

CAPE MOUNTAIN ZEBRA 2009 STATUS REPORT

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**Centre for African Conservation Ecology
Nelson Mandela Metropolitan University**

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Executive summary

Through active conservation programmes, Cape mountain zebra numbers increased gradually from their critical status of fewer than 80 individuals in the 1950's to more than 1600 animals in the wild in 2002. The aim of this survey was to determine the current status of this subspecies, which is listed as Endangered by the World Conservation Union (IUCN), and is on Appendix 1 of the Convention of International Trade in Endangered Species (CITES).

The survey found the extant population of Cape mountain zebra now stands at a minimum of 2 725 animals, in no less than 52 sub-populations. The target population size of 2 500 animals set by the IUCN Action Plan has therefore been exceeded. A high annual rate of increase has also been maintained since 2002, at 10% (compared to 8.4% between 1998 and 2002), indicating that the metapopulation approach to management has been successful in ensuring a continued population growth. The majority of the population (69%) is on formally protected land, but the proportion on privately owned land has risen from 14 % in 1998 to around 31 % currently, in at least 35 sub-populations (compared to 17 formally protected sub-populations). Private land owners therefore clearly play an important role in increasing the distribution and abundance of Cape mountain zebra within their historic range.

A main concern for the future conservation of the subspecies is the large number of small, isolated sub-populations, particularly on private land. Excessively small populations (below the recommended minimum of 14 individuals) can result in demographic problems (poor population growth), inbreeding depression and increased susceptibility to disease as a consequence of inbreeding. A greater effort to inform private owners of these difficulties associated with small populations and a higher level of enforcement of policies in place to prevent these problems is therefore urgently needed.

Introduction

Cape mountain zebra (CMZ) are listed as 'Endangered' by the World Conservation Union (IUCN) and are on Appendix 1 of the Convention of International Trade in Endangered Species (CITES), reflecting earlier concerns regarding their conservation status. Their current status is not known, however, as this has not been reviewed since 2002, when their numbers were estimated to be 1 600 animals in the wild. In particular, the number of animals on privately-owned land has been poorly monitored in recent years, despite the potential significant contribution private populations could make towards the total population size. An urgent need for an updated status report for the subspecies has therefore been identified (paying particular attention to the privately-owned subpopulations), in order to determine whether the current 'Endangered' listing and the corresponding trade regulations are still relevant.

A survey, commissioned by the Professional Hunters Association of South Africa, was therefore undertaken to specifically identify all privately-owned subpopulations of CMZ; determine the number of animals on privately-owned land and assess the general performance of these subpopulations. These data were combined with that from formally protected areas to provide a current status report for CMZ, which is presented here.

Research approach

Private owners of CMZ were first identified from permit records and through contacts with individuals involved in conservation in the distribution area of CMZ. A questionnaire regarding the current and historic details of the subpopulation (zebra number, deaths, translocations etc.) and property details (size, forage quality, location etc.) was compiled and sent to all owners. Questionnaires were completed in direct interviews (22 out of 35 questionnaires) with as many owners as possible, to ensure a clear understanding of the questions and answers. Similar data was retrieved from subpopulations on public land (provincial reserves and national parks).

Taxonomy

The mountain zebra (*Equus zebra* L. 1758) is represented by two geographically separated subspecies, namely the Cape mountain zebra (*Equus zebra zebra* L. 1758) and the Hartmann's mountain zebra (*Equus zebra hartmannae* Matschie 1898). The Cape mountain zebra, the subspecies of interest here, is slightly smaller than the Hartmann's subspecies, generally has wider black stripes and its mane does not come as far forward between the ears (Novellie *et al.* 2002).

Historic and current range

Historically, Cape mountain zebra (CMZ) occurred extensively in the mountainous regions of the southern parts of South Africa (Millar 1970a; 1970b; Figure 1). It is postulated that in historic times they were separated from Hartmann's mountain zebra (which occur mainly in Namibia), by an area devoid of mountainous habitat, the Knersvlakte, which separates the Kamiesberg in the north from the Roggeveldberge in the south (Novellie *et al.* 2002). This large plain, constituting unsuitable or marginally suitable habitat for mountain zebra is about 70 km wide at its narrowest point. Mountain zebra also rarely occur in sympatry with plains zebra (*Equus quagga*) as they are adapted for life on rugged terrain and have harder and faster growing hooves, thereby inhibiting their habitation of soft flat plains for long periods (Skinner & Smithers 1990).

