IUCN/SSC CAT SPECIALIST GROUP
AFRICAN CARNIVORE SURVEY
AND CHIPANGALI WILDLIFE TRUST

THE CATS OF SOUTHERN AFRICA

A SUMMARY OF THE CURRENT KNOWLEDGE OF THE SEVEN CAT SPECIES OCCURRING IN SOUTHERN AFRICA, WITH EMPHASIS ON CONSERVATION AND STATUS.

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COVER — Leopard *(Panthera pardus)* — Photo Kevin Wilson.

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Introduction

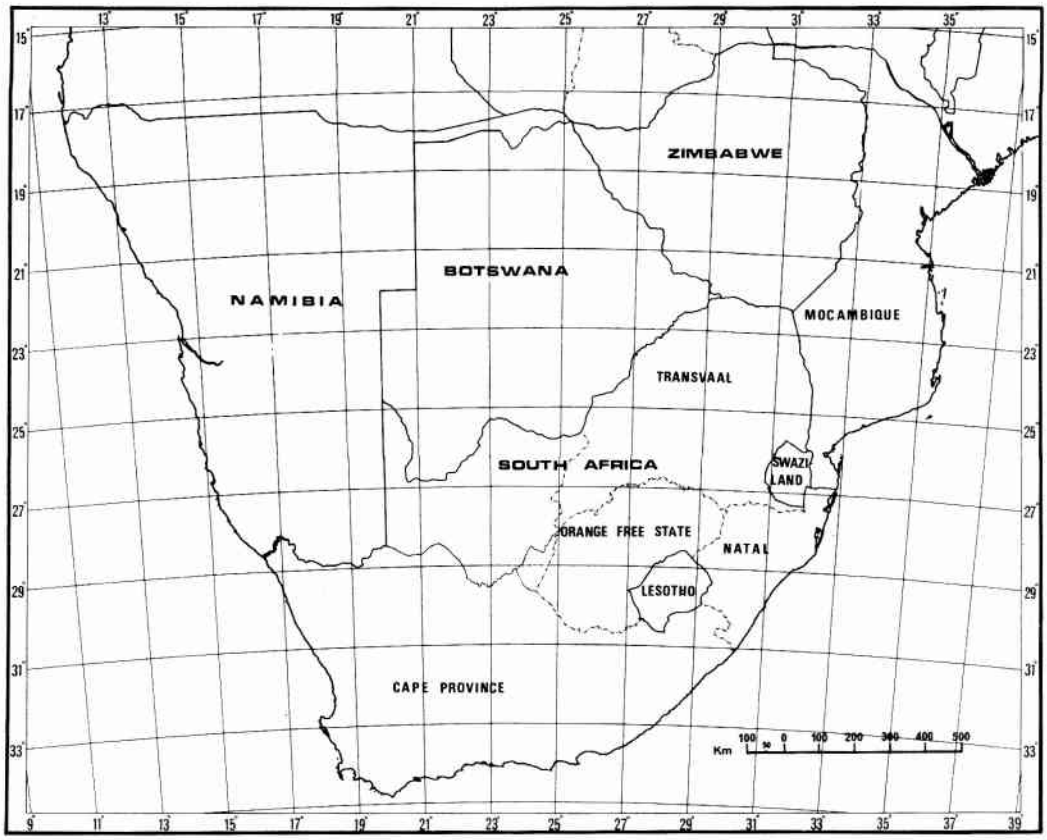
It is commonplace that in the last few decades man's attitude to the management of his environment has changed dramatically. However, despite an improved approach to conservation, even now the role of predators in the management of agricultural or protected areas is controversial and poorly understood. Even today the very mention of the word "carnivore" is often closely associated with vermin, and our knowledge of their ecology and influence on other animals is hopelessly inadequate.

The role of carnivores as consumers of secondary productivity, place them in the most vulnerable part of the food chain in any environment. They are dependent on herbivores, who in their turn are dependent on the vegetation; thus their numbers can be affected by human interference with the predators themselves, or with their food species, or with the food of their food species.

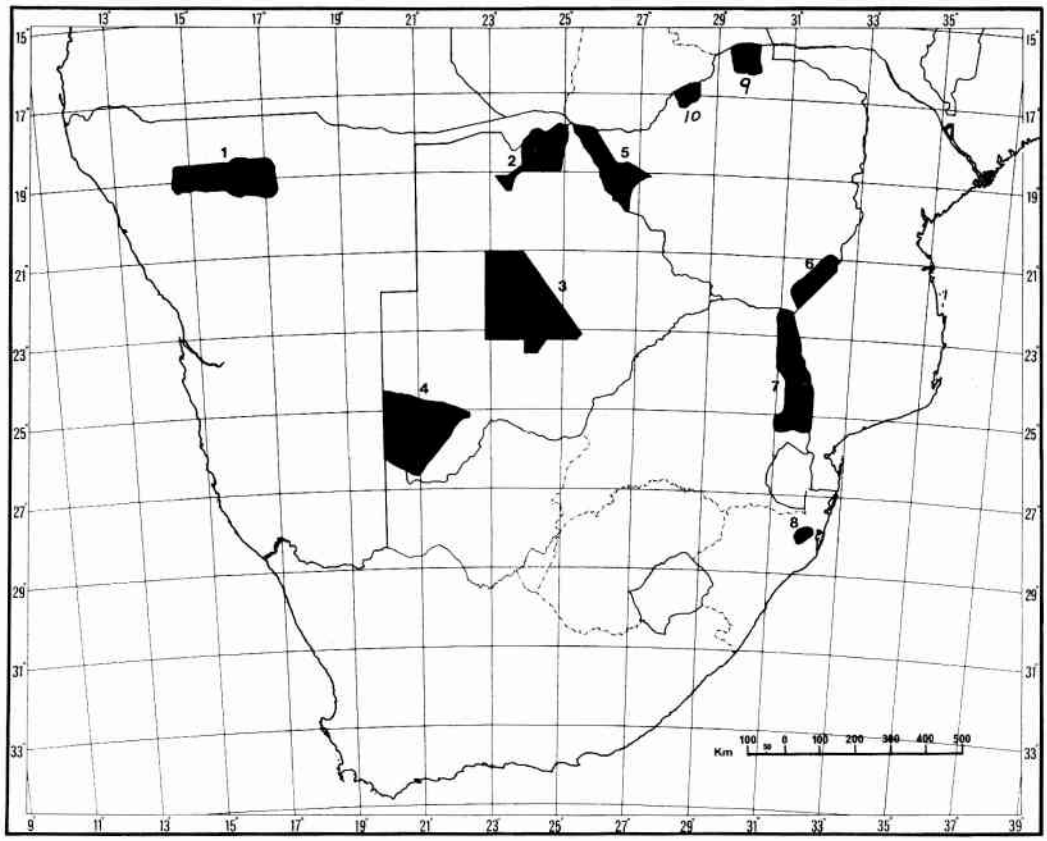
The Order Carnivora is made up of seven families, 92 genera and approximately 238 species that are currently recognised worldwide, of which one third occur on the African continent and on the island of Madagascar (Malagasy Republic). Thirty seven species of cat are currently recognised, of which nine fall into the "big cat" group. In Southern Africa we have seven species of cat, namely, lion, leopard, cheetah, caracal, serval, African wild cat and small spotted cat. Of these, only the small spotted cat is endemic, or restricted, to the confines of Southern Africa. Almost all species of cat are declining in numbers and range because of direct or indirect human influences.

Reduction in both numbers and range, or even local extinction, of the cats, is not only a loss in aesthetic terms but can result in the disruption of entire natural processes. As a result of increasing fragmentation of habitat and the pressure of human activities in their vicinity, the cats (particularly the larger species) may become problem animals. Demands then arise for elimination, or continuous control, not only of the offending animals but also of the populations as a whole. One cannot put carnivore conservation on a pedestal, it has to go hand in hand with overall conservation, and at the same time take into consideration the needs of the human communities that may be influenced by conservation action. Although the advantages of established conservation areas in the protection of our cat species cannot be over-emphasised, greater emphasis must be placed on conservation outside these areas.

Successful conservation relies on an adequate knowledge of the environment and its various biota. This booklet sets out to summarise existing knowledge on our seven cat species and examine their past and present distribution and numerical status. Past, present and future conservation problems are discussed and we attempt to give realistic overviews of possible solutions. We are aware that we are treading on controversial ground but we hope that this work will go some way to stimulating greater interest in the cats of Southern Africa and their conservation as part of greater systems.



MAP 1. The countries of Southern Africa. The provinces of South Africa are also named.



MAP 2. The principal National Parks and game reserves in Southern Africa with "big cat" populations.

1. Etosha National Park.
2. Chobe/Moremi National Parks.
3. Central Kalahari Game Reserve.
4. Kalahari Gemsbok National Park (South Africa); Gemsbok Park (Botswana).
5. Hwange/Matetsi/Zambezi National Parks and Safari Area.
6. Gonarezhou National Park.
7. Kruger National Park.
8. Hluhluwe/Umfolozi Game Reserves.
9. Mana Pools National Park.
10. Matusadona National Park.

Species Accounts: Ecology

General

As with all known carnivores, according to the fossil record the cats emerged from the miacids. However, the first recognisable felids were the sabre-toothed cats that appeared during the Upper Eocene. Sabre-toothed cats of the subfamily Machairodontinae are well represented in the Pliocene and Pleistocene deposits of Africa. All modern cats belong to the Family Felidae, consisting of a single subfamily, the Felinae.

The cats all have a similar appearance, with rounded heads, short muzzles and conspicuous, erect ears. Facial whiskers are well developed and often thought to be an adaptation to nocturnal movement in dense cover. The sharp, curved claws are retracted into protective sheaths when walking, or at rest. This ensures that they retain their sharpness for prey capture. The cheetah, although it is able to extend the claws, cannot retract them fully into sheaths but they remain partly exposed. The tracks show distinct clawmarks.

All cats show a preference for meat, although invertebrate food may be readily taken by some species from time to time. The large, well developed, canines are used for killing bites and the laterally flattened cheekteeth (molars, premolars) act as shears, slicing the meat into pieces small enough to swallow.

Hunting is mainly reliant on sight but olfactory (scent) "messages" play an important role in communication and territorial marking. Social life is regulated by visual, olfactory and to a lesser extent vocal signals. The lion is the most vocal of all the Southern African cats.

All cats give birth to blind and helpless young, usually in a well hidden den or shelter. The young stay with the mother for long periods, up to two years in the case of lion.

Key to the Cats of Southern Africa (After Smithers, 1975)

1. Claws, only partially retracted, not covered by sheaths, and leave distinct marks in tracks. Body with black spots; black line from inner corner of eye, down side of nose to upper lip (tear-line). Skull arched, in profile short and high. Long legs and tail.

Cheetah *Acinonyx jubatus*

2. Claws fully retractile. Body with distinct rosettes or spots; no tuft at tip of tail. No mane in the male, or black tear-line on face. Skull length up to 260 mm.

Leopard *Panthera pardus*

3. Body uniformly coloured, fawn/tawny and end of tail tufted. Adult males usually have well developed mane on head and neck. Skull length up to 460 mm.

Lion *Panthera leo*

4. Ears elongate, pointed and tufted at tip with long black hair; back of ears black with sprinkling of white hairs. More or less uniformly coloured, fawn/reddish, with lighter belly and faint spotting in same region. Short tail.

Caracal *Felis caracal*

Ears not elongate, not distinctly tufted, not jet black on the back 5

5. Upper parts of body distinctly barred and/or spotted 6
Upper parts of body uniformly coloured or indistinctly barred and/or spotted.

African Wild Cat *Felis lybica*

6. Size smaller, height at shoulder in adults not over 25 cm; legs short.

Small Spotted Cat *Felis nigripes*

Size larger; height at shoulder in adults over 38 cm; legs long.

Serval *Felis serval*

CHEETAH *Acinonyx jubatus* (Schreber, 1778)

Taxonomic Note

This is a monospecific genus, being the only species occurring throughout its African, Middle-eastern and Asian range. Allen (1939) lists seven subspecies for Africa but only five are generally recognised (Smithers, 1975). However, the validity of the subspecies is questionable. The nominate race, *Acinonyx jubatus jubatus* (Schreber, 1776) is the only one recognised as occurring in Southern Africa.

The so-called "King Cheetah" was given specific status, *Acinonyx rex* (Pocock, 1927), but it is now merely considered to be an abnormally marked form of *Acinonyx jubatus*. All known wild collected specimens or sightings come from a limited area of Southern Africa and these are shown on the accompanying map.

Description

The cheetah, sometimes referred to as the "greyhound" of the cats, is probably the most elegant member of the cat family. It is tall and slender with long legs and a short muzzle with a rounded head. The body colour is off-white to pale fawn and it is liberally dotted with black, rounded, spots more or less uniform in size. A clear black line (the "tear mark") runs from the inner corner of each eye to the corner of the mouth. Numerous small black spots are present on the forehead and top of the head. The tips of the ears are white. The long tail is black ringed with a white tip. A short erectile crest is situated on the back and sides, but this is often very short and indistinct. The cubs, up to three months of age, have a long, greyish coloured, mantle of hair on the back. This serves as a form of camouflage when they are at their most vulnerable to other predators. The cheetah is the only cat that does not have fully retractile claws and the impressions of the claws can be seen in their tracks. The total length measures about 2 m, the tail 70 cm and the mass ranges from 40 to 60 kg. For more detailed information see Appendix 1.

Reproduction and Development

Cheetah have a long drawn out and complex courtship and this has been described in detail by a number of authors (see the bibliography) and is only given in summary here. A male or males approach a female to test her reproductive condition and when excited may mock charge her and she will in turn mock charge the male. Their excitement at this stage leads to much urine spraying and scraping by the male. After between seven and fourteen days of this initial period the female comes into oestrus and is then receptive to the male. Aggression between males now reaches a peak and mounting of the female may take place but copulation is infrequent. Oestrus may last up to fifteen days but if fertilisation has not taken place, the female may enter further oestrus periods. Aggression between males and between male and female plays a vital role in the mating process. Litters of between one and five kittens, usually three, weighing between 250 and 300 g, are born after a gestation period of 90 to 95 days. For the first six weeks after birth they are usually hidden in dense plant cover, thereafter following the mother. The cubs are fully weaned at about three months after birth and at the age of between eight and twelve months they start to hunt and make their own kills. When the cubs leave the mother, they may do so as a group or singly.

Behaviour

The cheetah is normally seen singly, in pairs or small family parties consisting of a female and cubs. Males may form bachelor

PLATE 1 — Cheetah *(Acinonyx jubatus)* — Photo Vivian Wilson.

groups, usually consisting of between four and seven individuals. Despite the fact that cheetah are principally diurnal they are rarely seen, except in conservation areas. This applies especially where they are hunted on farmland.

Work undertaken on farmland in South West Africa/Namibia by Dieter Morsbach, has shown that male cheetah operate within an average home range size of 800 km^2, whereas females in his study covered an average range of 1 500 km^2. Range size may vary considerably from area to area and season to season. To date, no other such study has been undertaken in Southern Africa. The same study showed that cheetah moved considerably between farms and seldom stayed in one area for an extended period. Females with small cubs would remain in the same area for several months until they were old enough to accompany the mother. Males are apparently not territorial and may move over areas held by several females. Favoured lying up spots are usually raised above the surrounding area and are urine-marked by both males and females. When hunting cheetah stalk to within a short distance of their intended prey and then sprint in for the kill. Although they may top speeds of more than 70 km per hour this can only be sustained for a few hundred metres. In National Parks and other conservation areas cheetah numbers are lower in areas where other large predators, such as lion, leopard and spotted hyaena occur, as these carnivores are not only competing predators but they will also catch, kill and eat young and adult cheetah.

Diet

The main prey consists of medium to small ungulates, and the young of larger species, such as giraffe. They also take ground living birds, including ostrich and a wide range of small mammals such as hares. In the Kruger National Park impala and southern reedbuck are the most frequently taken prey, with lesser numbers of waterbuck, kudu and tsessebe. Impala are the most frequently taken prey in the Transvaal Lowveld. Springbok form the bulk of ungulate prey over much of Botswana, except in the north-east where impala is the principal food item. Records from Zimbabwe indicate that the main natural prey of the cheetah is impala, but as in keeping with other areas they also take young kudu, sable and tsessebe, as well as southern reedbuck, common duiker, steenbok and warthog. A similar picture emerges in South West Africa/Namibia, with springbok, young kudu and other ungulates making up a large percentage of this cat's prey. On game and stock farms they are unpopular as they tend to prey on the spectrum of game species, sheep, goats and calves of domestic cattle. As with the other

cat species dealt with in this booklet, no attempt is made to provide a comprehensive checklist of food items and the bibliography should be consulted for more detailed information on available literature.

