

THE BAVIAANSKLOOF CONSERVATION AREA: OPPORTUNITIES FOR THE CONSERVATION OF CAPE MOUNTAIN ZEBRA AND LEOPARD

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Introduction

Summary

This report briefly discusses the implications of the proposed expansion of the Baviaanskloof Conservation Area (BCA) for Cape mountain zebra and leopard.

The Cape mountain zebra, restricted in its distribution to the mountains of the southern Cape, suffered a severe decline in the mid-1900's, with the total population dropping to <100 individuals. The BCA has the potential to support c. 2000 zebra, the only site currently with the potential to meet the theoretical requirements for the long-term maintenance of genetic diversity, and is regarded as essential for the conservation of Cape mountain zebra. Consolidation of the Baviaanskloof and Kouga mountain ranges will allow movement of individual zebra between populations, facilitating a metapopulation processes, as well as providing access to possible winter grazing on the lower slopes.

Although not a recognised taxonomic entity, the leopards of the southern Cape Fold mountains exhibit morphological and ecological features which distinguish them from those to the north. As a distinct ecotype this leopard is regarded as a threatened species. By decreasing the length of the boundary the proposed expansion of the BCA will reduce the area of conflict with neighbouring land users. The inclusion of the northern slopes of both the Kouga and Baviaanskloof mountains will ensure that leopard habitat is conserved and reduce encounters between leopards and livestock. Furthermore, the acquisition of land to the south and north of the BCA will provide a buffer between the leopard refuge and stock farmers. The incorporation of suitable habitat along the Baviaanskloof River valley will increase the range and number of historically appropriate prey species. Finally, as an economically viable nature-based endeavour, the expanded BCA will attract like-minded ventures, creating a local community sympathetic towards the conservation of leopard.

Arising from this report is a clear understanding that the proposed expansion of the BCA has a critical role to play in ensuring the long-term survival of both the Cape mountain zebra as well as the leopards of the Cape Fold mountains

Introduction

The Cape Floristic Region is renowned for its floral diversity. It, however, offers a rather specialised habitat for a range of large mammals. The unpalatable nature of this vegetation and the history of human interference have made it a relatively insecure region for large mammals. Within recent historical times one endemic species, the bloubok (*Hippotragus leucophaeus*), and another subspecies, the Cape lion (*Panthera leo melanochaitus*) have gone extinct. Two other endemic large mammals, the bontebok (*Damaliscus dorcas dorcas*) and Cape mountain zebra (*Equus zebra zebra*), have suffered catastrophic population declines. Thus, this region has revealed itself as one prone to local extinctions of large mammals, a dubious conservation legacy. The Cape mountain zebra and leopard (*Panthera pardus*) are two species which are currently considered threatened within this biological zone.

A recent study has identified the ecological and potential economic viability of the Baviaanskloof Conservation Area (BCA), and opportunities for its expansion (Fig. 1) (Boshoff, Cowling & Kerley 2000, see Appendix for Executive Summary). The report highlights the intrinsic value of the Cape mountain zebra and leopard, a globally threatened ungulate and constituent of the "Big 5" respectively, as flagship species with the capacity for attracting sustained support for the expanded BCA. This in turn translates into a long-term conservation opportunity for these species.

This brief report to WWF South Africa discusses the role of the BCA, and in particular the implications of its possible expansion, for the conservation of the Cape mountain zebra and the leopard. Each species is dealt with separately.

