

Kraus D, Marker-Kraus L. 1991. The status of the cheetah (*Acinonyx jubatus*) 26 p.

Keywords: 1Afr/45Asia/*Acinonyx jubatus*/cheetah/distribution/endangered species/extinction/hunting/status/trophy/zoo

Abstract: The status of the cheetah, *Acinonyx jubatus*, varies widely in the 44 countries listed in this report, being extinct in a few countries, nearly so in some, and endangered in most others. Only in two or three countries, the cheetah populations are considered only threatened, where they are legally eliminated if found to be in conflict with human interests. All populations are regulated by CITES in Appendix I, which regulates international trade. However, a few countries in the world have lifted the ban and have allowed import of hunting trophies. Namibia is exporting a limited number of wild caught animals for zoological and private facilities.

# THE STATUS OF THE CHEETAH

(Acinonyx jubatus)

## CURRENT STATUS

The status of the cheetah, Acinonyx jubatus, varies widely in the 44 countries listed in this report, being extinct in a few countries, nearly so in some, and endangered in most. Only in two or three countries are the cheetah populations such that they are considered only threatened, where they are legally eliminated if found to be in conflict with human interests. All populations are regulated by CITES as Appendix I, which bans international commerce and sporting trophies. However, a few countries in the world have lifted the ban and have allowed import of sporting trophies. Namibia is exporting a limited number of wild caught animals for zoological and private exhibition.

## DISTRIBUTION

The cheetah was widely distributed throughout Africa and Asia. Cheetahs were originally found in all suitable habitats from the Cape of Good Hope to the Mediterranean, throughout the Arabian Peninsula, and the Middle East, from Israel to India and Pakistan, and through the southern provinces of the USSR. Reports on the status of cheetahs in the following countries are included in this document.

In Africa: Algeria, Angola, Bukina Faso (Upper Volta), Botswana, Cameroon, Central African Republic, Djibouti, Egypt, Ethiopia, Kenya, Libya, Malawai, Mali, Mauritania, Morocco, Mozambique, Namibia (South West Africa), Nigeria, Niger, Senegal, Somalia, South Africa, Sudan, Tanzania, Tunisia, Uganda, Western Sahara (Spanish Sahara), Zaire, Zambia, and Zimbabwe.

On the Asian continent: Afghanistan, India, Iran, Iraq, Israel, Jordan, Oman, Pakistan, Saudi Arabia, Syria, and USSR.

Five subspecies are currently considered valid by most taxonomists (Smithers, 1975). But this could be changed or condensed in the future, as the validity of the existence of subspecies is questionable. Genetic research in 1987 has shown the genetic distance between two subspecies (A.j.jubatus and A.j.raineyi) is trivial, 10 to 100 times less, for example, than the genetic distance between human racial groups (O'Brien, 1987).

A.j. hecki (Hilzheimer, 1913): southern Mauritania, Senegal, Ghana, Bukina Faso, southern Mali, and northern Benin.

A.j. venaticus (Griffith, 1821): North Africa from Morocco to Egypt, Algeria, northern Niger, northern Mali, northern Mauritania, Western Sahara, southern Asia, and India.

A.j. soemmeringii (Fitzinger, 1855): Ethiopia, Chad, Sudan, northern Cameroon, northern Central African Republic, northern Nigeria, southern Niger.

A.j. raineyi (Heller, 1913) Kenya, Uganda, and northern Tanzania, and Somalia.

A.j. jubatus (Schreber, 1976): Angola, Zambia, southern Zaire, southern Tanzania, Mocambique, Malawai, Zimbabwe, Botswana, Namibia, South Africa.

## POPULATION-CENSUS

Censusing such an elusive species as the cheetah is very difficult particularly since it is largely diurnal and widely roaming. Current information about the status of the cheetah in many countries, especially those which have been engaged in long civil wars, is lacking. The following material is taken from recent literature, and where noted, from recent communications originating from researchers in the field.

From the information gathered, we have a strong feeling that there are far less than 15,000 cheetah throughout their range, with a low estimate of 9,000 animals and an optimistic estimate of 12,000 animals. Perhaps for the cheetah, though, individual numbers of animals may not be the important point, but the numbers of viable populations still existing. We believe that viable populations may be found in only half or less of the countries where cheetahs still exist.

## AFRICA

Free-ranging cheetah inhabit a broad section of Africa including areas of North Africa, Sahel, eastern, and southern Africa. Their two remaining strong-holds are Kenya and Tanzania in East Africa and Namibia and Botswana in southern Africa.

There has not been a comprehensive survey of African cheetah since 1975, when Norman Myers calculated the African population of cheetah to be 14,000 animals in 22 countries, and that the population of cheetah in Africa had decreased by half since the 1960's (Myers, 1975). On the basis of his research, he estimated that there would be fewer than 10,000 cheetah by 1980. No new information is available to validate or refute this prediction, although there is a consensus that the cheetah population is declining throughout Africa.

The cheetah is generally considered to be an animal of open country and grass lands. This impression is probably due to the ease of sighting the cheetah in the shorter grass. However, it does use a wider variety of habitat and is found often in dense vegetation, ie. Kora Reserve in Kenya and the Namibian farmlands.

As reported throughout Africa, cheetahs are not doing well in protected wildlife reserves due to increased competition from other, larger predators such as lion and hyenas, (Laurenson, 1991; Morsbach, 1987; Mills, 1991 pers comm). Therefore, a large percentage of the remaining, free-ranging cheetah populations are outside of protected reserves or conservation areas.

There has been no recent information from North or West Africa in the form of surveys, but from personal correspondence with field researchers the cheetahs future in these areas is questionable (Plowes, 1991 pers comm; de Smit, 1990 pers comm; Newby, 1990 pers comm; Grettenberger, 1990 pers comm). Cheetahs continue to survive in small pocketed groups in isolated areas throughout the Sahel. Most of these populations though can not be considered viable for long-term survival. Controlling factors are small populations, restricted habitats with a limited prey base, conflict with nomadic herders and wars that have supplied guns and ammunition's to the populace which then poach all forms of wildlife for food and profit.

Although a current pan-African survey is underway at the present time by Paula Gross and Tim Caro, it will be a few years before it is complete. A few regional studies do exist: David Burney reported on cheetah in Kenya in 1980; P.H. Hamilton did a survey on the cheetah in Kenya in 1981; Norman Myers reported on the status of cheetah in Africa, 1981; Dieter Morsbach reported on the cheetah in Namibia, 1986; Vivian Wilson on the status of cheetah in Zimbabwe, 1985; and Christopher Stuart and Vivian Wilson on the status of cheetahs in southern Africa, 1988.

In East Africa both Burney and Hamilton found the cheetah adapting in the agriculture land in the Masai Mara region outside the national parks and were co-existing with the Narok Masai whose stock they left alone (Burney, 1980; Hamilton, 1986). In southern Africa, it has been reported that cheetahs are killed regularly in farming areas due to their raiding of livestock and the attitudes of the farmers (Morsbach, 1987; Wilson, 1987; Stuart and Wilson, 1988; Bulger, 1990 pers comm; Lawson, 1991 pers comm). In Namibia, the population of cheetah was halved by farmers from 1975-1987 (Morsbach, 1987).

Hamilton predicted that cheetah prospects in Kenya in the 1981-2000 period looked reasonable in the vast arid and semi-arid rangelands (primarily in the north) which would be the last areas to be developed. Hamilton's premise seems to be that the cheetah is a "remarkably successful predator...supremely adapted to surviving at low densities over large expanses of often waterless arid and semi-arid lands. Elsewhere the spread of commercial and group ranching is likely to bring the cheetah into greater conflicts with man. The spread of illegal and legal firearms is also likely to pose a threat so long as the cheetah's skin has any value" (Hamilton, 1986).

