

SURVEY OF THE ADEQUACY OF EXISTING CONSERVED AREAS IN RELATION TO WILD ANIMAL SPECIES

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Abstract – The following mammals larger than the silver fox (*Vulpes chama*) were considered to be endangered within South and South West Africa – Cape mountain zebra (*Equus zebra zebra*); Hartmann's mountain zebra (*Equus zebra hartmannae*); black rhinoceros (*Diceros bicornis*); reedbuck (*Redunca arundinum*); red lechwe (*Kobus leche*); puku (*Kobus vardoni*) – probably extinct in South Africa; sable (*Hippotragus niger*); roan antelope (*Hippotragus equinus*); bontebok (*Damaliscus dorcas dorcas*); tsessebe (*Damaliscus lunatus*); black-faced impala (*Aepyceros melampus petersi*); oribi (*Ourebia ourebi*); suni/Livingstone's antelope (*Neotragus moschatus*); pangolin (*Manis temminckii*); leopard (*Panthera pardus*); cheetah (*Acinonyx jubatus*); brown hyaena (*Hyaena brunnea*). The following birds were considered to be endangered – Jackass penguin (*Spheniscus demersus*); pink-backed pelican (*Pelecanus rufescens*), white pelican (*Pelecanus onocrotalus*); bald ibis (*Geronticus calvus*); lammergeyer (*Gypaëtus barbatus*).

The following large reptiles were considered endangered – Nile crocodile (*Crocodylus niloticus*); loggerhead turtle (*Caretta caretta*); leatherback turtle (*Dermochelys coriacea*). The following large mammals were considered to be rare within South and South West Africa – Square-lipped rhino (*Ceratotherium simum simum*) – rare, but secure; nyala (*Tragelaphus angasi*) – rare, but secure; sitatunga (*Tragelaphus spekei*); blue duiker (*Cephalophus monticola*); red duiker (*Cephalophus natalensis*); vaal rhebuck (*Pelea capreolus*); black wildebeest (*Connochaetes gnou*) – rare, but secure; klip-springer (*Oreotragus oreotragus*); Cape grysbok (*Raphicerus melanotis*); Sharpe's grysbok (*Raphicerus sharpei*); lion (*Panthera leo*); aardvark (*Orycteropus afer*); spotted hyena (*Crocuta crocuta*); hunting dog (*Lycaon pictus*); Cape fur seal (*Arctocephalus pusillus*); eland (*Taurotragus oryx*); hartebees (*Alcelaphus buselaphus*); samango monkey (*Cercopithecus mitis*) – not common, but secure as long as adequate habitat is protected.

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1.0 Introduction

The terms of reference for this survey stipulated by the IBP National Committee through the CT Working Group were:

“To determine the adequacy of existing conserved areas in relation to wild animal species, and to make recommendations in the light of the information obtained to ensure the survival of species at present in danger of extinction”.

The CT Working Group subsequently decided that only mammals above the size of the silver fox (*Vulpes chama*) should be actively surveyed, but that any relevant information on other animal species and their survival status which was readily available should be included in the report.

The survey was initiated in May 1968 and the field work completed in December 1970. It became evident that information on the status and distribution of species outside conservation areas was essential for a reasonable assessment of their survival status. Such information was partially available from Natal, the Transvaal and the Cape Province. As no detailed information on abundance and distribution of large mammalian species in the Orange Free State was on hand, a survey of game on farmland in the Orange Free State was carried out through the post during 1970.

2.0 Methods

Visits were paid to all relevant provincial nature and game reserves, National Parks, to conservation areas under the control of the Department of Forestry and to a number of selected private and municipal reserves, thus augmenting the available published and unpublished information with first-hand observation.

For each conservation area investigated, a standard IBP CT Check Sheet was completed as laid down by Peterken (1967) and Nicholson (1968). Peterken (1967) has provided the following definitions for two terms used in this report:

rare: species or subspecies which are rare in the region containing the IBP area (= conserved area), but not necessarily rare elsewhere;

threatened or endangered: species or subspecies which are rare when considered on a world-wide scale.

The “Region” under consideration here was the Republic of South Africa and South West Africa. Information on the survival status of certain mammal species in South West Africa has been included for the sake of completeness. In considering the present status of species in the Republic, the former distribution and habitat requirement of the species concerned was borne in mind. Mammal species not discussed in detail here are considered not to be rare or endangered in South Africa although

almost entirely confined to conservation areas included the following large species: elephant, hippopotamus, buffalo, eland, blue wildebeest, hartebeest, gemsbok, waterbuck, giraffe and Burchell's zebra. Impala, springbok, blesbok, kudu, bushbuck, steenbok, duiker, mountain reedbuck and vaal rhebuck, warthog and bush pig are still to be found in appreciable numbers on farmland with suitable habitat.

3.0 Rare and endangered mammal species

Samango monkey (*Cercopithecus mitis*)

The preferred habitat of this species – dense forest – limits its distribution and abundance in South Africa. It occurs in reasonable numbers in all forest areas in the eastern Cape, Natal and Zululand, and in the eastern and northeastern Transvaal. As long as the forest areas fall under the jurisdiction of the Department of Forestry or any other nature conservation authority, no concern for the survival of the species is expressed. Outside of conserved areas, however, numbers of the species have decreased substantially due to heavy hunting by local inhabitants and habitat destruction, especially in northern Zululand.

Status: Secure as long as adequate habitat is protected.

Cape mountain zebra (*Equus zebra*)

The only permanent sanctuary for the species is the Mountain Zebra National Park near Cradock, Cape Province. In April 1971, the population in this reserve numbered 127. A further six animals (3 males, 2 females and 1 foal) are kept on the De Hoop Provincial Nature Reserve and Millar (1968, 1970a) has estimated the number of free ranging mountain zebra at 39, spread over the Gamka, Kamanassie, Outeniqua and Kouga Mountains in small groups.

The species is endangered as the only viable population is concentrated in one reserve and could easily be decimated by the outbreak of a disease. It is essential for the survival of the species that a second sanctuary be established as soon as possible and the remaining wild specimens transferred to it. Otherwise it could only be a matter of time before the species is exterminated.

The Nature Conservation Department of the Cape Province is in the process of acquiring suitable areas for a sanctuary in the Gamka Mountains. A concentrated effort should be made by all nature conservation authorities to speed up the creation of the second sanctuary. It is suggested that a joint effort should be made by the Cape Provincial Administration and the National Parks Board of Trustees, as administrators of the Mountain Zebra National Park, to secure the preservation of the species.

Status: Endangered

Hartmann's mountain zebra (*Equus zebra hartmannae*)

Though the taxonomical situation as a distinct subspecies is now questioned (Heinichen 1970), this is still treated as different from the Cape mountain zebra.

Recent estimates put the total number as 7 000 of which 4 000 are found on farmland as against 10 500 on farmland alone in 1960 (Van der Spuy 1962). An estimated 500-800 have found refuge in a reserve in the Naukluft Range in the Maltahöhe District in the southern part of South West Africa. The Namib Desert Park harbours a small migratory population in marginal habitat. The largest concentration is found in the Khomas Hochland and approximately 1 200 animals live in the Kaokoveld near the Cunene River.

The Naukluft Mountain Zebra Park is no ecological unit, as permanent water is lacking, and is not viable as a sanctuary. The population in the Kaokoveld is endangered by the envisaged development of the area as a Bantu homeland. The populations on farmlands are not secure as hunting permits are issued in times of drought when zebra compete with domestic stock for grazing and water. Illegal hunting is quite common as hides find a ready market and zebra meat is used as rations for native labourers.