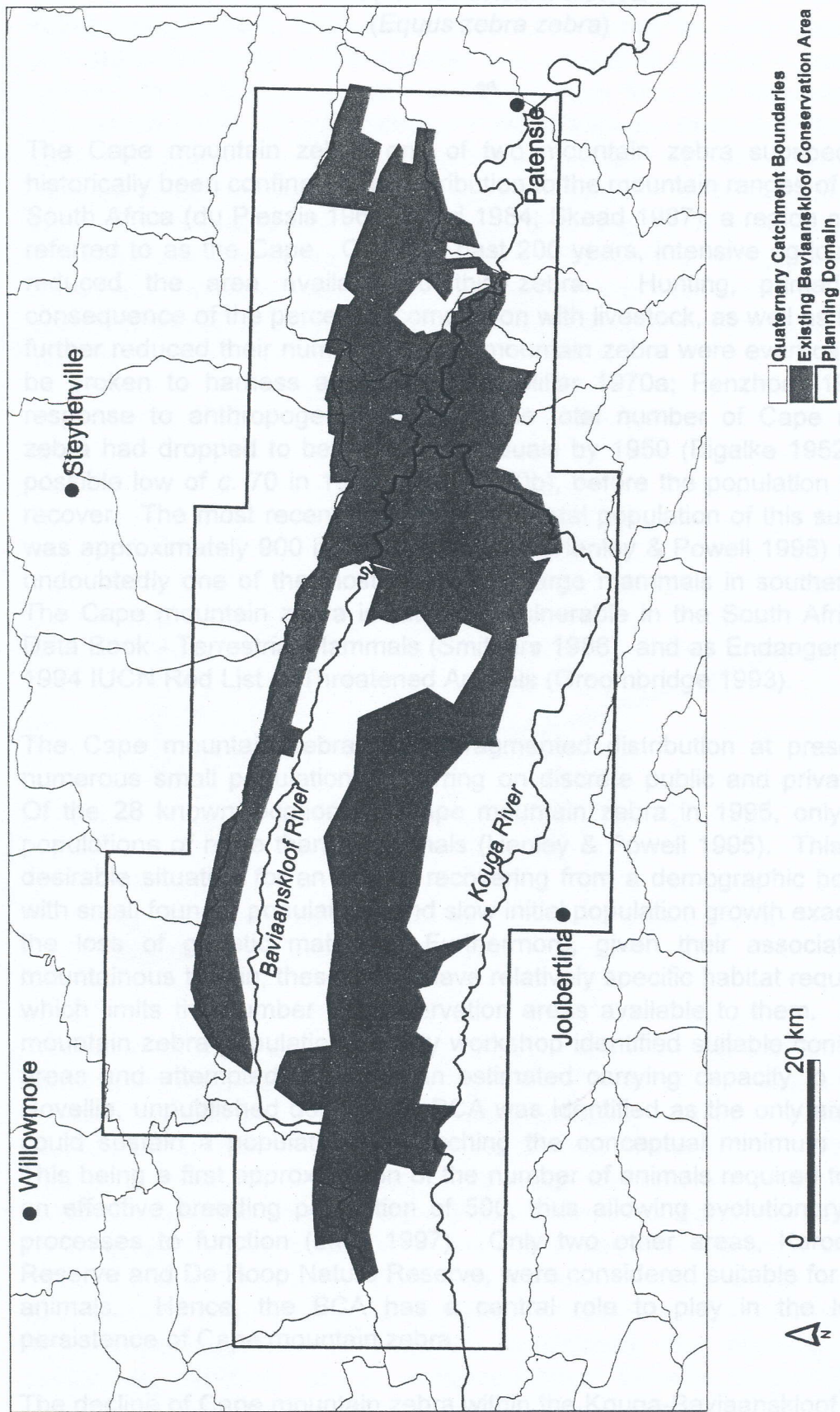


Fig. 1. The planning domain for the proposed expansion of the Baviaanskloof Conservation Area. The major catchment boundaries are indicated (Boshoff, Cowling & Kerley 2000).

Cape mountain zebra

(*Equus zebra zebra*)

The Cape mountain zebra, one of two mountain zebra subspecies, has historically been confined in its distribution to the mountain ranges of southern South Africa (du Plessis 1969; Lloyd 1984; Skead 1987), a region commonly referred to as the Cape. Over the past 200 years, intensive agriculture has reduced the area available to this zebra. Hunting, primarily as a consequence of the perceived competition with livestock, as well as for hides, further reduced their numbers. Cape mountain zebra were even captured to be broken to harness and for export (Millar 1970a; Penzhorn 1994). In response to anthropogenic pressure, the total number of Cape mountain zebra had dropped to below 100 individuals by 1950 (Bigalke 1952), with a possible low of c. 70 in 1947 (Millar 1970b), before the population began to recover. The most recent estimate of the total population of this subspecies was approximately 900 individuals in 1995 (Henley & Powell 1995) making it undoubtedly one of the most threatened large mammals in southern Africa. The Cape mountain zebra is listed as Vulnerable in the South African Red Data Book - Terrestrial Mammals (Smithers 1986), and as Endangered in the 1994 IUCN Red List of Threatened Animals (Groombridge 1993).

The Cape mountain zebra has a fragmented distribution at present, with numerous small populations occurring on discrete public and private lands. Of the 28 known locations of Cape mountain zebra in 1995, only six had populations of more than 50 animals (Henley & Powell 1995). This is not a desirable situation for an animal recovering from a demographic bottleneck, with small founder populations and slow initial population growth exacerbating the loss of genetic material. Furthermore, given their association with mountainous terrain, these zebra have relatively specific habitat requirements which limits the number of conservation areas available to them. A Cape mountain zebra population viability workshop identified suitable conservation areas and attempted to assign an estimated carrying capacity to each (P. Novellie, unpublished doc.). The BCA was identified as the only area which could sustain a population approaching the conceptual minimum of 2000. This being a first approximation of the number of animals required to sustain an effective breeding population of 500, thus allowing evolutionary genetic processes to function (Lacy 1997). Only two other areas, Karoo Nature Reserve and De Hoop Nature Reserve, were considered suitable for 400-500 animals. Hence, the BCA has a central role to play in the long-term persistence of Cape mountain zebra.