Habitat

Although cheetah are usually associated with open grass-covered plains, they are also commonly found in savanna woodland associations. In Southern Africa cheetah occur in a wide range of habitats, including the arid, open Pro-Namib plains of South West Africa/Namibia and the Kalahari Thornveld. They previously occurred in the dry, scrub-covered plains of the South African interior. They are absent from areas of forest and dense woodland.

LION *Panthera leo* (Linnaeus, 1758)

Taxonomic Note

The lion was first described by Linnaeus from a specimen taken at Constantine, Algeria (Allen, 1924).

With the great variation in pelage colour, mane colour in males, size of adults and the skull form, many subspecies of lion have been named. Descriptions of these subspecies have often been based on captive animals, or on very few study specimens and in some cases even on only a single specimen. In view of this variation, even in a very limited area it is considered to be highly unlikely that all of these subspecies are valid and therefore only the nominate subspecies of the lion should be recognised for Africa, *Panthera leo leo*. The lion on the African continent and therefore including Southern Africa, is considered to be a monotype species.

Description

The lion is the largest of the African cats and it is easy to distinguish between males and females. Body colour is uniform but ranges from reddish-grey to pale tawny with lighter under parts. Although faint spots are present on the sides of cubs these are usually lost by the time they reach adulthood. The tail is short haired and the same colour as the rest of the body but a tuft of dark hair is situated at the tip. Only the adult male carries a mane of long hair, extending from the sides of the face on to the neck, shoulders and chest. Mane colour ranges from pale tawny to black. The highly publicised "White" lions of the Transvaal Lowveld are not true albinos but they are genetic varients, with strongly reduced pigmentation. Despite the fact that many lions are shot each year by sport hunters and farmers in some areas of Southern Africa, very few records of body measurements and mass are taken. Total length of males ranges from 2,5-3,3 m; tail 1 m; shoulder height 1,2 m; mass 150-225 kg. Females average smaller with total lengths of 2,3-2,7 m; shoulder height 1 m; mass 110-152 kg. For more detailed information consult Appendix 1.

Reproduction and Development

Lions in Southern Africa can be expected to breed at any time of the year. A lioness in oestrus is closely accompanied by a lion and during this time copulation is frequent, in some recorded cases every fifteen minutes for several hours. Oestrus lasts for four to sixteen days and periods between oestrus cycles varies from a few days and up to one year. One to four (rarely six) cubs, weighing about 1,5 kg, are born after a gestation period of approximately 110 days. The lioness gives birth under cover, only returning to the pride when the cubs are four to eight weeks old. However, she will only rejoin the pride if there are no cubs older than three months already present. As a lioness allows any pride cub to suckle, the presence of older cubs would prevent younger cubs from competing for milk. Cubs may remain with the mother for two years or longer. Cub survival is low, with an estimate of 50 per cent mortality in Kruger National Park (South Africa) and 60 per cent in Etosha Pan National Park (SWA/Namibia). Of course this will vary according to conditions such as food availability but gives an idea of the high level of mortality. Growth and development of lions has been studied in some detail in Southern Africa and the relevant references are given in the bibliography.

Behaviour

Lion, as the largest and most "visible" of the African cats has received considerable attention from biologists, with many studies

PLATE 2 — Lion and Lioness *(Panthera leo)* — Photo Vivian Wilson.

having been undertaken in game reserves in Southern and East Africa. Lions are the only true social felids in Southern Africa, living in prides of between three and thirty individuals. Pride size varies according to the area and prey availability. In Botswana prides usually consist of six or fewer members, whereas average pride size in Kruger National Park is about 12. Prides normally consist of from one to four adult males, several adult females (one of which is dominant over the other females) and a number of subadults and cubs. A pride's area or territory is defended against strange lions by both sexes but some prides and solitary males are nomadic. Territories are marked by urine, droppings and by earth-scratching. The mighty roars of the lion also serve to indicate that an area is occupied. Most of their activity takes place at night and during the cooler daylight hours. The lionesses undertake most of the hunting, and despite the fact that the lions play little part in most kills they feed before the females. Cubs compete for what remains once the adults have finished their meal.

Diet

Although the lion is mainly a hunter of medium to large-sized mammals, particularly ungulates, they will take a wide range of other food items, ranging in size from mice to young elephant. Lions also scavenge and will chase other predators, such as cheetah, from their kills. Detailed feeding studies of lion in Southern Africa have been undertaken in Etosha Pan National Park (SWA/Namibia), Kalahari Gemsbok National Park, Kruger National Park and the Hluhluwe/Umfolozi Game Reserve Complex (South Africa), Hwange National Park (Zimbabwe), Chobe National Park and Central Kalahari Game Reserve (Botswana). Consult the bibliography for more detailed literature. In order to give an indication of the wide range of prey items, records of one of the authors (VJW) for north-western Zimbabwe are here summarised; crocodile, eland bull, buffalo, zebra, ostrich, black-backed jackal, giraffe and antbear. In the Kalahari Gemsbok National Park lion take an equally wide range of prey items, including porcupine and springhare. Lion are considered to be a major problem in stock farming areas and are rarely tolerated.

Habitat

The lion has a very wide habitat tolerance, from the Namib Desert coast (Skeleton Coast Park), Kalahari Desert, to various savanna and woodland communities. The main requirements are a suitable and adequate food supply and shade.

LEOPARD *Panthera pardus* (Linnaeus, 1758)

Taxonomic Note

Although Smithers (1971) listed 13 subspecies of leopard as occurring in Africa, with only *Panthera pardus shortridgei* (Pocock, 1932) recognised for Southern Africa, the validity of many is questionable. The relatively small leopard inhabiting the coastal mountains of Cape Province (South Africa) is often erroneously thought to be a distinct subspecies but this is not the case.

Description

The leopard is an elegant, powerfully built cat with a distinctly marked coat. The basic body colour varies from almost white to orange-russet, with black spots on the legs, flanks, hindquarters and head. The spots over the rest of the body consist of rosettes or broken circles of irregular black spots. The tail is about half of the total length, with rosette spots above and a white tip. The ears are rounded and white tipped. The underparts are usually white to off-white. Cubs have dark, woolly hair and less distinct spots. Total length ranges from 1,6 to 2,1 m, tail 68 to 110 cm, shoulder height 70

PLATE 3 — Leopard *(Panthera pardus)* — Photo Vivian Wilson.

to 80 cm. The mass of males ranges between 20 and 90 kg, with females from 17 to 60 kg. Leopards from the mountain ranges of the Cape Province are generally much smaller than those from further north. Males are considerably larger than females. Appendix 1 gives more information on measurements.

Reproduction and Development

Being solitary felids, male and female leopards only come together briefly to mate. After a gestation of between 90 and 100 days a litter of two to three kittens is dropped. Although up to six cubs have been recorded in a single litter this is very unusual. Cubs are born in dense cover, rock crevices or caves and weigh between 500 and 600 g. The cubs first accompany the mother on hunts when they are about four months old and remain with her for slightly less than two years. At this stage they are approximately two thirds of adult size. There is no fixed breeding season.

Behaviour

Leopards are normally solitary except when a pair comes together to mate or when a female is accompanied by cubs. Although mainly nocturnally active, in areas where there is little disturbance they may be seen moving during the cooler daylight hours. The leopard is mainly terrestrial but it is a good climber and swimmer. Males mark and defend a territory against other males, and a male's territory may overlap that of several females.

Territories are marked with urine, droppings and tree scratching points. Home ranges vary considerably in size. In Southern Africa home range studies have been undertaken in two areas of the Cape coastal mountains; in the Cedarberg the average male range covers some 50 km^2 and in the Stellenbosch mountains approximately 400 km^2. Work done in the Kalahari Gemsbok National Park on two males revealed home range sizes of some 400 km^2 but a study in the Matobo National Park in Zimbabwe revealed an average range extent of between 10 and 20 km^2. Home range size is largely dependent on the availability of food. Although normally silent the leopard does have a characteristic call that has been likened to the sound of a coarse saw cutting wood. Leopard stalk and then pounce on their prey.

Diet

Leopards take a very wide range of prey species and it is this adaptability that helps explain their ability to survive in areas where other large predators have long disappeared. Their food ranges from insects, rodents, birds to medium-sized and occasionally large antelope. In some rocky mountainous areas rock hyrax (dassies) make up an important part of its diet. Studies in Matobo National Park, Zimbabwe, showed that hyrax and klipspringer had the highest percentage occurrence; 78 per cent of the leopard's diet in Kruger National Park consists of impala. Studies in the coastal mountains of Cape Province have shown that hyrax is the most important species in the diet of leopard in this area. Preliminary studies by one of the authors (CTS) indicate that leopard in the Soutpansberg (Northern Transvaal) also include a high percentage of hyrax in their diet, with smaller numbers of antelope of several species. This cat is considered to be a problem in stock farming areas.

Habitat

The leopard has an extremely wide habitat tolerance, from high mountains to coastal plains and low or high rainfall areas. This adaptability has ensured that the leopard is still the most widespread of the three large Southern African cats.

CARACAL *Felis caracal* (Schreber, 1776)

Taxonomic Note

Although there is some dispute about placing the caracal into the genus *Felis,* rather than in its own genus *Caracal,* most authorities today prefer the former. The type locality is Cape of Good Hope. Allen (1954) listed nine subspecies for Africa of which three have been recognised as occurring in Southern Africa; namely *F. c. caracal, F. c. limpopoensis* (Roberts, 1926) and *F. c. damarensis* (Roberts, 1926). Smithers (1983) has suggested that it is doubtful if *F. c. limpopoensis* is valid but he favours the retention of *F. c. damarensis* on the basis that the pelage colour of animals from arid north-western areas of Southern Africa is generally paler than those from other areas. However, one of the authors (CTS) who has examined large numbers of specimens from most regions of Cape Province, feels that pelage colour variation is so great that the justification for retaining any but the nominate race for Southern Africa is questionable. As further pointed out by Smithers larger samples would possibly make it possible to show that there may be a cline in colour from west to east and north to south.

Description

The caracal is a robustly built cat, with hindquarters raised slightly higher than the shoulders. The tail is short and the same colour as the body but it is occasionally dark tipped. The long, pointed ears with the tuft of long black hair at the tip are characteristic. The backs of the ears are black, liberally sprinkled with white hairs. The unicolour coat of the caracal varies from reddish-grey, to sandy brown or brick red. The coat is usually grizzled with silvery-white hairs but the level of grizzling is very variable. The underparts are white to off-white and faint spotting is often present. The face is distinctly marked with various black and white patches and lines (see the photograph). The only large series of measurements of caracal is available from Cape Province and these are presented in Appendix 1. Total length ranges from 70 to 110 cm, tail 18 to 34 cm, shoulder height 40 to 45 cm and mass 7 to 19 kg. Females are consistently smaller than males.

Reproduction and Development

Caracal are solitary cats and male and female only come together for mating. Mating behaviour is similar to that recorded for other cat species and the mean gestation length is 79 days. The number of kittens per litter varies from one to five but one to three is usual. Although litters have been recorded in all months of the year (Cape Province) there is a distinct increase in births between October and February. Kittens are weaned between 15 and 24 weeks after birth, with the first solid food being taken at three and a half to eight weeks. Full permanent dentition is developed at ten months of age. Birth mass is approximately 250 g. Kittens may be born in burrows excavated by other species, in rock crevices or amongst dense vegetation.

Behaviour

Although caracal are predominantly nocturnal, crepuscular movement is not unusual. Daylight sightings are, however, rare. The caracal is a solitary cat, with male and female coming together to mate but otherwise contact between individuals is limited to females accompanied by young. From work done in the south-western sector of Cape Province it seems that caracal are territorial, using urine, droppings and "scratching trees" to mark such areas. Home range sizes for four females in the same area averaged 18,2 km^2 and for a male some 65 km^2. This will no doubt vary from area to area, according to level of persecution and availability of food. In a study currently in progress in the Negev Desert in Israel home range size is very large with males covering some 200 km^2 and females 100 km^2. Hunting relies on stalking and pounce, or short, fast run at prey. They are incredibly fast and are adept at hooking birds out of the air as they take off.

Diet

Caracal are predominantly predators of small or medium-sized mammals, up to the size of mountain reedbuck and bushbuck ewes, but readily take mice. In a study undertaken in Cape Province of a large sample of stomach contents and droppings mammal remains

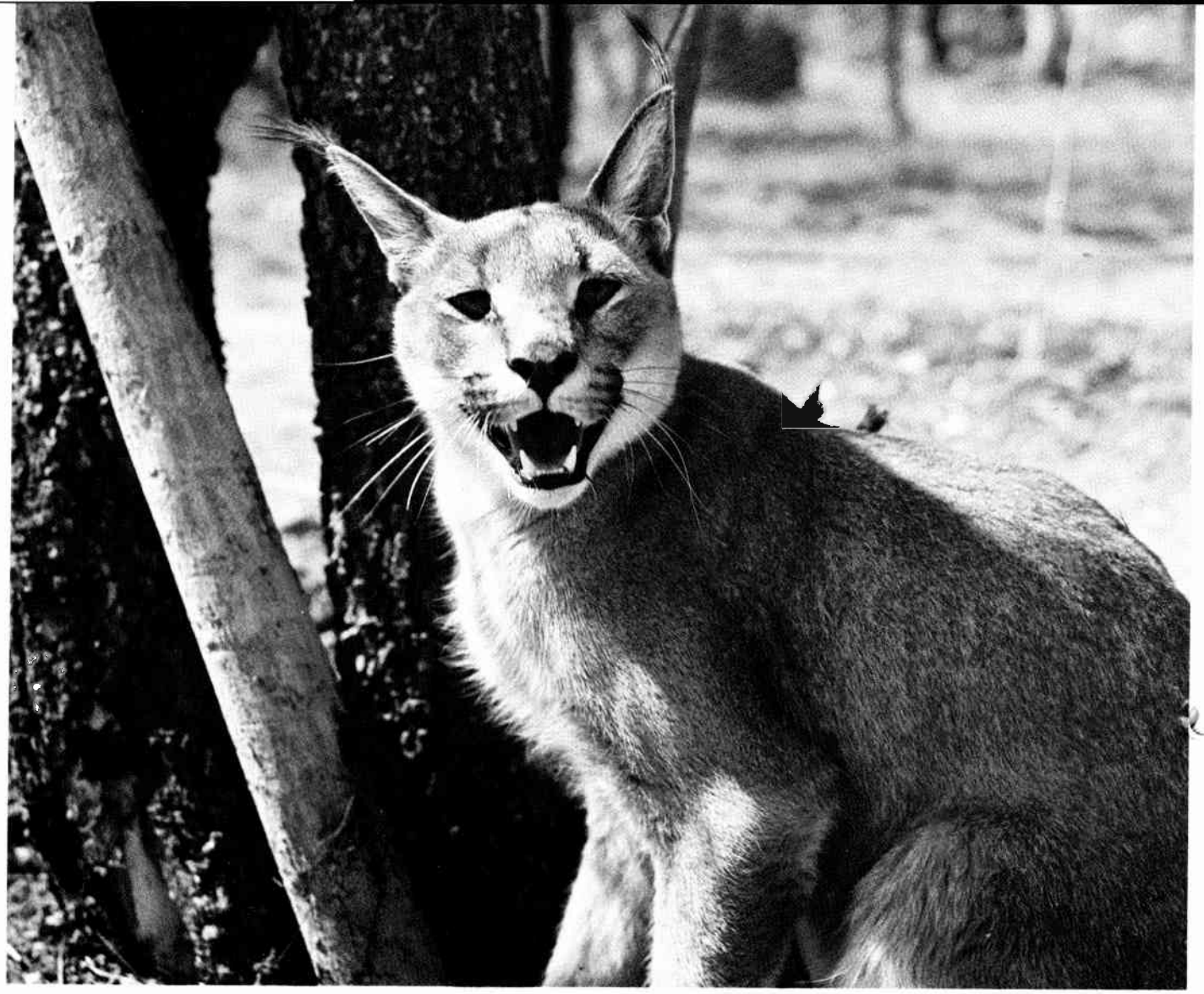


PLATE 4 — Caracal *(Felis caracal)* — Photo Vivian Wilson.

were found in more than 90 per cent of the sample. Birds are taken quite frequently, with reptiles occasionally recorded. In areas where hyrax occur they form an important part of caracal diet. Small antelope, such as common duiker, steenbok and grysbok feature strongly in this cat's diet in some areas. Hares and spring-hares also feature prominently. In parts of South Africa and southern South West Africa/Namibia caracal are the principal wild predators of sheep and goats and as such are heavily persecuted. Scavenging has been recorded but is very rare.