The situation gives cause for alarm and additional measures are necessary to ensure the ultimate survival of the species. The most logical and reasonable solution would be the extension of the Naukluft Mountain Zebra Park, thus making it a viable ecological unit. The whole Naukluft Range is an uneconomical farming area and could be turned to better use as a conservation area. In addition, the area could be linked up with the Namib Desert Park, to create a unique conservation area which would stretch from the coast to the escarpment. A sanctuary in the Kaokoveld would benefit not only the mountain zebra, but also the black rhinoceros, as will be pointed out, and would preserve an area of almost unsurpassable beauty.

Status: endangered

Square-lipped rhinoceros (*Ceratotherium simum simum*)

The southern square-lipped rhinoceros, once on the brink of extinction, has recovered remarkably well and has been re-introduced in many areas within its known former range.

The stronghold of the species is the Umfolozi-Hluhluwe-Corridor complex where, in 1969, at least 1 208 were counted (Vincent *pers. comm.*). This does not include animals in the adjacent Bantu Reserve, estimated at 394 in 1968 (Vincent 1969). The Ndumu Game Reserve harboured 25 animals in 1970 and nine animals are to be found in the Mkuzi Game Reserve, both representing re-introductions. The Queen Elizabeth Park Nature Reserve and Midmar Public Resort Nature Reserve have also recently been restocked with six animals each.

In the Kruger National Park the total population stands now at a minimum of 157 animals (Pienaar 1970). During the period 1961 – 1969

139 animals were re-introduced (Anon. 1968, 1969, 1970a; Pienaar 1970). Further introductions have recently been made into various provincial, municipal and private game reserves in the Transvaal, Natal and the Orange Free State.

In the Transvaal 110 animals have been released since 1961. Approximately 20 are preserved in the Loskop Dam Nature Reserve, 16 having been introduced there (Anon. 1968, 1970a). Fifty-three occur on large private game reserves in the eastern Transvaal Lowveld (Anon. 1970b). The remainder is spread throughout the province. These large populations in the Transvaal have established themselves well, as indicated by the reported births from some of the reserves. In Natal 30 animals had been released on private land by 1970 (Anon. 1970a). The Willem Pretorius Game Reserve in the Orange Free State now harbours 16 animals, of which eight were introduced in 1965 (Anon. 1968).

The species has responded so well to the conservation efforts and measures adopted in the Zululand reserves that it has now become a problem to protect the available habitat from over-utilization in the most densely populated areas. Between 1961 and mid-1970, 701 surplus animals were removed from the Umfolozi-Hluhluwe complex by the Natal Parks Board (Anon. 1970b), but obviously the removal has to be increased further. If the removal of living animals cannot be stepped up, due to reasons of costs or declining demand for the species, and if the extension of the presently existing conservation areas is not feasible, more drastic measures will have to be adopted. Possibilities include reducing the competition of grazing species, coupled with habitat improvement and/or culling of the species.

Status: Rare but secure.

Black rhinoceros (*Diceros bicornis*)

The distribution of the species has drastically shrunk during the last century and is now confined to the following areas: Hluhluwe-Umfolozi-Corridor complex, with about 350 individuals (Hitchins 1968), Mkuzi and adjacent state land, with 30 – 40 animals, and the Ndumu Game Reserve, with 20 animals.

Joubert (1971b) estimated a total of 90 animals in the Etosha National Park and the Kaokoveld. Seventy per cent of the total population, however, inhabits areas which will eventually be deproclaimed for development as a Bantu homeland. At present, approximately 25 animals have full protection in the newly delineated Etosha Pan National Park, after 19 animals were captured on farmland and transferred to the park.

Black rhinoceros have been re-introduced into the Addo Elephant National Park near Port Elizabeth and numbered eight in 1970. However, the animals are kept in an enclosure which is not ideal. The National Parks Board has also re-introduced the species into the Kruger National Park during 1972.

The overall position of the species is alarming. The populations in Hluhluwe and Umfolozi are merely maintaining themselves (Hitchins 1968; Roth and Child 1968; Joubert and Eloff 1971). It is apparent that the carrying capacity in these reserves has been reached or perhaps even exceeded. A large die-off of black rhinoceros in Hluhluwe has been attributed to over-population (Roth *et al.* 1968).

The populations in Ndumu and Mkuzi are small and expanding. However, with the high concentrations of other browsing species and the relatively small size of the areas, both populations will reach the ceiling of the habitat in the near future.

It is strongly recommended that a sanctuary be established in the Kaokoveld, where the highest concentration of the South West African black rhinoceros population is found. The extension of the Ndumu Game Reserve and the incorporation into the Hluhluwe and Umfolozi Game Reserves in Zululand of state land situated in the corridor between them would greatly help in the protection of the species. Management policies which would favour black rhinoceros habitat and remove competition from other browsing species are also essential. Child (1968) reports that black rhinoceros and other browsing species made use of the same plants on islands in Lake Kariba, suggesting considerable competition for food.

Status: Endangered in South Africa.

Nyala (Tragelaphus angasi)

This is a tropical species which only extends into Zululand and the eastern Transvaal Lowveld within the boundaries of South Africa. It is abundant and over-abundant in all the Zululand reserves and has established itself well in the Kruger National Park in the northeastern sector, and has also colonized the riparian forests along the Shingwidzi-Mphongolo and Great Letaba Rivers further south (Pienaar 1963)

Small numbers have been reported from some farms in Zululand and in the northeastern Transvaal. The species has been introduced outside its former range into the Loskop Dam Nature Reserve (central Transvaal) and the Thabazimbi Private Nature Reserve (western Transvaal). The Natal Parks Board has sold a number of animals to farmers in Natal, for instance in the Pietermaritzburg district, also outside its former range, where they appear to be doing well (*Mentis in litt.*).

Though it is nearly extinct outside of conservation areas, except where specially protected by private individuals on their property, no concern for the survival of the species exists. The over-abundance in some Zululand reserves, however, makes it essential that management measures should be adopted to protect the habitat and thereby forestall a severe overpopulation.

Status: Rare, but secure.

Sitatunga (*Tragelaphus spekei*)

The species has been recorded in the western Caprivi (Bigalke 1958; Tinley *pers. comm.*). No proclaimed conservation areas exist in this area. The preferred habitat of the species is the swampy areas. The fact that these areas are remote and inaccessible probably affords the sitatunga a certain amount of protection. However, it is strongly urged that a formal conservation area in the Caprivi, the only one possible in South West Africa, is set aside for the species.

Status: Rare.

Blue duiker (*Cephalophus monticola*)

A relict species, confined to dense evergreen indigenous vegetation from sea level to about 1 300 m above sea level in Natal, Zululand and the southeastern Cape as far west as the Knysna forests (Bigalke and Bateman 1962; Vincent 1962). Records of the Department of Forestry indicate occurrence of the species in patches of mountain forest in the eastern Transvaal which have so far been undocumented. Where such forest patches are sufficiently protected, the blue duiker still occurs in fair numbers. Outside formally protected areas, however, the species has suffered a decline, mostly due to habitat destruction and poaching. The best measure to ensure the ultimate survival of the species, is the protection of the indigenous forests in South Africa.

Status: Rare.

Red duiker (*Cephalophus natalensis*)

Like the blue duiker, the red duiker is a relict species confined in South Africa to low-lying dense forests in the warm and humid regions of Natal (Bigalke 1967), the eastern Transvaal and the Zoutpansberg and Drakensberg Ranges (Kettlitz 1955).

It is adequately protected in the Zululand reserves and in reserves of the Department of Forestry in Zululand, as well as in the eastern Transvaal and escarpment. It has also been reported from the Timbavati Private Nature Reserve and the Groot Letaba Private Nature Reserve in small numbers in suitable habitat. The only suitable habitat in the Kruger National Park was unfortunately recently excised (Penzhorn 1969).