Excessive hunting and habitat loss to agriculture left CMZ numbers in a critical status by the 1930's, when the subspecies was confined to just five localities. Two of these sub-populations subsequently went extinct, leaving only three natural populations surviving to the present day. One population, in the Cradock district, was formally protected in 1937 by the proclamation of the Mountain Zebra National Park (Lloyd 1984). The other two, in the Kammanassie and Gamka Mountains, have been protected since 1923 and 1971, since the areas were proclaimed as a State Forest Nature Reserve and a Provincial Nature Reserve, respectively.

During the 1960s and 1970s the Cradock population increased to a point where in 1979, 23 individuals could be translocated to the newly proclaimed Karoo National Park. During the 1980s and 1990s translocations to 25 other protected areas and game ranches within the subspecies' historic range took place, all from original Mountain Zebra National Park stock except for the De Hoop Provincial Nature Reserve population, which included individuals from the Kammanassie population. By 2002 the subspecies occurred in no less than six national parks, 10 provincial reserves and 17 private reserves, encompassing most of their natural range (Castley *et al.* 2002; Fig 2).

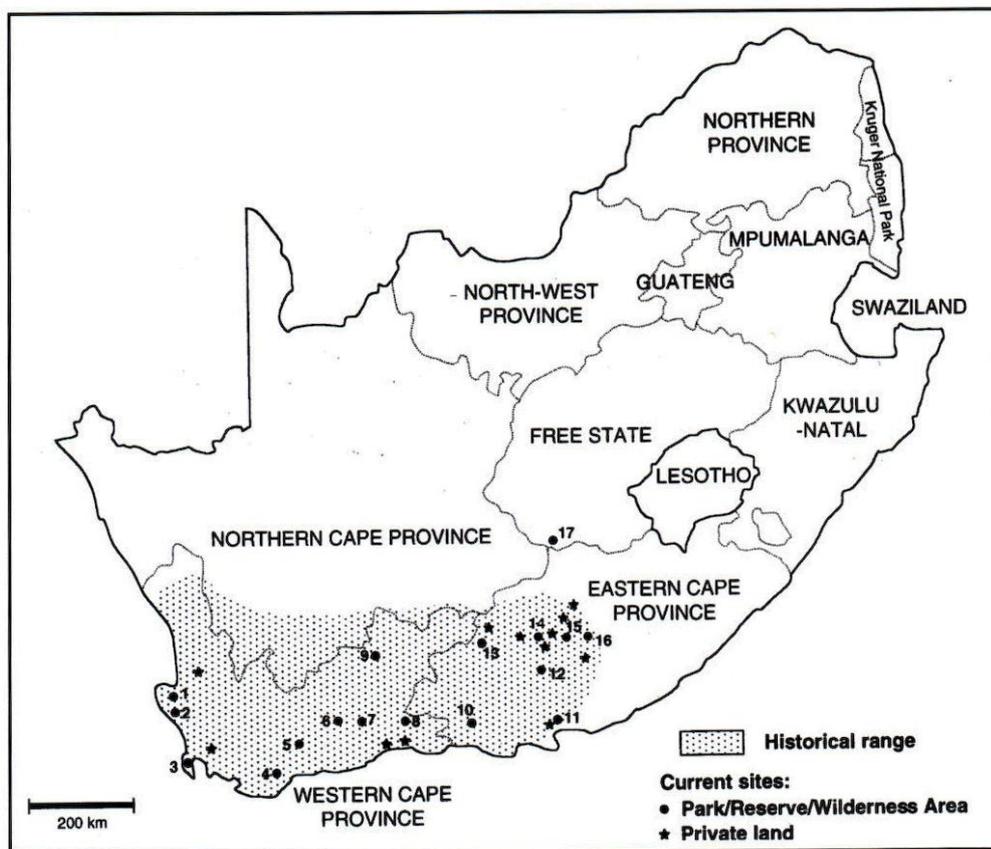


Figure 1. Historic (shaded area) and 2002 (points) distribution of the Cape mountain zebra in South Africa (figure from Novellie *et al.* 2002).

