

Jackson P. 2000. Carnivores des régions arides: Asie de l'Ouest, Asie centrale et Afrique du Nord. *Planète Conservation*:25.

Keywords: 1Afr/45Asia/Acinonyx jubatus/action plan/Asiatic jackal/Canis aureus/Caracal caracal/Carnivora/cheetah/CITES/Felis margarita/habitat/hunting (by human)/leopard/lion/Panthera leo/Panthera pardus/predation/Rüppell's fox/sand cat/status/Vulpes rueppelli/wild cat

Abstract: The increase of human activities in carnivores' habitats is a major factor of the decrease of their population in West-central Asia and in the North Africa. The Asiatic lion, cheetah and leopard are very scarce in the region, but they have already substantial population in Sub-Saharan Africa. The Asiatic cheetah (*Acinonyx jubatus venaticus*) was distributed from Arabia to India, but now it habits only aridest region of Iran and probably the nearest regions of Pakistan.

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THE STATUS AND CONSERVATION OF WILD CATS

by Peter Jackson

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ABSTRACT

The principal factors affecting the status of wildlife today are the condition of habitat and the extent of human predation. Both are under human control. The situation is unsatisfactory in both cases, and is resulting in the decline of cat species almost everywhere.

Tropical forests are the home of over half the wild cats. The condition of these forests is therefore of paramount importance for cat conservation. The U.S. Interagency Task Force on Tropical Forests concluded that, if current trends continued, tropical forests outside central Africa and the Amazon basin would be "nothing but scattered remnants" by 2025.

Shifting cultivation is responsible for 70% of total deforestation in Africa, 49% in Asia, and 35% in Latin America. Planned colonisation also leads to clearance of vast areas in Amazonia, as well as in Sumatra and other Indonesian islands, while oil palm plantations are a major factor in Malaysia. In tropical Latin America vast areas have been cleared for cattle ranching. Large-scale irrigation and power projects have also led to clearance of vast areas and threaten more. Apart from actual deforestation, there is widespread degradation of forests caused by wood collection for fuel and construction, and by over-grazing by cattle and goats which destroys regeneration.

With the diminution of habitat, refuges for cats and their prey species are eliminated and the species become more vulnerable. If prey species are hunted out, cat populations inevitably decline and surviving cats turn to domestic livestock, and then get killed as pests.

Natural phenomena and disasters can be responsible for destruction of habitat and for direct killing of wildlife. Not least of the threats to wildlife are sudden political changes.

Human predation on cats involves hunting and trapping, legal and illegal. Trophy hunting, mainly for the big cats, has declined in recent years because of bans in many countries. Local hunting and trapping of cats is still widespread because of their predation on livestock and just for sport.

All the spotted cats, big and lesser, have been trapped for their beautiful pelts. Campaigns against the use of wild furs, and the growing strength of the Convention on International Trade in Wild Species of Fauna and Flora (CITES) have checked this onslaught. A review of overall factors affecting wildlife, including the cats, gives a clearer indication of the present decline than field survey data.

Conservation of the big cats will ensure biodiversity throughout their large ranges. The Cat Specialist Group of the World Conservation Union is preparing a Cat Action Plan to promote field research and conservation.

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1. INTRODUCTION

The principal factors affecting the status of wildlife today are the condition of habitat, and the extent of human predation. Both are under human control. The situation is unsatisfactory in both cases, and is resulting in the decline of cat species almost everywhere.

1.1. Habitat destruction

Tropical forests are the home of 22 of the 37 species of wild cats. The condition of these forests is therefore of paramount importance for cat conservation. Unfortunately, they are being destroyed at an alarming rate. In 1980, the U.S. Interagency Task Force on Tropical Forests (1980) concluded that, if current trends continued, tropical forests outside central Africa and the Amazon basin would be "nothing but scattered remnants" by 2025.

FAO recently stated that deforestation increased from 92,000 km<sup>2</sup> annually in 1976-80 to 168,000 km<sup>2</sup> between 1981 and 1990 (FAO 1990). The area of tropical forests of all types declined from 15,290,000 km<sup>2</sup> to 12,281,500 km<sup>2</sup> in 1990. The Brazilian Institute of Space Studies reported that, in 1987, 200,000 km<sup>2</sup> of forest vegetation was burned in Brazil alone, including 80,000 km<sup>2</sup> of primary forest - that is about twice the area of Switzerland.

Logging is widely blamed for forest destruction. But, without minimizing the damaging effects it can have, it must be emphasized that firewood and charcoal account for eight times as much timber as logging (FAO 1982). In addition, there is destruction and degradation by too frequent shifting cultivation, settlement, overgrazing, fire and other factors.

Selective logging, carefully carried out, need cause relatively little damage, but, all too frequently, careless cutting and extraction of the selected species results in considerable destruction of vegetation. The logging roads also open up forest areas to settlers.

Shifting cultivation appears to be the main factor in deforestation. It is an efficient way of exploiting moist forests when sufficient time for regeneration is allowed, but the cycle is now far too brief almost everywhere, so that forests are being quickly degraded. Shifting cultivation is responsible for 70% of total deforestation in Africa, 49% in Asia, and 35% in Latin America (FAO 1982).

Planned colonisation also leads to clearance of vast areas in Amazonia, as well as in Sumatra and other Indonesian islands, while oil palm plantations are a major factor in Malaysia. In tropical Latin America there has been extensive clearance for cattle ranching.