Myers believes the cheetah is less adaptable. He says that "if its ecological circumstances start to experience persistent perturbation, the specialized nature of the species ecology and behavior, and its genetic make-up, could leave it little able to adapt to the disruptive conditions imposed by human communities in emergent Africa" (Myers, 1986).

In fact, the ability of the cheetah to adapt to a changing ecological system brought about principally by conversion of its preferred habitat to farmland is perhaps the critical question in estimating the population's survivability in Africa. In several studies over the last decade, the cheetah was reported to suffer declining numbers as land was developed and suitable habitat converted to farmland (Wrogemann, 1975; Hamilton, 1986; Myers, 1986; Cambell and Borner, 1988; Wilson, 1987; Morsbach, 1987; Marker-Kraus and Kraus, 1989).

Wild cheetahs in Africa need help. Suitable prey is becoming scarce and habitat is disappearing. They are suffering from the consequences of human encroachment, from competition with other large predators in game reserves, and not least, from the complication of their very limited genetic make-up. The wild population continues to sustain the captive population (Marker-Kraus, 1990).

## ASIA

The wild cheetah is nearly extinct in Asia. Once widely distributed throughout Asia, the cheetah has suffered a devastating decline of available habitat and prey. A small number of Asian cheetahs still survive in small pocketed areas through Iran, and possibly in the boarding areas of Afghanistan and Pakistan.

## HISTORY OF THE CAPTIVE CHEETAH

The similar experiences of the world's zoos have reaffirmed the traditional difficulties of breeding cheetah in captivity. Despite the capturing, rearing and public display of cheetah for thousands of years, the first documented captive reproduction did not occur until 1956.

The history of the captive population of cheetah after 1947, when it became one of the major animals exhibited throughout the world, is presented in Table 1. From 1947 to 1990, the number of world zoos which held cheetah increased from 7 to 154, and the number of animals during this 43 year period increased from 10 to 935. Since 1947, 1062 cheetah have been imported from the wild and there have been 1793 births (Marker-Kraus, 1990).

Table 1. History of the Captive Cheetah Population\*

	1947-56	1957-66	1967-77	1978-88	1989-90	Total
No. Facilities	7-30	33-77	75-87	87-140	150-154	
No. Cheetahs	10-45	52-157	171-342	342-804	880-935	
No. Imports	98	234	384	305	41	1062
No. Births	3	17	480	1046	247	1793
No. Deaths	62	107	236	1132	230	1767

\*derived from Marker-Kraus, 1990

The current captive population as of December 31, 1990, is 935 (455.469.11) animals in 154 facilities in 34 countries. Of the 935 animals, 27.7% are wild-caught and 72.3% are captive born, which is a decrease of captive-born animals in the population over the past two years (see Table 2) (Marker-Kraus, 1990). The captive population is currently maintained by a combination of imports and captive breeding.

Table 2. Two Year History of the World Captive Cheetah Population

	Total Pop. year end	%CB	%WC	Births #	% Deaths < 30 days	Total # Deaths
1989	880(420.454.6)	74.3	25.7	132	25.3	118
1990	935(455.469.11)	72.3	27.7	116	13.7	112

Table 3. History of Total Captive Cheetah Reproduction\*

	1956-66	1967-77	1978-88	1989-90	Total
No. Facilities	6	35	41	24	
No. Litters	9	158	301	73	541
No. Cubs	20	480	1046	247	1793
No. Deaths < 6 mo.	12	99	355	49	515
% Infant mortality	60%	20.6%	33.9%	19.8%	28.7%

\*derived from Marker-Kraus, 1990

The breeding programs of our world's zoos, though, are not self-sustaining, data indicates that a high proportion of cheetah propagation has occurred in a handful of the zoos with a majority of these facilities having only limited success (see Table 3); and half of the successful breeding facilities have had only a single breeding pair, or a single male or female. The captive population has had a low effective breeding size from 22.4% in 1980 down to 10.5% in 1988. The fecundity of wild-caught versus captive-born animals is higher than captive-born animals and both are low, 17% and 9% respectively. In the absence of further importation of wild animals, the size of the captive population would be expected to decline further, and the continuing decline of the wild population leaves the species very vulnerable (Marker-Kraus, 1990).

## CONSERVATION

No one knows what constitutes a minimum viable population for wild cheetah. Unquestionably, the larger the population and the more broadly it is dispersed, the better placed it will be to avoid genetic failings and to endure localized epidemic mortality or widespread episodic catastrophe.

An important factor which must be taken into account, when considering the long-term conservation of the cheetah, is its lack of genetic variation. In 1981 an extensive genetic and physiological analysis of captive and free-ranging cheetah revealed that the cheetah appears to be unique among felids and other mammals in having an extreme paucity of genetic variation (O'Brien et al, 1983). The combined genetic, reproductive, and morphological data places the cheetah in a status similar to deliberately inbred mice or livestock, and prompted the hypothesis that in its recent natural history (perhaps dating back 10,000 years) the species had probably suffered a demographic contraction or population bottleneck necessarily followed by inbreeding (O'Brien et al, 1985; O'Brien et al, 1987; Wayne, et al, 1986). The consequences of this lack of genetic variation include reproductive abnormalities (Wildt, et al, 1983; Wildt et al, 1987), high infant mortality, and a weakened immune system (O'Brien et al, 1985; Marker and O'Brien, 1989; Marker-Kraus, 1990; Heaney, 1990; Junge, 1991), making the species more susceptible to ecological and environmental changes.

Although the species tolerates a broad range of habitat types, its essential requirements for long-term survival is for suitable prey and the reduction of conflict with humans and other large predators. These components are essential to its conservation.

## 1. Algeria

1.1. Population. Still to be found in a few areas of southeast Algeria, between 3 1/2 E to the Libyan border and between 27 1/2 N to 20 1/2 N with possible concentrations in Tassili N'Ajjer Range, Tassili Attoggar, and Tassili Teffedest. Females with two cubs are seen regularly by tribesman who complain that the cheetah are attacking their camels. Rain fall was good from 1987-1990 in these areas, and there were increasing populations of Dorcas gazelle and Barbary sheep for cheetah to prey upon (de Smet, pers comm, 1990).

This country could be a very important area for saving the North African cheetah.

1.2. Principal Threats. Restricted habitat, effects of drought on prey, and conflict with nomadic herders.

1.3. Legislation. Algeria became a party to CITES on 21 February 1984.

1.4. National Parks. There have been a few sightings of cheetah in the Tassili National Park (de Smet, 1990 pers comm).

1.5. Taxonomy. All are A.j. venaticus.

## 1.2. Angola

1.2.1. Population. No recent information due to the long-standing civil war which just ended. Estimate of 500 with a range of 200-1000 animals (Myers, 1975). Range was confined to the drier, arid areas in the central and southern parts of the country.

1.2.2. Principal Threats. Large scale poaching which has helped support the long, civil war, cultivation and over grazing of cattle in the arid areas will contribute to the elimination of cheetah habitat.

1.2.3. Legislation. Angola is not a party to CITES. The cheetah was declared protected game in 1957, but legislation is difficult to enforce, and the military community is exempt from these provisions of the law. (Myers, 1975).

1.2.4. National Parks. In 1975 cheetah were reported in the following parks and protected areas: Iona National Park (14,500 Km<sup>2</sup>), Bicuar National Park (7,900 Km<sup>2</sup>), Cameia National Park (14,450 km<sup>2</sup>), Luando National Park (8,280 km<sup>2</sup>), Quicama National Park. (Wrogemann, 1975).