The best protection for the species would be the conservation of suitable habitat both within and outside of conservation areas. However, outside of conservation areas red duiker are decimated by illegal hunting by Bantu.

Status: Rare.

Vaal rhebuck (*Pelea capreolus*)

An endemic species, mainly confined to the higher lying areas of the Cape Province, Natal, Orange Free State and the Transvaal, though it also has been reported from the Cape Point Nature Reserve, the De Hoop Provincial Nature Reserve, the Bontebok National Park and the Addo Elephant National Park, all at an altitude of 325 m above sea level, or lower. The species has found refuge in all the game and nature reserves in the Drakensberg, the escarpment of the eastern Transvaal and the abovementioned reserves in the Cape Province, as well as on some municipal reserves in this province.

Bigalke *et al.* (1962) estimate that approximately 10 000 vaal rhebuck are to be found in the eastern and northeastern parts of the Cape Province. The total number is certainly higher as the southern and southwestern Cape has not yet been surveyed and the species occurs there as well, especially in areas under the protection of the Department of Forestry. In the Transvaal the species occurs especially around Waterberg in the west, around Ermelo, Wakkerstroom and Piet Retief in the southeast, around Lydenburg in the east and Pietersburg in the north. Kettlitz (1962) has estimated 2 000 animals in the province, but subsequent assessments seem to indicate his figures to have been too low, as the species has been reported from additional districts not mentioned by Kettlitz.

The survey of game on farmland in the Orange Free State has shown the species still to be widespread though localized due to its habitat requirements. A total of 10 619 animals was accounted for, though the figure has to be treated cautiously as a possible confusion with the mountain reedbuck by the farmers questioned cannot be ruled out. The largest concentration was to be found in the southern and eastern parts of the province (Von Richter, Lynch and Wessels 1972). A small population is protected in the Golden Gate Highlands National Park.

The range of the species has been reduced considerably in the past, mainly due to afforestation of the mountain sour grassveld along the escarpment and the Drakensberg. As this process still continues, more habitat suitable for the species will disappear. It seems, therefore, necessary to create additional reserves in the Transvaal, the Cape Province or the Orange Free State where the species still occurs in reasonable numbers.

Status: Rare (endemic).

Reedbuck (*Redunca arundinum*)

This species is in a precarious state of survival. The Kruger National Park protects the only large population in the Transvaal, estimated as 1 860 in 1968 (Pienaar 1969). Even there the situation is viewed with concern as the preferred habitat has decreased in the past, due to bush encroachment and progressive desiccation of the range (Pienaar 1969;

Jungius 1971). The largest population in a provincial reserve is to be found in the Loskop Dam Nature Reserve (54 in March, 1969) while 13 animals in all have been reported from the Hans Merensky and Percy Fyfe Nature Reserves. The population in the Loskop Dam Nature Reserve has not increased as it should, probably because suitable habitat is lacking. Remnant populations have been reported on the large private reserves and on a number of farms in the eastern Transvaal. The stronghold of the species in the Transvaal appears to be the Letaba, Pilgrims Rest and Barberton districts. The numbers on farmland probably will not exceed 1 000 in the Transvaal.

In Natal the largest concentrations are found in the Umfolozi Game Reserve, the False Bay Nature Reserve, St Lucia Game Reserve and Giant's Castle Game Reserve. Small populations are preserved in a number of other reserves in Natal. From the Natal Midlands appreciable numbers are still recorded.

In the Cape Province the species has been virtually exterminated. A few animals survive in the Mountain Zebra National Park, the Bontebok National Park and the Addo Elephant National Park. However, in all these parks suitable habitat is so limited that they never can serve as a potential sanctuary for the species. Small numbers have been reported from the Umzimkulu divisions of the Transkei on forestry grounds, where they are protected. The only confirmed record on farmlands in the eastern Cape comes from Kokstad and King William's Town areas, where small groups still survive. Bigalke *et al.* (1962) reported the species from the Komga and East London division. Recent information indicates that the animals from the Komga division have since disappeared. No information could be obtained on the situation in the East London area.

Reedbuck have been recorded in historical times in the Orange Free State (Du Plessis 1969). A number have been re-introduced into the Golden Gate Highlands National Park, where suitable habitat is very limited. In 1970 they were believed to have died out. One doubtful record was obtained from the Reitz district in the eastern Free State (Von Richter *et al.* 1972). In South West Africa the species has been reported along the Okavango river and in the western and eastern Caprivi (Bigalke 1958; Tinley *pers. comm.*; Rautenbach *pers. comm.*). With the exception of the Caprivi, the species is virtually extinct. However, none of these areas enjoy conservation status and may be lost entirely in the near future due to proposed development.

The main danger to the survival of the species lies in the destruction of suitable habitat. Protection on farmlands by the owners certainly will help prolong the survival of the species, but if it is not coupled with proper range management, the ultimate extermination will not be stopped. In the reserves where the species occurs, great attention should be paid to the fact that suitable reedbuck habitat is maintained and where possible, former habitat re-claimed. This would also greatly benefit other sensitive grazing species.

It is, therefore, urgently required that additional sanctuaries are established in proper habitat, where the species still occurs or can be

re-introduced with a reasonable assurance that the animals will establish themselves successfully.

Status: Rare, endangered in South Africa.

Red lechwe (*Kobus leche*)

This species is confined to the western and eastern Caprivi (Tinley *pers. comm.*, Rautenbach *pers. comm.*) and the Okavango area (Bigalke 1958). In the eastern Caprivi numbers have drastically declined during the recent past mainly due to habitat destruction and indiscriminate hunting (Child and von Richter 1969). No formal conservation area has been set aside for the species in South West Africa, though it is protected in the Moremi Game Reserve and the Chobe National Park in Botswana. The latter reserve has a common boundary with the eastern Caprivi along the Chobe River and the population has to be considered as one, crossing the river seasonally. The lack of protection in the eastern Caprivi, therefore, has also had an adverse effect on the conservation of the species in the Chobe National Park.

The species range has been generally reduced by desiccation of suitable habitat in Ngamiland and has been exterminated locally. The creation of a sanctuary in the Caprivi for the species would be highly advisable.

Status: Rare, endangered in South Africa.

Puku (*Kobus vardoni*)

Tinley (*pers. comm.*) assumes that the puku occurs in the western Caprivi, since it is reported on the Angola side in the north and the Botswana side in the south. In the eastern Caprivi the puku has been exterminated in the last decade (Rautenbach *pers. comm.*; Child *et al.* 1969). The only sanctuary south of the Zambezi is found in the Chobe National Park where numbers probably do not exceed 100 (Child *et al.* 1969).

If the occurrence of the species in the western Caprivi is confirmed, all efforts should be made to protect them there.

Status: Rare, endangered – extinct in South Africa.

Sable (*Hippotragus niger*)

The species has to be considered in danger of extermination in South Africa.

The major stronghold in the Republic is the Kruger National Park where the 1969 count yielded 1 068 animals. In three Transvaal provincial reserves small herds have been re-introduced. The Hans Merensky Game Reserve harbours the largest herd, 55 in January 1971, followed by the Loskop Dam Nature Reserve, 43 in January 1971, and 16 in the Percy Fyfe Nature Reserve in January 1971. The oldest established herd is to be

found in the Loskop Dam Nature Reserve, while the other two populations represent recent introductions.