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Large-scale irrigation and power projects have led to destruction of many forest areas and threaten more. Their construction involves forest disturbance, far beyond the actual project site, through construction of roads and the introduction of large work forces, which may indulge in poaching and cause fires.

Apart from actual deforestation, there is widespread degradation of forests caused by wood collection for fuel and construction, and by over-grazing by cattle and goats, which destroys regeneration.

With the diminution of habitat, refuges for cats and their prey species are eliminated and populations become more vulnerable. If prey species are hunted out, cat populations inevitably decline and surviving cats turn to domestic livestock, and then get killed as pests.

Fifty miles north of Manaus, in central Amazonia, a long-term experiment is being carried out to document the effects of deforestation and fragmentation. Within an area of 595 km<sup>2</sup>, where clearance began in 1980, 20 forest tracts ranging from one to 1,000 hectares have been preserved for scientific observation. In every reserve it has been found that cutting of surrounding forest was followed by a rapid and cataclysmic decline in species, including disappearance of cats, such as jaguar and ocelot, from many reserves. (Ola and d'Aulaire 1986).

### 1.2. Natural phenomena and disasters

Natural phenomena and disasters can be responsible for destruction of habitat and for direct killing of wildlife. A huge conflagration in the forests of Kalimantan in 1986 did both. Violent cyclones which hit the Sundarbans of Bangladesh and India must have killed many wild animals, including tigers. There have been observations of tigers being washed away in monsoon floods in Nepal (MacDougal 1988). In the Assam (India) floods in 1988 two tigers are known to have been lost, as well as 46 one-horned rhinos (Singh 1989).

Not least of the threats to wildlife is political change. Uganda was transformed from a wildlife paradise to a disaster area during the regime of Idi Amin. India's wildlife was devastated when protection lapsed after Independence in 1947. Fortunately, in neither case has all been lost, and the situation has improved in recent years.

### 1.3. Human predation on cats

Human predation on cats involves hunting and trapping, legal and illegal. Trophy hunting, mainly for the big cats, has declined in recent years because of bans in many countries. Tigers are no longer trophies, but lion, jaguar, leopard and snow leopard are still legally hunted in some areas, and there is a proposal to make cheetah a legal trophy in Zimbabwe.

Local hunting and trapping of cats is still widespread because of their predation on livestock and just for sport. Some indigenous peoples, such as those in the mountainous areas from northeast India into southeast Asia, hunt cats for skins and also for meat. In China tigers are hunted for bones and other parts for medicine. With tigers nearly extinct in China, hunters have turned to leopards and golden cats to provide substitutes. Furthermore, it has now been found that tigers are being poached in India and Nepal for bones to smuggle to China across the Himalayan passes. (McDougal. Upreti. pers. comm.) Since 1985, over 1,700 kg of tiger bone have been imported by South Korea, mostly from Thailand, Indonesia and Singapore, according to the monitoring organization TRAFFIC (Milliken 1991). Tiger skeletons weigh from eight to 20 kg.

In Thailand, large stocks of trinkets fashioned with tiger and other cat claws have been found in jewellers' stores.

All the spotted cats, big and lesser, have been trapped for their beautiful pelts. World fashion markets in North America, Europe and Japan provoked a massive slaughter, but campaigns against the use of wild furs, and the growing strength of the Convention on International Trade in Wild Species of Fauna and Flora (CITES) have checked this onslaught to a large extent. Bobcat in North America and lynx there and in the USSR are still legally trapped for the fur trade. Large-scale smuggling of spotted cat skins to Europe a few years ago from Latin America, especially from Paraguay to Germany, appears to have diminished since customs authorities have been allowed to control the free port in Hamburg. But skins are available in local markets in many countries and, from time to time, large hauls of contraband skins are uncovered in many parts of the world.

#### 1.4. Counting cats

This review of overall factors affecting wildlife, including the cats, gives a clearer indication of the present decline than field survey data, of which there are few of real value in assessing population trends. Local anecdotal observations often prove widely off the mark and influenced by predilections.

India has, however, carried out detailed censuses of tigers. The first, in 1972, in the wake of indications of a catastrophic decline, counted about 1,800 tigers (Indian Board for Wildlife. 1972). Later censuses, conducted as part of the overall tiger conservation programme, produced estimates of 3,000 in 1979 and over 4,000 in 1984 and 1989. Some independent Indian specialists believe the figures to be unreliable and probably inflated (Karanth 1986), but they give some measure of tiger numbers.

Because of the impossibility of actually counting leopards in sub-Saharan Africa, Martin and de Meulenaer recently developed a computer model to predict potential populations in suitable habitat. Their estimate of a total of 700,000 leopards (Martin and de Meulenaer 1988) has been challenged as far too high. Experienced field biologists say there are no longer leopards in many suitable habitats, where the computer model had predicted substantial numbers. (Cat News. 1989)

## 2. REVIEW OF THE STATUS OF SPECIES

In reviewing the status of cats in various regions, it is helpful to look at the big cats since they require the largest area of habitat, which provides also for lesser species. Furthermore, the status of large carnivores gives us an indication of that of the whole spectrum of wildlife in their range.