The current survey, which aimed to identify all sub-populations on private and formally protected land (national parks and provincial reserves) found that the number of localities with CMZ has continued to increase over the last decade, particularly on privately owned land. The extant population

now consists of no less than 52 sub-populations - 35 privately owned (possibly a few more due to ongoing translocations during the current game capture and translocation season) and 17 formally protected (Fig. 2 and Fig. 3). Private land owners therefore clearly play an important role in increasing the distribution of CMZ within their historic range, as the number of privately owned populations has doubled since 1998 and makes up at least two thirds of the total number of sub-populations (Fig. 3). Only one extra-limital population exists at present, in the Gariep Nature Reserve in the Free State Province. This population however is to be relocated to within the natural distribution range once a problem with sarcoid warts is resolved.

The total land area now available to CMZ is more than 780 000 ha. The majority of this land falls within formally protected areas (about 622 000 ha versus at least 160 000 ha of private land), despite the number of privately owned sites being more than double that of state-conserved areas. This is due to the substantially smaller average size of private properties with CMZ compared to formally protected sites (6 214 ha versus 38 860 ha, respectively).

Population information

In the 1950s, when the subspecies reached its most critical status, only around 80 individuals remained. The three surviving natural populations all underwent extreme demographic contraction at some stage, with 19 individuals in the Cradock population and no more than six and five individuals in the Gamka and Kammanassie populations at their lowest points, respectively (Millar 1970a, b; Lloyd 1984). While the populations remaining at Gamka and Kammanassie have not substantially recovered from their more extreme bottlenecks and currently comprise of 47 (T. Barry, pers. comm.) and 53 (P. Esau, pers. comm.) animals, respectively, the Cradock population has increased considerably despite the regular off-takes to re-stock other areas and now has 596 animals (the largest sub-population at present).