The decline of Cape mountain zebra within the Kouga-Baviaanskloof complex is ascribed primarily to unlawful hunting as a consequence of perceived competition with livestock, and damage to stock fences (Henley & Powell

1995). In 1971 five animals were captured for translocation to the Mountain Zebra National Park. Subsequent population estimates were three in 1972 and two in 1977. By 1978 it is believed that the local population had become extinct. In 1990, following the culling of more than 200 feral donkeys to remove the threat of hybridization, 11 zebra were successfully re-introduced. With the population currently estimated to be 35 (D.L. Clark, Chief Directorate: Environmental Affairs, Eastern Cape Provincial Administration pers. comm.), growth has been relatively slow (Fig. 2). This is not surprising, considering the small founder population. The slow growth provides cause for concern given that rapid initial population growth may minimise the loss of genetic diversity in small populations (Caughley 1994). The introduction of additional animals is recommended.

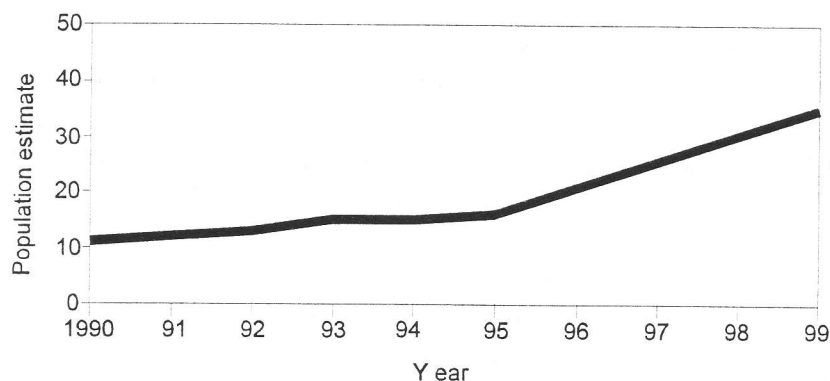


Fig. 2. Population growth of Cape mountain zebra in the Baviaanskloof Conservation Area

The vision for Cape mountain zebra management within the BCA calls for the establishment of 4-6 populations. (Henley & Powell 1995). These have the capacity to function as a natural metapopulation, through the occasional exchange between otherwise relative discrete areas of suitable habitat (Henley & Powell 1995). However, the current configuration of the boundary of the conservation area hinders the establishment of additional populations. Fencing and human habitation inhibits the movement of animals across the BCA. Linking the Kouga and Baviaanskloof mountain ranges across the Baviaanskloof River valley will facilitate movement of individual animals between populations once these are established, thus allowing the BCA zebras to function as a metapopulation, thereby encouraging the maintenance of genetic diversity.

There is some evidence to suggest that Cape mountain zebra exhibit seasonal changes in habitat selection. For example, in the Mountain Zebra National Park, zebra move down from the plateau grasslands in winter to more sheltered valleys and hill sides (Penzhorn 1982a). This corroborates Millar's (1970b) more general observation of Cape mountain zebra being altitudinal migrants. Incorporation of the Baviaanskloof River valley into the conservation area will accommodate this seasonal movement, giving zebra access to low lying grassveld areas for winter grazing. The ability to undertake seasonal movements allows a specific area to support a larger population of animals than would be the case for either the summer or winter range in isolation, or the sum of both these separate areas (Novellie, Fourie, Kok & van der Westhuizen 1988). The incorporation of tall grassveld areas, as well as the entire gradient of environmental conditions associated with a mountain, will enhance the diversity of habitat conditions available to Cape mountain zebra in a world subject to short and long-term climatic changes. This is an essential consideration if the BCA is to realise its potential and serve as a principal site for the conservation of Cape mountain zebra.

In conclusion, the expansion of the BCA, along with additional introductions, is essential for the establishment of a population of the globally threatened Cape mountain zebra of sufficient size that it retains its genetic diversity. **The BCA has been identified as the only conservation area suitable for this purpose.** Linking the Kouga and Baviaanskloof mountain ranges is important if Cape mountain zebra are to have access to sufficient suitable habitat. Furthermore, this is essential as a means of facilitating movement between discrete populations as required by a metapopulation. Cape mountain zebra, being large bodied, social, non-ruminant grazers, in turn contribute to the biodiversity of the region through their impact on the pattern and process of herbivory. Furthermore, as a flagship species, Cape mountain zebra will focus attention on the BCA, contributing to the long-term economic viability of the region.