### 2.1. TIGER *Panthera tigris*

The status of the tiger is best known of all the cats. It was rapidly heading for extinction in 1970 when the World Wildlife Fund and IUCN announced an international conservation campaign, Operation Tiger. The Indian Government launched its Project Tiger in 1973 based on an ecological approach to save habitat and all the species associated with the tiger. The programme has been very successful, and the Indian tiger and other Indian wildlife now have a new lease of life. The last census in 1989 produced an estimate of 4,334 tigers, of which 1,327 were in 18 special tiger reserves covering an area of 28,017 km<sup>2</sup>. Tigers are found in many other wildlife reserves, but Panwar (pers.com.1988) states that 55% of the tiger population is outside the wildlife reserve system. Only one of the special reserves had more than 100 tigers. Seven had fewer than 50. Tigers in reserves are not necessarily isolated - although many are - but it is not a healthy situation from the

standpoint of maintaining genetic diversity. The Indian conservation authorities are trying to ensure that corridors of suitable habitat continue to link tiger populations in order to minimize the problem. But, in terms of pressure on land, it is a sobering thought that India's human population has risen by nearly 50% since Project Tiger was launched in 1973.

Nepal has also carried out an effective tiger conservation programme. Mishra et al (1986) estimated a population of about 300 tigers grouped around three reserves at the foot of the Himalaya, compared with only about 50 in 1973. The Kingdom has also backed a long-term tiger ecology study by American and Nepalese scientists in the Royal Chitwan National Park under the auspices of the Smithsonian Institution of Washington, DC. This project has greatly increased knowledge of the tiger's way of life, which is essential to good conservation management.

In Bangladesh the tiger is now confined to the Sundarbans mangrove forests fringing the Bay of Bengal, having been eliminated from the rest of the country by 1960 (Khan 1986). However, in the vast Sundarbans area of nearly 10,000 km<sup>2</sup>, of which nearly half is in neighbouring India, there is certainly the largest remaining single population anywhere in Asia, numbering perhaps 500. Despite the grave endemic problem of man-eating, which results in officially recorded deaths of at least 30-40 men every year, the tigers are protected and probably have as good future prospects as any. However, Khan wondered how long the people of Bangladesh would tolerate man-eaters (op.cit.).

Elsewhere the situation of the tiger is far from satisfactory. Three of the eight subspecies have become extinct in the past 50 years - first the Bali tiger P. t. balica around 1940, then the Caspian tiger P.t. virgata during the 1970s, and, in this decade, the Javan tiger P.t. sondaica.

Now the South China tiger P.t. amoyensis is on the brink. Chinese specialists (Tan Bangjie 1987; Lu Houji 1987) put the population at fewer than 50 in the wild, scattered over a wide area with a dense human population. In the 1950s it was still numerous, but it was officially declared a pest and hunted mercilessly. About 3,000 were killed between 1950 and 1980 (Lu Houji and Sheng Helin. 1986). Protection was finally given in 1977. It was probably already too late, particularly since no serious effort has been made to protect the animal. This is particularly sad, since it is the only endemic subspecies of tiger in China, a country where the tiger has always figured prominently in art and culture. Still, a current survey has found sign of tigers and of reproduction.

In Burma, where the Indian and Indo-Chinese subspecies are found, Salter (1983) reported that FAO surveys showed that tigers were "still fairly numerous in some areas". But they are not protected and there is extensive hunting, trapping and poisoning.

The Siberian tiger P.t. altaica numbers only a few hundred, mainly in the Soviet Far East. There may be no more than 30 in neighbouring China (Ma Yiqing 1988), where it is known as the Northeast China tiger. Although it has legal protection in China, this tiger is still hunted and its future looks grim.

The population of P.t. altaica in the USSR in 1987 was put at 350-370 by the Soviet delegate to a CITES conference in Ottawa (Cat News 1987). He said the number was considered too high. There had been attacks on livestock and humans, and it had been decided to reduce the population to 300 by shooting aggressive tigers and livestock raiders.

Even if the population numbers 350 or more - and some Russian specialists put it only in the 200s (Ovsyanikov, pers. comm. 1987) - the situation is not good, for tigers are split into more or less isolated populations numbering from several to several dozens (Spitsin et al. 1987). Destruction of tiger habitat will continue in the future, and poaching and licenced shooting of dangerous animals could reduce numbers.

The Indo-Chinese tiger P.t. corbetti, which ranges from the Irrawady in Burma through continental southeast Asia and into the extreme south of China may number over 2,000. Khan (1987) gives a probable population of 600-650 tigers in Malaysia, and says it represents an increase over 1972 as a result of conservation measures.

In Indo-China, Salter (1988 in litt.) quotes a Mekong Commission report dated 1978 that tigers were found throughout the basin, but were rare.

The last of the island tigers to survive is the Sumatran subspecies P. t. sumatrensis. Borner (1975) estimated the population in the mid-1970s at about 1,000, and said about 100 were killed each year. Santiapillai and Widodo (1985) recently put the population at "hundreds", adding that the threats to tiger survival were indiscriminate forest clearance, poaching and poisoning.

To sum up, there are probably 7,000 to 8,000 tigers in the wild today, but the number could well be more than halved by the end of the century, and the longterm future of the species is a matter of concern. Recently, a new threat has emerged - poaching tigers in India and Nepal, and perhaps elsewhere, for bones, which are smuggled to China for medical use.

## 2.2. LION Panthera leo

More than any other cat the lion has suffered diminution of range since early times, when it was found in Europe, much of Asia and throughout most of Africa. Apart from the small relict population in the Gir forest in western India, it is now confined to sub-Saharan Africa, except the extreme south. Although lions are more visible than most cats, there is surprisingly little information about numbers. Myers (1987) put the population at fewer than 50,000, representing a quarter of the number 50 years earlier. Bertram (1989 in litt.) suggested that there might be only 30,000 surviving lions.