1.2.5. Taxonomy. All are A.j. jubatus.



### 1.3. Botswana

1.3.1. Population. Estimates vary between 1,000 and 2,500 (Bulger, 1990 pers comm; Stuart and Wilson, 1988; Gross, 1990 pers comm). Cheetah have a wide distribution throughout Botswana, but are absent from areas of dense human settlement in the extreme south. In the northern districts of Ngami West, Ngami East, and Tutume areas, the cheetah is found throughout and is often in conflict with communal farmers who graze livestock and the commercial farmers of the Botswana Livestock Development Corporation (Bulger, 1990 pers comm). The cheetah is also in with communal herders in the south central Ghanzi district (Lawson, 1991 pers comm). Cheetahs are found in the large conservation areas. The low human population and agriculture development is thought to be beneficial to the cheetah in Botswana (Stuart and Wilson, 1988).

1.3.2. Principal Threats. Livestock farming and poaching.

1.3.3. Legislation. Cheetahs have been protected game since 1968. Botswana became a party to CITES on 12 February 1978. Cheetahs can be shot for livestock defense even before any damage has been noted.

1.3.4. National Parks. Cheetahs have been reported in the following protected parks and reserves: Chobe National Park (11,000 km<sup>2</sup>), Moremi Wildlife Reserve (3,880 km<sup>2</sup>), Nxai Pan National Park (2,100 km<sup>2</sup>), Makgadikgadi Pans Game Reserve (3,900 km<sup>2</sup>), Kalahari Game Reserve (24,800 km<sup>2</sup>).

1.3.5. Taxonomy. All are A.j. jubatus.

### 1.4. Benin (Dahomey)

1.4.1. Population. Thought to be non-existent outside of the tri-country national park in the north of Benin where a very small population of 2 or 3 pairs may exist (Grettenberger, 1990 pers comm).

1.4.2. Principal Threats. Insufficient numbers of cheetah to sustain a viable population and lack of habitat.

1.4.3. Legislation. Benin became a party to CITES in 1984.

1.4.4. National Parks. Small population of 2 or 3 pairs may still exist in Park Nationale du W which adjoins three countries, Niger, Burkina Faso and Benin (Grettenberger, 1990).

1.4.5. Taxonomy. All are A.j. hecki.

## 1.5. Burkina Faso (Upper Volta)

1.5.1. Population. Extremely low. Estimated at 100 (Myers, 1975). Country is under growing invasion by large numbers of nomads from the north, which has increased the pressure on the cheetah's range. Perhaps only found, now, in the tri-country national park in the eastern point of the country that borders Niger and Benin where 2 or 3 pairs exist (Grettenberger, 1990 pers comm).

1.5.2. Principal Threats. Loss of habitat, and insufficient numbers of cheetah to sustain a viable population.

1.5.3. Legislation. Burkina Faso became a party to CITES on 11 January 1990. The cheetah is totally protected but enforcement is likely to be inadequate.

1.5.4. National Parks. A population of 2 or 3 pairs is still found in the Park Nationale du W which joins the three countries of Niger, Benin and Burkina Faso (Grettenberger, 1990 pers comm).

1.5.5. Taxonomy. All are A.j. hecki.

## 1.6. Cameroon

1.6.1. Population. No current information. Small population may still exist in National Parks (Myers, 1975).

1.6.2. Principal Threats. Decline of prey species, poaching and environmental degradation (Myers, 1975).

1.6.3. Legislation. Cameroon became a party to CITES on 12 September 1981.

1.6.4. National Parks. No current information. Small populations of cheetah were still found in the following national parks in 1975: Benoue National Park, Boubandijidah National Park (Wrogemann, 1975).

1.6.5. Taxonomy. All are A.j. soemmeringii.

## 1.7. Central African Republic

1.7.1. Population. Still found in the south eastern area of the country boarding Sudan and in the southern middle of the country bordering Zaire (Stephenson, 1991 pers comm).

1.7.2. Principal Threats. Extensive poaching and limited prey species.

1.7.3. Legislation. Central African Republic became a party to CITES on 25 November 1980.

1.7.4. National Parks. No current information. A small population still existed in Saint Floris National Park in 1975 (Wrogemann, 1975).

1.7.5. Taxonomy. North Africa listed as A.j. soemmeringii, there is no listing for southern Central African Republic or northern Zaire.

## 1.8. Chad

1.8.1. Population. No current information. Estimated 400 (Myers, 1975). Possibly a small population still exists in the Semi Desert where prey survives and in the southern Chad National Park.

1.8.2. Principal Threats. Changing climate conditions have reduced the carrying capacity of the land and have over burdened the sensitive environment (Myers, 1975). Currently, the many years of war have armed the general population, which puts all wildlife in danger of poaching for food and profit.

1.8.3. Legislation. Chad became a party to CITES on 3 March 1989.

1.8.4. National Parks. No current information. As of 1975, there was a small population of cheetah in the Zakouma National Park (Wrogemann, 1975).

1.8.5. Taxonomy. All are A.j. soemmeringii.

## 1.9 Djibouti

1.9.1. Population. Believed to be extinct. Although in 1990 private people could still buy cheetah skins and live cheetah cubs in the market place. These skins and live cheetahs are thought to be coming from Somalia and possibly eastern Ethiopia (French diplomat, 1990 pers comm). Skins are still available in large numbers.

1.9.2. Legislation. Djibouti is not a party to CITES.

1.9.3. National Parks. No Information

1.9.4. Taxonomy. All are A.j. venaticus.

## 1.10. Egypt

1.10.1. Population. In 1984 many tracks were seen and at least 5 animals were seen around the Sitra water source in the Qattara Depression in the northwest of the country, and north of Qara Oasis and it is believed there is still a small population which remains there (Giegengak, 1991 pers comm, Amer, 1990 pers comm).

1.10.2. Principal Threats. Restricted habitat, possible conflict with nomadic herdsmen, and insufficient numbers of cheetah to sustain a population.

1.10.3. Legislation. Egypt became a party to CITES on 4 April 1978. The cheetah is totally protected, although enforcement is likely to be inadequate.

1.10.4. National Parks. No populations are believed to be in National Parks.

1.10.5. Taxonomy. All are A.j. venaticus.

## 1.11. Ethiopia

1.11.1. Population. No current information. In 1975 the population was estimated to be 1000 animals and believed that the populations could decline to 300 animals by 1980 (Myers, 1975). The cheetah was widely distributed from Addes to Djibouti in eastern Ethiopia. Also, widely distributed through the southern parts of the country, between 200-1500m elevation, absent from the low lands of the Ogaden in the east, and no sightings in the north since 1937 (Yalden et al, 1979).

1.11.2. Principal Threats. Civil war, habitat loss, extensive poaching, decline of prey, and fur trade.

1.11.3. Legislation. Ethiopia became a party to CITES on 4 July 1989. Cheetahs are protected against hunting and capture although legislation is difficult to enforce.

1.11.4. National Parks. No current information. Small population was known to be in the Danakil Reserve and in former times the Yangundi Rassa Reserve (2000 km<sup>2</sup>) (Myers, 1975).

1.11.5. Taxonomy. All are A.j. soemmeringii.

## 1.12. Ghana

1.12.1. Population. No information. Believed to be extinct.

1.12.2. Legislation. Ghana became a party to CITES on 12 February 1976.

1.12.3. National Parks. No current information. Mole Reserve had a small population in the reserve (Wrogemann, 1975).

1.12.4. Taxonomy. All are A.j. hecki.

## 1.13. Kenya

1.13.1. Population. Estimation of 1,200 animals (Hamilton, 1986). Species still occurs throughout the country, except in forests, montane moorland, swamps, and areas of dense human settlement and cultivation. Cheetahs are absent in western Kenya, the more densely populated parts of Central Province, and

### 1.13.1. Kenya (cont.)

most parts of the coastal strip. Its distribution coincides with the distribution of Thompson's gazelle, Grant's gazelle, and gerenuk. Cheetah occur throughout most of the arid northern and north eastern parts of Kenya. Although this area is vast and mostly unpatrolled and poaching is on an increase (Hamilton, 1986).