Leopard

(*Panthera pardus*)



It has been suggested that the leopards occurring in the mountains of the southern Cape represent a species or subspecies distinct from those found in the bushveld areas to the north. This argument is based firstly on the perception of the animal's coat as being longer and softer, as well as more vividly coloured, than individuals to the north (Thesen 1974; Stuart 1988), and secondly on the fact that these animals are smaller than other leopards (Stuart 1988). There is some empirical evidence to support the second assertion. The mean mass of adult male and female leopards in the Cape Fold Mountains is 31kg and 21kg respectively (Stuart 1981). For comparison, Kalahari leopards, the nearest population and that with which the Cape leopards most recently had direct contact, have a mean mass of 60kg and 32kg for males and females respectively (Bothma, Knight, leRiche & van Hensbergen 1997). However, it is generally accepted that the leopards of southern Africa belong to a single subspecies, *Panthera pardus melanotica* (Meester, Rautenbach, Dippenaar & Baker 1986), and that the taxonomic separation of the "Cape leopard" is unfounded. Nonetheless, from a functional point of view there is some justification for considering the leopards of the Cape mountains separately:

- they represent discrete population in the southern extreme of the distribution of a very widespread though uncommon species (Fig. 3);
- where as most other leopard populations in Africa retain some degree of spatial continuity, those in the southern Cape have become increasingly isolated since the early 1900's (Fig. 4) (Norton 1986; Skinner & Smithers 1990);
- they occur within a unique vegetation type, the Cape Floristic Region, dominated by fynbos, with a distinct herbivore assemblage and hence prey base;
- they do appear to show some degree of morphological differentiation from their nearest neighbours, although this is possibly diet induced.

Furthermore, the leopard, as the largest indigenous predator remaining in the region, constitutes an important component of the biodiversity of the southern extreme of Africa, and provides a critical ecosystem process. Therefore, recognising the conservation of biotic diversity to mean the long-term maintenance of within species variability as well as of ecological and evolutionary processes, the leopards of the southern Cape are deserving of special consideration. Exacerbated by the fact that there has been a substantial decline in their range (Norton 1986), and due to low densities and conflicting land use, the conservation status of the leopard in the mountains of the Cape is regarded as extremely insecure, and has been recognised as such since 1967 (Tunbull-Kemp in Stuart & Heinecken 1977).

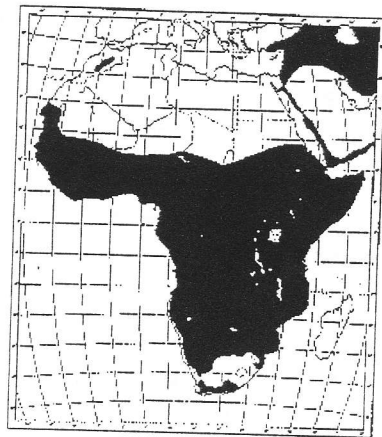


Fig. 3. The current distribution of leopard within the African continent (from Skinner & Smithers 1990)

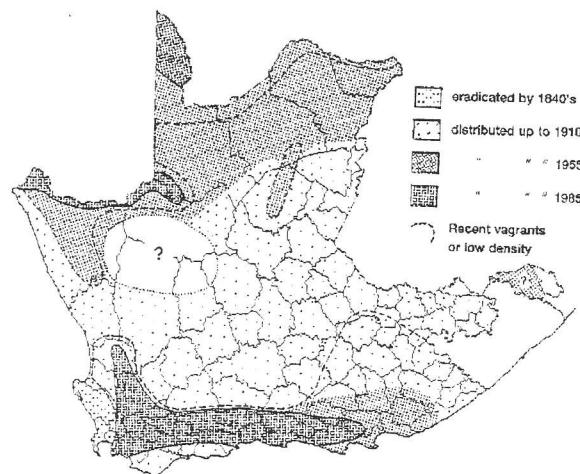


Fig. 4. The historic distribution of the leopard in the southern Cape (from Norton 1986)

The sizes of leopard home ranges in the mountains of the Cape are substantially larger than those recorded from most other regions, with the possible exception of animals in the arid Kalahari (Norton & Lawson 1985; Norton & Henley 1987). As a territorial species, which traverses large areas, leopards in the southern Cape mountains occur at low densities. Norton & Henley (1987) make a crude estimate of 6-9 adults per 100 km². This

suggests that any attempt to conserve leopards in the region will require an exceptionally large area, or suffer the risks associated with small populations and conflict with neighbouring land users.

Stuart's (1981) observation that in the Cape the leopard reaches its highest densities in the mountain fynbos of the southern and eastern Cape, is supported by Norton (1986) who identifies two concentrations in its distribution, those of the south western Cape and the south eastern Cape. Thesen (1974), Stuart & Heinecken (1977) and Stuart, Macdonald & Mills (1985) motivated for the coastal and mountain strip between the towns of George and Humansdorp to be managed as a leopard sanctuary. Rebelo (1992) suggested that this plan be reassessed, to incorporate an area which contains karroid and renosterveld shrubland. The BCA lies in the north east of this proposed sanctuary area, and includes elements of both renosterveld and karroid shrubland (Boshoff *et al.* 2000). The motivation for the sanctuary area is based on: the occurrence of leopard in the area; clearly defined boundaries; largely compatible land use; incorporation of formal conservation areas; and tourism potential. The proposed expanded BCA meets all these criteria, and in addition is removed from the developed coastal belt. Furthermore, it is a single unit, which greatly simplifies management. Norton (undated) identifies the existing BCA as one of four core sanctuary areas in the Cape, where leopards should be actively conserved if there is to be any chance of the species surviving in the region.