Like tigers, lions are usually not popular neighbours because they prey on livestock and some individuals may attack people. Large reserves, such as the Serengeti and the Kruger National Park in South Africa, are clearly essential for the future of the lion, which may not be tolerated elsewhere. Smithers (1983) considered that they will be in danger even then as they wander widely and cannot be contained.

The relict population of about 280 Asiatic lions P.l. persica, survivors of a subspecies which once ranged as far west as Greece, holds out in the Gir forest of western India, surrounded by agriculture and cattle hungry for the abundant grasses of the sanctuary. The lions are vulnerable to disasters, such as fires, floods and disease, and to droughts, which lead to livestock invasions of the Gir. The past two years have seen at least 16 people killed in an unusual rash of attacks. Specialists think the population has grown too large. Furthermore, the Gir lions have a narrow genetic base as a result of the bottleneck through which the population passed around the beginning of this century before conservation measures took effect. To remedy the situation the Indian authorities hope to establish a second population as a safety measure and to relieve the population pressure on the Gir.

## 2.3. JAGUAR Panthera onca

There are still many thousands of jaguars and vast areas of forest habitat. But, in a report to the US Fish and Wildlife Foundation, Swank and Teer (1987) stated that, although possibly holding its own in a relatively large area of South America and some small areas of Central America, the jaguar was not adequately protected anywhere. They estimated that jaguar range had shrunk since European settlement from 15 million km<sup>2</sup> to 9,340,000 km<sup>2</sup> today. There is little commercial hunting for skins now, but many jaguars are killed to protect domestic livestock and by local people.



Swank and Teer gave no overall estimate of the jaguar population, but quoted estimates of 3,500 in the Brazilian Pantanal plus 1,400 to the north in the Guapore river basin; 450-750 in the Mexican state of Chiapas; and 500-800 in the Peten of Guatemala. They stated that the jaguar was considered extinct in Chile, El Salvador and Uruguay, and approaching extinction in Argentina, Costa Rica and Panama, but that the population was sustaining itself in about 65% of the area it currently occupies, especially Amazonia and surrounding regions.

Hoogesteijn (1987) offered an "optimistic estimate" of 2,500-3,500 jaguar in Venezuela and considered survival assured in large forests in Bolivar State and Amazonas.

#### 2.4. LEOPARD Panthera pardus

The recent computer-generated estimate of a potential leopard population of around 700,000 in sub-Saharan Africa has been challenged as a gross over-estimation, but certainly there are still a lot of leopards in Africa. Nevertheless, the range has retracted and it has become scarce in parts of South Africa and West Africa. North African leopards may be close to extinction because of decline of prey and persecution because they are seen as a threat to livestock.

In Asia many leopard subspecies are thought to be in a serious state of decline, although leopards appear to be fairly common in some areas. Green (1987), in a report for the US Fish and Wildlife Service, described leopards as widespread and common in northern India, and probably the same in Bhutan, where legislation for licensed hunting has been drafted. A recent Indian estimate put the leopard population in the country at 6,763, but, in view of the difficulty of censusing such a secretive animal, it could be twice that number. The leopard is also said to be common in Nepal (MacDougal and Smith 1984), but it is likely that there is no longer a viable population in Bangladesh (Khan 1984).

The leopard is probably decreasing or at best stable in Burma in the face of hunting and habitat loss. Hunting is not controlled and skins and skulls are on sale. Leopards near villages are poisoned with pesticides (Salter 1983).

In Sri Lanka, Santiapillai (1987) quoted his estimate of 400-600 leopards in 1982 but considered that the species had become "clearly endangered".

In China, the leopard is hunted for skins and for bones as a substitute for tiger bones in medicine, but it is faring better than tigers because of its cunning and ability to conceal itself (Tan Bangjie 1988 in litt.).

The Amur leopard P.p.orientalis is extremely rare, both in China and in the neighbouring USSR, where it is thought to number only 25-30 individuals (Bragin 1987 in litt.). There may be some Amur leopards in North Korea. Russian specialists are planning conservation measures, which include capture of wild specimens for breeding with captive animals, aimed at reintroduction of offspring in due course. They hope to establish a protected area of 2,000 km<sup>2</sup>.

Other subspecies of leopard in China - japonensis, fuscus, delacouri - number only "hundreds" and may only survive for some years (Tan Bangjie 1988 pers. comm.).

Leopards may be surviving reasonably well in forested regions of southeast Asia.

There is little information on leopards in southwest Asia, except from Israel, where Mendelsohn (1989) estimates that there may be 15 to 20 Arabian leopards P.p. nimr surviving in the Judean desert, but highly inbred. The Sinai leopard P.p. jarvisi is now extinct, as is the Anatolian P.p. tulliana, which existed until recently in the Galilee. Mendelsohn (op.cit.) states that the Anatolian leopard is on the verge of extinction in Turkey, and the whole subspecies has only an extremely slim prospect of continued survival. Arabian leopards are still reported from time to time in parts of Arabia, such as Oman and the Asir in Saudi Arabia.

## 2.5. SNOW LEOPARD Panthera uncia

In a review of snow leopards and protected areas Green (Tigerpaper 1987), put the known world population at 1,500-2,900, but added that the estimates were crude and did not take into account populations in much of China and the Himalayan and Hindu Kush regions. He suggested that the actual world population was likely to be at least double these estimates, but unlikely to exceed 10,000.