1.13.2. Principal Threats. Poaching, habitat loss, competition with agriculture and farming development.

1.13.3. Legislation. Kenya became a party to CITES on 13 March 1979. All hunting is completely banned. Exports of live cheetah stopped in the 1960's.

1.13.4. National Parks. Populations of cheetahs are found in the following national parks and reserves: Nairobi National Park (114 km<sup>2</sup>), Tsavo National Park (20,821 km<sup>2</sup>), Amboseli National Park (329 km<sup>2</sup>), Meru National Park (870 km<sup>2</sup>), Samburu-Isiolo Reserve (504 km<sup>2</sup>), Kora Reserve (1500 km<sup>2</sup>), Masai Mara Reserve (1510 km<sup>2</sup>), Marsabit Reserve (2088 km<sup>2</sup>), Tana River Reserve (165 km<sup>2</sup>).

1.13.5. Taxonomy. All are A.j. raineyi.

### 1.14. Libya

1.14.1. Population. Little information available. Formerly found across the south of the country but last seen in 1980, possibly still exist in south west corner where country borders Algeria (de Smet, 1990 pers comm.). Until 1969 still found sparsely throughout the country except for the south and southeast (Skinner and Smithers, 1990).

1.14.2. Principal Threats. Unknown, lack of information, presumed lack of prey species.

1.14.3. Legislation. Not a party to CITES.

1.14.4. National Parks. No current information. Sighting in 1980 in Tassili National Park near the Algeria boarder (de Smit, 1990 pers. comm.).

1.14.5. Taxonomy. All are A.j. venaticus.

### 1.15. Malawi

1.15.1. Population. Estimated at 50 (Myers, 1975). Sightings of individual animals do still occur. Small population still exists only in western parks and possibly 10 individuals around Chiperi area south of Kasurgu Park. Animals seen to be coming and going from Zambia into parks with very few resident individuals in Malawi parks. Absent in southern park of country. (Gross, 1990 pers comm).

1.15.2. Principal Threats. Human population growth, loss of habitat, and poaching.

1.15.3. Legislation. Malawi became a party to CITES 6 May 1982.

1.15.4. National Parks. There have been sightings of individual cheetah in Nyika National Park (3134 km<sup>2</sup>), Vwaza Marsh Game Reserve (986 km<sup>2</sup>), and Kasunga National Park (2316 km<sup>2</sup>) (Gross, 1990 pers comm).

1.15.5. Taxonomy. All are A.j. jubatus.

#### 1.16. Mali

1.16.1. Population. Estimated to be 200 to 500 (Myers, 1975). No current information. Probably a small population still exists in the Sahel areas in the north central third of the country. In 1990 skins were found for sale in Tibuta, north Mali (Mackie, 1991 pers comm). In the Adrar des Iforhas mountain region in eastern part of country, Tuaregs (nomadic herdsman) said there have been no cheetah sighted in that area for quite some time (de Smet, 1990 pers comm).

1.16.2. Principal Threats. Decline of prey, poaching, environmental desiccation and reduction of habitat due to drought conditions.

1.16.3. Legislation. Not a party to CITES.

1.16.4. National Parks. No current information.

1.16.5. Taxonomy. All are A.j. venaticus.

#### 1.17. Mauritania

1.17.1. Population. Estimated at 100 to 500 (Myers, 1975). No current information. Possible small population still exists in the Sahel zone.

1.17.2. Principal Threats. Decline of prey, poaching, environmental desiccation and reduction of habitat.

1.17.3. Legislation. Not a party to CITES.

1.17.4. National Parks. No Current Information.

1.17.5. Taxonomy. Northern Mauritania are A.j. venaticus and in the south A.j. hecki.

#### 1.18. Morocco

1.18.2. Population. Extinct. Were still found up to 40 years ago in the mountainous regions of the country bordering the sahara (Wrogemann, 1975).

1.18.3. Legislation. Morocco became a party to CITES in 1976.

1.18.4. Taxonomy. A.j. venaticus.

1.19. Mozambique

1.19.1 Population. Estimated at 100 (Stuart and Wilson, 1988). Once widely distributed, now relic populations perhaps survive in parts of Gaza and Inhambane Provinces and south of the Zambezi River, and in the southern regions of Tete Province (Wrogemann, 1975). The Tete Region is believed to be absent of cheetah now (Stuart and Wilson, 1988). The long-standing war has made it impossible to obtain current information.

1.19.2. Principal Threats. Poaching due to civil war situation, lack of enforced protection.

1.19.3 Legislation. Mozambique became a party to CITES on 23 June 1981. But, legislation has been impossible to enforce because of the war.

1.19.4. National Parks. The Gorongosa National Park (3,770 km<sup>2</sup>) had small population of cheetahs (Wrogemann, 1975).

1.19.5. Taxonomy. All are A.j. jubatus.

1.20. Namibia (South West Africa)

1.20.1 Population. Estimated at 2500-3000 (Morsbach, 1987), which is half of the 1975 estimated population. Still widely spread throughout the country, although only small populations are found in the southern part of the country due to small stock farming, jackal proof fences and eradication of predators. Ninety-five percent of the population is on commercial farm lands to the north of the Tropic of Capricorn. Apart from farmlands, very small numbers of animals still occur in communal farming areas of Damaraland, Bushmanland, Kavango, Kaokaland, and Caprivi. Individual animals are seen in Hereroland. Only two conservation areas have populations of cheetah Etosha and the Namib/Naukluft, but only 1.4 to 4% of the population lives in proclaimed conservation areas (Morsbach, 1987; Marker-Kraus and Kraus, 1989; Stuart and Wilson, 1988). The majority of the current world's captive population of cheetah have originated from Namibia (Marker-Kraus, 1990).

1.20.2. Principal Threats. Live capture and shooting by livestock and game farmers. Cheetahs are easily trapped, in large numbers, on farms that have "cheetah play trees". The trapping is indiscriminate. These animals are then shot as there is little export market for live animals.

1.20.3. Legislation. Namibia became a party to CITES in March 1991 with an exception to the cheetah. Although protected game, cheetahs can be killed if livestock is threatened. Wildlife is the property of the landowners. Trophy hunting of cheetah is allowed, some live exports still occur, particularly to South Africa.

1.20.4. National Parks. Possibly less than 100 animals live in the 2 conservation areas, Etosha National Park (22,270 km<sup>2</sup>) because high predator competition, and Namib/Naukluft National Park (49,768 km<sup>2</sup>), because of low prey density.

1.20.5. Taxonomy. All are A.j. jubatus.

## 1.21. Niger

1.21.1. Population. Estimated at 50 to 400 (Myers, 1975). Still found in the Niger Sahel running from Mali to Chad with concentrations of 10 to 15 pairs in the L'Air Tenere Reserve in the northwest central park of the country. A few remain in the Termit Area, and 3 or 4 pairs are found in the Park National Du W in the extreme south west of the country bordering Benin and Burkina Faso (Newby, 1990 pers comm; Grettenberger, 1990 pers comm; Newby and Grettenberger, 1986; Grettenberger, 1987).

1.21.2. Principal Threats. Poaching, lack of prey species, conflict with livestock.

1.21.3. Legislation. Niger became a party to CITES on 2 December 1975.

1.21.4. National Parks. Small populations of cheetahs have been recorded in Reserve Naturelle Nationale de L'Air et du Tenere (20 or 30 animals) (77,360 Km<sup>2</sup>) and Park Nationale Du W (2190 km<sup>2</sup>) has 2 or 3 pairs.

1.21.5. Taxonomy. A.j. venaticus in northern Niger and A.j. hecki in southern Niger.

## 1.22. Nigeria

1.22.1. Population. Extinct (Farri, 1990 pers comm). Skins are found for sale in the public market in Lagos which are probably coming from the countries north of Nigeria (Watkins, 1990 pers comm).