The proposal to increase the size of the BCA (Boshoff *et al.* 2000) will benefit leopard conservation directly by expanding the area of the refuge available. Assuming a density of seven adult leopards per 100km² (Norton & Henley 1987), the current 1700 km² conservation area may support 119 leopards. Increasing the area by incorporating the 56 000ha area adjacent to the Baviaanskloof River and 20 000 ha along the northern boundary (Boshoff *et al.* 2000) will theoretically provide habitat for an additional 53 leopards, bringing the total to 172. This figure approaches the 200 believed to be a benchmark required of large mammal populations to reduce inbreeding depression and genetic drift (Lacy 1997). As such, the expanded BCA would make a major contribution towards achieving a viable leopard population. However, given their extensive spatial requirements, it must be recognised that in isolation even the largest conservation area may prove inadequate for the conservation of leopards in their southern extreme. Linkages between the BCA and other conservation areas is an important for the long-term management option for this species.

Based on data collected over a 27 year period (Stuart & Heinecken 1977), leopards are recognised as a problem animal on private lands in the vicinity of the BCA and regularly culled by stock farmers. This creates the dilemma of a threatened species also being regarded as a problem animal. Consolidating the BCA, in particular through the acquisition of the central Baviaanskloof

River valley, will substantially decrease the length of the boundary (Fig.1), thereby reducing the area of conflict with neighbouring land users within the BCA.

It is conventional wisdom amongst stock farmers that climatic conditions force leopards down mountain slopes in winter, increasing depredation upon livestock (Stuart & Heineken 1977). Although research into the movements of leopards in the mountains of the southern Cape provides no support for this belief (Norton & Lawson 1985; Norton & Henley 1987), the extension of the BCA towards the Kouga River in the south, where the greatest conflict occurs (Esterhuizen & Norton 1985, D. Clark pers. comm.), will create a buffer zone between the mountain refuge of leopards and the grazing lands. The same is true for the proposed hunting zone to the north of the BCA.

By incorporating the entire Baviaanskloof into the BCA, additional habitat is acquired for indigenous wildlife, and leopards will have greater access to what may be regarded as historically appropriate (*i.e.* non-domestic) prey species. It has been suggested that leopard home range size is dependent upon the availability of prey (Norton *et al.* 1986). Thus, an increase in the diversity and abundance of prey items may result in a decrease in the home range of leopards in the area. A higher density of leopards increases the viability of the population and its contribution to conservation. Observations by conservation staff of the BCA suggest that there has been an increase in the occurrence of leopards following the introduction of indigenous game (D.L. Clark pers. comm.).

Finally, the creation of an economically viable, nature-based development within the BCA, is expected to attract similar or subsidiary ventures, creating a community around the BCA sympathetic towards wildlife conservation.

Large carnivores present a specific conservation dilemma due to their extensive spatial requirements and conflicts with neighbouring land users. As a result, the opportunity to develop a realistic conservation area is extremely rare. The BCA is recognised as an essential refuge in the conservation of leopards. Its expansion will create the only conservation area in the region of sufficient size, with suitable habitat and the opportunity to minimise conflict with neighbouring land users. This will make a meaningful contribution to the long-term survival of leopards within the Cape Fold mountains.