Schaller (1988) guesstimated the population in Tibet as at least 2,000, but stated that hunting, often in defence of livestock, had depressed snow leopard numbers in most areas and eliminated local populations. Tan Bangjie (1988, in litt.) put the Chinese population (including Tibet) at under 1,000.

Visitors to China report skins on sale in many places, mainly on offer to foreign tourists, who cannot legally take them out of China and to their home countries if both are parties to CITES.

A recent survey of Pakistan's Khunjerab National Park, which adjoins the Taxkorgan Nature Reserve in neighbouring China, reported snow leopard as common with strong prey populations of ibex (Wegge 1988).

There is controversy over the snow leopard population of Mongolia with the authorities claiming over 3,000, and foreign experts asserting that it may be below 1,000. Mongolia is the only country promoting trophy hunting of snow leopards. The annual quota of five - so far not achieved - is limited to known stock raiders.

Bhutan remains a sanctuary for the snow leopard, as it does for Himalayan wildlife in general, but even here snow leopards are killed for livestock raiding. In Nepal, Rodney Jackson and Gary Ahlborn carried out the first scientific study of snow leopards involving radio tracking. The Indian Government has proposed a network of reserves on the lines of those for tigers. Emphasis will be placed on habitat rehabilitation and complete protection of snow leopards and associated wildlife. The Wildlife Institute of India has launched a three-year ecological study of snow leopard in Ladakh, and a similar study is under way in Nepal.

## 2.6. CHEETAH Acinonyx jubatus

The cheetah is mainly an African species, but was also found in southwest and south Asia. Three shot together in India in 1947 were the last confirmed in the subcontinent. Some specimens of the Asian subspecies A.j. venaticus were found in Iran in the 1970s, but, although individuals are known to have survived (Groves in litt. 1990), the effects of political upheavals makes their future looks grim. Recently, Flint (1988 in litt.) reported sightings in the deserts of Kazakhstan and Turkmenistan fringing the eastern Caspian, but the existence of a viable population was ruled out and introduction of African cheetahs was being discussed (Flint 1987, in litt.). This possibility is viewed with considerable concern by those who believe it is essential to maintain the integrity of subspecies, as it could be extremely difficult to confirm that the Asiatic population is completely extinct and thus that no interbreeding could take place.

The only overall estimation of the African cheetah population was by Myers in the early 1970s (Myers 1975). He proposed a population of slightly over 15,000, probably half that in 1960, and he predicted that it would halve again by the early 1980s. It appears that Myers underestimated cheetah numbers, at least in Rhodesia (now Zimbabwe), when he put the figure at 400, which he predicted was likely to be halved by 1980. A recent survey (Wilson 1987) produced an estimate of 470. Similarly, Myers estimated 1,500 cheetah in Southwest Africa (Namibia), but recent studies (Morsbach 1987) put the figure at 2,000-3,000 on farmland alone. One can take little heart from the higher figures as declines are still reported. In both countries farmers

illegally kill cheetah because of livestock predation, and Wilson (op.cit.) reluctantly concedes that cheetah on farms in Zimbabwe will only be tolerated if farmers can benefit from selling licensed hunting. In both Zimbabwe and Namibia continuing declines are reported.

A Serengeti predator census reported a decline from 251 in 1977 to only 63 in 1986 (Campbell and Borner 1987), but this may have been due to seasonal or prey population fluctuations in cheetah presence in the survey area (Frame pers.comm.).

A global cheetah survey is taking place (Caro 1988) with the aim of improving the database and developing recommendations to governments for cheetah conservation.

## 2.7. LESSER CATS

There are no overall population figures for lesser cats, except for the Iriomote cat. Their situation is reviewed in regional terms.

### 2.7.1. Tropical and Sub-tropical Asia

This region contains the habitat of 12 species - Bornean bay cat F. badia, leopard cat F. bengalensis, caracal F. caracal, jungle cat F. chaus, Iriomote cat F. iriomotensis, sandcat F. margarita, marbled cat F. marmorata, flat-headed cat F. planiceps, rusty-spotted cat F. rubiginosa, wildcat F. sylvestris ornata (see section on Eurasia), Asiatic golden cat F. temmincki, fishing cat F. viverrina and clouded leopard Neofelis nebulosa.

The Bornean or bay cat is the least known of the cats, and can only be described as extremely rare, judging by the few sightings.

The leopard cat is a successful species because of its ability to adapt to human settlement. The Indian population is persecuted (Panwar 1984), but the Chinese subspecies is sufficiently numerous to be heavily exploited for furs without serious effects on the population (Lu Houji et al 1986). It is likely to be in reasonably good shape in the forests of Burma, Indo-China, Sumatra and Borneo.

The caracal is exploited in the arid areas of northwest India and Pakistan. Panwar (1984) said it was endangered by trapping for fur in India, but Roberts (1984) thought it was holding its own in Pakistan. The Turkmenian subspecies F. c. michaelis is classed by IUCN as rare. The caracal is quite common in Israel (Mendelssohn 1989). It is, of course, widespread in suitable areas of Africa and is often considered a pest in the south.

The jungle cat is found from India to Egypt, and does not appear to be threatened as a species, although it has been heavily exploited in some countries, notably India, where 306,343 skins were declared by traders when export was banned in 1979 (Panwar 1984). Mendelssohn (op.cit.) says the jungle cat is fairly common in northern and central Israel.