1.22.2. Legislation. Nigeria became a party to CITES on 1 July 1975.

1.22.3. Taxonomy. A.j. hecki.

## 1.23. Senegal

1.23.1. Population. No current information. Possibly still a few animals in Parc National Du Niokolo-Koba (Grettenberger, 1990 pers comm).

1.23.2. Principal Threats. Lack of habitat.

1.23.3. Legislation. Senegal became a party to CITES on 3 November 1977.



1.23.4. National Parks. Parc National Du Niokolo-Koba (8,000 km<sup>2</sup>) may still have a few animals.

1.23.5. Taxonomy. All are A.j. hecki.

#### 1.24. Somalia

1.24.1. Population. Estimated at 300 (Myers, 1975). No current information for country except the report from a traveler who saw 8 animals in one days travel in the south of the country along the main road from Kenya, suggesting some numbers still in this region (Burling, 1991 pers comm). Formerly found throughout the entire country, reduced by half to two thirds as of 1975 (Myers, 1975). Previously found along the Ethiopian boarder in the northwest and central areas of Somalia (Yalden, 1980). Live cheetahs and skins for sale in Djibouti market place and thought to come from Somalia (French diplomat, 1990 pers comm).

1.24.2. Principal Threats. Civil war, agriculture expansion caused reduction of prey, and poaching for skins and live trade.

1.24.3. Legislation. Somalia became a party to CITES on 2 March 1986. Due to Shifta bandits and civil war, enforcement is inadequate.

1.24.4. National Parks. No current information

1.24.5. Taxonomy. A.j. raineyi.

#### 1.25. South Africa

1.25.1. Population. Estimated at 500 - 800 (Marker-Kraus and Kraus, 1989, Gross, 1991, pers. comm). Individuals occur sporadically in the north parts of the Cape Province. In the Kalahari Gemsbok National Park there is a small population of approximately 50 animals. A small population is found on the extensive commercial farmlands in the north western, northern and eastern Transval to the souther boarder of the Kruger National Park and along the Zimbabwe and Botswana boarders. In Natal they were exterminated by the 1930's, but animals from Namibia were reintroduced to Hluhluwe/Umflozi and Mkuze Game Reserves in 1965 now about 40 animals are found in these parks; and in 1978 Namibian cheetahs were relocated to the eastern shores of Lake St. Lucia (Skinner, Smithers 1990). Other reserves contain isolated groups too small to be considered as viable populations. The population in the Kruger National Park is approximately 250 animals. Many cheetahs are imported to South Africa from Namibia for zooparks and private facilities as well as for trophy hunting in small camps. South Africa does have several successful captive breeding facilities (Marker-Kraus, 1990).

1.25.2. Principal Threats. Livestock farming, small populations in unconnected conservation areas, and that the successful captive breeding program in South Africa has eliminated the need to put much effort into the conservation of the remaining wild populations.

1.25.3. Legislation. South Africa became a party to CITES on 13 October 1975. The cheetah was taken off the South Africa endangered species list in 1989. Permits are issued to control problem animals through shooting and live capture. Trophy hunting is allowed.

1.25.4. National Parks. Only three Parks hold large enough populations: Kruger National Park (19,485 km<sup>2</sup>), Kalahari Gemsbok National Park (9,591 km<sup>2</sup>) and Hluhluwe/Umflozi Game Reserve (719 km<sup>2</sup>).

1.25.5. Taxonomy. All are A.j. jubatus.

## 1.26. Sudan

1.26.1. Population. Estimation of 1,200 animals which could have declined by half by 1980 (Myers, 1975). No recent information except in the north, cheetah skins are used to make slippers and these are in great demand by rich Sudanese (Plowes, 1991 pers comm, Mackie, 1991 pers comm). Populations may still be present where adequate prey and livestock exist in semi arid areas below the true desert in the central middle of the country (Plowes, 1991 pers comm). Wide distribution throughout the south as, of 1982 (Hillman, 1982). Recent information is lacking from the south of the country due to the long, civil war, and the population there could be greatly affected by the 8 years of war. All wildlife has been severely affected by the availability of guns and ammunition (Plowes, 1991 pers comm).

1.26.2. Principal Threats. Poaching, loss of prey, indirect effects of the long civil war in the south of the country.

1.26.3. Legislation. Sudan became a party to CITES on 24 January 1983. The cheetah has been a protected species since 1972. Effective 1 January 1989 Wildlife Conservation and National Park forces of Sudan issued a 3 year notice banning the hunting and capture of mammals, birds and reptiles in the Republic of Sudan.

1.26.4. National Parks. No current information. Were very rare or non-existent in all parks and reserves (Myers, 1975). Sightings of 10 animals in southern reserve- \*Southern National Park (23,000 km<sup>2</sup>), sightings also seen in \*Boma National Park (22,800 km<sup>2</sup>), \*Boro Game Reserve (1,500 km<sup>2</sup>), \*Meshra Game Reserve (4,500 km<sup>2</sup>), \*Badingile Game Reserve (8,400 km<sup>2</sup>), Ashana Game Reserve (900 km<sup>2</sup>), Chelkou Game Reserve (5,500 km<sup>2</sup>), Kidepo Game Reserve (1,400 km<sup>2</sup>), Numatina Game Reserve (2,100 km<sup>2</sup>), and Shambe Game Reserve (620 km<sup>2</sup>) (Hillman, 1982). \* Proposed not yet gazetted (1988).

1.26.5. Taxonomy. All are A.j. soemmeringii.

Serengiti/land

1.27. Tanzania

1.27.1. Population. Estimated at 1000 with a range of 500-1500 (Myers, 1975). No new information reported, but Gross is conducting a survey at present. Found in the grasslands of Masailand and a few localized areas of woodlands. Main population has been found in the Serengeti/Ngorongoro Conservation Area where the population has declined due to competition with lions and hyenas.

1.27.2. Principal Threats. Poaching, predation and competition with other large predators.

1.27.3. Legislation. Tanzania became a party to CITES on 27 February 1980.

1.27.4. National Parks. Populations due exist in the Serengeti/Ngorongoro Conservation Area (25,000 km<sup>2</sup>) possibly as many as 500 (Laurenson, 1991), individual sightings in Mikumi National Park (3,230 km<sup>2</sup>), Tarangire National Park (2,600 km<sup>2</sup>), Katavi National Park (2,250 km<sup>2</sup>), and Ruaha National Park (10,200 km<sup>2</sup>) (Caro and Gross, 1989 pers comm.).

1.27.5. Taxonomy. All are A.j. raineyi.

102

1.28. Tunisia

1.28.1. Population. No present information, believed to be extinct. Formerly found in the region of Chott el Djerid and the desert south of Tatahoume (Wrogemann, 1975). Last cheetah sighted and was then killed in 1968 near Bordj Bowrgiba in the extreme south (de Smet, 1990 pers comm).

1.28.2. Principal Threats. Decline of prey.

1.28.3. Legislation. Tunisia became a party to CITES on 1 July 1975.

1.28.4. National Parks. No current information.

1.28.5. Taxonomy. All are A.j. venaticus.

1.29. Uganda

1.29.1. Population. Estimated at 170 (Myers, 1975). No current information. Small numbers are thought to be found in the north east sector of the country (Wrogemann, 1975).

1.29.2. Principal Threats. Poaching, loss of habitat.

1.29.3. Legislation. Uganda is not a party to CITES.

1.29.4. National Parks. No current information. A few still found in Kidepo National Park (1,400 km<sup>2</sup>) (Wrogemann, 1975).

1.29.5. Taxonomy. All are A.j. raineyi.

1.30. Western Sahara (Spanish Sahara)

1.30.1. Population. Presumed extinct. Last individual caught in 1976 and given to the Algeria Zoo (de Smit, 1990 pers comm).