References

- Bigalke, R. 1952. Early history of the Cape mountain zebra (*Equus zebra zebra* Linn.). *Afr. Wild Life* **6**:143-153.
- Boshoff, A.F., Cowling, R.M. & Kerley, G.I.H. 2000. The Baviaanskloof Conservation Area: a conservation and tourism development priority. *TERU Report #27*, Terrestrial Ecology Research Unit, Port Elizabeth.
- Boshoff, A.F. & Kerley, G.I.H. 1999. Conservation planning in the Cape Floristic Region: distribution, conservation status and spatial requirements of the medium- to large-sized mammals. *TERU Report # 26*, Terrestrial Ecology Research Unit, Port Elizabeth.
- Bothma, J. du P., Knight, M.H., le Riche, E.A.N. & van Hensbergen, H.J. 1997. Range size of southern Kalahari leopards. *South African Journal of Wildlife Research* **27**:94-99.
- Caughley, G. 1994. Directions in conservation biology. *Journal of Animal Ecology*. **63**:215-244.
- DuPlessis, S.F. 1969. The past and present distribution of the Perissodactyla and Artiodactyla in southern Africa. Unpublished Ph.D. Thesis, University of Pretoria, Pretoria. 332pp.
- Esterhuizen, W.C.N. & Norton, P.M. 1985. The leopard as a problem animal in the Cape Province, as determined by the permit system. *Bontebok* **4**:9-16.
- Goombridge, B. (ed.) 1993. *1994 IUCN red list of threatened animals*. IUCN, Gland.
- Henley, S.R. & Powell, M.J. 1995. Cape mountain zebra: ECNC conservation guidelines. Unpublished Report, Eastern Cape Nature Conservation, Port Elizabeth. 34pp.
- Lacy, R.C. 1997. Importance of genetic variation to the viability of mammalian populations. *Journal of mammology* **78**:320-335.
- Lloyd, P.H. 1984. The Cape mountain zebra 1984. *African Wildlife* **38**:144-149.
- Meester, J.A., Rautenbach, I.L., Dippenaar, N.J. & Baker, C.M. 1986. Classification of southern African mammals. *Transvaal Museum Monograph #5*. Transvaal Museum, Pretoria. 359pp.
- Millar, J.C.G. 1970b. Census of Cape mountain zebras: part I. *African Wild Life* **24**:17-25.
- Millar, J.C.G. 1970a. Census of Cape mountain zebras: part II. *African Wild Life* **24**:105-114.
- Norton, P.M. 1986. Historical changes in the distribution of leopards in the Cape Province, South Africa. *Bontebok* **5**:1-9.
- Norton, P.M. undated. Recommendations on a conservation strategy for leopards in the mountains of the Cape Province. Unpublished report to the Leopard Working Group. 16pp.
- Norton, P.M. & Henley, S.R. 1987. Home range and movements of male leopards in the Cedarberg Wilderness Area, Cape Province. *South African Journal of Wildlife Research* **17**:41-48.
- Norton, P.M. & Lawson, A.B. 1985. Radio tracking leopards and caracals in the Stellenbosch area, Cape Province. *South African Journal of Wildlife Research* **15**:17-24.
- Norton, P.M., Lawson, A.B., Henley, S.R. & Avery, G. 1986. Prey of leopards in four mountainous areas of the south-western Cape Province. *South African Journal of Wildlife Research* **16**:47-52.
- Novellie, P.A. 1994. Monitoring the condition of mountain zebra habitat in the Mountain Zebra National Park. *Koedoe* **37**:35-39.
- Novellie, P.A., Fourie, L.J., Kok, O.B. & van der Westhuizen, M.C. 1988. Factors affecting the seasonal movements of Cape mountain zebras in the Mountain Zebra National Park. *South African Journal of Zoology* **23**:13-19.
- Penzhorn, B.L. 1982a. Habitat selection by Cape mountain zebra in the Mountain Zebra National Park. *South African Journal of Wildlife Research* **12**:48-54.
- Penzhorn, B.L. 1994. Social behaviour of Cape mountain zebras. In: (ed.) Verstraete, F.J.M. *Proceedings of the 19th world congress of the World Small Animal Veterinary Association*.
- Rebelo, A.G. 1992. Preserving biotic diversity. In: Cowling, R.M. (ed.). *The ecology of fynbos: nutrients, fire and diversity*. Oxford University Press, Cape Town. 411pp.
- Skead, C.J. 1987. *Historical mammal incidence in the Cape Province: the eastern half of the Cape Province, including the Ciskei, Transkei and East Griqualand*. Chief Directorate Nature and Environmental Conservation, Cape Town. 1121pp.
- Skinner, J.D. & Smithers, R.H.N. 1990. *The mammals of the southern African subregion*. University of Pretoria, Pretoria. 769 pp.

- Smithers, R.H.N. 1986. South African red data book - terrestrial mammals. *South Africa National Scientific Programmes Report #125*. FRD, Pretoria. 216pp.
- Stuart, C.T. 1981. Notes on the mammalian carnivores of the Cape Province, South Africa. *Bontebok* 1:1-58.
- Stuart, C. 1988. The leopard. *Farmer's weekly*. 22 April 1988, p.44.
- Stuart, C.T. & Heineken, T.J. 1977. The distribution and conservation status of the leopard *Panthera pardus* in the Cape Province. In: Unpublished research reports (mammals). Department Nature and Environmental Conservation, Cape Town, pp. 183-198.
- Stuart, C.T., Macdonald, I.A.W. & Mills, M.G.L. 1985. History, current status and conservation of large mammalian predators in Cape Province, Republic of South Africa. *Biological Conservation* 31:7-19.
- Thesen, H. 1974. A leopard sanctuary in the Southern Cape forests. *African Wildlife* 28(1):11-13.

Appendix 1

THE BAVIAANSKLOOF CONSERVATION AREA: A CONSERVATION AND TOURISM DEVELOPMENT PRIORITY

EXECUTIVE SUMMARY

Boshoff & Kerley 2000

The Baviaanskloof Conservation Area (BCA) is a 174 400 ha reserve 75 km northwest of Port Elizabeth in the Eastern Cape Province, South Africa. It lies in the Cape Floral Kingdom, a region internationally renowned for its spectacularly high endemic plant richness. Within the Cape Kingdom, it is one of only three areas identified for mega reserve status (> 500 000 ha). **Given its large size, varied terrain and wilderness context, the BCA has the potential to sustain and maintain biodiversity indefinitely.** The reserve has not received the recognition and support that it deserves.