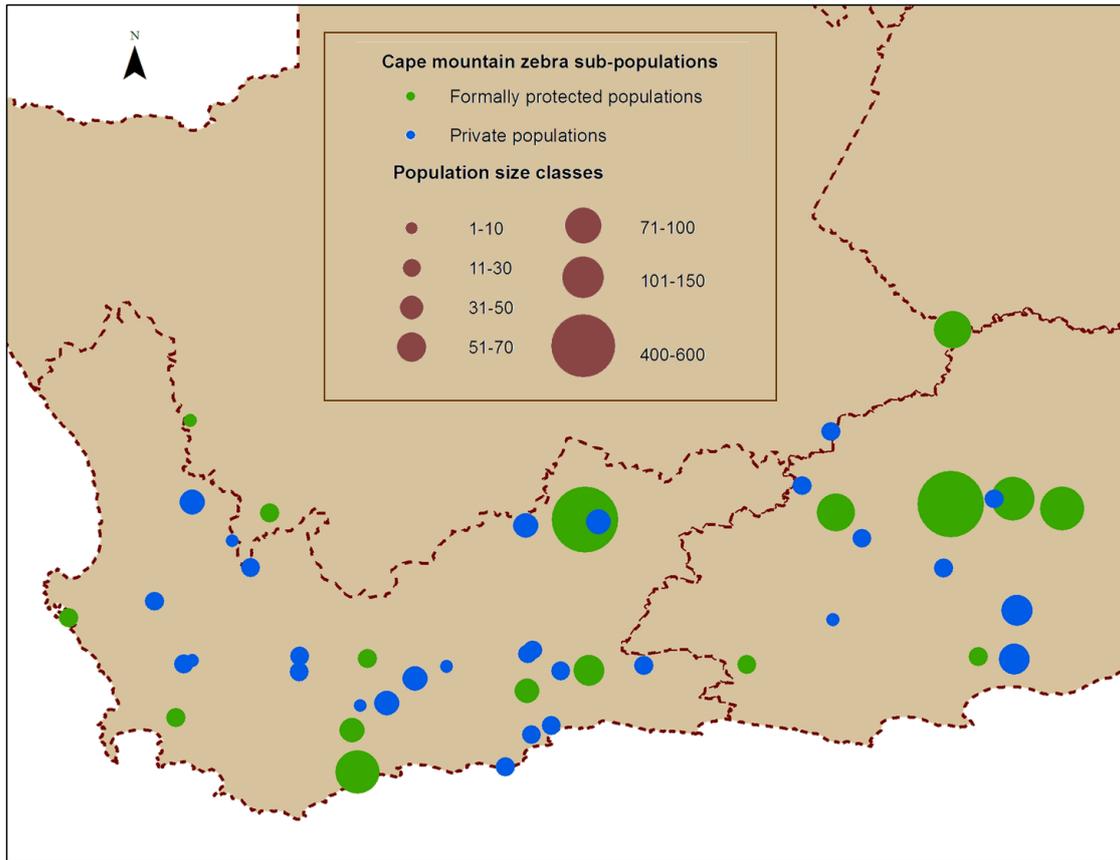


Figure 2: Current distribution of privately owned Cape mountain zebra sub-populations identified to date in this study, and all formally protected Cape mountain zebra sub-populations in South Africa.

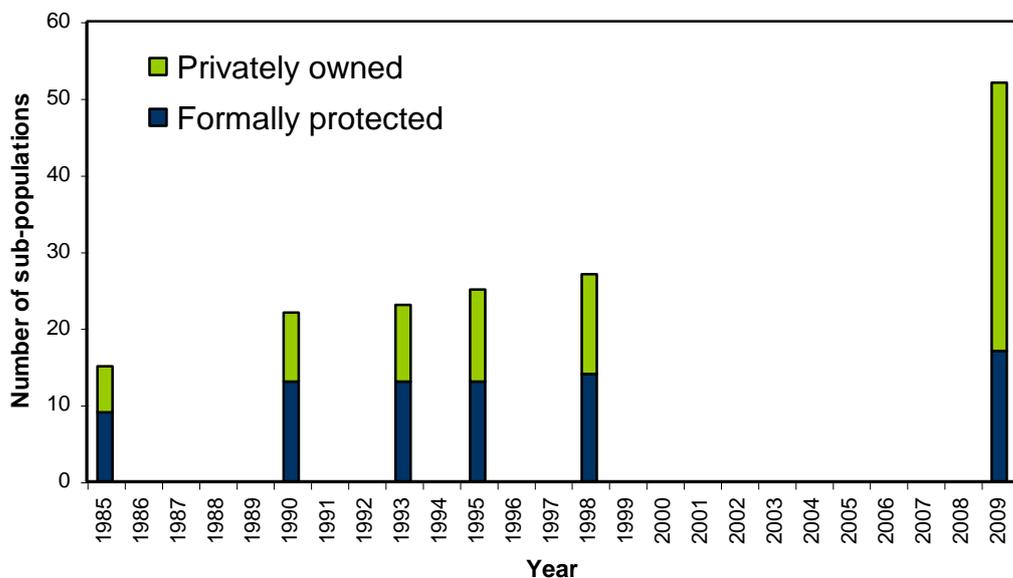


Figure 3. The total number of Cape mountain zebra sub-populations on privately owned land and formally protected land in South Africa from 1985 to 2009 (data for the period 1985 to 1998 from Novellie *et al.* 2002).

Due to the fragmentation of the population into smaller, isolated subpopulations (restricted to fenced areas), a metapopulation management approach has been necessary, with translocations to ensure continued population growth and genetic diversity – to meet the objective of the IUCN Action Plan to ‘build up numbers to a target of 2 500 as quickly as possible’ (Novellie *et al.* 2002). Since the 1960s numbers have gradually built up through such active conservation programmes and in 2002 there were estimated to be more than 1 600 Cape mountain zebra in the wild (Castley *et al.* 2002). The subspecies is, however, still listed as Endangered by the World Conservation Union (IUCN) and is on Appendix 1 of the Convention of International Trade in Endangered Species (CITES).