Habitat

Caracal occur in every major habitat type in Southern Africa but they appear to be absent from most of the Namib Desert. Contrary to the current literature caracal are found in the evergreen forests of the Southern Cape.

SERVAL *Felis serval* (Schreber, 1776)

Taxonomic Note

There is some doubt as to the validity of the type locality given by Schreber, as Cape of Good Hope, as Smithers (1983) indicates that there remains some doubt as to the past occurrence of serval in the Cape Peninsula. Certainly they were present in the vicinity of Somerset West and suitable habitat on the Cape Flats existed until recent times. Cape of Good Hope may have been used in its broader context. Allen (1939) listed some 17 subspecies of the serval of which 14 were of the *F. serval* group, and three of the *F. brachyura* group. The latter group has not been recorded from Southern Africa. There is considerable variation in background colouration and patterning in serval occurring in Southern Africa and Smithers (1978) has suggested that until such time as more material is available for study only the nominate race is recognised for this region.

Description

This is a slender, long legged, spotted cat with a short tail and large, rounded ears. The body colour is very variable but it is usually yellowish-fawn with scattered black spots and bars. Black spots and bars are present on the neck and black bands extend down the legs. The under parts are usually paler but spotted. The back surface of the ear has a black band, separated from the black tip by a white patch. This plays an important role in communication between individuals. The short tail is banded with black and has a black tip. Serval have a total length of between 96 and 120 cm, tail 25 to 38 cm, shoulder height 60 cm, and a mass of between 8 and 13 kg. More information on measurements are given in Appendix 1.

Reproduction and Development

One of the authors (VJW) has recorded the mating behaviour of serval on many occasions in captivity. Nothing appears to have been recorded in the wild in Southern Africa on serval mating. There is a marked increase in urine squirting by the female when she

is in oestrus but mating follows the typical felid pattern. The female is highly vocal during actual copulation with a combination of screams and growls, which can be heard from up to 200 metres away. Estimates of gestation differ widely in the literature but observations of 15 litters of known gestation averaged 73 days with a range of from 70 to 79 days. From one to three kittens per litter is usual but up to five kittens have been rarely recorded. Twenty nine newly born kittens weighed at Chipangali Wildlife Orphanage in Zimbabwe, averaged some 241 g, with a range of between 218 g and 260 g. The eyes open between the seventh and tenth day and the kittens accompany their mother from about the fourth month. At Chipangali births have been recorded throughout the year but with a distinct peak from September to February. The records that are available for Southern Africa as a whole indicate that most births take place from September through to April, with a peak towards the end of the wet summer period. Although more than one litter per female per annum has been recorded in captivity it seems likely that single litters are usual in the wild. The female usually gives birth in burrows dug by other species or amongst dense vegetation.

Behaviour

The serval is mainly crepuscular and nocturnal in habit but occasional daylight activity has been recorded. In areas where it is closely associated with human settlements it is completely nocturnal. Although usually single animals are encountered, pairs are frequently observed, as are females with young. Captive observations of females with small kittens indicate that they are highly intolerant of other serval. While the species is predominantly terrestrial they will take readily to trees if pursued by dogs or other larger wild carnivores. Serval are known to wander widely but to date no study of home range has been undertaken in Southern Africa. Work undertaken in the Ngorongoro Crater of Tanzania indicates that home ranges in that region cover about 10 km^2 with very little range overlap between individuals. The serval has acute hearing and sight but in many instances when hunting rodents in long grass or reedbeds hearing is of critical importance. In addition to its large ears, the serval has, relatively, the longest legs of any felid and this is an adaptation to its hunting technique rather than for rapid running. Having long legs is an obvious advantage in the long grass and reedbeds, which are the principal hunting grounds of this cat.

Diet

Serval have been recorded as hunting a wide range of small mammals, birds, reptiles and amphibians. However, rodents make up the much larger percentage of total intake. A study undertaken in Zimbabwe found that rodent remains occurred in 97 per cent of a sample of 65 stomach contents, of which the Angoni vlei rat and multimammate mouse were by far the most important. The largest prey items recorded in Zimbabwe studies were cane rat *(Thryonomys* sp.), scrub hare and klipspringer. There appears to be no other literature record of antelope prey being taken in Southern Africa and can be taken as atypical. Most feeding records indicate the grassland/marshland usually frequented by serval.

Habitat

Water, tall grass, reedbeds and other forms of cover are essential for the survival of this cat. All observations and specimens taken of serval in Botswana and Zimbabwe were associated with rivers, pans, swamps or waterholes.

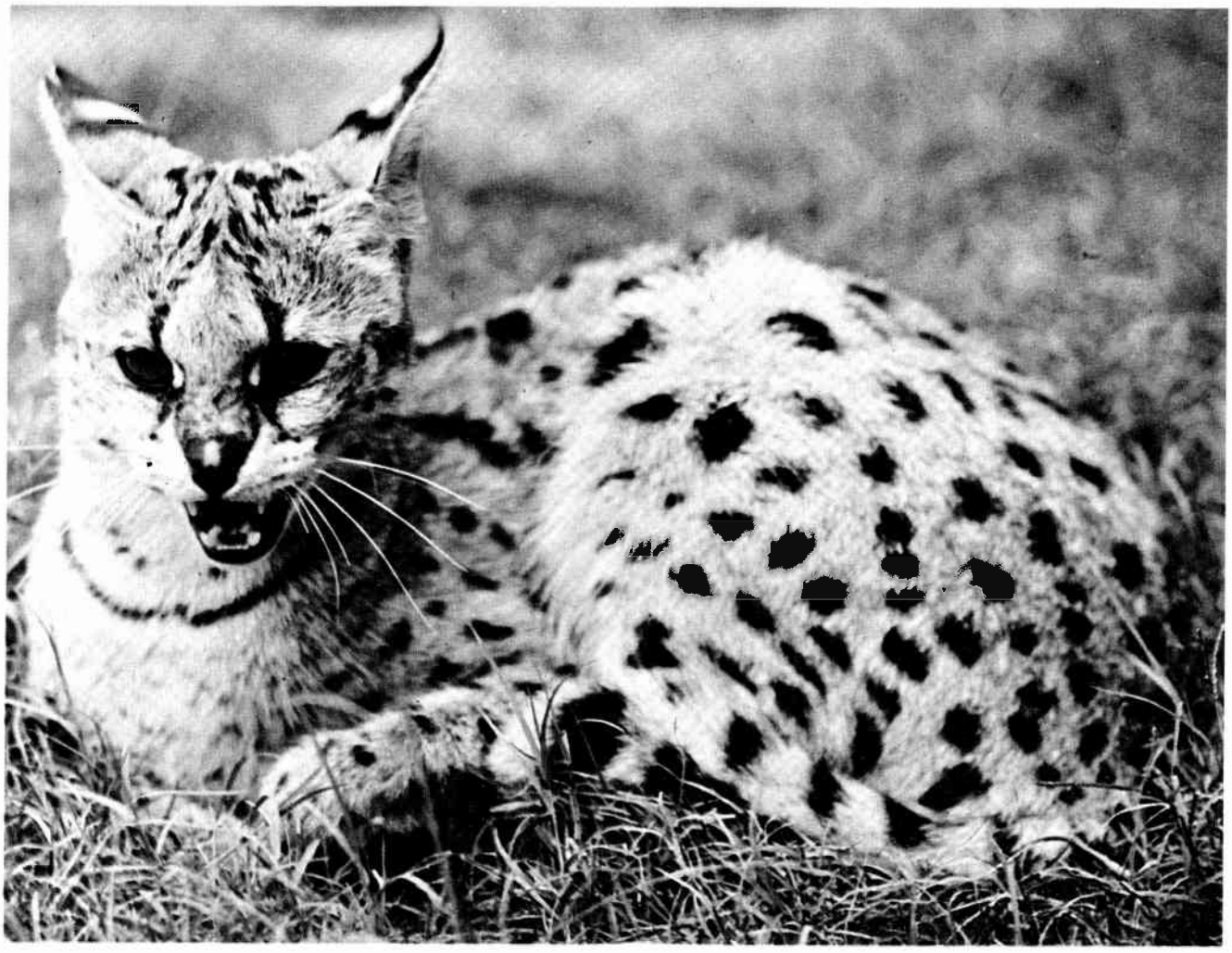


PLATE 5 — Serval *(Felis serval)* — Photo Vivian Wilson.

AFRICAN WILD CAT *Felis lybica* (Forster, 1780)

Taxonomic Note

Allen (1939) listed 15 subspecies of *Felis lybica* as occurring on the African continent, of which five were accepted as occurring in Southern Africa (Roberts, 1951). However at the present time only two subspecies are recognised for this region, *Felis l. cafra* (Desmarest, 1822) and *Felis l. griselda* (Thomas, 1926). They are separated on the basis of pelage colouration. The much paler *griselda* is found in the arid south west and central areas, with the darker *cafra* being found over the rest of the subcontinent. However, there is considerable variation within each subspecies. A major complicating factor is the regular hybridisation between the African wild cat and the domestic cat. Pure African wild cat are distinguished by the rich red hair behind the ears, which in hybrids is either grey, blackish or with red only at the base. Hybrids are encountered in many areas and most pure animals are now only encountered in areas far away from human habitation.

Description

The African wild cat is similar in general appearance to the domestic cat but larger with proportionally longer legs. The general body colour ranges from pale sandy brown in drier areas, to light or dark grey in areas with higher rainfall. The body is marked with more or less distinct dark vertical stripes. The tail is relatively long, dark ringed with a black tip. The chin and throat are white and the chest is usually paler than the rest of the body. The belly is usually reddish, particularly in animals from the more arid areas. The back of each ear is coloured a rich reddish-brown. They interbreed readily with domestic cats and hybrids can cause considerable confusion as they often show many of the wild cat characteristics but always lack the totally red-coloured backs of the ears.

Reproduction and Development

Little is known of the reproduction of the African wild cat in the wild. Between two and five kittens (average of three) are born after a gestation period of about 65 days. Although most litters are born between September and March there are a few records from other months. The kittens are born in burrows dug by other species, in rock crevices or amongst dense vegetation.

Behaviour

The African wild cat is a solitary species except when a pair come together for mating or a female is accompanied by kittens. These cats are almost exclusively nocturnal and only rarely are they seen moving during daylight. During the day they usually lie up in rock crevices, amongst dense vegetation and also in low branches of trees. The latter is particularly noticeable in the Kalahari where cover is at a premium. Territories are established and defended by both sexes but no work has been done on the sizes of territories/home ranges in Southern Africa. Urine is probably the principle means of marking individual territories, but droppings, which are usually buried, probably also play a role. Droppings are also deposited in small middens, particularly in rocky areas. Observation of captive individuals indicates that they hunt in much the same way as the domestic cat, making maximum use of even minimal cover.

Diet

By far the greater part of the diet of the African wild cat consists of small rodents. Percentage occurrence of mice and rats in stomach contents in three separate studies were, Botswana (74 per cent), Zimbabwe (72 per cent) and Cape Province, South Africa (54 per cent). A total of 171 stomach contents were examined. Other mammals taken include young hares, rock hyrax, springhare and elephant shrews. Juvenile antelope are occasionally taken. Newborn lambs of domestic sheep are taken in some areas but the level of predation seems to be exaggerated. Birds and reptiles are also taken, with the former ranging from 10 per cent to 21 per cent in the three studies. Insects and other invertebrates also feature importantly in the diet of the African wild cat.

Habitat

The wild cat tolerates a very wide range of habitats and it is only absent from the coastal fringe of the Namib Desert but even here it follows the river beds in the north and central areas to close proximity with the coast. It is even found on the open plains of the central interior of Southern Africa, where it lies up in burrows excavated by other species and amongst rock outcrops.

PLATE 6 — African wild cat *(Felis lybica)* — Photo Vivian Wilson.

SMALL SPOTTED CAT/BLACK-FOOTED CAT *Felis nigripes* (Burchell, 1824)

Taxonomic Note

The only felid entirely restricted to the Southern African sub-region, the small spotted cat, the nominate form *Felis nigripes nigripes* (Burchell, 1824), is described from a specimen taken near Kuruman in Cape Province. In the southern areas of its distribution, based on difference in pelage colouration, Shortridge (1931) named *E. n. thomasi.*

Description

This is the smallest felid occurring in Southern Africa. Pelage colour ranges from reddish-fawn in the southern form, *F. n. thomasi,* to pale tawny or almost white in the northern form, *E. n. nigripes.* Numerous black (or red-brown in the north) spots and bars are present on the body, legs, head and the tail. The short tail is black-ringed and tipped. The chin, throat and chest are white but there are two or three distinct dark bands on the throat. The under parts of the northern form are white but off-white to tawny in the southern form, both with dark spots. The backs of the ears are the same colour as the general pelage, or slightly darker, but never red-brown as in the African wild cat. Total length ranges from 50 to 63 cm, tail 16 cm, shoulder height 25 cm, and the mass runs from approximately 1 kg to 2 kg. Measurements are given in more detail in Appendix 1.

Reproduction and Development

Oestrus cycles are short apparently, only one or at most, two days. Virtually nothing is known about this aspect of small spotted cat biology, but recorded information indicates that kittens are born during the mid-summer months but it may be shown to be broader when more information becomes available. Captive breeding certainly points to a wider breeding season. Gestation is approximately 67 days, with litters of one to three kittens. Birth mass ranges from 60 to 88 g. Although no litters have been found in the wild, it seems likely that they make use of burrows dug by other mammals to drop and raise the young. The eyes are open between the third and ninth day following birth. By the end of the first month they are eating solid food.

Behaviour

Virtually nothing is known of their behaviour in the wild but they are exclusively nocturnal and rarely seen. Most sightings are of solitary animals but observations of captives are contradictory, in that some observers record a close bond between male and female, and others indicating a high level of intolerance. An ecological study of this rare felid is to be undertaken as part of the African Carnivore Survey programme.

Diet

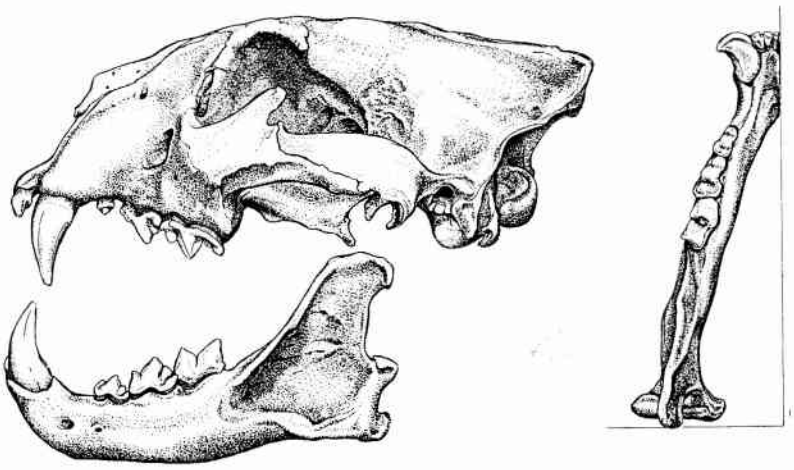
The few records that exist from stomach contents indicate a strong preference for small rodents, arachnids and insects, with reptiles, birds and other small mammals playing a lesser role.

However, further study is required. A record from the Eastern Cape province of a small spotted cat being caught in a trap baited with a dead guinea fowl indicates that they will also scavenge.

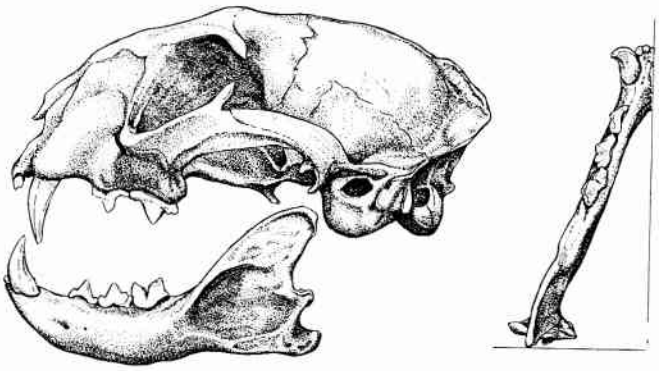
Habitat

They are found in open, dry habitats with some vegetation cover.