The high numbers in the Hans Merensky Game Reserve are the result of repeated introductions from farmland. Both other herds have more or less maintained their numbers. Bush encroachment in the Hans Merensky Game Reserve has rendered substantial parts of the reserve unsuitable for the species. Small numbers are still to be found in the Letaba and Pilgrims Rest districts of the eastern Transvaal Lowveld on large cattle ranches and some private reserves. Efforts to re-introduce or maintain the species on three large private reserves failed, due to lack of suitable habitat. Lambrechts (1974) estimated the numbers on farmland as approximately 680, with the highest concentrations in the Letaba, about 560, and Pilgrims Rest districts, about 70.

In the western and eastern Caprivi the species has been reported by Tinley (*pers. comm.*) and Rautenbach (*pers. comm.*) as very rare in the latter area. In South West Africa the species is nearing extinction. No conservation area exists in any of those areas.

The sable antelope, very sensitive in its habitat requirements, has suffered mostly as a result of changing vegetation due to past land use practices which have turned open savanna grassveld into bush. Older residents unanimously report that sable were once common throughout the Lowveld and describe the areas then inhabited by the species as open grassland. Pienaar (1969) also attributes the discouraging low numbers in the Kruger National Park to the increasing reduction of suitable habitat.

The creation of additional sanctuaries for sable antelope is urgently required. However, utmost care should be taken to acquire areas suitable for the species to ensure that proper breeding herds can be established. Consideration should be given to the acquisition of farm areas in the Lowveld where the species still occurs and every effort put into reclaiming proper habitat. The fact that the species still survives on those farms is taken as an indication that partially suitable habitat is still available. If this should not be feasible, then land should be acquired in the former range of the species and suitable habitat reclaimed prior to releasing the animals.

Status: Endangered in South Africa.

Roan Antelope (*Hippotragus equinus*)

This is the rarest antelope in South Africa and is on the verge of extinction.

The largest population is protected in the Kruger National Park and numbered 250 to 300 animals in 1970 (Joubert 1970). The centre of the population is found north of the Letaba River on the open grassland savanna west of the Lebombo Range.

The Transvaal Provincial Administration has caught a number of animals in the Waterberg district in the northwest, the only area in the Transvaal where the species still occurs on farmland, and has transferred them to the Percy Fyfe Nature Reserve. In December 1970, the herd

numbered 16 animals and it is hoped to establish a breeding herd of this very rare antelope. The number of free-living animals has been assessed by Lambrechts (1974) as 80 on the New Belgium Block in the Waterberg district.

The only other wild populations are to be found in the western Caprivi (Tinley *pers. comm.*), along the Gwando River in the eastern Caprivi (Rautenbach *pers. comm.*) and around the Aha Mountains in the northeast of South West Africa. The South West African Administration transferred 75 animals from the Aha Mountains to the southwestern section of the Etosha Pan National Park in an effort to establish the species in a conservation area.

The rapid decline of the species throughout its former range in South Africa is largely attributable to the deterioration of open grassland savanna. Roan antelope have disappeared from parts of the Kruger National Park where they used to be common and the status of the species here is viewed with particular concern. Drastic changes in vegetation have very seriously limited suitable habitat, bush encroachment rendering these areas unsuitable (Pienaar 1969; Joubert 1970), thus adversely affecting this very sensitive grazing species. Moreover, it is susceptible to anthrax (Pienaar 1963, 1969; Joubert 1970).

In the Kruger National Park and in other conservation areas, management should aim at re-claiming and maintaining proper habitat for the species, as otherwise the future of the species is in very great jeopardy. *Status:* Endangered in South Africa.

Black wildebeest (*Connochaetes gnou*)

A once plentiful species, black wildebeest came near to extinction at the turn of the century, but has responded very well to protection measures. During 1970, 3 100 individuals were accounted for, of which just under half are protected in major game reserves, the remainder being distributed on private lands (Von Richter 1971). The largest population is to be found in the Willem Pretorius Game Reserve in the central Orange Free State, numbering 443 in August 1970. Small herds have also been introduced outside the former range, or on marginal habitat within it, especially at high altitude in the Drakensberg.

The survival of the species may be considered as secure, as the surviving populations in conservation areas are expanding. However, the policy of distributing animals in twos and threes to farms and small municipal reserves should be discontinued and attempts made to give herds of 15 to 20 animals to institutions and farms where the establishment of proper breeding herds can be assured.

Black wildebeest and other species once occurred in great numbers in the Karoo and the establishment of a large conservation area for these species in the Karoo is most desirable.

Status: Rare, but secure.

Bontebok (*Damaliscus dorcas dorcas*)

Bontebok are found on a number of reserves and farms in the coastal areas of the southwestern Cape Province, the range it formerly occupied in historical times (Du Plessis 1969). They have also been introduced outside of their former range, for instance onto farms in the Harrismith district in the northeast Orange Free State and Grahamstown district in the eastern Cape Province. In spite of rigid protection, however, the subspecies numbered only 861 in 1969 (Millar *pers. comm.*).

Bontebok are predominantly grazers and it seems clear that the area presently occupied includes very little really suitable habitat. Most of this is classified by Acocks (1953) as macchia or coastal renosterbos, with little or no grass vegetation. In addition, most of the former grazing areas have either been ploughed or have been excluded from the conservation areas. The species has therefore to subsist on somewhat inferior habitat. It is assumed that in the past the species were concentrated on the patches of grassy vegetation within the predominant macchia and renosterbosveld, such as that mapped by Acocks north of Swellendam.

About half of the present population is preserved in three reserves, while the remainder are protected on private farmland, the biggest herds being found in the Grahamstown and Harrismith districts, respectively 70 and 33 in 1970. Two of the reserves show little or no grass vegetation and here bontebok compete with other grazing species. Both reserves are considered marginal for the species. The third reserve, Bontebok National Park, has a more suitable vegetation (Grobler and Marais 1967), but here bontebok again has to compete with other grazing species and it is clear that the population will outgrow its habitat in a few years time.

The species is not in immediate danger, but it is viewed with concern that no herd is preserved in an area with really suitable habitat. Moreover, the largest herds are concentrated together and an epizootic disease could severely jeopardise the survival of the species.

Serious consideration should be given to the acquisition of a suitable additional reserve. Two possibilities appear to exist. Land on which bontebok do not occur could be purchased now and the veld allowed to recover to suitable bontebok habitat. Alternatively, farms which still harbour the species could be purchased. The distribution to suitable farms of proper breeding nuclei would also be a useful additional safeguard.

Status: Endangered.

Tsessebe (*Damaliscus lunatus*)

The majority of the present tsessebe population is confined to the Kruger National Park north of the Letaba River (Pienaar 1963) and the latest count yielded 584 animals. The second largest population is preserved in the provincial Percy Fyfe Game Reserve. This herd, 42 in December 1970, has increased very satisfactorily since the first introduction of the animals in 1966. A herd of 16 animals introduced into

the Hans Merensky Game Reserve, on the other hand, has failed to increase, the population being adversely affected by scarcity of suitable habitat.

In the Timbavati Private Nature Reserve in the eastern Transvaal, a small herd has established itself despite heavy predator pressure. The suitable habitat available to this herd is very limited, however, and it is feared that the population will not be able to increase much further, unless habitat management is carried out.

Lambrechts (1974) has estimated 570 animals on farmland in the Transvaal, about 350 of which he found in the Pilgrims Rest district. With the expected increase in bush encroachment in the district, these numbers will be very drastically reduced if drastic measures are not adopted to reverse the trend.

In South West Africa the species is confined to the eastern and western Caprivi Strip (Tinley, Rautenbach *pers. comm.*) and to the Okavango territory and the area around the Aha Mountains. A recent estimate puts the numbers at between 50 and 100, excluding the Caprivi. No conservation area, however, exists to protect the species in South West Africa.