The Iriomote cat is estimated to number 100 on the small Japanese island of that name 100 km east of Taiwan (Ono 1988 pers. comm.), where it is threatened by habitat destruction and decline in prey.

The sandcat is another animal of arid lands, which ranges west through North Africa. The Pakistan subspecies F.m. scheffeli is listed as "Endangered" by IUCN. Mendelssohn (op.cit.) describes it as endangered in Israel through habitat loss and predation by caracal and wolf. Its overall status is unknown.

The marbled cat ranges the dense forests from eastern India through southeast Asia. For lack of information IUCN lists its status as "Indeterminate".

The flat-headed cat is confined to peninsular southeast Asia, Sumatra and Borneo and is also listed as "Indeterminate" by IUCN. Khan (1987 pers.comm.) states that it has benefitted from the large rodent populations on oil palm plantations in Malaysia.

The rusty-spotted cat is a highly secretive species found in India and Sri Lanka. But, while it is obviously rare, more have been recorded recently in western India than expected (CAT NEWS 13, 1990). Panwar (1984) says it is trapped for the fur trade in India and the subspecies is on Appendix I of CITES.

The golden cat is exploited in China for pelts and bones for medicine (Tan Bangjie 1984). Panwar (1984) described it as "relatively well off" in Arunachal Pradesh in northeast India but lacking protection in other areas. There is no reliable information from elsewhere and IUCN lists its status as "Indeterminate".

The fishing cat is quite widespread but said to be suffering from loss of habitat. Recently it has been discovered in very small patches of wetland in densely-populated West Bengal (Sanyal 1988).

The clouded leopard ranges through 13 countries of southern Asia from India to Taiwan. As with other lesser cats, little is known about it. Rabinowitz visited Malaysian Borneo, Taiwan and Thailand, and reported it to be "still present in some numbers" in both Sabah and Sarawak (Rabinowitz 1987). He thought some might survive in Taiwan, where it has been considered extinct, but deforestation and poaching of prey species threaten its longterm survival (Rabinowitz 1988). In Thailand, Lekagul and McNeely (1977) stated that clouded leopards must be considered "seriously endangered" because of the high demand for skins.

In Sumatra, Santiapillai and Ashby (1988) said clouded leopard appeared to have healthy populations in major reserves and possibly in good habitat elsewhere. But continued forest clearance is a threat.

Clouded leopard skins are reported in markets in Bangladesh (Reza Khan 1984), China (Tan Bangjie 1984), and Laos (Salter 1988 *in litt.*). Clouded leopard are probably rare in Burma (Salter, 1983). Koehler (1991) said clouded leopard appeared to be "widespread and common" in surveyed areas of southern China.

#### 2.7.2. Africa

Africa has golden cat F. aurata, serval F. serval, black-footed cat F. nigripes and wildcat F. silvestris lybica, as well as caracal, jungle cat (in Egypt) and sandcat (through North Africa), which have been touched upon in the first section.

None is reported to be threatened overall. However, serval has been declared extinct in Cape Province, South Africa, and the black-footed cat, one of the smallest of the Felidae, is considered rare in its range in southern Africa.

The golden cat, inhabiting moist forests from West Africa to western Kenya, must be suffering from deforestation - it is found in the Tai Forest in Ivory Coast, which has the highest annual rate of deforestation in the world - seven per cent (FAO 1982). However, vast areas of suitable habitat remain.

The African wildcat, while widespread and not directly endangered, is threatened in the same way as the Eurasian population by interbreeding with domestic and feral cats. This has occurred even in remote areas where there has been only temporary human settlement (such as parts of Botswana), according to the South African Red Data Book (Smithers 1987), which states: "It seems inevitable that eventually this process will lead to virtual extinction of F. lybica as we know it at present".

#### 2.7.3. Eurasia (Palaeartic zone)

The Palaeartic in Eurasia has the lynx F. lynx, Iberian lynx F. pardina, Chinese desert cat F. bieti, Pallas's cat F. manul and wildcat F. silvestris.

The lynx is found in both the Palaearctic and Nearctic Realms. Broad et al. (1988) describe the Eurasian lynx as widely distributed, but extensively persecuted for its pelt and as a pest. Hunting is permitted in some countries. European populations, mainly in the east, are small but mostly protected and stable. Lynx have been reintroduced in Austria, France, Germany, Switzerland and Yugoslavia. Only in Switzerland and Yugoslavia do viable populations appear to be developing. Introduced lynx are a subject of controversy because of alleged damage to sheep and game populations.

Over 12,000 skins were traded in 1985, mainly from China and the USSR, where populations are thought to be large, although unknown. In the light of this increase and the decreasing number of cat species available for trade it is suggested that trade be closely monitored (op.cit.).

The Iberian lynx is one of the most endangered cats, now only surviving in small numbers in fragments of its original range in Spain and Portugal (ICONA, 1990). The decline in the rabbit population due to introduced myxomatosis seriously affected the lynx, and they are killed on the roads and injured in rabbit traps. Some are still shot by hunters (Delibes pers.comm.).

The current status of the Chinese desert cat is unknown, but according to Tan Bangjie (1984) it is not so rare in the wild, although rare in captivity. It is trapped for its pelt.

Pallas's cat is found in the arid areas of central Asia in China, Mongolia and the USSR, and in northernmost India and Pakistan. Tan Bangjie (op.cit.) states that it is apparently more numerous than the desert cat in China, judging from the number of furs on the market. It is on China's protected list because it consumes a large quantity of rodents. Roberts (1984) described Pallas's cat as the rarest felid in Pakistan. The species has been heavily exploited for fur in Mongolia.