1.30.2. Legislation. Western Sahara is not a party to CITES.

1.30.3. National Parks. No information.

1.30.5. Taxonomy. A.i. venaticus.

1.31. Zaire

1.31.1. Population. No current information. Estimated at 300 and could decline below 100 by 1980 (Myers, 1975). Small populations found in parts of Shaba, Kasai and Kwango Provinces in the southern and southeastern part of country (Myers, 1975).

1.31.2. Principal Threats. Agricultural development, poaching and loss of habitat.

1.31.3. Legislation. Zaire became a party to CITES on 18 October 1976.

1.31.4. National Parks. No current information. Kundelungu National Park (7,600 km<sup>2</sup>) and Upemba National Park (10,000 km<sup>2</sup>) did contain a few cheetah (Myers, 1975).

1.31.5. Taxonomy. A.i. jubatus.

1.32. Zambia

1.32.1. Population. No current information. Estimated at below 800 (Myers, 1975). As of 1969 the cheetah was still widely distributed in various parts of the country but in low densities (Ansell, 1979). Populations were concentrated in the flood plains and along dry river beds. Thought that the majority of the suitable habitats will disappear by the 1980's (Myers, 1975).

1.32.2. Principal Threats. Poaching, loss of habitat, and expanding human population.

1.32.3. Legislation. Zambia became a party to CITES on 22 February 1981.

1.32.4. National Parks. Small populations were found in Kafue National Park (22,400 km<sup>2</sup>) and Lunga National Park (Myers, 1975).

1.32.5. Taxonomy. All are A.i. jubatus.

## 1.33. Zimbabwe

1.33.1. Population. Estimated at 500-1000 (Wilson, 1987; Stuart and Wilson, 1988; Marker-Kraus and Kraus, 1989). Largely absent from the northeast part of the country. Two main populations are found in the southern commercial farming areas and in the northwest conservation areas. These two areas account for about 400 animals. The remainder of about 100 animals is distributed over the middle Zambezi Valley, the Midlands and Gonarezhou. Eighty percent of the population occurs on privately owned farmland (Wilson, 1987).

1.33.2. Principal Threats. Conflict with farmers and livestock and illegal killing of cheetah.

1.33.3. Legislation. Zimbabwe became a party to CITES on 17 August 1981. The cheetah was a "protected animal" and has been downgraded to "restricted species" status. Government has opened trophy hunting on the cheetah in 1990 which is monitored by "hunting returns".

1.33.4. National Parks. Less than 200 animals are thought to be in the conservation areas including: Hwange National Park (14,650 km<sup>2</sup>), Matetsi Safari Area (2,920 km<sup>2</sup>), Kazuma National Park (313 km<sup>2</sup>), Zambezi National Park (564 km<sup>2</sup>), occasional sightings in Matobo National Park (432 km<sup>2</sup>) and 10-20 animals are in the National Park and Safari area around Lake Kariba Valley, small numbers are in the Mana Pools National Park (2,196 km<sup>2</sup>), and the lower Zambezi area, unknown number in the Gonarezhou National Park (5,053 km<sup>2</sup>) (Wilson, 1987).

1.33.5. Taxonomy. All are A.j. jubatus.

## 2. ASIA

### 2.1. Afghanistan

2.1.1. Population. No information at this time. Possibly still a few animals in the southwest above Baluchistan, Pakistan and the Iranian border region.

2.1.2. Legislation. Afghanistan became a party to CITES on 28 January 1984. Besides that, there is no protection.

2.1.3. Taxonomy. A.j. venaticus.

### 2.2. India

2.2.1 Population. Extinct in 1952. Last known cheetah found in Hyderabad in 1951 and Chitoor in 1952. Indians were importing cheetah from Africa to be used as hunting leopards in 1929 due to the rarity of local cheetahs (Guggisberg, 1975; Wrogemann, 1975; Divyabhanusinh, 1984). There has been talk of reintroducing cheetah back to India, but availability of prey species and unsuitable habitat are limiting factors.

2.2.2. Legislation. India became a party to CITES on 18 October 1976.

2.2.3. Taxonomy. A.j. venaticus.

## 2.3. Iran

2.3.1. Population. Estimates of 100-200 (Karimi, 1990 pers comm). Under the rein of the Shah of Iran the population was estimated at 400 - 450 (Gruelick, 1990 pers comm; Joslin, 1989 pers comm) As of 1990 cheetah could still be found in very small groups in a variety of areas of this large country. A few have been seen in Dashte-Rig, Bahram Gur Protected Area (29.15'N - 55 00 E), at least 15 animals have been seen in southern Khornsan Province in the Tabas region, some have been seen in the Turan Protected Region in the Sasht-e Kavir (34''30'n 56 E), some in the Koshe-Yeilagh Protected region in the northeast of Tehran, and 10-20 animals in Bahran-e-Gour Protected Area and National Park 200-250 km east of Shiraz, and possibly a few between Qom and Esfahan in the Muteh Protected Area. Other possible locations are around Bam, areas near Bandar'Abbas on the Persian Gulf, and in the region near Zabol on the Afghanistan border (Karami, 1990 pers comm; Dareshureh, 1990 pers comm). Cheetahs outside protected areas and some within certain parks are living primarily on hares which are found in large numbers. Only in some parks are there large enough populations of wild sheep, goats and gazelle for the cheetah to regularly prey upon (Groves, 1990 pers comm; Karami, 1990 pers comm).

2.3.2. Principal Threats. Poaching, limited numbers of prey species.

2.3.3. Legislation. Iran became a party to CITES on 1 November, 1976.

2.3.4. National Parks. A few have been seen in Dashte-Rig, Bahram Gur Protected Area (29 .15'N - 55 00 E), in the Turan Protected Region in the Sasht-e Kavir (34''30'n 56 E), some in the Koshe-Yeilagh Protected region in the northeast of Tehran, and 10-20 animals in Bahran-e-Gour Protected Area and National Park 200-250 km east of Shiraz, and possibly a few between Qom and Esfahan in the Muteh Protected Area (Karami, 1990 pers comm).

2.3.5. Taxonomy. All are A.j. venaticus.

## 2.4. Iraq

2.4.1. Population. Extinct. Last sighting in 1950.

2.4.2. Legislation. Iraq is not a party to CITES.

2.4.3. Taxonomy. A.j. venaticus.

## 2.5. Israel

2.5.1. Population. Extinct. Last report of cheetah was in 1956 (Malka, 1989 pers comm; Mendelsohn, 1989 pers comm).

2.5.2. Legislation. Israel became a party to CITES in 1980.

2.5.3. National Parks. No cheetahs exist. There have been thoughts of reintroduction of cheetah into the Biblical Wildlife Reserve of the Negev Desert (Mendelsohn, 1989 pers comm; Malka, 1989 pers comm).

2.5.5. Taxonomy. A.j. venaticus.

## 2.6. Jordan

2.6.1. Population. Extinct. In 1935 still many skins were sold in Be'er Sheva'. May still have been found in Negev Desert, the Palestine Mountains, Sinai Desert, and Trans Jordan until the late 1940's (Guggisberg, 1975).

2.6.2. Legislation. Jordan became a party to CITES in 1979.

2.6.3. Taxonomy. A.j. venaticus.

## 2.7. Oman

2.7.1. Population. Extinct. Last sighting in 1968 (Wrogemann, 1975).

2.7.2. Legislation. Not a party to CITES.

2.7.3. Taxonomy. A.j. venaticus.

## 2.8. Pakistan

2.8.1. Population. Information collected suggests that there are no more cheetah in northern Baluchistan from Quetta westward. This was thought to be the last area claiming cheetah in Pakistan (F. Ahmad, 1990 pers comm). Previously, cheetah had been found near Kalat, Khavan, Merkan and Chiagai (F.Ahmad, 1990 pers comm). Possibly some still exist in southwest Baluchistan on the Iranian border. It is very difficult for Pakistan officials to get information from these semi-autonomous areas. Specimens of hides were collected in the early 1970's. (F. Ahmad, 1990 pers comm; Mian, 1990 pers comm; A. Ahmad, 1990 pers comm; Auffenburg, 1990 pers comm).