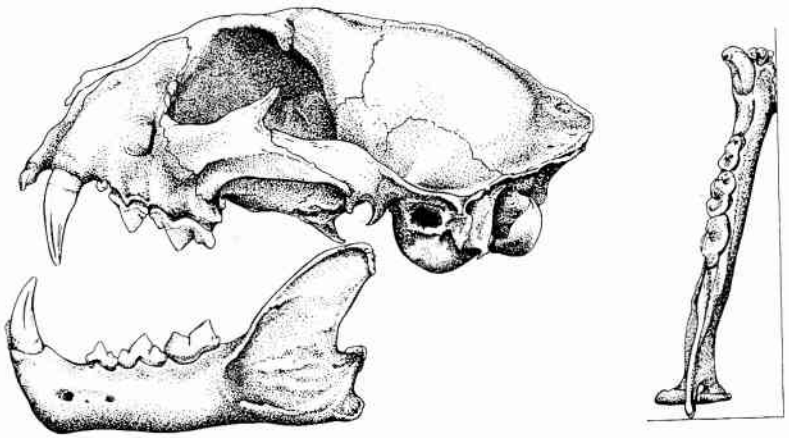
PLATE 7 — Small spotted cat *(Felis nigripes)* — Photo Chris and Tilde Stuart.



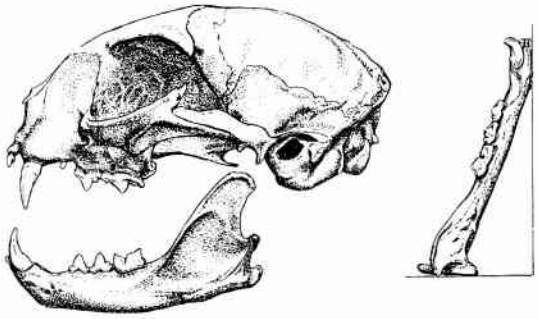
Lion *(Panthera leo)*. Credit: P. R. Meakin.



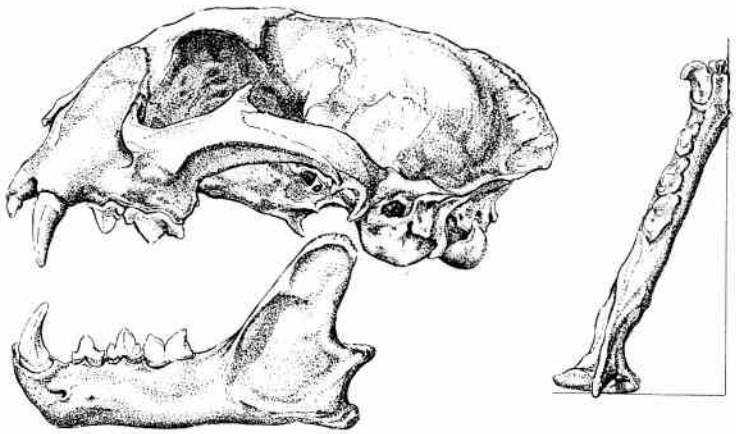
Serval *(Felis serval)*. Credit: P. R. Meakin.



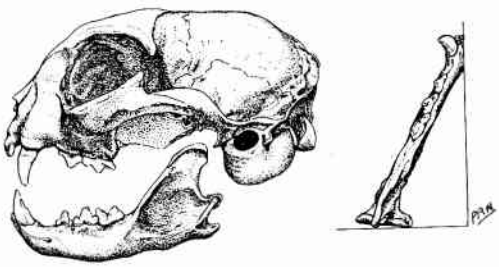
Leopard *(Panthera pardus)*. Credit: P. R. Meakin.



African Wild Cat *(Felis libyca)*. Credit: P. R. Meakin.



Caracal *(Felis caracal)*. Credit: P. R. Meakin.



Small Spotted Cat *(Felis nigripes)*. Credit: P. R. Meakin.

Species Accounts: Distribution and Conservation Status

General Preamble

The distribution of the three large cats occurring in Southern Africa has been greatly modified since the advent of European settlement. Lion and cheetah have been most seriously affected, whereas the leopard has been able to survive in some areas vacated by the other two because of its greater adaptability, both to habitat and diet. Unfortunately, little historical information is available for the *Felis* species but it would seem that there have been minor modifications in both distribution and conservation standing. These are discussed separately in the species accounts.

Three maps are presented for each of the three large felids, one indicating probable past distribution, a second showing current distribution limits (it should always be remembered that individuals may be encountered outside these areas but secure populations are not present) and a third indicating specimen and sight records. Two maps are given for the four smaller cats, one showing current distribution limits and the other specimen and sight records.

Conservation status is discussed for each species but population estimates are only presented for the three large species. A word of caution — carnivores are notoriously difficult to count accurately and apart from estimates for the larger national parks and game reserves, other figures given in this work should be seen as approximate only. There is an urgent need to know how many animals we are dealing with in order to improve conservation planning.

Cheetah

Once found virtually throughout Southern Africa, with the possible exception of the Namib Desert coastal fringe, forested and high mountain areas, the cheetah has now been pushed back to the north of 25° South. There are occasional sightings to the south of this line but these involve the movements of vagrants. Cheetah have been re-introduced to a number of game reserves south of this line. Examination of historical records indicates that cheetah were probably never common, possibly because of competition with other large carnivores. The bibliography should be consulted for further information sources and the individuals/organisations who provided information are listed separately. This applies to the three large cats.

SOUTH WEST AFRICA/NAMIBIA

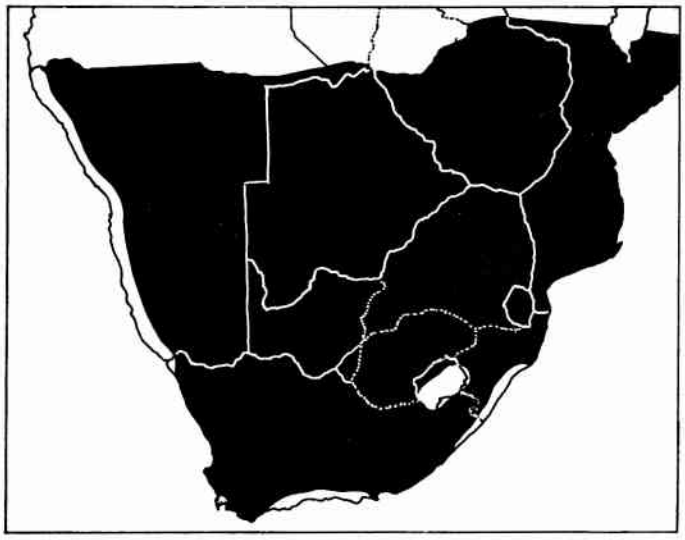
Still widespread in this territory, the cheetah is, however, under considerable pressure from farmers. Densities are highest to the north of the Tropic of Capricorn but smaller numbers do occur to the south. Apart from farmland, small numbers of cheetah still occur in Damaraland, Kaokoland, Bushmanland, Kavango, Caprivi and Hereroland. Only two major conservation areas, Etosha National Park and the Namib-Naukluft Park have cheetah populations. Estimates of numbers vary considerably, from 2 000 to 6 000 on farmland, but the true figure possibly lies somewhere between the two. Many farmers believe that there has in fact been an increase in cheetah numbers and ascribe this to the eradication, or reduction, of other large predators and an increase in kudu numbers which in the form of calves supply a regular food source. Fewer than 400 cheetah are estimated to be present on the traditional areas with non-commercial farming. There are probably fewer than 70 cheetah in the two major game parks already mentioned. Recently proclaimed reserves in Kavango/Bushmanland have small cheetah populations. Based on the above figures only 1,5 per cent to 4 per cent of cheetah in the territory occur in proclaimed conservation areas.

BOTSWANA

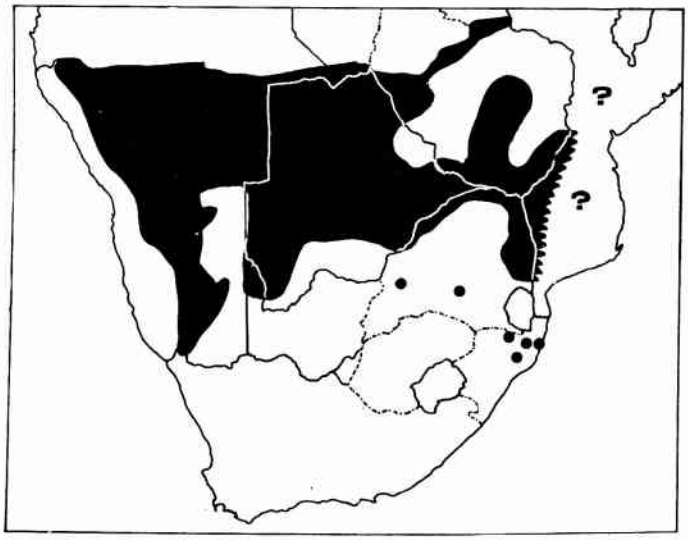
Cheetah have a wide distribution in Botswana but they are absent from the area of dense human settlement in the extreme south. No detailed survey of any of the cats has been undertaken in Botswana. The large conservation areas and low human population and agricultural development in this country is beneficial to the survival of cheetah but it is essential that a survey be undertaken to establish the current situation. An estimate of some 2 500 cheetah would be reasonable based on literature and other records. However, it must be stressed again that this is a very rough estimate, and detailed information from the field is lacking.

ZIMBABWE

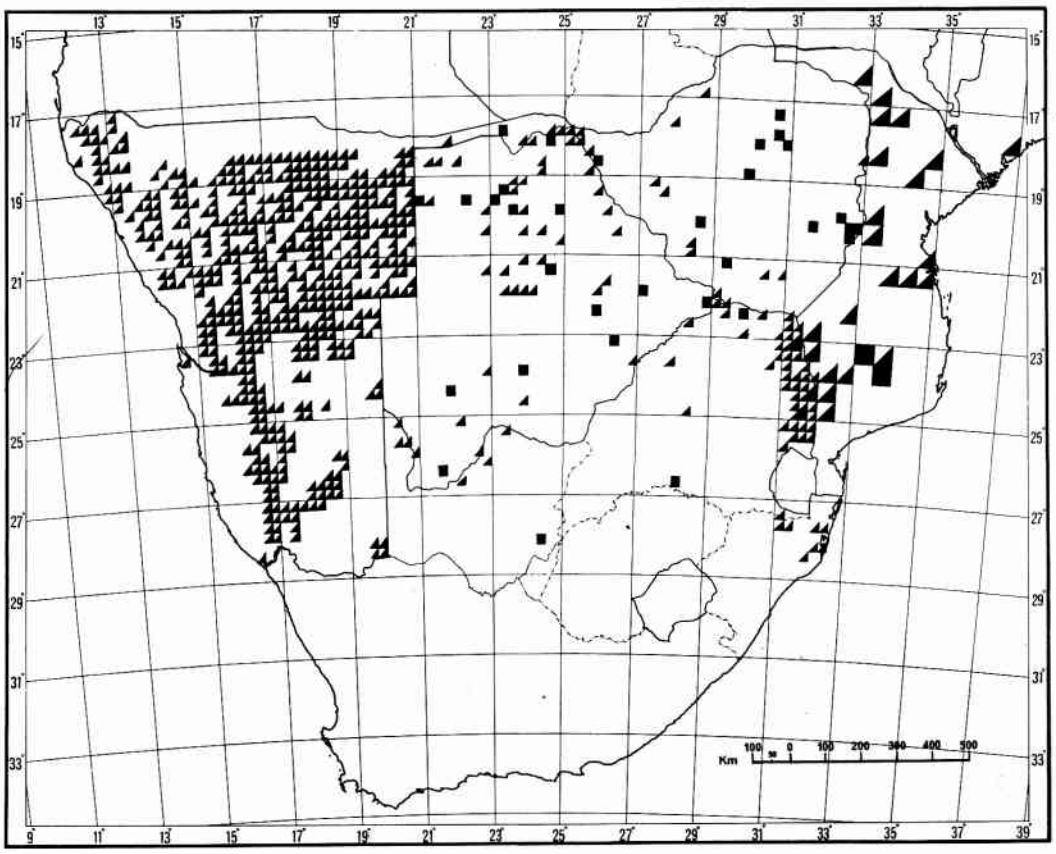
Although widespread in Zimbabwe they are largely absent from the north-east. The two main cheetah populations are to be found in southern and north-western areas, the latter consisting of large areas of conserved land. These two areas account for less than 400 (370) cheetah, with the remainder of about 100 being distributed over the Middle Zambezi Valley, Midlands and Gonarezhou. It is



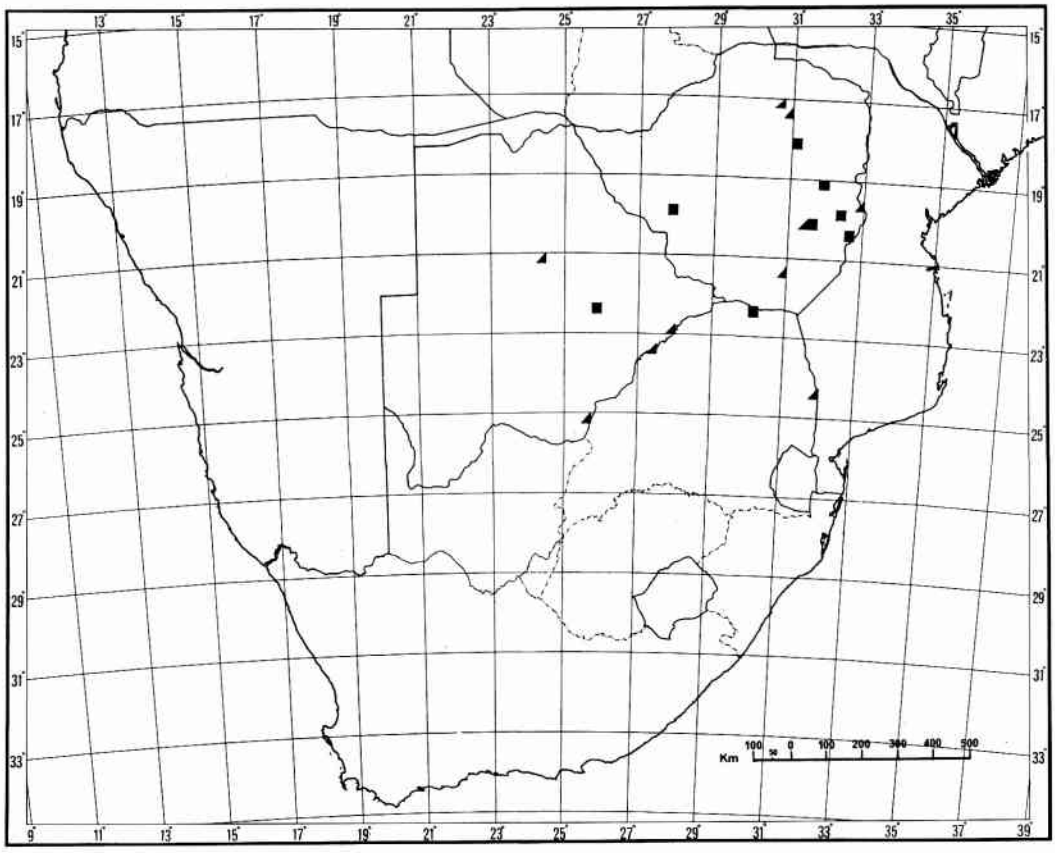
MAP 3. The past distribution of cheetah in Southern Africa.



MAP 4. The approximate limits of present distribution of cheetah in Southern Africa. The six isolated records indicate reserves where cheetah occur in isolation. Current distribution in Moçambique is uncertain.



MAP 5. Locality records for cheetah in Southern Africa. Squares indicate specimen records and triangles show sight, literature or other records. The great number of records for South West Africa/Namibia and the Eastern Transvaal (South Africa) are indicative of intensive research programmes and should not be taken as an indication of abundance. (Dieter Morsbach of the South West African Division of Nature Conservation is thanked for providing the information for that country).



MAP 6. Specimen (squares) and sight (triangles) records of the so-called "King Cheetah" (after Hills and Smithers, 1980).

estimated that about 80 per cent of the total occur on privately owned farmland. Conservation areas with cheetah include Hwange National Park (80), Matetsi Safari Area/Kazuma National Park/Zambezi National Park (60-80). (The difficulty of establishing population estimates is made clear by the variation in estimates by two different observers in a hunting concession in the Matetsi, from 2-3 to approximately 30!) Occasional sightings have been reported in and around the Matobo National Park. Between ten and twenty animals are estimated in all the National Parks and safari areas in the Lake Kariba valley. A small number occur in the Mana Pools and Lower Zambezi area, with an unknown number in Gonarezhou.