The Baviaanskloof environs, in common with much of the Eastern Cape countryside, is facing growing socio-economic problems due mainly to the decline of the agriculture industry. There are no concrete development plans to remedy this. The future of the small and isolated population living on private land in the western sector of the valley is bleak. **The greatest potential for substantive socio-economic development in the area is conservation/tourism,** which is firmly in line with national, provincial and regional government policies and strategies.

The size and shape of the existing BCA is deficient in terms of effective biodiversity conservation. Consequently, **the reserve must be expanded in order to achieve biological viability.** This report highlights a motivation to consolidate (through the purchase of land) and expand (through the conservancy model) the BCA. This proposal will achieve goals for conservation, enable effective water catchment management and provide enhanced tourism opportunities.

The BCA and environs is extremely rich in all levels of biodiversity. The spectacular landscapes harbour a flora rich in species (1161), genera (556) and families (135), as well as a great diversity of vegetation types representative of six of southern Africa's seven biomes. The fauna is also extremely rich, due to high habitat diversity and complexity, and to the region's position as a stable refuge for palaeoendemic (ancient) species. As many as 46 species of medium- to large-sized mammals can potentially be supported in the area, including Africa's Big Five (lion, leopard, African elephant, black rhinoceros, Cape buffalo).

As the meeting place for the diverse cultures of the San (hunter-gatherers), Khoekhoen (herders), Bantu-speaking groups (agro-pastoralists) (possibly) and settlers of European descent, **the Baviaanskloof area has an exceptionally rich cultural history and prehistory.**

The Baviaanskloof area plays a vital role as the sole water catchment for the thriving agro-economy in the Gamtoos Valley, and as a major source of water for the rapidly growing Port Elizabeth/Uitenhage metropole.

A number of factors pose real and potential threats to the BCA. Its natural environment and water services are impacted by overgrazing, invasive alien plants and harmful animal introductions. The institutional/policy framework suffers from ineffective management models, a lack of funds and personnel. Socio-economic interventions threaten in the form of ill-considered land settlement schemes and inappropriate peripheral developments. **This situation requires urgent attention from key stakeholders at national level: Departments of Agriculture, Environmental Affairs & Tourism, Land Affairs, and Water Affairs &**

Forestry (including the Working for Water Programme); at provincial level: Department of Economic Affairs, Environment & Tourism and Eastern Cape Tourism Board; and at local level: Western District Council.

This report makes the following recommendations:

- The BCA must be **managed by an authority that has sufficient financial and human capacity** to fulfil this function effectively. The management agency must operate according to a model that allows it to retain income, take out loans, appoint suitable staff, etc.
- Owing to the severe threats, and the high conservation value of its ecosystems, **the first priority for conservation action should be the expansion and consolidation of the western sector**. The next priority should be the expansion northwards into the Nama-karoo and southwards to the Kouga River.
- Every effort must be made to ensure that **expansion is done in a socially sustainable way** and the reserve must provide a series of immediate benefits. In this regard, explicit targets for job creation and other socio-economic opportunities must be set.
- As a matter of urgency, a **comprehensive and professional socio-economic study needs to be conducted on the various land-use options**, prior to any land settlement schemes being implemented on private land adjoining the BCA.
- The BCA **project requires an impartial "champion"** – to promote, facilitate and co-ordinate research, planning and development actions, and to develop a synergy within the entire spectrum of stakeholders.
- **Most of the reserve must be zoned and managed as a wilderness area**. Tourism activities and development nodes must be restricted so as not to compromise this status.
- The BCA, in its existing or expanded form, **must be awarded national protected area status** and conform to Category Ia, Ib, II and III IUCN Protected Area Categories. Its eligibility for World Heritage Site status must be assessed.
- **Research must be undertaken to fill gaps** in the biological, ecological and cultural history inventories. This information is important for regional, national and international conservation planning in the future.
- **International funding must be secured** to cover the incremental costs of implementing the expanded reserve.
- **The BCA must not be developed in isolation**. For example, the outcomes of the CAPE Project in relation to the reserve need to be developed further in the context of a bio-regional development plan.