Conservation efforts have continued to be a success, as the extant population now exceeds the target size and stands at a minimum of 2 725 animals (deduced from this survey). The average annual rate of increase of the Cape mountain zebra population from 1985 to 1995 was reported as 8.6% (Novellie *et al.* 1996) and 9.6% between 1995 and 1998 (Novellie *et al.* 2002). This rate of increase has been maintained in more recent years at 8.4% between 1998 and 2002 and 10% between 2002 and 2009. The metapopulation approach to management therefore appears to have been successful in ensuring continued population growth.

While the majority of the population (69%) is on formally protected land (which is vital according to Novellie *et al.* 2002), the proportion on privately-owned land has risen from 14 % in 1998 to around 31 % today (Fig. 4). The average size of privately-owned sub-populations remains relatively small (25 animals), however, ranging from 6 to 78 animals, while formally protected populations range from 4 to 596 animals (average size of 111; see population sizes in figure 2). Interestingly, the Mountain Zebra National Park and Karoo National Park sub-populations still currently make up 22% and 18% of the metapopulation, respectively, which is relatively unchanged since 2002 when each made up 18% and 20% of the metapopulation. This is most likely due to the expansion of MZNP from 6 536 ha to 28 412 ha and the Karoo NP from

41 000 ha to 88 122 ha, thereby allowing the expansion of each sub-population. This emphasizes the importance of the availability of additional habitat for the recovery of this species.

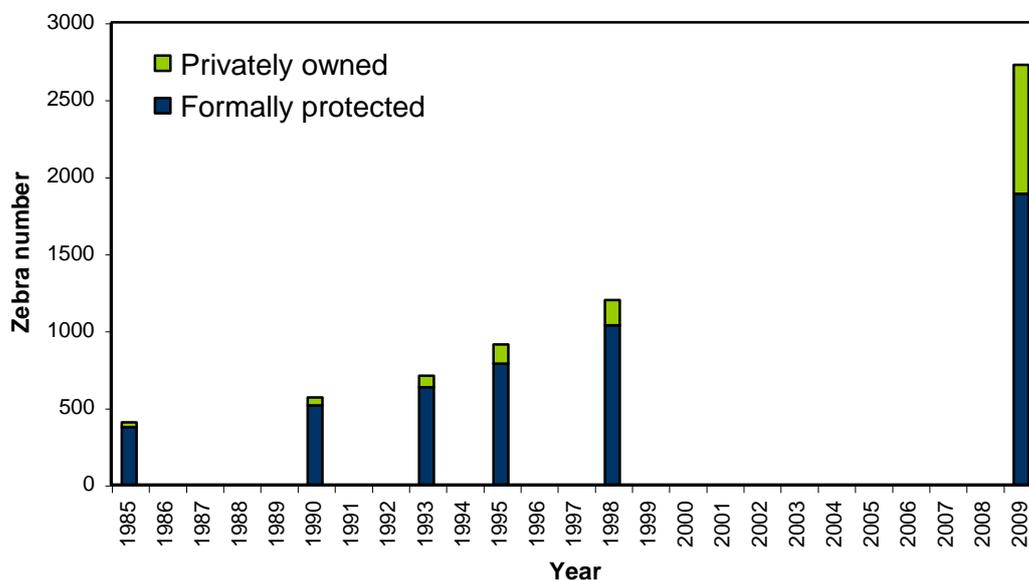


Figure 4. The total number of Cape mountain zebra on privately owned land and formally protected areas between 1985 and 2009 (data for the period 1985 to 1998 from Novellie *et al.* 2002).

Conservation challenges

Previous challenges

In 1992, major threats to Cape mountain zebra were noted as:

- the risk of hybridization between the two subspecies, which would lead to a loss of genetic diversity;
- droughts leading to a loss of forage; and
- the relatively small numbers in the wild, which means the loss of a single population (e.g. Mountain Zebra National Park) could reduce the world population by about a third.

As mentioned by Novellie *et al.* (2002), the risk of drought does not seem to be serious, as CMZ are well adapted to arid conditions. While there have been isolated incidences of deaths through starvation or dehydration (through poor management practices), there have been no recorded cases of large-scale mortality caused by droughts.

The risk of losing a large proportion of the metapopulation through the catastrophic loss of one important population has also decreased significantly with the increase in sub-population numbers and total number of animals in the wild. As mentioned earlier, MZNP, the largest sub-population today, currently makes up 22% of the metapopulation, compared to 43% in 1985.