The wildcat has a range from Scotland to China, and into Arabia and the northwestern Indian subcontinent. Panwar (1984) says the desert wildcat F. s. ornata is persecuted by pelt hunters in India. Given the extent of relatively undisturbed habitat in China, Mongolia and USSR, the wildcat is probably holding its own, but interbreeding with domestic and feral cats is considered a serious threat wherever they mix. This is a spreading problem as human settlement expands.

#### 2.7.4. North America

The Nearctic Realm has the Canadian lynx F. l. canadensis and the bobcat F. l. rufus, as well as puma F. concolor, which is dealt with in the next section.

The Canadian lynx is heavily trapped for the fur trade. Its population cycles associated with the snowshoe hare are well documented and trade followed these cycles. However, the Fur Institute of Canada (1986) reported that recent high prices and increased access to remote areas might be leading to over-exploitation. Zero quotas have been imposed in some areas.

The bobcat has also been heavily exploited for fur, particularly as exotic spotted cat skins became less available in the USA. There is no sign of it being threatened, although a survey for the Fauna and Flora Preservation Society/USA indicated local declines. Continuous monitoring was recommended (Theobald and Pierson 1987).

#### 2.7.5. Central and South America

The Neotropical Realm is home to nine lesser cats - pampas cat F. colocolo, puma F. concolor, Geoffroy's cat F. geoffroyi, kodkod F. guigna, Andean cat F. jacobita, ocelot F. pardalis, oncilla F. tigrina, margay F. weidii, and jaguarundi F. yagouarundi.

The puma stands apart from the other American lesser cats, both in size and adaptability to a very wide range of habitats. Furthermore, its plain pelt has made it largely unaffected by the fur trade. It still ranges from southern Chile through to Canada, and, although reduced in numbers from former times, is not threatened. In Costa Rica the local subspecies F.c. costaricensis is on Appendix I of CITES, along with the Nearctic eastern cougar F. concolor cougar and the Florida panther F. c. coryi, which certainly deserve their status "Endangered" in the IUCN Red List.

North and Central American populations of jaguarundi are also on Appendix I of CITES, but, overall, IUCN (1990) classed the species status as "Indeterminate". There are reports of it being common near human settlements.

The spotted cats, except for the kodkod and the Andean cat, were heavily exploited at the height of the fur fashion from the 1960s until the early 1980s. A recent review by the Wildlife Trade Monitoring Unit of the World Conservation Monitoring Centre (Broad et al. 1988) indicated the poverty of knowledge of the status of these species. No overall population estimates exist. In a related publication, Broad (1986) noted that ocelot was the main species in trade until the mid-1970s, but the name also covered similar spotted cats, such as margay and oncilla, which became more important constituents as ocelot became harder to obtain. Margay, oncilla, pampas and Geoffroy's cat skins have been traded in large numbers since the late 1970s, but the international trade in spotted cat skins decreased significantly by 1985 (op.cit.).

A scientific survey of cats in Bolivia was carried out in 1986 for CITES because of concern about a high level of exports (Tello 1986). Tello found no evidence that any cats were endangered, except very locally, and declared that all large mammal populations were sufficient to allow recovery.

Generally speaking, it seems that none of the Neotropical cats is threatened at present, as the skin trade has abated and there is still considerable habitat. But, of course, the habitat is diminishing and therefore populations must be declining.

### 3. TRADE IN FELIDAE

The advent of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1975 began the process of controlling international trade in wildlife products. By 1991 there were 104 governments party to the Convention, including most of the main producers and importers. Serious gaps in coverage, such as Singapore, a major centre for trade in southeast Asian wildlife, have now been closed. Thailand, although a party to CITES, has allowed trade in endangered species from other countries, but has announced that it will legislate a ban (Reuters, 1991).

Obviously, every effort must be made to persuade all the absent countries to subscribe to CITES. No less important is the task of seeing that countries which are parties to the convention have the necessary domestic legislation and infrastructure, and actively enforce the regulations. Press reports of raids and seizures in various countries confirm the existence of extensive clandestine trade in wildlife products. International borders, especially in the Third World, can never be adequately policed to prevent smuggling completely. A great deal moves in personal baggage, which is subject to few controls these days, and most international travellers are unaware of the international regulations.

CITES does not regulate domestic markets in animal products. Therefore, skins may be seen in shops. They may be purchased by foreign tourists, ignorant of the law.

#### 4. CONSERVATION ACTION

##### 4.1. Legislation

Of about 35 species of Felidae, 15 are listed as "Endangered" or "Vulnerable" in the IUCN Red List of Threatened Animals (IUCN 1990), either as species or represented by one or more sub-species. In addition, two species are listed as "Rare" and four as "Indeterminate".