MOÇAMBIQUE

Once widely distributed in Moçambique, cheetah are now considered endangered, with one estimate of only 100 remaining in that country (see Bibliography). Relict populations apparently survive in parts of Gaza and Inhambane Provinces and the southern regions of Tete Province. The long standing war situation has made it impossible for the authors to obtain recent information.

SWAZILAND AND LESOTHO

Cheetah almost certainly occurred in Swaziland in the past and possibly on the more open northern margins of Lesotho. Cheetah no longer occur in either country.

SOUTH AFRICA

Cape Province. Previously found over much of this province they are now restricted to the Kalahari Gemsbok National Park, where an estimated population of 60 individuals occur. There is free movement across the Botswana border and the population is not confined. Vagrants have been recorded within the Province, close to the Botswana border, in the northern Cape Province and in the north-western sector of Namaqualand. Despite their protected status these animals are usually shot.

Orange Free State. Cheetah occurred here in the past but are now extinct in this Province.

Natal. Though extinct as free-living populations animals have been introduced to the following conservation areas: Itala, Hluhluwe/Umfolozi, Mkuzi and Eastern Shores. Although no accurate estimate of numbers is available, there are probably between 100 and 150 cheetah present in these Natal reserves.

Transvaal. Approximately 500 cheetah occur in the Transvaal, of which some 400 occur in conservation areas (Kruger National Park and adjacent privately owned game parks). Small numbers are also present in the Suikerbosrand Nature Reserve and Pilanesberg National Park. The remainder are found in two main areas, one in the Hans Merensky/Gravelotte "block", also adjacent to Kruger National Park and the other the north-western sector bordering on Botswana. This last mentioned population is low (certainly less than 50 animals) and there is movement across the Limpopo River (dry for much of the year). Previously this cat occurred over much of the Transvaal.

Lion

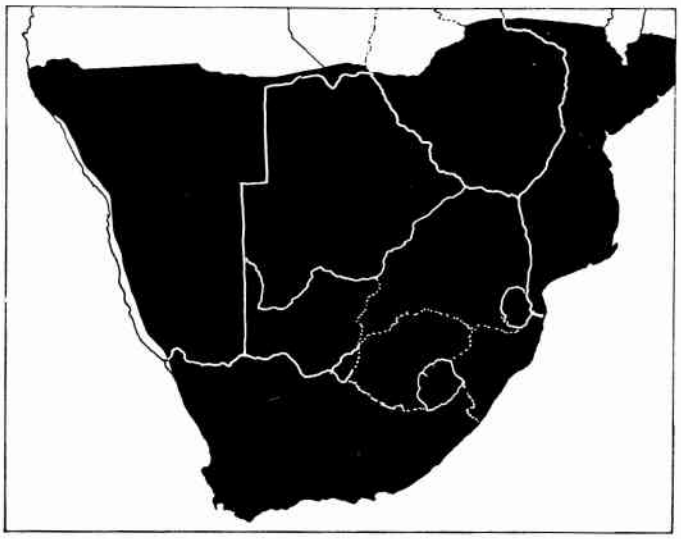
Lions were found virtually throughout Southern Africa in the past but are now pushed far to the north. Except in Botswana, Moçambique and to a lesser extent Zimbabwe lion populations are largely restricted to conservation areas. "Breakouts" from these areas are however quite frequent and as virtually all reserves are surrounded by farm land or settlements these animals are usually shot. With continuing development in Southern Africa the chances of lion populations surviving outside conservation areas are remote.

NAMIBIA

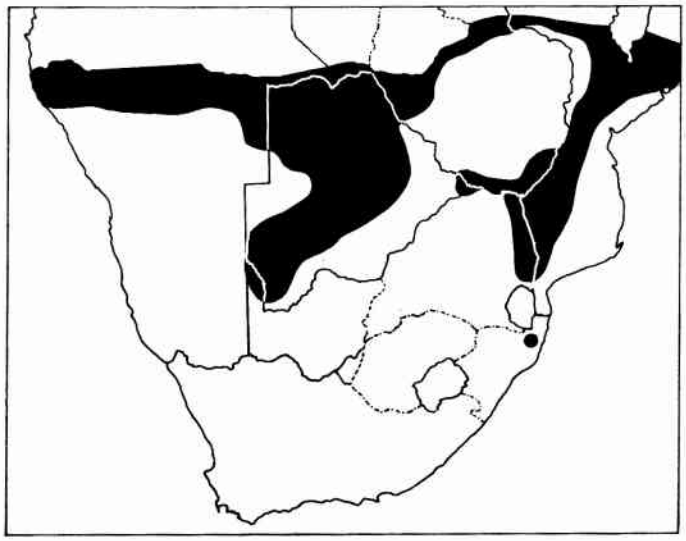
Lion populations in South West Africa/Namibia only survive in the Etosha National Park, with small numbers in Bushmanland, Kavango and Caprivi and northern Damaraland/Kaokoland. An estimated 400 lion remain in SWA/Namibia, the vast majority of which are in the Etosha National Park. They were probably found throughout in the past only being absent from much of the Namib Desert coastal belt. However, a remnant population lives in the Skeleton Coast Park.

BOTSWANA

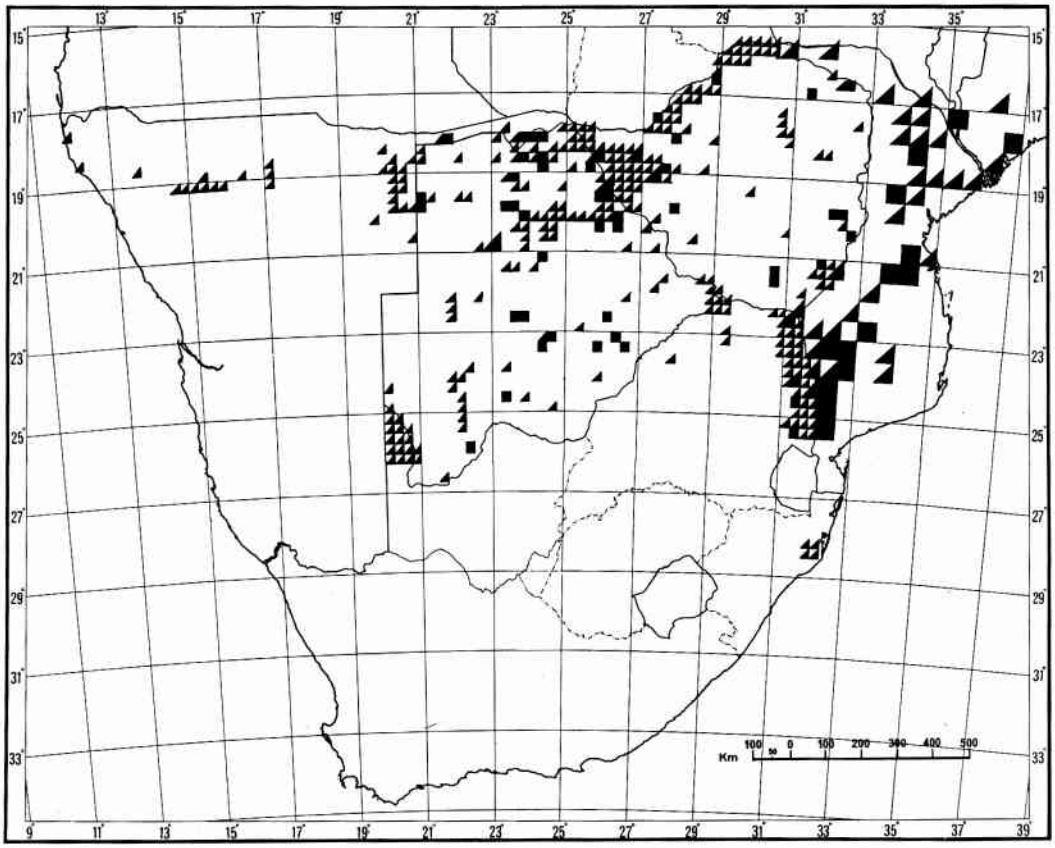
Lion still have an extensive distribution in Botswana and that has probably changed little. Today, however, they are largely absent from the populated areas in the south and south-east, although nomads and wanderers can be expected virtually anywhere. This of course applies to other countries discussed here. Viable populations are present in all the major conservation areas, as well as outside them. However, the impact of hunting, poisoning and trapping of these animals is unknown at this stage. No attempt has been made to estimate the lion population in the literature but based on habitat and food availability a figure of 5 000 would seem to be realistic. It must be emphasised that there is an urgent



MAP 7. The past distribution of lion in Southern Africa.



MAP 8. The approximate limits of present distribution of lion in Southern Africa. The single isolated record is of the Umfolozi/Hluhluwe Game Reserves population. Lion are great wanderers and may be expected, from time to time, to occur outside these limits but not as resident populations.



MAP 9. Locality records for lion in Southern Africa. Squares indicate specimen records and triangles are of sight, literature and other records.

need to obtain population estimates, particularly in view of the fact that cattle ranching and other conflicting interests are expanding in Botswana.

ZIMBABWE

As with the other countries, lion were once found throughout Zimbabwe but today they are mainly restricted to three areas. It is estimated that approximately 500 survive in the north-western block, which includes Hwange, Victoria Falls National Park, Matetsi Safari Area and adjacent forest areas and to a lesser extent ranchland. A second population of about 200 lives in the south-east and along the north bank of the Limpopo River, and an estimated 300 roam the Zambezi Valley. There is movement out of, and between, these areas but these lion are rarely tolerated and are usually shot.

MOÇAMBIQUE

Up to 1975 lion were widely distributed in Moçambique but the position at present (see Bibliography), as far as is known, is that vagrants cross into Maputo Province from Kruger National Park; in Inhambane Province they are restricted to Zinave National Park and in the districts of Massinga and Govuro. Lion are said to be still common and even increasing in the Upper Limpopo Valley. In 1978 there were still healthy lion populations in Gorongosa National Park (about 300) but the current position is unknown. The Tete Province still has fair numbers of lion but declining in parts. According to J. Tello (1986) lions are not endangered in Moçambique but that their future in the area south of the Save River will depend on the recuperation of the Limpopo Wildlife Utilisation Unit, as well as the Banhine National Park. The same author estimates that there are between 1 000 and 2 000 lion surviving in Moçambique but gives no indication of what percentage of this estimate survives within the Southern African subregion sector.

SWAZILAND AND LESOTHO

Lion previously occurred in both countries but are now extinct.

SOUTH AFRICA

Cape Province. Once found throughout, from Table Mountain, lion are today confined to the Kalahari Gemsbok National Park in the far north. Approximately 140 animals survive in this Park and they have free movement to the Gemsbok Park in Botswana. Individuals or small groups occasionally cross the Molopo River (dry for most of the year) from Botswana but they are either shot or soon move back across the border.

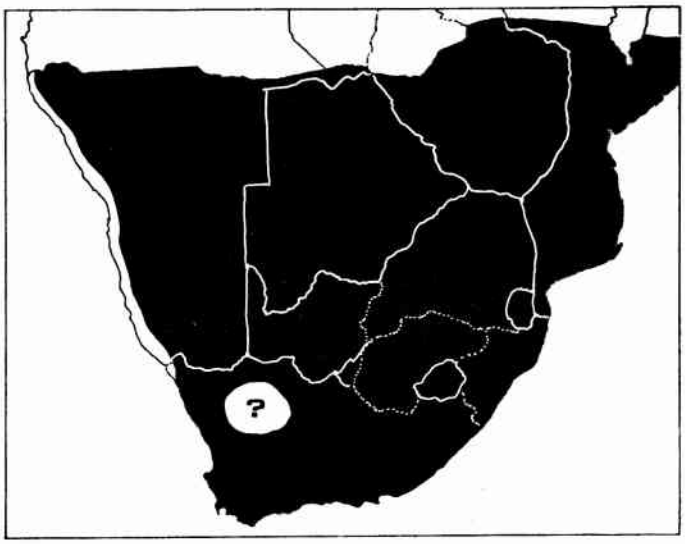
Transvaal. Probably occurring throughout in the past they are now restricted to the Kruger National Park and adjacent private reserves, with a total population of about 1 500 individuals. In the area adjacent to the Tuli Block, Botswana, lion occasionally take up temporary residence on game farms just across the border. Individuals and small groups occasionally make their way south to the Soutpansberg mountain range but they soon return or are eliminated by farmers.

Natal. Eradicated earlier this century there is now an established population of about 70 to 80 lion in the Hluhluwe/Umfolozi Game Reserves Complex. It is claimed that a solitary male "arrived" at the reserve in the early 1960's and females were then brought from the Transvaal to establish a breeding population.

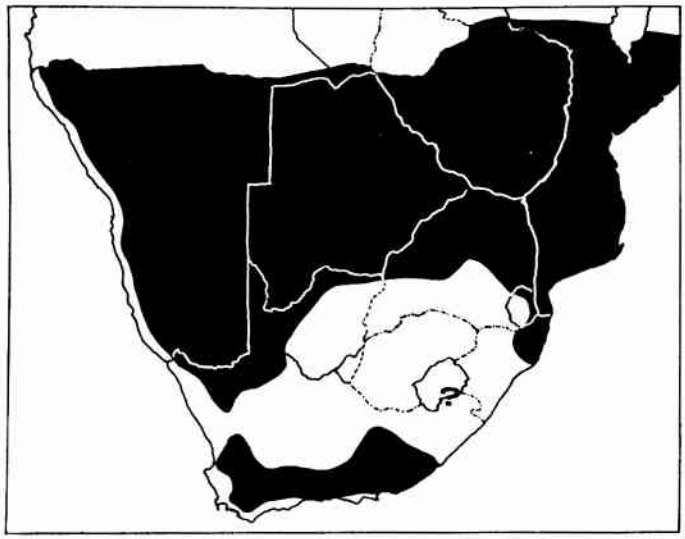
Orange Free State. Lion occurred in the past but are now extinct.

Leopard

The leopard is the most widespread and abundant of the large cats occurring in Southern Africa. However, numbers in some areas are greatly reduced and there has been considerable shrinkage of range, particularly in South Africa.



MAP 10. The past distribution of leopard in Southern Africa.



MAP 11. The approximate limits of present distribution of leopard in Southern Africa. Individuals can be expected, from time to time, outside these limits.

NAMIBIA

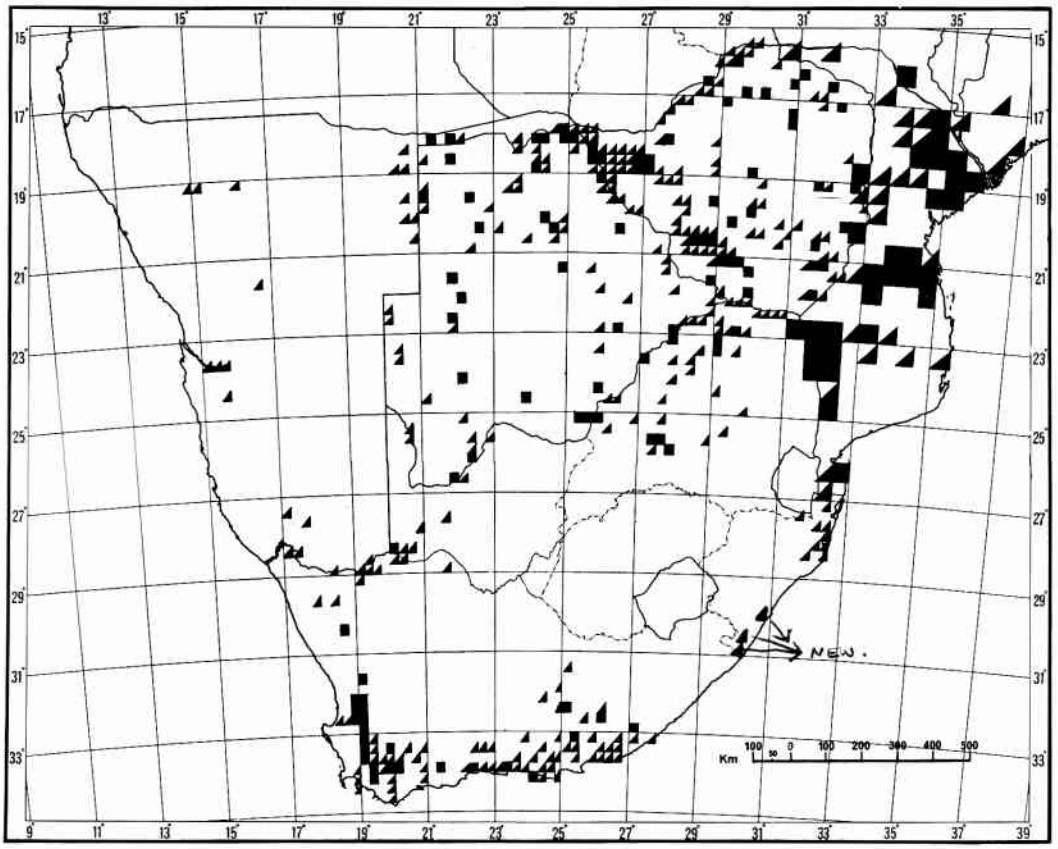
Distribution has changed little in this territory and they occur widely but are absent from much of the Namib Desert and they are less abundant in the arid plains of the south than they are in the woodland savanna of the northern and central areas. They are persecuted in stock farming areas. They are present in the major conservation areas, such as Etosha National Park, Namib-Naukluft Park and the newly proclaimed conservation areas in Bushmanland and Kavango. The only estimate of numbers is given as 3 353 leopard occurring in the territory (see Bibliography) but as this was based on a questionnaire survey a more detailed survey is called for.