It is considered of urgent importance to establish additional conservation areas for the species in suitable habitat in the Transvaal to avoid the danger of the species becoming extinct. In the established reserves all efforts should be made to reclaim and improve the preferred habitat. Management policies should focus primarily on the requirements of this very rare grazing species. In South West Africa a sanctuary is urgently required for the species and efforts should be made to obtain suitable areas for conservation.

Status: Rare; endangered in South Africa.

Black-faced impala (*Aepyceros melampus petersi*)

The subspecies has a very limited distribution north and south of the Cunene River, but also occurs in several other localities, some of them very isolated, in the Kaokoveld (Joubert 1971a). This author estimates the total number to be between 750 and 1 000 animals, 750 probably being more accurate.

No conservation area exists in the main range of the subspecies. In the Etosha Pan National Park some 25 animals are protected around Namutoni in the east and an additional 100 or so animals were introduced in the west of the park where the subspecies formerly occurred. This herd now numbers around 150. Unless suitable conservation areas are created, either along the Cunene River or in the Kaokoveld, the majority of the population is doomed to extinction. The Kaokoveld also includes suitable habitat for other endangered Southwest African species, such as Hartmann's mountain zebra and black rhinoceros.

Status: Endangered.

Klipspringer (*Oreotragus oreotragus*)

Because of its habitat requirements – rocky outcrops and hills – the distribution of the klipspringer is rather patchy and localised. The somewhat inaccessible habitat should be a natural protection but evidently it is not, as klipspringers are becoming more and more rare throughout their range. In the Transvaal, the only large population is confined to the Kruger National Park. The provincial Loskop Dam Nature Reserve, Blyde River Nature Reserve, Ohrigstad Dam Nature Reserve, Hans Merensky Game Reserve and Rustenburg Game Reserve all harbour populations, the numbers being determined by the available habitat.

The species is found on private land where suitable habitat and sufficient protection is available. In general, however, its survival gives cause for concern.

In Natal the species only occurs in any reasonable numbers in the Giant's Castle Game Reserve, the Royal Natal National Park, and in forest reserves in the Drakensberg. Other game reserves in the Drakensberg harbour only small populations on limited habitat. Hluhluwe and Umfolozi Game Reserves have only very sparse habitat and accordingly the species is extremely rare there. It has been locally reported in small numbers from northern Natal and along the Drakensberg on farmland. In all the game reserves in the Drakensberg, with the exception of the Royal Natal National Park, numbers are reported to be declining in spite of rigid protection.

In the Cape Province the species is protected in the Mountain Zebra National Park and in a number of Forest Reserves where suitable habitat occurs. It is still widespread along Cape mountain ranges and in the hilly country further inland and occurs in reasonable numbers in this habitat (Fairall *in litt.*).

In the Orange Free State small populations have found refuge in the Willem Pretorius Game Reserve and the Golden Gate Highlands National Park. On farmlands the species has been reported in low numbers from the eastern, southeastern, and southern mountainous parts of the province. The total number for the whole province was assessed at 222 in 1970 (Von Richter *et al.* 1972).

In South West Africa the species is still quite widespread in suitable habitat. The only large population is protected in the Naukluft Mountain Zebra Park. In the Namib Desert Park and the Etosha Pan only small populations are encountered due to limited habitat.

The species is not threatened with immediate extinction but is certainly not fully safeguarded for the future. Consideration should be given to the creation of additional sanctuaries, especially in the Cape Province, the Orange Free State and South West Africa.

Status: Rare.

Oribi (*Ourebia ourebi*)

The species is an inhabitant of the open grassy plains of the Southern

Savanna zone, and its distribution is often localised (Ansell 1968). Its overall distribution in South Africa has been much modified and reduced by human activity, notably vegetation changes and heavy hunting pressure.

The species has been re-introduced into the Loskop Dam Nature Reserve and Ohrigstad Dam Nature Reserve. In both areas, however, the species is merely holding its own. A re-introduction in the Kruger National Park failed. Small populations have been reported from the provincial reserve Blyde Rivierspoort, from a municipal and from a private reserve outside Pretoria, and from the Lydenburg Nature Reserve. Forest reserves with sufficient habitat in the eastern and southeastern Transvaal also harbour small populations. On farmlands, oribi have been reported from the southeastern Highveld (Ermelo, Wakkerstroom, Piet Retief and Carolina as the centre of their present distribution). Small numbers also still occur on the central Highveld and on mountain sour grassveld along the escarpment.

In the Cape Province a recent detailed survey has revealed only 370 animals to have survived on farmland in the southeastern Cape Province (Millar 1970b). The highest concentrations of these are to be found in the Bathurst, Mount Currie and Humansdorp Divisions. The species also still occurs around Umzimkulu and Matatiele but no figures could be obtained for these areas. The Department of Forestry protects at present probably the largest population in the Umzimkulu Division, where the establishment of a reserve is under negotiation. The two municipal reserves at Matatiele and Queenstown harbour three oribi in all.

In Natal the species is now confined to the foothills of the Drakensberg range and the Natal Midlands. It formerly occurred in Zululand, but has long since disappeared from there (Vincent 1970). Giant's Castle Game Reserve harbours probably the largest population not only in Natal, but in the whole of South Africa. In all the other reserves along the Drakensberg range the species has been reported in fair numbers, but lack of sufficient habitat or the size of the reserves have limited numbers.

A recent survey in the Orange Free State has put the number of oribi as low as 314, the highest concentration being in the Harrismith, Bethlehem, Reitz and Frankfort districts in the northeast (Von Richter *et al.* 1972). In South West Africa the species is confined to the Caprivi strip and the Okavango territory (Bigalke 1958; Tinley *pers. comm.*; Rautenbach *pers. comm.*) However, no conservation area exists in these territories.

With the possible exception of Natal, the species is in a very precarious state of survival. The cause of the decline can probably be sought in ecological habitat changes brought about by human activities, for instance by intensive agriculture and the afforestation of mountain sour grassveld, especially in the Transvaal and Natal. Coupled with human activities, is increased illegal hunting pressure. Millar (1970b) lists 11 reasons for the decline of the species which he elicited from the farming community.

The establishment of suitable conservation areas for oribi in the Transvaal, the Cape Province, the Orange Free State, and South West Africa is considered of utmost importance. In conservation areas where oribi are already protected, management policy should aim at providing

optimal habitat for the species, as marginal habitat, even with the best of intentions, will prove to be of no value for the survival of the species.

Status: Endangered in South Africa.

Cape grysbok (*Raphicerus melanotis*)

Endemic to the southwestern Cape zone and east along the coast to about 28°E (Bigalke *et al.* 1962). Abundance and survival is very difficult to assess, as our knowledge of the habitat requirements is rather scanty. Bigalke *et al.* (1962) describe the habitat as scrubby mixed grassveld and mixed grassveld in areas with high mountains and sheltered valleys, since all records come from such areas.

Bigalke (*in litt.*) maintains that the species might still occur in some Drakensberg valleys, but that this represents the very edge of its natural range where it has always been rare. It was quite common in Giant's Castle Game Reserve until the mid-thirties, but has since declined and has not been recorded in 10 years (Barnes *pers. comm.*). Bigalke *et al.* (1962) report particularly low numbers in the eastern parts of the species' range. Some of the people interviewed maintained that the species has always been rare, while others have indicated a reduction in numbers and that in several reserves the species has declined during the last decade. It is quite possible that both opinions are correct for different areas. The species would probably do well in areas where the vegetation was in a state of transition, for instance from grassland to scrubby mixed grassveld. The where woody vegetation is allowed to spread in the absence of fire and grazing pressure by domestic stock, would adversely affect the species.

