A., Waite, T. A. & Ismail, K. 2001. In search of the optimal management strategy for Arabian oryx, *Animal Conservation* 4: 239-249.