BOTSWANA

This cat occurs throughout Botswana and distribution has probably changed little. No estimate of numbers has been made but it would seem to be safe for the foreseeable future.

ZIMBABWE

Leopard occur throughout Zimbabwe and continue to survive in areas of intense hunting and on farmland. They are considered to be common in the northern sector of Hwange National Park, Matobo National Park and in the Gwanda/West Nicholson area in the south-west. They are also plentiful in the Zambezi and Limpopo Valleys and throughout the Eastern Districts. Hwange



NPB radio report on 11.4.90.
ORIBI GORGE
UMTHUUNU NR.
AMANZIMTOTI.

MAP 12. Locality records for leopards in Southern Africa. Squares indicate specimen records and triangles are of sight, literature or other records. Although widely distributed in South West Africa/Namibia documented records are few. The overall distribution is similar to that of cheetah in that country.

National Park has an estimated population of 300 leopard and the much smaller Matobo National Park some 100. For the country as a whole very broad population estimates have been made, from 2 000 to an amazingly high 38 000. This includes an estimated 10 to 13 000 leopard in conservation areas alone. Thus once again the difficulties involved in trying to peg accurate estimates of population sizes of the large cats are emphasised. However, the higher estimate is in our opinion on the optimistic side, and such a very high figure should not be regarded seriously.

MOÇAMBIQUE

Leopard occur throughout the country but no estimate of numbers is available. Distribution has probably remained virtually unchanged but population shrinkage in some areas will almost certainly have taken place.

SWAZILAND

A few individuals probably survive in the lowveld area and in the mountainous north. Leopard almost certainly occurred throughout in the past.

LESOTHO

There are no recent records but leopard almost certainly occurred throughout in the past.

SOUTH AFRICA

Cape Province. The leopard was once found throughout Cape Province but was possibly absent, or occurred in very low numbers, on the sandy flats of Bushmanland. Today they are restricted to the Cape Fold Belt (mountain chain) from Van Rhynsdorp in the north-west to Port Elizabeth in the south-east. A fairly substantial population survives in the Kalahari Gemsbok National Park and along the Lower Orange River basin from the Augrabies Falls to the Richtersveld in the west. Areas of very low density spread further away from some of these regions. The Cape Fold Belt population is virtually isolated but the Lower Orange River population extends into South West Africa/Namibia, as does the Kalahari population, which is also continuous with Botswana leopard.

Population estimates for leopard in Cape Province range from between 500 and 700; with between 150 and 250 inhabiting the Kalahari Gemsbok National Park, with approximately 250 in the Cape mountains (estimates range from a low of 150, to a high of 500) and probably fewer than 50 in the Lower Orange River area. The estimate of 500 for the Cape mountains is considered to be too high.

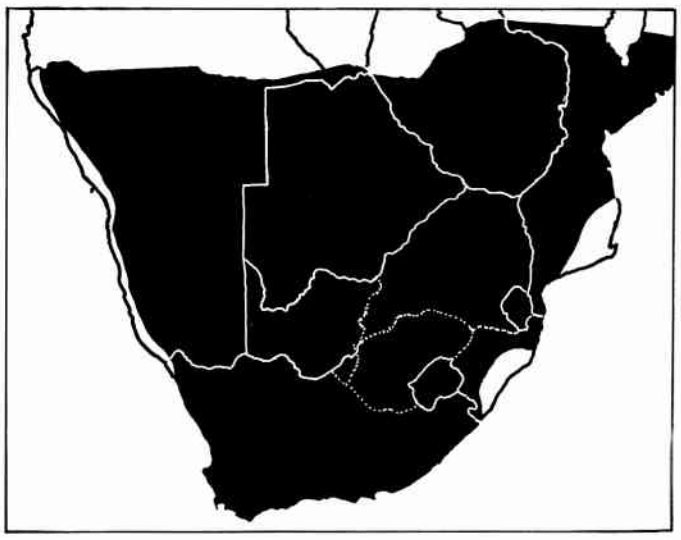
Transvaal. The leopard is still widespread in the Transvaal, with the exception of the southern Highveld. An estimated 600 inhabit the Kruger National Park but no estimate is made for the rest of the Province. Apparently healthy populations exist in several areas, including along the eastern escarpment and the Soutpansberg range. The rising interest in game ranching and in the leopard as a trophy animal increases its survival potential, although it comes into regular conflict with stock farming interests.

Natal. Leopard previously occurred throughout the Province but the main population is now centred in Zululand, including all of the major game reserves in this region. Isolated occurrences are recorded for the Drakensberg and vagrants occasionally turn up in other areas. No estimate of numbers is available.

Orange Free State. Leopard probably occurred widely in this Province but it is extinct here today.

Caracal

The caracal has a very wide distribution in Southern Africa and it is apparently the only one of the seven felids that has expanded its range and this, despite the fact that it is heavily persecuted as a predator of domestic small-stock. This expansion of range has been ascribed to the eradication of the black-backed jackal in some stock-farming areas and the vacant niche being taken over by the caracal. Certainly, in many of the areas where this jackal has been eradicated or drastically reduced in numbers, the caracal has taken up residence where they were either absent or uncommon previously.



MAP 13. The approximate limits of present distribution of caracal in Southern Africa.

NAMIBIA

They occur widely in SWA/Namibia but are apparently absent from the Namib Desert coastal belt. The highest densities are reached in the southern areas where they are considered a major predator of domestic sheep and goats.

BOTSWANA

Caracal are evenly distributed throughout Botswana and can be considered secure.

ZIMBABWE

Caracal are widespread in the drier western parts of the country but occur more sparsely in the eastern regions. Generally it is uncommon in this country and even rare in parts.

MOÇAMBIQUE

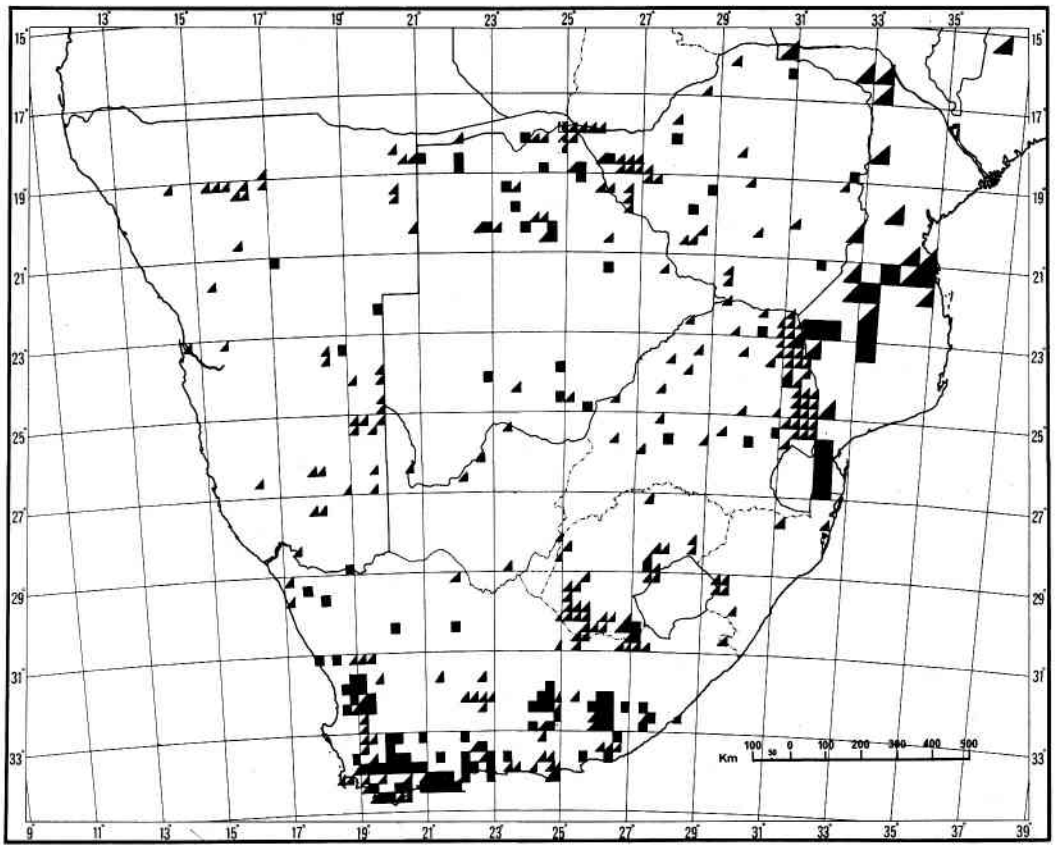
They have a wide distribution in Moçambique but they are generally considered to be uncommon to rare. They are probably not as uncommon as records indicate as they are difficult to locate and observe and even in areas of high density they are rarely seen.

SWAZILAND AND LESOTHO

Caracal probably occur in low numbers in both countries but information is lacking.

SOUTH AFRICA

Cape Province. Caracal occur throughout the Province and can be considered common in most areas. Although records are sparse for the arid interior, it is known to occur throughout. The highest densities are reached in the southern and western regions, particularly along the coastal belt, the coastal mountain chain and the adjacent interior. It is only in the past 40 years (farmer records) that caracal has been observed in much of the southern and south-western Cape Province and the coastal areas of the Eastern Cape Province. Heavy persecution seems to have had little or no impact on populations in most areas.



MAP 14. Locality records for caracal in Southern Africa. Squares indicate specimen records and triangles are of sight, literature and other records.

Transvaal. This felid is evenly distributed throughout the bushveld areas of the Transvaal but it is apparently absent from much of the grassland area in the south (much of this region is under crop production).

Natal. Until recently the caracal was considered to be rare in Natal but it is now a problem to sheep farmers in the shadow of the Drakensberg mountains. Several animals were released at Itala Game Reserve in the 1970's and there have been recent sightings in Zululand (Mkuzi Game Reserve). It probably occurs more widely than previously suspected.

Orange Free State. Caracal are widespread in the southern and south-eastern sectors but apparently uncommon in the north.

Serval

Apart from their apparent extinction in the Cape Province, serval distribution has probably changed little, although numbers have no doubt decreased in heavily populated areas.

NAMIBIA

The serval is only known from suitable habitat in Kavango and Eastern Caprivi in this country. Habitat limitations indicate that distribution here was always limited.

BOTSWANA

Serval are restricted to the Okavango delta and then eastwards along the Botletle River and northwards up the upper Mababe Depression, to the Chobe River and then southwards along the Zimbabwe border as far south as Thari Pan. There is a solitary record in the south-east. It is unlikely that the serval had a wider distribution in the past.

ZIMBABWE

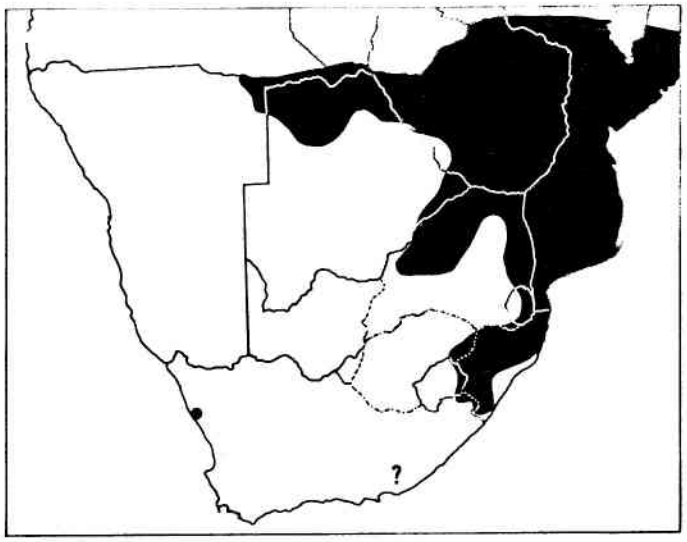
The serval occurs throughout, except in the south-west where their absence coincides with their absence in adjacent areas of Botswana. The species is much more abundant on the better watered Mashonaland Plateau and in the Eastern Districts than in the drier western areas of Matabeleland. Apparently this cat is quite common in areas with suitable habitat.

MOÇAMBIQUE

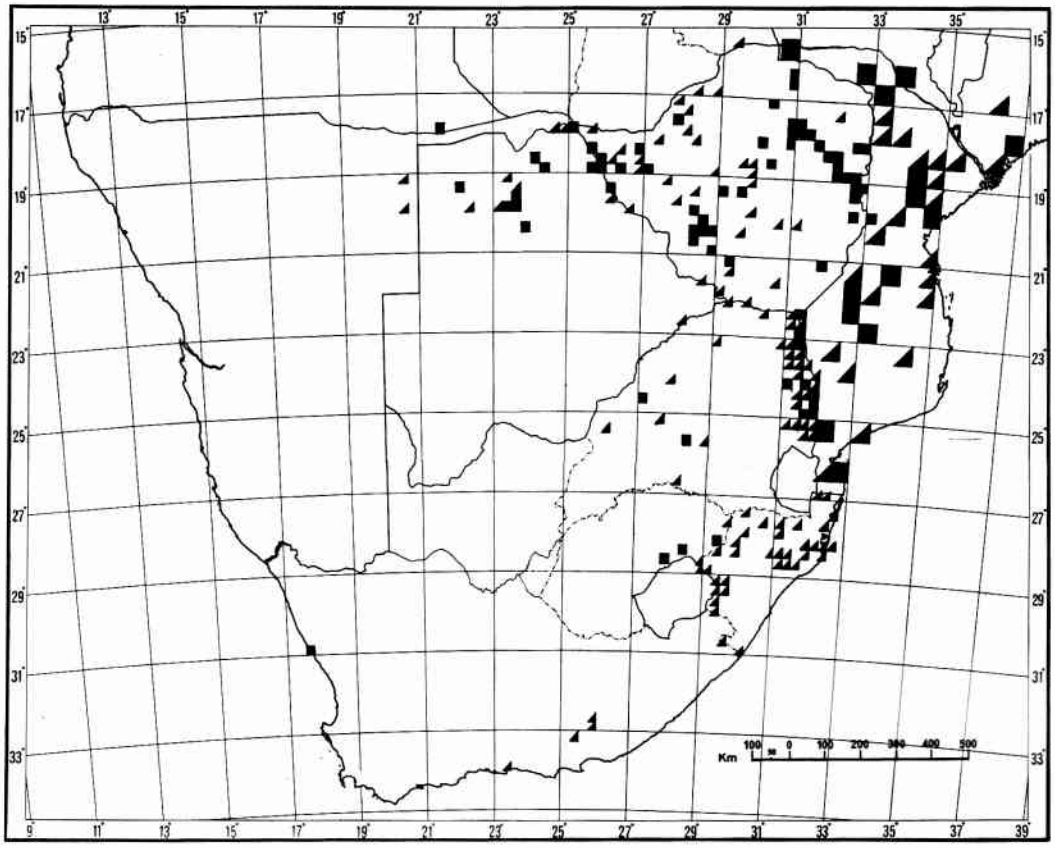
Serval are widely distributed in this country and although information is lacking it seems unlikely that there have been any major changes in either distribution or conservation status.

SWAZILAND AND LESOTHO

There is no information available on the presence of serval in either country but it is almost certainly present in suitable habitat in



MAP 15. The approximate limits of present distribution of serval in Southern Africa. The single locality on the west coast of the Cape Province (South Africa) is an isolated occurrence in atypical habitat.