The species is found in all reserves throughout its range in varying numbers. It is apparent that more knowledge is essential to be able to manage the conservation areas for the benefit of the species.

Status: Rare (endemic).

Sharpe's grysbok (*Raphicerus sharpei*)

The species is endemic to the southern savanna and of restricted distribution within that zone (Ansell 1968). Pienaar (1963) reports Sharpe's grysbok from the Kruger National Park where the centre of its distribution is north of the Letaba River. No definite records could be obtained from any of the provincial or large private reserves in the northern and eastern Transvaal, though most of them fall within the range of the species (Ansell 1968). However, the species has been reported from farms in the Lydenburg, Letaba, Pietersburg, Soutpansberg and Sibasa districts in this area. It is also known from the Waterberg and Thabazimbi districts in the western Transvaal and one specimen is recorded from the Rustenburg district. It has been reported that the species has disappeared from a number of areas in the Transvaal in the recent past.

The main cause for the alleged decline of the species is probably

habitat alteration brought about as a result of human activities. It is therefore advisable to consider the inclusion of suitable habitat in proposed new conservation areas within the species range.

Status: Rare.

Suni/Livingstone's antelope (*Neotragus moschatus*)

An inhabitant of the tropical littoral, the species extends its range in South Africa only into Zululand and the extreme northeastern corner of the Transvaal. The only known range in the northeastern Transvaal falls within the Kruger National Park (Pienaar 1963).

In the Zululand reserves the best protected habitat is to be found in the Ndumu Game Reserve, where the species is reported to be common. In the Mkuzi Game Reserve the species is barely holding its own as suitable habitat is very limited and has been reduced in the last decade. The species has been seen here only rarely during the past five or six years (*Mentis in litt.*). In False Bay Nature Reserve and St Lucia Game Reserve the species is still quite common, but only on the eastern shore of the lake in the latter reserve. There are indications that browsing species (nyala) have an adverse influence on the vegetation and so cause a decrease in suni habitat. This is a matter to be viewed with some concern. Kosi Bay Nature Reserve and Sordwana Bay National Park are too small to hold any significant populations.

The occurrence outside conservation areas in Zululand is not well known. However, due to increasing population pressure and accompanying heavy habitat destruction, especially in Tongaland, the survival prospects of suni seem to be poor. The only area where suitable habitat is still found in almost virgin conditions is the dry forest complex halfway between Ndumu Game Reserve and the Mosi Swamps. Unfortunately, this is not a conservation area and it could be destroyed in the near future.

Status: Endangered in South Africa.

Aardvark (*Orycteropus afer*)

It is a common species in the Kruger National Park and widespread where there is an abundance of anthills, particularly in sandveld (Pienaar 1964). It has been reported throughout the Transvaal on provincial and private reserves where suitable habitat occurs.

It is widespread and, in some areas, common in the Cape Province (Bigalke *et al.* 1962) and has been reported in the Kalahari Gemsbok National Park.

It has been reported in most game reserves in Zululand in fair numbers. It is absent from all the reserves in the Drakensberg range, due to lack of proper habitat.

In the Orange Free State the species occurs in the Willem Pretorius Game Reserve and the Tussen-die-Riviere Game Farm in the south. It has been recorded from farmlands throughout the province, though in low numbers.

In South West Africa it is widespread and has a refuge in the Etosha Pan National Park.

The greatest danger to the survival of the species might lie in its alleged "medicine" value accorded to it by the African population, as well as in changes in the vegetation.

Status: Not common, but secure.

Pangolin (*Manis temminckii*)

An abundance of termitaria is the major habitat requirement of the species. The rather shy and mainly nocturnal habits of the species make it difficult to assess its abundance and survival status. It has probably always been rare but widespread.

It is distributed throughout the Kruger National Park wherever suitable habitat occurs (Pienaar 1964). It has been reported in the Hans Merensky Game Reserve, the Sabi Sand Private Nature Reserve and the Timbavati Private Nature Reserve. It presumably still occurs on farmland in this area as well. In the north of the province it has been reported in the Langjan Nature Reserve, and in the central part of the Loskop Dam Nature Reserve.

In the Cape Province it is confined to the north according to Meester (1969) and is reported from the Kalahari Gemsbok National Park.

In Natal it is confined to the northern parts and was recently found in the False Bay Park Nature Reserve. In Ndumu and Mkuzi Game Reserves it has not been recorded for the last 10 years, although it did occur there, according to local residents.

In the Orange Free State its presence is recorded predominantly in the western parts (Von Richter *et al.* 1972).

It occurs throughout South West Africa and has been recorded in the Etosha Pan National Park.

Present knowledge of the biology and ecology of the species is very limited. The very small number of records from non-conserved areas could possibly indicate that its survival is precarious. It is much sought after by various African tribes for its alleged medicinal value.

Status: Rare – endangered in South Africa.

3.1 Rare and endangered terrestrial Carnivora

Large feline predators are confined in South Africa mostly to game reserves of sufficient size. Outside conservation areas all species are relentlessly persecuted for actual or alleged livestock killings. In the face of this the survival of leopard in inaccessible shelters, even in areas of dense human population, is remarkable. Leopards are not uncommon in the hilly and mountainous country around Pretoria and Cape Town. Lion seem to be less able to survive outside conservation areas and cheetah even less so, because of their very specific habitat requirements.

The smaller feline species, like lynx, serval, wild cat and black-footed cat, still survive in some areas in appreciable numbers where suitable habitat is found. The lynx, which now appears in the list of vermin species, is alleged to kill sheep and is hunted vigorously in sheep farming areas, but seems to maintain its status more or less. The serval, its distribution being restricted to areas of higher rainfall, has fared less well. Its numbers have decreased substantially, partly due to extensive trapping, but probably also in part as a result of changes in the habitat. African wild cat and black-footed cat seem to hold their own. The latter has probably always been rare, and it is almost impossible to estimate their abundance or survival.

Spotted and brown hyena are largely confined to conservation areas and are persecuted if they stray outside. The brown hyena seems to be the more abundant species outside game reserves, as indicated by the number of animals shot over the last decade in almost every part of the Republic and seems to be able to survive in more remote areas.

The aardwolf is still common in suitable habitat inside and outside conservation areas. Motor traffic, however, takes an increasing toll on the road at night. The species still suffers from persecution by the farming community for alleged lamb killing habits.

All of the species mentioned are much maligned as killers of livestock and are actively persecuted. The scanty information available on the food habits of the smaller carnivora, however, does not support the general notion that their main diet consists of domestic stock (Bothma 1965, 1966a, 1966b, 1971; Grafton 1965). Moreover, both authors deplore the indiscriminate hunting of these species and stress that only known marauders should be hunted.

Stock killing by predators is of course in part at least a consequence of the fact that farming areas are denuded of their wild game populations. This forces the larger predators to take to stock killing and thereby to invite their own death. Wilson (1969) reports that the leopard might be an exception to this rule. He has found free roaming leopards to prey almost exclusively on rockhares and dassies. It is equally known that baboons contribute to the diet of leopards. However, dassie and baboon are viewed as pests in many parts of South Africa and as such measures have been instituted to control them. Leopard, dassie and baboon share very similar habitat and, if protected, the leopards will keep the others from getting out of hand.

Unless the policy of indiscriminate hunting is discontinued, the larger predators will become confined to conservation areas, and the smaller predators will be severely reduced in numbers and range. The ecological side effects of this cannot be predicted at this stage. For a more detailed discussion of the present status and distribution see Von Richter (1972).