Current challenges

Current challenges to Cape mountain zebra conservation, identified through this survey, include:

- poor population performance of small populations i.e. effect on demographics;
- loss of genetic diversity through inbreeding and genetic drift in small populations, exacerbated by the social structure of CMZ, which tends to reduce effective population size;
- disease; and
- the risk of hybridisation between the two subspecies still exists.

Two problems are associated with small populations. Firstly, an excessively small number of founder individuals tends to result in either failed reintroduction or poor population performance in the long term. This wasted effort was noted by Novellie *et al.* (1996) and the current survey also found that four out of five sub-populations that were over 10 years old but had not increased in size since reintroduction, had founder populations of less than 10 individuals. Inbreeding depression and genetic drift is the second and very real threat associated with small populations.

These threats related to small populations should be reduced, through the adoption of the following policy for the translocation of CMZ by the Western Cape Nature Conservation Board as well as by South African National Parks set out in 1993 (at a Population and Habitat Viability Analysis workshop on Cape mountain zebra).

- 1) Reinforcement of existing populations will receive priority over the establishment of new populations, at least until a majority of the existing populations are securely established and increasing.
- 2) In cases where new populations are established, the minimum number introduced should be 14 (either with a one to one sex ratio or up to ten females and four males).
- 3) New owners will be made aware of the difficulties associated with the establishment of small populations and should understand that they will need to acquire one or two animals once every five to ten years in order to avoid inbreeding depression.

Currently, 10 of the 52 known sub-populations have fewer than the recommended 14 animals and 6 out of 20 privately-owned populations (only those with appropriate data included) have only had a single introduction event, despite being more than 10 years old. The degree to which the above policy is being implemented is therefore of concern and private owners still seem largely unaware of these recommendations (personal communication with owners).

The number of small populations could also potentially increase, as the number of private populations increases – which is expected as private owners becoming increasingly important in the purchasing of surplus animals from existing sub-populations. A problem is that many new owners cannot afford to invest in a large number of animals, especially due to their relatively low commercial value at present (their value has shown a decreasing trend over recent years). South African National Parks aims to reduce this problem by making available stock accessible at competitive prices to current owners, thereby encouraging them to supplement their herds. Sales from private owners are, however, unlikely to follow this goal.

Equine sarcoids (the most common cutaneous neoplasm of Equids) is a widespread disease of Equids that has also been found in CMZ. Although only the odd case has been reported from some populations, the virus has

reached epidemic proportions in two populations, namely in the Gariiep Nature Reserve and Bontebok National Park where 22% and 53% of the population was infected, respectively. It has been found that affected populations were highly inbred (Sasidharan 2006). Isolation of small populations may therefore lead to increased susceptibility to disease by inbreeding - highlighting yet another problem associated with small populations.

African Horse sickness (AHS) is also a disease of concern as zebra are seen to be carriers of the disease. As a result, restrictions are in place for the movement of Cape mountain zebra, especially into the AHS controlled areas of the Western Cape (set out by the Department of Agriculture in 2003).

The risk of hybridisation was considered a serious threat for CMZ in 2002 and is still of concern. The implementation of a permit system for the transportation of game, maintained by the provincial conservation agencies has reduced this threat to a degree, as the system ensures that Hartmann's mountain zebra cannot legally be introduced into the range of the CMZ and *vice versa*. Hartmann's mountain zebra populations established prior to this permit system still exist within the range of CMZ, however, despite owners being encouraged to replace them with CMZ offered at a reduced price. While it is illegal for CMZ and Hartmann's to be kept on the same property, populations in close proximity to each other are vulnerable to cross-breeding as fencing is often not adequate to restrict their movements.

Conservation measures

1) *Mountain Zebra Working Group*

The Mountain Zebra Working Group was established to coordinate the future conservation of mountain zebras in South Africa. It is a local body of interested and affected parties whose mandate is to implement and revise the strategy outlined in the IUCN Action Plan for Mountain Zebra (Novellie *et al.* 2002).

2) Metapopulation approach

The translocation of animals from existing populations (particularly the larger populations) is considered to be necessary to ensure continued population growth, genetic diversity and increasing the distribution of the subspecies within its natural range.

