

CHAPTER 11

MANAGEMENT RECOMMENDATIONS

Introduction

Some conservation agencies operate on the premise that population persistence can be ensured with the protection of a piece of the natural habitat of an animal population (Belovsky, Bissonette, Dueser, Edwards, Luecke, Ritchie, Slade & Wagner 1994). However, the conservation of biodiversity, or any part of it, usually requires judicious wildlife management. Desert ecosystems, however, normally require less intense management than the more mesic and species rich areas (Bothma & Strauss 1995).

The management of wildlife in the past has been explained on the basis of two concepts, namely conservation and preservation (Thomson 1992). The basic difference between conservation and preservation management is based on whether the animal species being dealt with are considered as endangered by the International Union for Conservation of Nature and Natural Resources (IUCN). If a species is not considered as endangered, then conservation management, which is based on the sustainable utilisation of natural resources, is aimed at. When a species is considered as endangered, however, preservation management, which is aimed at the protection of the endangered species, is followed. Preservation management forms the basis of the Arabian oryx management programme in the 'Uruq Bani Ma'arid Protected Area. Elsewhere a management plan and specific management objectives have been formulated for the 'Uruq Bani Ma'arid Protected Area (Bothma & Strauss 1996). The aim of this section is therefore to concentrate on the future management of the Arabian oryx population, while also giving some guidelines for future reintroductions. Criteria for the periodic assessment of the reintroduced population and possible future populations are also given.

Management objectives

Well-defined management objectives are essential for any wildlife management plan (Mentis & Collinson 1979; Bothma 1996). The objective of the reintroduction of the Arabian oryx into the 'Uruq Bani Ma'arid Protected Area was simply to re-establish a free-ranging, self-sustainable population. From this follows the primary management objective for the Arabian oryx population in the area. It is:

- To maintain a free-ranging, self-sustainable Arabian oryx population in the 'Uruq Bani Ma'arid Protected Area

Management recommendations

The captive management of the animals chosen for reintroduction can contribute significantly to the rate of population growth after release, the heterozygosity of the reintroduced population, and ultimately to the success of the reintroduction. The sand gazelles which were reintroduced into the 'Uruq Bani Ma'arid Protected Area during 1995 and 1996 were, for example, carefully managed in captivity to maximise their initial contribution to the reintroduction process. In captivity before release into the wild the female gazelles all had the opportunity to conceive from selected males. These potentially pregnant females were then released into the protected area with males other than those that impregnated them while in the enclosures in captivity (Wacher *pers. comm.*). Soon after release a large proportion of these females produced young, thereby increasing the size of the population considerably (Strauss, *pers. obs.*). A similar approach could be followed with future reintroductions or the release of additional oryxes to augment existing populations.

The escarpment areas and especially the wadis are seasonally of great importance to the reintroduced Arabian oryxes (Chapter 5, 6). It is essential to recognise the value of these areas. Consequently the disturbance and utilisation of these areas inside and outside the core protected area should be limited. This is especially so due to the fact that the complete interaction between the animals and the *Acacia* stands in these areas are not fully understood yet.

Competition for food among the Arabian oryxes of the 'Uruq Bani Ma'arid Protected Area is likely to be high during both the summer, when the animals are concentrated in the escarpment areas, and the winter when the animals travel long distances to get sufficient food. Consequently, it is advisable to control the livestock numbers in the area because large concentrations of livestock can have a serious effect on the amount and quality of forage available to all wildlife in the protected area. Moreover such food is already a limited resource there. If the livestock situation in the 'Uruq Bani Ma'arid Protected Area is not monitored closely then the limited food resource might become a limiting factor for the survival of the Arabian oryx in the area.

The condition of the grazing resource determines the performance of the animals, including the breeding potential of the females (Spalton 1995; Strauss, *pers. obs.*). During periods of

prolonged drought, however, both the quantity and the quality of the vegetation in the area decrease, which in turn lead to decreasing productivity in the oryx population. However, since the 'Uruq Bani Ma'arid Protected Area is unfenced, the animals are able to make use of the best areas in a vast desert system (Strauss, Al-Khaldi & Ghamidi 2000). Therefore interference with the reintroduced population should be kept to a minimum unless the well-being of the population is at risk (Bothma & Strauss 1995). As indicated earlier, special attention should be given to the adult female oryxes during periods of prolonged drought because they are the key to the recovery of the population. As a consequence it has been suggested that active action should be taken when 50% of the adult female oryxes are considered to be in a poor physical condition (Wacher In: Strauss *et al.* 2000).

None of the management recommendations are attainable without the long-term monitoring of the reintroduced Arabian oryx population. Long-term monitoring of reintroduced animals is considered essential for any reintroduction project (Stanley-Price 1989; Tear 1992; Bothma & Strauss 1995). The long-term monitoring of a reintroduced population is also important so as to evaluate the progress made by the reintroduced animals. Therefore, some criteria have been proposed for the periodic evaluation of reintroduction programmes (Ostermann, Deforge & Edge 2001). These criteria involve both the captive and the reintroduced populations. They are:

- The survival and the recruitment rates in the demographically and genetically managed captive population must be high
- Both the survival and the recruitment rates of the captive-bred animals released into the wild must be within the normal range of values for that or similar species
- The reintroduced population must have a positive population growth rate
- One or more viable wild populations must have been established as a result of the reintroduction

While the above criteria are useful for periodically evaluating the reintroduction process, and the state of both the captive and the reintroduced populations, they do not assess whether a reintroduction has been successful or not. Sarrazin and Barbault (1996) have pointed out the need for additional criteria to establish whether a reintroduction has been successful. These authors list three criteria that a population has to meet before becoming self-sustaining. They are:

- The successful breeding of the first wild-born individual (Kleiman, Beck, Dietz & Dietz 1991)

- A recruitment rate that is higher than the mortality of the adults over a 3-year period (Cade & Temple 1995)
- Reaching the minimum viable population size (Beck, Rapaport, Stanley-Price & Wilson 1994)

It is recommended here that the Arabian oryx population that was reintroduced into the 'Uruq Bani Ma'arid Protected Area be monitored on an annual basis and that the proposed criteria for evaluating and finally assessing the success of the reintroduction be used to determine the relative performance of the population.