Lion (*Panthera leo*)

Large populations are today confined to the Kalahari Gemsbok National Park, the Kruger National Park and the Etosha Pan National

Park. There is also a small population in the Umfolozi Game Reserve in Zululand. Also, the large Timbavati and Sabi Sand Private Nature Reserves in the eastern Transvaal Lowveld still harbour a fair number. Individual animals are encountered throughout the Lowveld and the northern Cape and are probably stragglers either from the large sanctuaries or from Botswana.

Status: Rare.

Leopard (*Panthera pardus*)

The largest numbers are to be found in the Kruger National Park, the Kalahari Gemsbok National Park, Etosha Pan National Park, and the Umfolozi, Hluhluwe, Mkuzi, Ndumu and St Lucia Game Reserves in Zululand. In the Transvaal, resident populations have been reported in the provincial Loskop Dam, Blyde River and Rustenburg Nature Reserves.

In the eastern Transvaal Lowveld the species is regularly met with on the large Timbavati and Sabi Sand Private Nature Reserves, as well as on the smaller provincial and private reserves. A private nature reserve just outside Pretoria in the Magaliesberg reports resident leopards and in the western Transvaal the Thabazimbi Private Nature Reserve has a resident population.

The holdings of the Department of Forestry in the Drakensberg and all along the mountain ranges in the Cape, harbour smaller or larger numbers of leopards.

Outside conservation areas the species is frequently encountered in more remote and undeveloped areas of the country and in inaccessible mountain ranges. Its secretive and cunning habits have enabled it to survive even in the face of ruthless persecution. In the Cape Province, excluding the northern Cape and most of the Karoo, nearly 100 animals were destroyed during the five year period 1965–1969 by professional vermin destruction clubs. The total number killed was probably much higher as leopards are killed by landowners as well.

With increasing human population and the pressure now being directed on remote and undeveloped areas, the species is most certainly endangered. The only possible way of forestalling its complete eradication would be to stop the all-out "war" on the species and to destroy only known stock killers. Moreover, the creation of a substantially sized conservation area in the western Cape would benefit not only leopard but other species as well.

Status: Endangered in South Africa.

Cheetah (*Acinonyx jubatus*)

The survival prospects of the species in South Africa are a matter of grave concern. The Kruger National Park and the Kalahari Gemsbok National Park are the only sanctuaries where cheetah can be encountered

in reasonable numbers. Even in the Etosha Pan National Park the species is rare.

Cheetah have been re-introduced into the Umfolozi, Hluhluwe and Mkuzi Game Reserves in Zululand where they have acclimatized well.

Small numbers are reported from the large private game reserves in the Transvaal Lowveld and very occasional animals have been seen on farmlands in the Letaba and Pilgrims Rest districts.

Cheetah have been reported from the western and eastern Caprivi (Tinley *pers. comm.*; Rautenbach *pers. comm.*). Reports from South West Africa are somewhat confusing, as some informants claim that the status has not changed much, while others maintain that the species is definitely on the decline. The overall picture appears to be that the species is becoming rare.

The main cause for the decline of the species is to be found in the habitat changes which have taken place during the last century. Past land use practices have rendered large parts of the former range unsuitable through bush encroachment (Pienaar 1969). The exceedingly low numbers in the Kruger National Park (250 in 1970, Labuschagne *pers. comm.*) reflect the very limited habitat available in the Park. With the absence of any serious veld management outside the Park in the Lowveld, it seems only a matter of time before the last cheetah will have disappeared from there, too. The Zululand reserves also face the increasing problem of bush encroachment and the established cheetah populations will soon reach the limits of available habitat.

To prevent the extinction of the species in South Africa, the only reasonable solution is to concentrate on veld management policies, thereby re-claiming suitable habitat and preventing further deterioration of open savanna grassland vegetation types in the existing conservation areas. Re-introduction should be attempted only in existing or newly created conservation areas where sufficient suitable habitat is available.

Status: Endangered.

Brown hyaena (*Hyaena brunnea*)

Next to the cheetah, the brown hyaena is probably the rarest carnivore species in South Africa. It is endemic to the southern savanna and the centre of its distribution is in the arid south west. A very small population has found refuge in the Etosha Pan National Park and the species also occurs in the Kalahari Gemsbok National Park and the Kruger National Park, where about 150 individuals have been estimated to be present (Pienaar 1969). In the Transvaal Lowveld a few individuals have been reported from the provincial Hans Merensky Game Reserve and some private reserves. The Loskop Dam Nature Reserve and the Blyde River Nature Reserve in the eastern and central Transvaal harbour small resident populations and, in the western Transvaal, the species has been reported from the Thabazimbi Private Nature Reserve. A small private reserve outside Pretoria in the Magaliesberg protects a small number of brown hyaena. With the exception of the Kalahari Gemsbok National Park, the

species has virtually disappeared from the Cape Province, the Orange Free State and Natal, where it apparently always was rare.

Indications of a surprisingly wide distribution of brown hyaena in South Africa come from animals being reported occasionally from farmlands in the northern and southeastern Cape, from most of the undeveloped parts of the Transvaal, especially southwestern and western parts, and from some areas in the Orange Free State, northern Natal and the Drakensberg range. In South West Africa the species is occasionally reported from the more remote regions in the north, but is considered to be facing extinction.

As an alleged threat to domestic stock the species is mercilessly destroyed whenever encountered outside conservation areas, and the survival of the species is only safeguarded in the existing sanctuaries. A more sophisticated and discriminating approach to the hunting of the species would certainly benefit its survival. Additional conservation areas in the northern Cape would be of tremendous value in conserving the brown hyaena.

Status: Endangered.

Spotted Hyaena (*Crocuta crocuta*)

The species is largely confined to the Etosha Pan National Park, the Kalahari Gemsbok National Park, the Kruger National Park and the Hluhluwe, Umfolozi, Mkuzi Game Reserves in Zululand. In the eastern Transvaal Lowveld the species is regularly encountered on the larger private game reserves and the Hans Merensky Game Reserve. The Loskop Dam Nature Reserve also has a resident population.

Occasional reports indicate the presence of the species in the northern and eastern Cape, the eastern and northeastern Transvaal, the Natal Drakensberg (*Mentis in litt.*) and in northeastern Zululand on undeveloped farmlands or Bantu areas. Probably all of these individuals are stragglers from the conservation areas. In South West Africa the species has been reported from remote areas in the northeastern parts of the territory. Apart from the Etosha Pan, however, no sanctuary is provided for the species.

In the near future the species will probably be entirely confined to conservation areas.

Status: Rare.

Hunting dog (*Lycaon pictus*)

This gregarious predator is almost exclusively confined to the large conservation areas, the Etosha Pan National Park, the Kalahari Gemsbok National Park and the Kruger National Park. The species has been reported on some of the large private game reserves in the Transvaal Lowveld and occasional stragglers are destroyed throughout the Lowveld on big cattle ranches.

Hunting dogs may still be encountered in the remote areas in the northeast of South West Africa, but in due course will also be exterminated.

Status: Rare.

3.2 *Rare and endangered marine mammal species*

The only marine mammal species occurring permanently along the coast or on islands within South African territorial waters is the Cape fur seal (*Arctocephalus pusillus*). Seal herds are distributed from Angola along the west coast to Cape Point, then east to Algoa Bay (Nel 1968). Rand (1959) lists 17 main rookeries of which 15 are on islands and the remainder are on the mainland in South and South West Africa.

Rookeries on the islands fall under the control of the Superintendent of the Guano Islands, while the mainland populations are to be found in prohibited areas in terms of diamond regulations. The total population is estimated at 500 000 in 1968 (Rand *in litt.*). The rookeries themselves are protected and sealing is carried out during limited periods only, but all rookeries are hunted. No island or rookery on the mainland give full protection on a year-round basis. The protection of the species is based solely on their economical value and thereby to the demand on the world market. If this demand drops, deliberate culling would be instituted to protect the interest of commercial fishing. Fur seals are commercially exploited for fur, leather, meat or bone meal and oil. A quota system which is associated with export market requirements is applied to each sealing area.