2.8.2. Principal Threats. Loss of habitat, competition with livestock and poaching.

2.8.3. Legislation. Pakistan became a party to CITES on 19 July 1976.

2.8.4. National Parks. No current information.

2.8.4. Taxonomy. A.j. venaticus.

## 2.9. Saudi Arabia

2.9.1. Population. Extinct. Last 4 cheetahs shot in 1950 near Saudi, Jordan, Iraq border intersection (Guggisberg, 1975).

2.9.2. Legislation. Not a party to CITES.

2.9.3. Taxonomy. A.j. venaticus.

## 2.10. Syria

2.10.1. Population. Thought to be extinct. Oil pipeline worker may have killed the last cheetah in the Syrian Desert in 1950 (Guggisberg, 1975).

2.10.2. Legislation. No a party to CITES.

2.10.3. Taxonomy. A.j. venaticus.

## 2.11. USSR

2.11.1. Population. Considered extinct as of 1989. No confirmed sightings in the past few years, a small expedition looked for cheetah during the summer of 1989 but no animals or tracks were seen. (Flint, 1990, pers comm). Once existed in southern USSR from the Caucuses in the west to the Tien Shan Mountains in the east. Cheetahs existed in many areas until the 1940's and 1950's when their prey, the goitered gazelle, was reduced drastically from over hunting. Some cheetahs were believed to have moved down into Afghanistan when the goitered gazelles conducted a permanent move southward. In the 1960's and 1970's the last cheetahs existed in parts of Turkmenia and Uzbekistan (east and west of Murgab, east of the Caspian sea, and in the Badkhyz Preserve). In these areas they lived mostly on remnant populations of goitered gazelle and arkhar sheep, saiga antelope, kopet-dag sheep and hares. (Knystautas 1977; Ognev, 1935; Heptner and Alvdskii, 1972; Flint, 1990 pers comm; Spitsin, 1990 pers comm; Denisov, 1990 pers comm; Shaymardanov, 1990 pers comm).

The USSR would like to reintroduce cheetahs into areas with sufficient prey populations such as the Ustyurt Plateau of Uzbekistan. We have suggested that before they introduce African cheetahs they wait until the genetics have been run on the Asian cheetahs in Iran.

2.11.2. Legislation. USSR became a party to CITES on December 8 1976. In 1972 it was suggested that the cheetah be listed as a living monument and very strict international laws be proposed to save the last of the Asian cheetah.

2.11.3. Taxonomy. A.j. venaticus.



## BIBLIOGRAPHY

- Ansell, W.F.H. 1978. Mammals of Zambia, National Parks and Wildlife Service, Chilanga, Zambia. pp.45.
- Burney, D.A. 1980. The effects of human activities on cheetah (Acinonyx jubatus, Schreber) in the Mara region of Kenya. Msc. Theses, Univ of Nairobi, Nairobi. pp.219.
- Cambell, K.; Borner, M. Cited in Cat News. P. Jackson, (Ed.) IUCN Publ, Gland, Switzerland. Vol.8, 1988, pp. 9.
- Divyabhanusinh. 1984. The origin, range and status of the Asiatic (or Indian) cheetah or hunting leopard (Acinonyx jubatus venaticus). Un-published Report.
- Firooz, S. 1974. Environment and nature conservation in Iran. Environ Consercy 3 (1): 33-42.
- Grettenberger, J. 1987. W National Park in Niger-a case for urgent assistance. Oryx. Vol 18 (4): 230-236.
- Guggisberg, C.A.W. 1975. Wild Cats of the World, 266-89. New York: Taplinger Publ Co.
- Hamilton, P.H. 1986. Status of the cheetah in Kenya, with reference to sub-Saharan Africa. In Cats of the World: Biology, Conservation, and Management. S.D. Miller; D.D. Everett, (Eds.) Washington, DC, National Wildlife Federation.
- Hillman, J. 1982. Wildlife Information Booklet, Dept of Wildlife Management, Democratic Republic of the Sudan, Ministry of Wildlife Conservation and Tourism, Southern Region, Sudan. pp 100.
- Heeney, J.F. et al. 1990. Prevalence and implications of coronavirus infections of captive and free-ranging cheetahs (Acinonyx jubatus). J of Virol. 64: (5) 1964-72.
- Heptner, V.G.; Sludskii, A.A. 1972. Mammals of the Soviet Union, Vol II, (2), Carnivores. Higher School, Moscow (trans. Hoffman) pp 901-942.
- Hoogstraal, H.; et al. 1968. The cheetah, Acinonyx jubatus, Schreber, in Egypt. Bull Zool Soc Egypt 21: 63-68.
- Junge, R.E. et al. 1991. Persistent cutaneous ulcers associated with feline herpesvirus type 1 infection in a cheetah. J of Amer Vet Med Assoc, Vol 198 (6): 1057-58.
- Kingdon, J. 1977. Cheetah (Acinonyx jubatus). East African Mammals, Vol. 3A. Academic Press, New York. pp 396-413.

- Knystautas, A. 1972. The Natural History of the USSR. Century, London. pp. 187.
- Laurenson, K. 1991. Cheetahs never win. BBC Wildlife Magazine, Feb. pp 99-105.
- Marker, L.L.; and O'Brien, S.J. 1989. Captive Breeding of the cheetah (Acinonyx jubatus) in North American Zoos (1871-1986). Zoo Biology, Vol 8 (1) 3-16.
- Marker-Kraus, L. 1990. 1988 International Cheetah Studbook. Pub. NOAHS Center, National Zoo, Washington, DC.
- Marker-Kraus, L.; Kraus, D. 1990. Investigative trip to Zimbabwe and Namibia. Cat News. P. Jackson, (Ed.) IUCN Publ, Gland, Switzerland. Vol.12, (1) pp 16-17.
- Morsbach, D. 1987. Cat News. P. Jackson, (Ed.) IUCN Publ, Gland, Switzerland. Vol.6, 1987, pp. 25-26.
- Myers, N. 1975. The cheetah, Acinonyx jubatus, in Africa. IUCN Monograph 4. Morges, Switzerland, International Union for Nature and Natural Resources.
- \_\_\_\_\_. 1986. Conservation of Africa's cats: Problems and opportunities. In Cats of the World: Biology, Conservation, and Management. S.D. Miller; D.D. Everett, (Eds.) Washington, DC, National Wildlife Federation.
- Newby, J.; Grettenberger, J. 1986. The human dimension in natural resource conservation in a Sahelian example from Niger. Envir Cons, Vol 13 (3): 249-256.
- O'Brien S.J. et al. 1983. The cheetah is depauperate in genetic variation. Science 221 (4609): 459-62.
- \_\_\_\_\_. 1985. Genetic basis for species vulnerability in the cheetah (Acinonyx jubatus). Science 227 (4693): 1428-34.
- \_\_\_\_\_. 1987. East African cheetahs Evidence for two population bottlenecks? In Proc of the National Academy of Sciences, 84 (2): 508-11.
- Ognev, S.I. 1935. Mammals of USSR and adjacent countries. Carnivora, Vol 3. Jerusalem: Israel Program for Scientific Translations (1962).
- Osborn, D.J.; Helmy, I. 1980. The contemporary land mammals of Egypt (including Sinai). Fieldiana Zoology, No. 5, Field Museum of Nat. History, pp 455-459.
- Skinner, J.D.; Smithers, R.H. 1990. Mammals of the South African subregion. University of Pretoria Press, Pretoria, pp 393-397.