The additional release of animals into the population in the 'Uruq Bani Ma'arid Protected Area is a potentially powerful management tool. However, the additional release of animals into this area, and the likely effects of such releases should be considered carefully. Additional releases of oryx are only justified if they can make a positive contribution to the reintroduced population. According to Saltz (1998) such positive contributions to a reintroduced population include:

- Increasing the population size, and therefore reducing the susceptibility of the population to demographic and environmental stochasticity
- Increasing the geographical range
- Increasing the genetic base of the population

As suggested earlier (Chapter 10) the relative contribution of additional releases will, however, decrease as the population increases towards ecological capacity and as the range of the population expands. Recent indications are that the National Commission for Wildlife Conservation and Development (NCWCD) is striving towards a minimum oryx population of 500 within the 'Uruq Bani Ma'arid Protected Area. The origin of this figure of 500 oryx is most likely linked to the minimum viable population concept. The latter is thought to be no fewer than 500 animals (Beck, *et. al.* 1994). Maintaining a minimum population of 500 oryxes in the present area, however, is unrealistic because it is doubtful that the ecological capacity of the currently protected area can maintain such a number, even during years of widespread rainfall. As predicted for the oryx population in Oman (Spalton 1995), the population in 'Uruq Bani Ma'arid is likely to grow continuously during several favourable years, during which time the animals will continue to expand their range and many animals will leave the protected area. Because it is impossible to manage the oryx population over the whole of the 'Rub al Khali, it is also these animals that are most likely to die when

adverse environmental conditions set in and the oryx population declines. Consequently, all the management efforts on the Arabian oryx should be concentrated within the core protected area. This area contains habitat that is in better condition than elsewhere, while it also contains the all important summer escarpment plateau and its incised wadi subhabitat of the oryxes. In addition, it might also be necessary in the future to increase the size of the escarpment area that is currently under protection, to ensure enough suitable summer subhabitat for an increasing Arabian oryx population.

The future survival of the Arabian oryx in Saudi Arabia does not, however, depend on the number of oryxes released only into the 'Uruq Bani Ma'arid Protected Area. It is strongly advised that further reintroductions of the Arabian oryx be made into other protected areas with suitable habitat within the country. With time and proper planning this could result in the development of a natural Arabian oryx meta-population within Saudi Arabia.

Alternatively the Arabian oryx populations in the Mahazat As Sayd and the 'Uruq Bani Ma'arid Protected Areas, and those captive animals at the National Wildlife Research Centre in Taif, could be considered as subpopulations of a single meta-population within the country and be managed accordingly. Elsewhere it has been shown that the survival probability of the existing oryx populations in the 'Uruq Bani Ma'arid and Mahazat as Sayd Protected Areas and that of another proposed reintroduced oryx population, will be enhanced by such a meta-population management approach (Strauss in press).

An Arabian oryx meta-population in the Kingdom of Saudi Arabia would increase the chances of survival of the species, because it is difficult to anticipate that many subpopulations would go extinct simultaneously (Ripa & Lundberg 2000). Various authors have also indicated that some level of contact between different populations enhances the survival prospects of those populations (Beudels, Durant & Harwood 1992; Vucetich & Creel 1999). In addition it has been suggested that multiple, independent Arabian oryx populations would be necessary to ensure the persistence of the oryx in the wild on an evolutionary time scale and that multi-national co-operation would be necessary for spatially structured populations to exist (Tear 1994).

To improve the growth rate of the future reintroduced populations, it is essential to release the correct ratio of breeding age females to males. Based on the population viability analysis which was conducted as part of this study, it is suggested that a ratio of five breeding age females per male be considered for future reintroductions. Also, the release of females older

than 4 years of age could potentially increase the population growth rate of a new population, because these females have higher fecundity rates than primiparous ones.

Future research perspectives

The aim of this section is to briefly outline possible future work associated with the current study that could be done in the 'Uruq Bani Ma'arid Protected Area. Several more detailed studies on, or associated with, the way in which the oryxes use their habitat could be done in the future because they would enhance the understanding of this desert ecosystem. These include:

- The interesting interaction of the oryxes especially with their summer habitat, the escarpment areas and the associated wadis. An in-depth study of the feeding patterns of the oryxes in the escarpment area and the interaction between these animals and the *Acacia* stands would greatly enhance the current knowledge on ungulate survival in hyper-arid environments.
- The present study suggested a change in the feeding resources used by the Arabian oryxes, varying from grazing to browsing on a seasonal basis. The ecological separation of the oryxes, sand gazelles and especially the mountain gazelles, which favour the escarpment areas, could also be done because they all compete for the same food sources in the escarpment areas during summer. Among other things this would indicate whether oryx and sand gazelle numbers are a potentially limiting factor to the mountain gazelle population in the area.