The situation gives no immediate concern for the survival of the species and century-long exploitation apparently has had only a limited influence on the range and probably numbers of the species. The controlled exploitation at the present level poses no danger to the species.

Nevertheless, it is considered of great importance that some rookeries are proclaimed full conservation areas where no culling should be carried out. The creation of island sanctuaries are especially important in view of some bird species as well, as will be shown in detail later.

Status: Rare, endemic to South Africa.

4.0 *Rare and endangered bird species*

In co-operation with the Percy Fitzpatrick Institute of African Ornithology a list of bird species has been drawn up for rare or endangered birds which are in need of better or additional protection. Some of the species are rare by the nature of their habitat requirements or have their main distribution outside South Africa. Only those species which require immediate additional protection will be discussed here.

Jackass penguin (*Spheniscus demersus*)

An endemic species of the South African Coast from the Cunene River

mouth in the west to Lourenco Marques in the east, but found only irregularly from the Transkei northwards (Roberts 1957), and mostly found on the islands. Of an estimated total of 190 000 birds, a small remnant of the numbers of 30 years ago, a very large percentage is found on Dassen Island off the west coast and on Dyers Island off the south coast (Elliott 1970). The increasing danger of oil pollution since the closure of the Suez Canal, egg-collection for overseas gourmets and a reduced food supply because of excessive fishing operations have put the species in a precarious situation. The main danger, however, comes from the continuing collection of guano on the islands off the west coast. The islands are being paved and the burrows where the jackass penguin breeds destroyed to facilitate the removal of guano. To avoid wave action carrying away the guano, the islands have been walled, a major obstacle for the birds who cannot fly to reach their breeding places (Elliot 1970). Should a major oil spill occur, the survival of the species is put into great jeopardy, not counting the constant harassment by guano and egg collectors and the destruction of their habitat.

The establishing of a conservation area for the jackass penguin is strongly recommended and would also benefit the bank cormorant, *Phalacrocorax neglectus*. This species is confined to the islands off the west coast and is also in need of more and better protection. The suggested conservation area could then also include fur seal rookeries.

Status: Endangered (endemic).

Pink-backed pelican (*Pelecanus rufescens*)

The only known breeding colony in South Africa is found in the northern part of Lake St Lucia. The devastating increase in the salinity during the last five years in the St Lucia system has placed this colony in great jeopardy. The adult birds do not fish on the lake themselves but take their fledglings onto it to feed. The drastic change in the whole ecosystem has resulted in the virtual absence of any fodder fish in the vicinity of the colony.

Any lasting moves to save the colony can only be coupled with a general and all-embracing effort to stop and revert the trend of the St Lucia system of turning into a salt lake.

Status: endangered in South Africa.

White pelican (*Pelecanus onocrotalus*)

Colonial breeders which breed in South Africa only on islands off the south west Cape and on Lake St Lucia. The population in St Lucia is endangered for the same reason as the pink-backed pelican, as outlined above. The populations on the islands are probably not endangered at the moment.

Status: Endangered in South Africa.

Bald ibis (*Geronticus calvus*)

A species endemic to South Africa and Lesotho. Its very specific habitat requirements make its distribution rather localised and patchy. Siegfried (1971) has estimated the total breeding population at 2 000 birds, with the centre of the distribution in the Orange Free State. The number of breeding colonies and birds has substantially decreased and the species has disappeared entirely from the Cape Province. The main cause for the decline is apparently the destruction of suitable habitat.

The species is covered by all the Nature Conservation Acts giving it full protection, but unfortunately only two breeding colonies are situated on state-controlled land where any meaningful protection can be carried out. It is considered to be of the greatest importance that some of the large breeding colonies should be incorporated into new conservation areas.
Status: Endangered.

Lammergeyer (*Gypaëtus barbatus*)

As all raptorial birds, the species has suffered mostly through the persecution by man and has been greatly reduced. It is now mainly confined to the Drakensberg range in Lesotho and Natal. Approximately 40 breeding pairs are thought still to survive (Barnes *pers. comm.*). Giant's Castle Game Reserve probably harbours the largest proportion of the South African population and the species breeds there. In the Golden Gate Highlands National Park one or two pairs also breed regularly.

The best protection to the species is probably offered by the inaccessible nesting sites, while the main danger is to be seen in human persecution due to alleged livestock killing.

Status: Endangered.

Other bird species

The Egyptian vulture (*Neophron percnopterus*) and the wattled crane (*Buggeranus carunculatus*) are also in need of additional conservation. Both species are covered by various conservation ordinances. Unfortunately only few existing conservation areas provide adequate habitat. Habitat destruction, especially in the case of the wattled crane, edges of swamps and adjoining grassy vleis, is the main factor reducing the numbers and range of the species.

5.0 Rare and endangered reptile species

Three large reptile species are considered to be endangered in South Africa.

Nile crocodile (*Crocodylus niloticus*)

The species has suffered a drastic decline throughout the African

continent, notably through hunting for skins, habitat destruction and persecution as a potent competitor for man's activities.

In South Africa the species has found refuge in the Kruger National Park as well as in some of the larger private game reserves in the eastern Transvaal where perennial river courses still exist.

In Zululand, the Ndumu, Hluhluwe and St Lucia Game Reserves are the only refuges for the species. The St Lucia Game Reserve used to have the largest breeding population in Zululand, but this has suffered severely during the last few years by the salination of the system and by increasing human disturbance. The population has abandoned most of its age-old breeding grounds. The Ndumu population is at present the only large population within a conservation area (Pooley 1969).

As the breeding grounds and the areas where most crocodiles are encountered are not necessarily identical, the danger for survival lies outside the conservation areas. Breeding specimens are the largest ones and are much sought after by crocodile hunters.

A provincial ordinance was recently promulgated in Natal by which the species is given full protection throughout the province. The Natal Parks Board is rearing crocodiles in captivity for redistribution in those areas where they have been destroyed. A number of important breeding grounds in northern Zululand lie outside the existing conservation areas and attempts should be made to safeguard these from destruction.

Legal protection for the species in the Transvaal would be of great importance. The export of crocodile skins should be banned for a period to allow populations to recover. Crocodile farming as a means of commercial utilization should be given serious consideration.

Status: Endangered.

Turtle species

Two marine turtle species, the loggerhead turtle (*Caretta caretta*) and the leatherback turtle (*Dermochelys coriacea*) use the beaches of northern Tongaland as breeding grounds. Hughes (1970) gives a detailed literature review of the breeding of these species. The leatherback turtle is considered to be very rare and the Tongaland beach, stretching from the Mocambique border about 50 km southward, is one of the only nine known breeding grounds in the world.

Formal protection is awarded to the species at present, but this is considered inadequate largely because of the practical difficulties of enforcement. The creation of a marine turtle sanctuary on the beaches of Tongaland is strongly recommended. It would not only provide refuge for the turtles, but would help to protect vegetation unique to South Africa.

Status: Endangered.

6.0 Rare and endangered amphibian species

All available information seems to indicate that no species is in need of urgent or more special protection than that already offered in the existing conservation areas.

7.0 *Rare and endangered fish species*

A list of rare and endangered fish and proposals for possible refuges for the species have been drawn up for Project Aqua. All of the fish listed are endemic either to South Africa or even to specific water systems. The danger to their survival originates in the introduction of exotic species like trout or in the destruction of habitat due to building of dams, channelling of rivers, and so forth.

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