- Smithers, R.H.N. 1975. Family Felidae, 8.1: 1-10, in Mammals of Africa an Identification Manual. (Ed) J. Meester & H.W. Setzer, Smithsonian Press, Washington, DC.
- Stuart, C.; Wilson, V. 1988. The Cats of Southern Africa, IUCN Cat Specialist Group, African Carnivor Survey, Chipangali Wildlife Trust, Bulawayo.
- Wayne, R.K.; Modi, W.S.; O'Brien, S.J. 1986. Morphological variability and asymmetry in the cheetah (Acinonyx jubatus), a genetically uniform species. Evolution 40: 78-85.
- Wildt, D. E. et al. 1983. Unique seminal quality in the South African cheetah and a comparative evaluation in the domestic cat. Biology of Reproduction 29: 1019-25.
- \_\_\_\_\_. 1987. Similiarity in ejaculate-endocrine characteristics in captive verus free-ranging cheetahs of two subspecies. Biology of Reproduction 36: 351-60.
- Wilson, V.J. Cat News. P. Jackson, (Ed.) IUCN Publ, Gland, Switzerland. Vol.8, 1988, pp. 9.
- \_\_\_\_\_. 1987. Distribution and status of cheetah in Zimbabwe. Unpublished report National Parks Advisory Board, Zimbabwe.
- Wrogemann, N. 1975. Cheetah under the sun. McGraw & Hill, Johannesburg.
- Yalden, D.W.; Largon, M.J.; Kock, D. 1980. Catalog of Ethiopia Mammals, Carnivora. Italian J of Zoology, No.8 pp 207-209.

Prepared by: Daniel Kraus, Co-director, Cheetah Preservation Fund, 211 West Magnolia, Fort Collins, Colorado 80521, USA; and Laurie Marker-Kraus, Co-director, Cheetah Preservation Fund and International Cheetah Studbook Keeper, NOAHS Center, National Zoological Park, Smithsonian Institution, Washington, DC 20008, USA. Namibian Field address for the Cheetah Preservation Fund is P.O. Box 247, Windhoek 9000, Namibia/SW Africa. 30 September 1991.

## CONTACTS

- Ahmad, Ashiq, Wildlife Management Specialist, Pakistan Forest Institute, Peshawar - 25130, Pakistan.
- Ahmad, Mohammad Farooq, Director, Zoological Survey Department, Government of Pakistan, Block No. 61, Pakistan, Secretariat, Shahrah-e-Iraq, Karachi-1, Pakistan.
- Amer, Dr. M.H., Under Secretary of the States for Zoos and Wildlife Services, Giza Zoo, Cairo, Egypt.
- Ammann, Karl, c/o Mt. Kenya Game Ranch, P.O. Box 35, Nanyuki, Kenya.
- Auffenburg, Walter, Florida Museum of Natural History, University of Florida, Gainesville, Florida 32611, USA.
- Bowland, Tony, Kruger National Park, P.O. Box 125, Skukuza 1350, South Africa.
- Burling, Kate, The Namibian Newspaper, Windhoek 9000, Namibia/SW Africa.
- Bulger, John Division of Environmental Studies, University of Davis, Davis, California 95616, USA.
- Bush, Mitchel, Assistant Director for Animal Health, National Zoological Park, Smithsonian Institution, Washington DC, 20008, USA.
- Caro, Tim, Wildlife and Fisheries Department, University of California at Davis, Davis, California, USA.
- Dareshureh, Bihan, Wildlife Biologist, Shiraz Province Department of the Environment, Iran.
- Denisor, Igor, Zoological Director, Zoo Riga, Meza Ave. 1, Riga, 226014, Latvian SSR, USSR.
- Divyabhanusihn, Taj Palace Inter-Continental, 2, S.P. Marg, New Delhi 110021, India.
- de Smet, Koen, DelftStraat, 4, 2140 Borgerhout, Belgium.
- Estes, Richard, Chairman of the Antelope Specialist Group, IUCN/SSC, 5 Granite St., Peterborough, New Hampshire 03458, USA.
- Farri, R.I., Nigerian Conservation Foundation, Plot 5, Moseley Road, P.O. Box 74638, Victoria Island, Lagos, Nigeria.
- Ferguson, Dave, United States Fish and Wildlife Services, U.S. Department of the Interior, Office of International Affairs, Washington, DC 20240 USA.
- Flint, Vladimar, Head of Department, All Union Research Institute of Nature Conservation and Reserves, Lomonosovskii, Prospekt 14, Apt. 492, Moscow 117296, USSR.
- Giegengak, Bob, Department of Geology, University of Pennsylvania, Philadelphia, PA 19104, USA.
- Grettenberger, John, United States Fish and Wildlife Service, Rock Island Field Station, 1830 Second Ave, Rock Island, IL. 52803, USA.
- Grishman, Jack, Oklahoma City Zoo, 2102 NE 50th St., Oklahoma City, Oklahoma 73111, USA.
- Gross, Paula, Wildlife and Fisheries Department, University of California at Davis, Davis, California 95616, USA.
- Groves, Collin, The Australian National University, Department of Prehistory and Anthropology, GPO Box 4, Canberra, ACT 2601, Australia.
- Greulich, Hans, D-4005 Meerbusch-3, Am Oberen Feld5, Germany.

Helmy, Ibrahim, Medical Zoology; NAMRU-3, FPO 540, New York, New York 09527, USA.

Hillman, Chris, C/O Ethiopian Wildlife Conservation Organization, P.O. Box 386, Addis Ababa, Ethiopia.

Joslin, Paul, 16219 17th Place West, Edmonds, Washington, 98020, USA.

Karami, Mohmoud, Assistant Professor of Wildlife Ecology, University of Tehran, home address, P.O. Box 31585-188, Karaji, Iran.

Labuschangne, Willie, Director, National Zoological Gardens of South Africa, P.O. Box 754, Pretoria, 0001, South Africa.

Lambrechts, A. Chief Director Nature and Environment, Director Regional Services, Private Bag X209, Pretoria 1101, South Africa.

Lawson, Dave, Department of Wildlife and National Parks, P.O. Box 131, Gabaroni, Botswana.

Mackie, Anita, USAID, 963 N. Rochester St., Arlington, VA 22205-1524 USA.

Malka, Rony, Director, Hai-Bar The Biblical Wildlife Reserve, POB 667, Eilat 8800, Israel.

Mendelsohn, H., Tel-Aviv University, Department of Zoology, Ramat-Aviv 69976, Tel-Aviv, Israel.

Mian, Afsar, Institute of Biology, B Z University, Multan, Pakistan.

Mills, Gus, Kruger National Park, P.O. Box 125, Skukuza 1350, South Africa.

Morsbach, Dieter, Department of Wildlife, Conservation and Tourism, Private Bag 13306, Windhoek 9000, Namibia/S.W. Africa.

Newby, John, WWF/IUCN, 10933, Niamey, Niger.

O'Brien, Stephen, Chief, Laboratory of Viral Carcinogenesis, NCI, Frederick, MD 21702-1201 USA.

Plowes, Darrel, 963 N. Rochester St., Arlington, VA 22205-1524, USA.

Shaymardanov, R.T., Zoology Institute of the Kazakh, SS Academy of Sciences, 480032, Alma-Ata, USSR.

Spitsan, Vladimir, Director Moscow Zoo, 123820 Moscow, B. Gruzins Kava, USSR.

Stephenson, Doug and Angie, P.O. Box 11199, Windhoek 9000, Namibia/SW Africa.

Tashami, Ato Ashimr, Director of Ethiopian Wildlife Services, Addis Ababa, Ethiopia.

Van Dyke, Anne, DeWildt Cheetah Breeding and Research Centre, P.O. 16, DeWildt, South Africa.

Watkins, Victor, REgional Director of the Eastern Hemisphere, 106 Jermyn St., London, SW1Y 6EE, United Kingdom.

Wildt, David, Reproductive Physiologist, National Zoological Park, Smithsonian Institution, Washington DC 20008, USA.

Wilson, Vivian, Chipangali Wildlife Trust, P.O. Box 1057, Bulawayo, Zimbabwe.