TERRESTRIAL ECOLOGY RESEARCH UNIT (TERU) REPORT SERIES

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- GEACH, B. 1995. Socio-economic and environmental aspects of land-use in the Sundays River Valley: pastoralism vs conservation/ecotourism. *TERU Report 1*:1-57.
- HASCHICK, S.L. & KERLEY, G.I.H. 1995. Land-use and proposed conservation of Valley Bushveld to the north-east of the Swartkops River. *TERU Report 2*:1-18.
- KERLEY, G.I.H. 1995. The terrestrial vertebrate fauna of Rein's Nature Reserve: inventories and management recommendations. *TERU Report 3*:1-19.*
- KERLEY, G.I.H. 1995. The mammals of Van der Kemp's Kloof. *TERU Report 4*:1-6.*
- SIMELANE, T.S. 1996. A preliminary survey of the traditional natural resources in the Addo Elephant National Park. *TERU Report 5*:1-12.
- VIAL, C. 1996. Levels of expectation, requirements and satisfaction of visitors viewing wildlife at Addo Elephant National Park, South Africa. *TERU Report 6*:1-22.
- KERLEY, G.I.H. & WATSON, J.J. 1996. Quail as a renewable resource in the Eastern Cape. *TERU Report 7*:1-13.
- BOSHOF, A.F. 1996. Roberts' Birds of Southern Africa : the "Millennium edition", a synthesis of opinions on options for a seventh edition. *TERU Report 8*:1-37.*
- BOSHOF, A.F. 1997. A survey of the birds of the farm " New Bradford" and surrounding areas, with notes on the medium to large mammal fauna. *TERU Report 9*:1-25.*
- BOSHOF, A.F. & KERLEY, G.I.H. 1997. Towards a conservation policy for the Eastern Cape: the function and management of protected areas. *TERU Report 10*:1-8.
- BOSHOF, A.F. & KERLEY, G.I.H. 1997. A habitat suitability assessment for the introduction of elephant to the Sante Sana Game Reserve, Graaff-Reinet district. *TERU Report 11*:1-15.*
- KERLEY, G.I.H. & BOSHOF, A.F. 1997. A habitat suitability assessment for the introduction of black rhinoceros to the Sante Sana Game Reserve, Graaff-Reinet district. *TERU Report 12*:1-16.*
- BOSHOF, A.F. & KERLEY, G.I.H. 1997. Apieskloof Wildlife Area : Habitats, Species and Land-use Options. *TERU Report 13*:1-17.*
- KERLEY, G.I.H. & BOSHOF, A.F. 1997. A habitat suitability assessment for the introduction of African buffalo to the Sante Sana Game Reserve, Graaff-Reinet district. *TERU Report 14*:1-16.*
- KERLEY, G.I.H. & BOSHOF, A.F. 1997. Proceedings of a strategic planning workshop for Sante Sana Game Reserve. *TERU Report 15*:1-20.*
- HENLEY, S. 1997. On the proposed reintroduction of serval (*Felis serval*) into the Great Fish River Reserve, Eastern Cape. *TERU Report 16*: 1-9.
- KERLEY, G.I.H. & BOSHOF, A.F. 1997. A proposal for a Greater Addo National Park: a regional and national conservation and development opportunity. *TERU Report 17*: 1-62
- BOSHOF, A.F. & KERLEY, G.I.H. 1997. Comparison of alternative Eskom 400kv transmission line routes from Wolwefontein to Grassridge: potential effects on birds and mammals. *TERU Report 18* : 1-14.*
- BOSHOF, A.F. & KERLEY, G.I.H. 1997. Breeding and production options for a founder herd of African buffalo in the Apieskloof Wildlife Area. *TERU Report 19* : 1-16.*
- BOSHOF, A.F. 1998. The predicted impacts of a proposed regional waste-water disposal scheme on the avifauna of the upper Blesbokspruit wetland (including the Ramsar site), Gauteng Province. *TERU Report 20* : 1-16.*
- BOSHOF, A.F., KERLEY, G.I.H. & GEACH, B. 1998. A biophysical survey, ecotourism development feasibility study and site assessment for Tamboekiesvlei, Mpofu District, Eastern Cape Province. *TERU Report 21* : 1-64. *
- BOSHOF, A.F. 1998. The Airports Company South Africa-Endangered Wildlife Trust strategic partnership: a project plan for a birdstrike hazard reduction programme. *TERU Report 22*: 1-48.*
- BOSHOF, A.F. 1998. The predicted ecological impact of the termination of the water supply to the Rondebult Bird Sanctuary, Germiston District, Gauteng Province. *TERU Report 23*: 1-7.*
- BOSHOF, A.F. & SIGWELA, A. 1998. The predicted impacts of the construction and operation of the proposed Coega harbour on the birds of the Coega Estuary and Jahleel Island. *TERU Report 24*: 1-11.*
- BOSHOF, A.F. & KERLEY, G.I.H. (Eds). 1999. Proceedings of a Greater Addo National Park Stakeholders Workshop: University of Port Elizabeth, 22-23 February 1999. *TERU Report 25*: 1-58
- BOSHOF, A.F. & KERLEY, G.I.H. 1999. Conservation planning in the Cape Floristic Region: Distribution, conservation status and spatial population requirements of the medium- to large-sized mammals. *TERU Report 26*: 1-141.*
- BOSHOF, A.F., COWLING, R.M. & KERLEY, G.I.H. 2000. The Baviaanskloof Conservation Area: A conservation and tourism development priority. *TERU Report 27*: 1-35.
- HENLEY, S.R. 2000. The Baviaanskloof Conservation Area: Opportunities for the conservation of Cape mountain zebra and leopard. *TERU Report 28*:1-13.