MAP 16. Locality records for serval in Southern Africa. Squares indicate specimen records and triangles are of sight, literature and other records. It is now thought unlikely that a viable serval population survives in the Cape Province.

Swaziland, although its presence in Lesotho still has to be determined. The fact that it occurs in the Natal Drakensberg and has been recorded from adjacent areas of the Orange Free State indicates that it probably occurred there in the past.

SOUTH AFRICA

Cape Province. The serval, according to historical evidence, occurred along the coastal belt and just east of Cape Town to the Transkei border and then northwards to Natal. It is also possible that this cat occurred in the extreme north-eastern corner of the Cape Province. The only museum specimens from the Cape Province were collected in Somerset West (South-western Cape Province) in 1898 and an old record from King William's Town in the Eastern Cape. Five recent (last 20 years) sight records have also been documented, all from the Eastern Cape. A serval shot by a farmer on the Namaqualand coast was in atypical arid habitat. The nearest known serval population is at least 1 300 km from this site. It is worth noting that Shortridge (1934) considered "the serval is rare and perhaps only of sporadic occurrence in the southern south, central and coastal regions of South West Africa". The fact that he mentioned their occasional presence in such arid environments confirms these highly unusual "appearances". It seems likely that viable populations of the serval no longer occur in Cape Province.

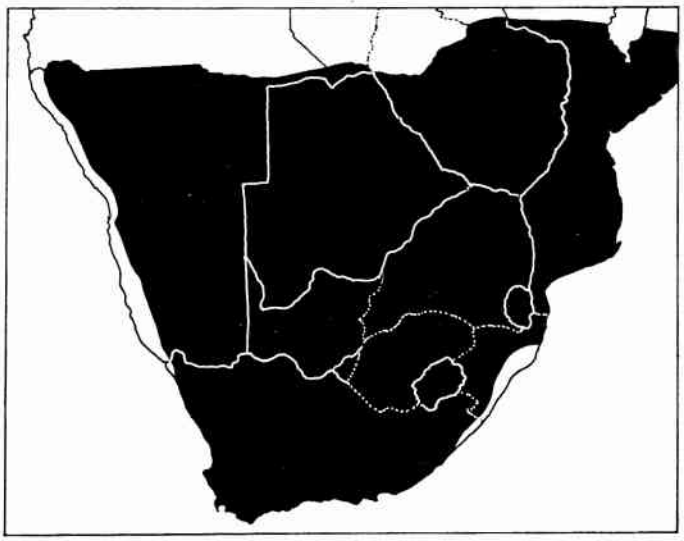
Transvaal. Serval are widespread and apparently quite common in the Kruger National Park and adjacent areas on the western boundary. There are a number of scattered localities in the rest of the Province but the serval is considered to be rare. No information is available on whether there have been any substantial changes in distribution or conservation status.

Natal. Serval occur in western and northern Natal and Zululand. They are fairly common in the foothills of the Drakensberg and are recorded as occurring in most of the mountain reserves and the principal Zululand reserves. They have probably declined in numbers and range in the heavily populated pockets of KwaZulu.

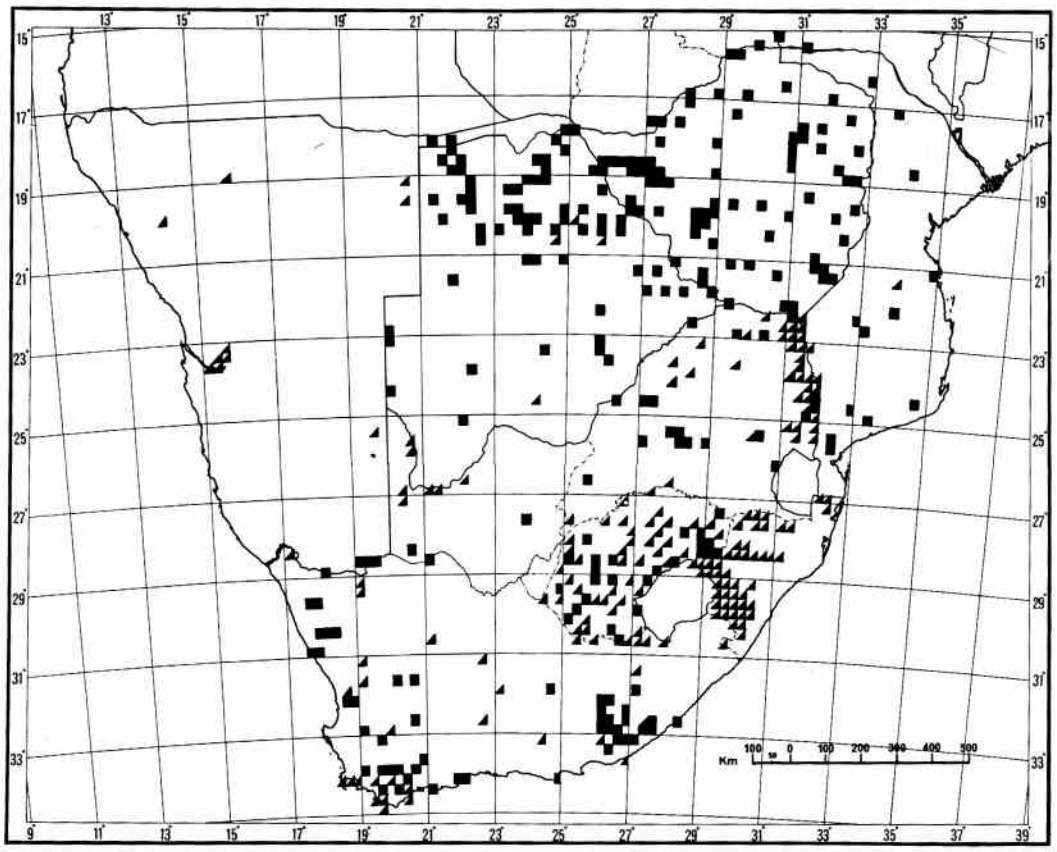
Orange Free State. Four specimens have been collected in the eastern sector of the Province, against the Lesotho and Natal borders. It is considered unlikely that a viable population is present and these records probably constitute stragglers from these adjacent areas. As suitable habitat exists in this area of the Orange Free State it is probable that serval were once a permanent feature of the local fauna.

African Wild Cat

The African wild cat is only absent from the Namib Desert coastal strip and apparently from part of the coastal belt in Natal.



MAP 17. The approximate limits of present distribution of the African wild cat in Southern Africa.



MAP 18. Locality records for the African wild cat in Southern Africa. Squares indicate specimen records and triangles are of sight, literature and other records. The African wild cat occurs throughout South West Africa/Namibia but documented records are lacking.

As they have such a wide distribution no country by country account is necessary. Although they are common throughout, despite many being killed in some areas as part of problem animal control operations, the major threat to their survival as genetically pure species is hybridisation with the domestic cat. Most animals encountered near human settlements are hybrids and even in isolated areas such hybrids are occasionally seen.

Small Spotted Cat

The small spotted cat is the only felid restricted to Southern Africa. It possibly occurs in Zimbabwe and is absent in Moçambique, Swaziland and the South African province of Natal. Sightings close to the Zimbabwe border in Botswana indicate that it will be found to occur in that country. Recent surveys (see the Bibliography) have extended its known range by approximately 450 km. into the south-western Cape Province and to the southern Namaqualand coast. Major changes in distribution and status seem to be unlikely. They are rare throughout their range and very few sight or specimen records exist.

NAMIBIA

Currently known only from east of 17° East and south of 21° South, however in time it may be found further to the west, northeastwards into Bushmanland and southern Kavango. A recent unconfirmed record from the north-west indicates that they may also occur in parts of Damaraland and Kaokoland.

BOTSWANA

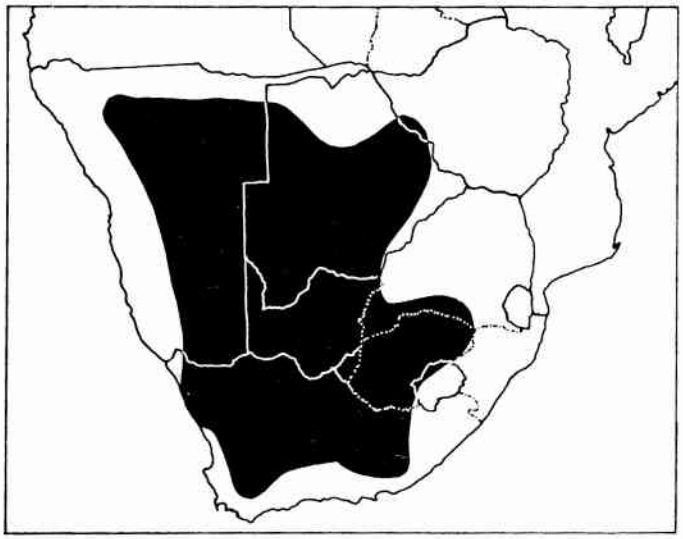
In Botswana they occur just to the south of the Okavango and throughout the arid south-western parts of the country. Previously thought to be absent from eastern Botswana there are now two confirmed sightings near Tamafupa adjacent to the Zimbabwe border. It is therefore certain the species will in time be found in western Zimbabwe in the Hwange National Park and vicinity where suitable habitat exists.

SOUTH AFRICA

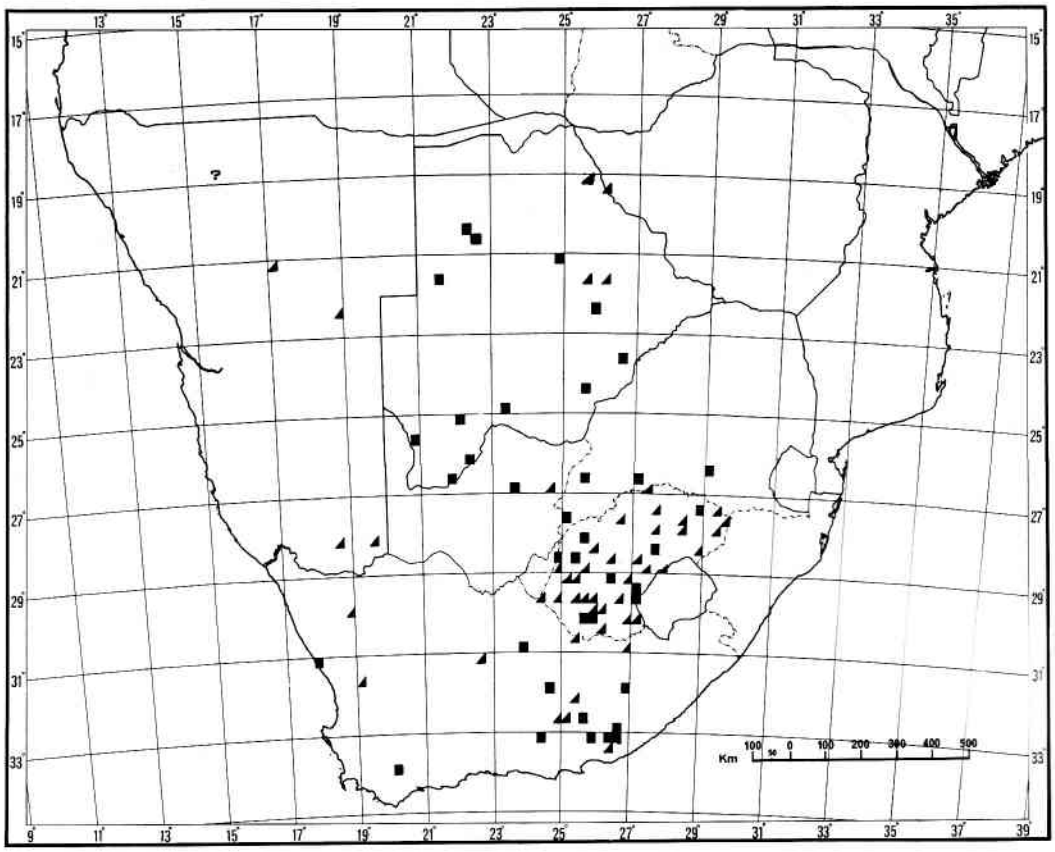
Cape Province. The small spotted cat is absent from the southern coastal plain and has not been recorded from the north-western area. However, with further fieldwork, it is likely that in time they may be found in the latter area. Otherwise they probably occur throughout this Province. Very few are killed in problem animal control operations which further points to their scarcity.

Transvaal. They only occur marginally in the south-western part of the Transvaal. There is no indication of any change in status.

Orange Free State. Although they occur virtually throughout the Province, the greatest number of records are from the south. The proximity of several records to the Lesotho border indicates it may be of marginal occurrence in that country.



MAP 19. The approximate limits of present distribution of the small spotted cat in Southern Africa.



MAP 20. Locality records for the small spotted cat in Southern Africa. Squares indicate specimen records and triangles are of sight, literature and other records.

Cat Conservation in Southern Africa: Past, Present and Future!

PAST

Man has come into conflict with wild animals; and cats are no exception; from the time he was a simple hunter-gatherer, to the point where he started domesticating animals and growing crops. To protect his sources of food and clothing, man had to attempt to control losses by driving away or killing the animals responsible. It is true to say however, that wherever possible man has aimed at killing all individuals of the "problem" species whether guilty of killing his stock or not. This is the main reason why predator control is one of the most controversial issues confronting wildlife management today, and one of the most difficult to solve. The killing of wild animals, whether problem species or not, is repugnant and unacceptable to many people but on the other hand many more feel that total eradication of such a species is acceptable. Neither of these extremes is acceptable to the reasonable and thinking person and past attitudes will have to be changed.

When the first Europeans arrived in Southern Africa great herds of game were to be found on the flat, arid plains of the interior. Here roamed the now extinct quagga, herds of blesbok, black wildebeest, springbok, red hartebeest and eland. Lion, leopard and cheetah were found throughout much of the subcontinent, along with the hunting dog, brown and spotted hyaenas, thriving on the plentiful sources of food. The rapacious human hunters and farmers soon decimated the game herds; the large predators turned to the domestic herds and flocks as an alternative or supplementary source of food. The large predators were in their turn shot, trapped or poisoned. The times of free-wandering herds and roaming predators had passed over much of Southern Africa.

THE PRESENT AND FUTURE

How do the cat populations of Southern Africa look today? Part of this section repeats in a summarised form the present conservation standing of the seven cat species of this region, particularly emphasising what has happened to the three large, and more vulnerable, species.

Legislation provides paper protection in most countries but the large and medium-sized cats are vulnerable because of clauses allowing for the protection of human life and property (stock). Of course if these clauses were not exploited and abused this would be completely acceptable as the stock-farmer has every right to remove predators killing his animals.

Permit systems have been implemented in several countries in an attempt to control unjustified killing of the three large cats. Unfortunately, many of these cats are killed (usually by shooting and poisoning) illegally and either buried or left to rot. This is proving to be a particular problem with cheetah in South West Africa/Namibia and Zimbabwe. Because of international and local controls this cat has no commercial value to the farmer (either as a trophy animal or for sale to zoos) and there is no motivation to manage or control cheetah populations. It is essential in our opinion that the financial benefits of having cheetah and leopard on private land should outweigh stock and game losses, certainly in selected areas. A complex problem that requires careful and practical thought.

The small spotted cat is fully protected by legislation and the fact that very few are killed, emphasises their scarcity and not the fact that such legislation provides adequate protection. In all four South African provinces and in South West Africa/Namibia the caracal is classified as a problem animal and as such receives no legal protection. However, this cat has been able to increase in both range and numbers in recent years despite heavy persecution. This is no mean feat in the face of the formidable forces levelled against it.

The African wild cat, throughout its Southern African range, is threatened by another member of the cat family, the domestic cat. Interbreeding between the two has resulted in large, and increasing hybrid populations, reducing the number of pure African wild cats. This is a problem for which there appears to be no practical solution.

If we now examine the cat populations species by species we see a mixed situation, some species with little or no hope of surviving outside the larger game parks and others that are increasing in numbers and are secure for the foreseeable future.

The following estimates must be seen as an effort to give an indication of population strengths and not fixed and final figures. They at least provide an indication of current standing.