It has been recognised that an updated analysis of the current situation and specialist information on CMZ is needed to determine the most effective and efficient opportunities for meta-population management of CMZ. This work is currently in the planning stage by the Mountain Zebra Working Group.

3) Conservation of genetics in natural populations

The genetics lineages of the three naturally-occurring populations have remained intact within these populations i.e. there have been no translocations between the three populations. All other sub-populations consist of animals originating from the Cradock area (MZNP), except the De Hoop population which includes genetic material from Kamannassie animals. While the aim is to increase the genetic diversity of other sub-populations by including Kamannassie and Gamka animals, the consequences of removing animals from these relatively small populations has been of concern. The goal is to first allow these populations to expand further, but the available habitat is currently a potential limiting factor.

Cape Nature has therefore submitted a proposal to the Table Mountain Fund (WWF) for financial support to set up a stewardship system for neighbouring private land owners, to increase the available habitat for the two populations. This proposal has received a positive response but it has been advised that an updated metapopulation management plan (as mentioned above), first be addressed (pers. comm. O. Huyser, Manager, Table Mountain Fund).

4) *A policy for the translocation of harvested CMZ has been adopted by Cape Nature Conservation and South African National Parks.*

Details of this policy are given in the previous section. Such a policy needs to be adopted by the Eastern Cape Department of Economic Development and Environmental Affairs.

5) *Making CMZ available to private landowners.*

Making animals available for private ownership has been a longstanding approach in the conservation management of CMZ, resulting in expanded habitat being available for the species. Given the growing area of land which is being dedicated to private reserves and game farms, it is expected that private ownership will increase substantially in the future.

6) *A permit system for the transportation and purchasing of CMZ.*

Examples of some of the criteria for awarding of permits include:

- The site must be within the historical distribution of the sub-species.
- Sufficient infrastructure to provide security.
- Habitat quality for CMZ must be high (Novellie & Winkler 1993; Novellie 1994).
- The area should be able to support at least 100 animals on a formally protected area and 25 animals on privately owned land.

6) *Hunting Policy*

Hunting of CMZ is controlled by the follow criteria:

- Hunting of excess males is allowed with a permit
- Hunting will only be allowed if the remaining sex ratio of the population is no less than 1 male to 3 females and at least 2 stallions must remain.
- Applicants for permits will be notified that it is unlikely that additions to their herds will be possible within the near future.

7) Further research that will assist with future conservation efforts

Research is currently being conducted by the Centre for African Conservation Ecology, Nelson Mandela Metropolitan University to investigate the factors affecting population performance of CMZ, as well as various behavioural characteristics.

The sarcoid virus is also undergoing investigation by SANParks to try and improve our understanding of its transmission, the effect it has on sub-populations and means of controlling the condition (pers. comm. D. Zimmerman, SANParks).

Recommendations

- 1) The previous target population size of 2 500 animals now needs to be reviewed, as the population has already exceeded this and substantial habitat is available.
- 2) The current listings as “Endangered” by the World Conservation Union (IUCN) and Appendix 1 of CITES need to be reconsidered.
- 3) The issue of small, isolated populations needs to be addressed. Although a policy is in place for the translocation of harvested animals and the establishment of new populations, the degree to which the criteria are followed appears to be poor. Private owners should sign an agreement to comply with the policy criteria before receiving a permit. Follow-up investigations are then needed to check if the agreement has been adhered to.
- 4) Although it is more practical to award translocation and possession permits at a regional level, the standards should be set at a national level and personnel issuing permits should be appropriately trained (e.g. for habitat assessment).
- 5) Information about difficulties associated with small populations needs to be provided to private owners. Relevant information must be provided regularly, to ensure a spirit of communication and to assist with management decisions that will enhance the conservation of the sub-species.

- 6) Increased monitoring efforts of privately-owned populations should be encouraged in order to detect potential problems timeously. Due to the small size of most private populations, monitoring should be relatively easy if the habitat allows. Owners should be made aware of the benefits of keeping a stud book of their population (made possible due to the unique stripe pattern of individuals). Inbreeding or post-reproductive age individuals suitable for hunting could, for example, be identified through such monitoring.

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