In Southern Africa, according to our estimates, at the present time there are between 6 200 and 8 500 cheetah, of which about 1 500 (between 18 per cent and 24 per cent) occur in proclaimed conservation areas. Lion numbers are similar to those for cheetah, with an estimated lower total of 6 100 and a higher total of 9 100, of which approximately 4 200 occur in conservation areas, with most of the free-ranging population being found in Botswana, Moçambique and to a lesser extent Zimbabwe. Approximately 46 per cent to 69 per cent of all lions occurring in Southern Africa are found within game parks. Estimating leopard numbers has proved to be the most difficult and we have not attempted an overall estimate for the subcontinent but it is probably lower than 15 000. In Zimbabwe estimates range from a low of 2 000 to a high of 38 000. The latter figure appears to have been extrapolated from the home range size of leopard in the Matobo National Park, for the entire country. The density of leopard in that National Park is known to be high and certainly would not apply to much of Zimbabwe. We therefore feel that the figure for Zimbabwe is unrealistic. Probably between 2 500 and 3 500 leopard survive in South Africa, with between 800 and 1 200 in conservation areas.

Can we look forward to the setting aside of further large tracts of land to conserve the large cats in Southern Africa? The answer is very simple, no! A rapidly increasing human population and the resultant demands for land utilisation will prevent any further major land acquisitions. For lion the only future lies within the boundaries of existing conservation areas. There is, however, a glimmer of hope for the cheetah and leopard.

A recent development in the conservation of leopard in the Cape Province, South Africa, has led to the establishment of a leopard sanctuary, or "safe-zone", which incorporates State and privately-owned land. It differs from conservation areas such as game reserves in that most human activities continue uninterrupted with the aim of reducing the conflict between leopard conservation and stock-farming to the point where few leopards have to be killed. The first such sanctuary is situated in the Cedarberg Mountains, part of the coastal mountain chain in the Cape Province. Other areas have been suggested and it is hoped that this will be the first of several such attempts to conserve leopards. A similar system has been suggested (Dieter Morsbach) for conserving cheetah in South West Africa/Namibia but it incorporates the utilisation of this cat in so far that the farmer is compensated to a certain extent for "carrying" a percentage of stock losses. One way in which this can be done is to allow limited numbers to be taken by trophy hunters and allow the farmers realistic prices for the sale of live animals. A similar system has been suggested by one of the authors (VJW) for Zimbabwe. Of course such systems require careful and strict controls.

However, the conservation of the wild cats must not be treated in isolation. Without the conservation of the habitats and prey species, on which these cats depend, any such efforts would be wasted.

The Cat Manifesto (Appendix 2) summarises the requirements for successful cat conservation but we will close by emphasising certain points which are essential to the continued survival of the cats of Southern Africa.

1. A greater emphasis must be placed on the conservation of the cat species outside established conservation areas.
2. As part of the above, the sanctuary, or "safe-zone", concept for the conservation of leopard and cheetah, needs to be emphasised and encouraged.
3. Greater efforts should be made to refine problem animal control techniques and to improve their selectivity.
4. There is a need for a greater emphasis on favourable publicity for the cats and other carnivores, as indicators of healthy ecosystems.
5. More research is required on the cats of Southern Africa, with particular emphasis on those living outside conservation areas.

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Most of the references presented here are of Southern African origin and no attempt has been made to include reference material from other regions of Africa. A number of references dealing with the small spotted cat in captivity are given because of the paucity of local information. A general section includes those references dealing with more than one species of cat, for example regional surveys and feeding analysis of several species.

References referring to individual species are given under the species name. Although this bibliography presents most of the Southern African felid references, the authors are aware that there are many unpublished reports and historical works that have been excluded.

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APPENDIX 1

Body Measurements and Mass of Cats of Southern Africa

CHEETAH *Acinonyx jubatus*

NAMIBIA (Labuschagne, 1979)

	MALE			FEMALE		
	$\bar{x}$	n	RANGE	$\bar{x}$	n	RANGE
TL (mm)	2060	7	1910-2210	1900	6	1840-1960
T (mm)	717	7	650- 760	667	6	630- 690
Ear (mm)	75	7	75	75	6	75
MASS (kg)	53,9	7	39,0-59,0	43,0	6	36,0-48,0

LION *Panthera leo*

BOTSWANA (Smithers, 1971)

	TL (mm)	T (mm)	MASS (lb)
MALE	2590	863	—
	2795	965	346
	2635	996	314
FEMALE	3022	825	—
	2476	965	234

ZIMBABWE (Smithers & Wilson, 1979)

		$\bar{x}$	n	RANGE
MALE	TL (mm)	2762	18	2652-2896
	MASS (kg)	202	18	138- 242

ZIMBABWE (Wilson, *in litt.*)

	MALE			FEMALE		
	$\bar{x}$	n	RANGE		n	RANGE
TL (mm)	2460	5	2300-2800	2350	4	2200-2500
MASS (kg)	175	5	158- 199	149	4	140- 164

LEOPARD *Panthera pardus*

ZIMBABWE (Smithers, 1983)

	MALE			FEMALE		
	$\bar{x}$	n	RANGE	$\bar{x}$	n	RANGE
TL (mm)	2110	13	2010-2360	1850	7	1780-1880
MASS (kg)	59,68	13	51,76-71,28	31,25	7	28,15-34,96

SOUTHERN AND SOUTH-WESTERN CAPE PROVINCE (Stuart, 1981)

	MALE			FEMALE		
	$\bar{x}$	n	RANGE	$\bar{x}$	n	RANGE
TL (mm)	1785			1707		
HB (mm)	1105	21	920-1250	1030	8	950-1050
T (mm)	678	20	510-800	677	8	640-740
HFT (mm)	219	20	190-252	206	7	190-220
Ear (mm)	73	20	65-100	70	7	65-72
MASS (kg)	30,9	27	20,0-45,0	21,2	9	17,0-26,0
TL Skull (mm)	219	21	195-248	200	9	190-210

CARACAL *Felis caracal*

CAPE PROVINCE (Stuart, 1981 and 1982)

	MALE			FEMALE		
	$\bar{x}$	n	RANGE	$\bar{x}$	n	RANGE
H & B (mm)	868	97	750-1080	819	94	710-1029
T (mm)	264	99	210-340	252	101	180-315
HFT (mm)	193	101	170-215	180	101	160-208
Ear (mm)	80	98	65-92	76	100	60-94
MASS (kg)	12,9	77	7,2-19,0	10,0	63	7,0-15,9
TL Skull (mm)	135	424	113-155	124,5	310	110-144

BOTSWANA AND ZIMBABWE (Smithers, 1971 and *in litt.*)

	MALE			FEMALE		
	$\bar{x}$	n	RANGE	$\bar{x}$	n	RANGE
TL (mm)	1116	6	1065-1226	1062	3	1020-1110
T (mm)	298	6	255-320	288	3	275-305
HFT (mm)	209	6	200-225	188	3	185-190
Ear (mm)	84	6	80-87	83	3	81-86
MASS (kg)	13,8	6	11,5-17,0	11,9	3	10,9-11,5

SERVAL *Felis serval*

ZIMBABWE (Smithers, 1978)

	MALE			FEMALE		
	$\bar{x}$	n	RANGE		n	RANGE
TL (mm)	1111	23	960-1205	1097	23	970-1230
T (mm)	314	23	280-380	290	23	254-330
HFT (mm)	193	23	180-205	182	23	165-194
E (mm)	91	23	83-97	86	23	80-97
MASS (kg)	11,13	20	8,63-13,53	9,67	23	8,63-11,8

AFRICAN WILD CAT *Felis lybica*

BOTSWANA (Smithers, 1971)

	MALE			FEMALE		
	$\bar{x}$	n	RANGE	$\bar{x}$	n	RANGE
TL (mm)	920	32	850-1005	886	27	820-947
T (mm)	344	32	320-375	336	27	310-370
HFT (mm)	153	34	135-170	147	27	138-158
E (mm)	70	34	64-79	68	27	62-73
MASS (kg)	5,1	32	3,8-6,4	4,2	26	3,2-5,5
TL Skull (mm)	102,8	25	95,5-110,5	98,5	28	93,6-107,2

CAPE PROVINCE (Stuart, 1981)

	MALE			FEMALE		
	$\bar{x}$	n	RANGE	$\bar{x}$	n	RANGE
TL (mm)	906	—	—	845	—	—
HB (mm)	601	21	545-665	550	15	460-620
T (mm)	305	21	275-360	295	16	250-355
HFT (mm)	138	21	120-150	133	14	120-150
E (mm)	62	20	55-70	64	15	55-72
MASS (kg)	4,9	10	4,0-6,2	3,7	10	2,4-5,0
TL Skull (mm)	102,0	18	95,0-116,0	96	7	90,0-103,0

SMALL SPOTTED CAT *Felis nigripes*

BOTSWANA (Smithers, 1971)

	MALE			FEMALE		
	$\bar{x}$	n	RANGE	$\bar{x}$	n	RANGE
TL (mm)	579	5	540-631	513	3	495-530
T (mm)	177	5	164-198	153	3	126-170
HFT (mm)	99	5	94-104	92	3	89-94
E (mm)	54	5	51-57	47	3	45-50
MASS (kg)	1,6	5	1,5-1,7	1,1	3	1,0-1,4

CAPE PROVINCE (Stuart, 1981)

		$\bar{x}$	n	RANGE
MALE	H & B (mm)	447	3	414-490
	T (mm)	176	3	150-200
	HFT (mm)	102	3	95-109
	E (mm)	53	3	45-58
	MASS (kg)	—	2	1,7-1,9

ORANGE FREE STATE (Lynch, 1983)

	MALE		FEMALE		
	n	RANGE	$\bar{x}$	n	RANGE
TL (mm)	2	605- 630	565	3	556-580
T (mm)	2	165- 195	165	3	145-180
HFT (mm)	2	100- 104	93	4	80-105
Ear (mm)	2	52- 60	53	4	50-57
MASS (g)	2	1900-2100	1215	4	814,7-1600

APPENDIX 2
SAVING THE WILD CATS
A Manifesto on Cat Conservation

This manifesto has been prepared by the Cat Specialist Group of the Species Survival Commission, International Union for Conservation of Nature and Natural Resources (IUCN), as a contribution to the World Conservation Strategy.

1. **Preamble**

1.1. Cats have been part of the environment, culture and mythology of human beings for thousands of years. The lion, in particular, has been widely used as a symbol of royalty and state to the present day. In pre-Colomban civilisations in Mexico and Central America, the jaguar had high ritual significance. The tiger has figured in the art and culture of the great civilisations of Asia. Domestic cats were revered in ancient Egypt, and in many countries today they rival the dog as a beloved companion of man.

1.2. Nevertheless, almost all species of wild cats are declining seriously in numbers because of human impact, some subspecies are already extinct, and others are on the brink of extinction.

1.3. The extinction of species of wild cats would be an inestimable loss to the world, not least because of their ecological role as predators. It behoves us to make every effort to prevent it, because human activities are largely responsible for their deteriorating status.

2. **Why Cats Should be Conserved**

2.1. Human beings have no right to eliminate other species. Indeed, in view of the extent of human domination of the natural environment, we have a responsibility and obligation to all species and to our descendants to perpetuate their existence. Extinction is forever.

2.2. The decline of a carnivore generally alters the ecological balance of its biological community. Cats are linked through predation to herbivores, which are, in turn, linked to each other through competition and to plant communities by their foraging. They are particularly sensitive to environmental disturbance, and the decline or disappearance of these vulnerable cat species serves as an indicator of changes in their ecosystem, which may be the result of natural phenomena or, as is increasingly the case in present times, of the impact of human activities. These changes frequently involve a deterioration in the human environment, such as the loss of forests and grasslands and their valuable animal and plant products, or impairment of water supplies essential to human life and agriculture. Furthermore, large cats, being at the pinnacle of the food chain, need considerable space, and are, therefore, key species in determining the area required to define an appropriate ecosystem.

2.3. In addition to the ecological consequences of the disappearance of these carnivores, many people feel a sense of inner loss when such magnificent and mysterious animals are gone from the wild.

3. **Problems Faced by the Cats**

3.1. Accelerating loss of habitat has now reached a critical stage as the human population continues to soar. In many cat ranges, remaining habitat represents but a small percentage of what existed in the past, and what remains could be wiped out in the near future.

3.2. Cats have long been hunted. They are killed because they have been viewed as competitors for prey. They are killed because they have taken livestock. They are killed for sport, and their body parts are used in some places as medicine. Young cats are captured for pets. And some, especially spotted cats, are killed for the fashion trade, which has often led to over-exploitation.

3.3. At the same time, the disappearance of natural prey has frequently deprived cats of their normal sustenance and contributed to conflict with humans and their livestock, leading inevitably to reprisal killing of cats, often including those not actually involved.

3.4. Where cat populations have been reduced to small numbers they are increasingly vulnerable to extinction due to fortuitous local events, such as epidemics, fires and floods. Some scientists also fear the possibility of deterioration through inbreeding depression and loss of genetic diversity in the long term, which might reduce the ability of small populations to adapt to changes in their environment.

4. **The Decline of the Cats**

4.1. Cat populations have long been in decline and today every indicator suggests that declines are accelerating and have reached, in some cases, a critical stage.

4.2. The Asiatic lion is a classic example of decline because of human impact. Ranging 2 000 years ago from Asia Minor to Central India, it was hunted and exterminated, so that by the beginning of this century only a few survived in India's Gir forest. Fortunately, conservation efforts have succeeded in maintaining a lion population in the Gir, but it is confined to this single habitat, and thus is still dangerously vulnerable.

4.3. In 1947 the last recorded Asiatic cheetahs in the Indian subcontinent were shot. The sub-species still survives in Iran, but only in small numbers in fragmented habitat.

4.4. The Bali tiger is thought to have already become extinct before 1940, and during this present decade of the 1980s, its neighbour, the Javan tiger appears to have passed into oblivion. No trace of the Caspian tiger has been found for several decades, and reports suggest that the Amoy tiger, which is endemic to China, is on the verge of extinction, and that other subspecies of tiger may have vanished from the wild there by the end of the century.

4.5. The Indian or Bengal tiger had declined to dangerously low numbers by 1970, but has recovered as a result of dedicated, internationally-supported conservation programmes implemented by the Indian and Nepalese governments. Nevertheless, it will remain vulnerable unless these programmes continue.

4.6. Among the small species, the Iriomote cat, endemic to a Japanese island east of Taiwan, is nearly extinct because of destruction of its habitat and human over-exploitation of its natural prey.

4.7. These examples of the decline of the cats and of suitable habitat are representative of the general situation throughout their world range.

5. **Problems of Cat Conservation**

5.1. There is still only limited knowledge of the distribution, numbers, biology and behaviour of almost all species of

cat. Research to increase understanding of these factors is essential to the planning and implementation of effective conservation measures.

5.2. Economic planners and decision-makers often fail to recognise the importance for human welfare of wild lands, including ecosystems of which cats are part. Consequently, development programmes are carried out with little or no consideration of the longer-term impact, which may result in the decline and extinction of many species, including cats, as well as impoverishing the human environment.

5.3. As a result of increasing fragmentation of habitat and the pressure of human activities in their vicinity, large cats may become problem animals, particularly through livestock predation, and in rare cases taking human life. Demands may then arise for elimination, not only of the offending animals, but of all the large cats in the area.

5.4. Insufficient resources are made available to pursue necessary research, and to implement protective measures and conservation management of natural habitats of cats, often because of failure to recognise their ecological significance and through lack of political will.

6. How Cats Can Be Conserved

6.1. Protected habitats of sufficient size and productivity to support viable populations of cats must be preserved, and linking corridors maintained wherever possible.

6.2. The distribution of each species and the habitat available to it needs to be established in detail down to the level of discrete populations.

6.3. Legislation to ensure long-term conservation of cat species and their prey, including controls on trade, national and international, must be passed and enforced.

6.4. Conservation of cats has to be reconciled with the needs of humans. Some conflict may be inevitable in areas where agriculture or livestock farming impinges on cat habitats, but it should be minimised by appropriate management measures. For many cats, and particularly large cats, parks and reserves may not be adequate. Land-use patterns in adjacent areas need to be designed so that they are compatible with use by both humans and cats.

6.5. Local people must feel that efforts are being made to protect their interests. Information about the role of cats and ways to conserve them should be part of conservation education at all ages and levels of the community, including the politicians, officials, industrialists and businessmen who are the decision-makers.

6.6. Captive propagation programmes should be considered as an important precaution to serve as a genetic and demographic reservoir, which could, in appropriate circumstances, be used to reinforce wild populations.

6.7. All these measures should be included in an overall conservation strategy for each species to ensure its survival.

7. Conclusions

7.1. Species need not be lost provided action is taken to conserve them. Experience has shown that seemingly desperate situations can be reversed, if protection is given to species and their ecosystems.

7.2. The Cat Specialist Group is pledged to do all in its power to achieve the conservation of all cat species, and appeals for the co-operation of all people to ensure that these magnificent animals continue to coexist with humans as they have through the ages.