##### Endangered Species:

1. Tiger Panthera tigris
2. Snow leopard P. uncia
3. Iriomote cat Felis iriomotensis
4. Iberian lynx F. pardina

##### Endangered Subspecies:

1. Puma in Florida F. concolor coryi and the eastern USA F.c. cougar
2. Sand cat in Pakistan F. margarita scheffeli
3. Lion in India P. leo persica
4. Cheetah in Iran and USSR Acinonyx jubatus venaticus

##### Vulnerable Species

1. Ocelot F. pardalis
2. Oncilla or little tiger cat F. tigrina
3. Margay F. weidii
4. Jaguar P. onca
5. Leopard P. pardus
6. Clouded leopard Neofelis nebulosa
7. Cheetah Acinonyx jubatus

##### Rare Species

1. Bornean bay cat F. badia
2. Andean cat F. jacobita

##### Species whose status is Indeterminate

1. Marbled cat F. marmorata
2. Flat-headed cat F. planiceps
3. Asiatic golden cat F. temmincki
4. Jaguarundi F. yagouarundi

Fifteen species, as well as several subspecies of wild cat are banned from international commerce under Appendix I of CITES. The list of species contains all the big cats, except the African lion, as well as cheetah, clouded leopard, Andean cat, marbled cat, black-footed cat, ocelot, Iberian lynx, flat-headed cat, Asiatic golden cat, oncilla and margay. International trade in other cats is allowed, but is licenced under Appendix II in order to monitor whether they are being threatened.

CITES does not prevent foreign hunters taking their trophies home, even if they are Appendix I species, provided that the exporting and importing government authorities agree that the survival of the species is not involved; that the trophy has been legally taken; and that the trophy is not primarily for commercial purposes.

On the other hand governments may independently prohibit trophy imports. For instance, the US Endangered Species Act does not allow imports of species listed as "Endangered". The leopard in Africa was reclassified as "Threatened" a few years ago, thus enabling trophy imports.

#### 4.2. Establishment of Reserves

The reserves of Project Tiger in India, nine reserves in 1973 and now 18, and the Coxcomb Basin Reserve in Belize for jaguar, are the only ones specifically for cats, but, as already noted, reserves in appropriate habitat will harbour a whole range of species, including cats.

Mackinnon and Mackinnon (1986) plotted selected mammal lists for reserves in the Indo-Malayan and Afrotropical Realms to determine how well the networks protected the fauna. Results for tiger, leopard and cheetah were as follows:

REGION	No. Reserves	Tiger	Leopard	Cheetah
Indo-Chinese	30	21	22	--
Indian	42	23	33	--
East African	36	--	34	17
West African (inc. Zaire)	47	--	31	15

Lesser cats are poorly represented in the records in both Realms, but in many cases this is because small carnivores are not always included in species lists. However, if the big cats survive and the habitat is suitable, one can expect the lesser cats to be there too. Mackinnon (*op.cit.*) supports the Indian parks authorities contention that the special tiger reserves protect most of the Indian fauna, but they are becoming increasingly isolated islands in the sea of humanity. The Government has now proposed a network of elephant reserves, which will also serve a wide spectrum of other fauna, and a chain of snow leopard reserves should improve the situation for high altitude fauna.

Reserves, of course, represent only a small part of potential cat habitat, e.g. 1.8% of closed and open forests in tropical America; 5.8% in Asia, and 7.3% in Africa (FAO 1982). These should be havens for cats, but they are subject to deforestation, degradation and disturbance, and there are too few guards to protect habitat or wildlife. Successful conservation demands that species should continue to range over as large an area as possible. Certainly there should be more and bigger reserves, but the challenge is to conserve as much habitat as possible in the face of exploitation for various human uses. At the very least, corridors of forest or other suitable habitat should be preserved between reserves to permit genetic exchange. While a species such as the leopard cat appears to adapt easily and to survive even drastic changes in land use, and the leopard shows a great capacity for survival if not hunted, most cats succumb. It is not just a question of conserving the cats themselves. It is vital to ensure that their prey species survive in sufficient numbers, and that depends on conservation of habitat and restricted exploitation.

#### 4.3. Field Projects and Research

Field research on felids nowadays usually has conservation elements, and again the tiger and jaguar figure prominently. The Smithsonian Tiger Ecology Project in Nepal enormously increased knowledge of the requirements of wild tigers and led to extension of the Chitwan National Park. Wildlife Conservation International's jaguar study in Belize led to the establishment of the first reserve dedicated to jaguar.



Members of the Cat Specialist Group have been involved in the following recent field projects:

01. Lion in Serengeti, Tanzania - Craig Packer
02. Jaguar in Brazilian Pantanal - Howard Quigley and Peter Crawshaw
03. Jaguar in Iguacu National Parks, Brazil and Argentina - Peter Crawshaw
04. Jaguar in Belize - Alan Rabinowitz
05. Jaguar in Mexico - Marcello Aranda
06. Leopard in Cape Province, South Africa - Peter Norton
07. Leopard in Kalahari, Botswana - J. du P. Bothma
08. Leopard in Kenya - Fumi Mizutani
09. Tiger in Nepal - Charles MacDougal and J.L. David Smith
10. Tiger in China - Gary Koehler
11. Snow leopard in Nepal - Rodney Jackson and Gary Ahlborn
12. Snow leopard in India - Joseph Fox and Wildlife Institute of India
13. Cheetah in Zimbabwe - Viv Wilson
14. Cheetah in Namibia - Dieter Morsbach
15. Cheetah in Serengeti, Tanzania - Tim Caro
16. Cat community in Huai Kha Khaeng, Thailand - Alan Rabinowitz
17. Serval in Tanzania - Aadje Gertseema
18. Lynx and fox in Doñana National Park, Spain - Miguel Delibes, Juan Beltran, Jaime Rau et al
19. Lynx in Switzerland - Urs Breitenmoser
20. Lynx in France - Veronique Herrenschmidt
21. Ocelot and jaguarundi in Venezuela - Mel Sunquist
22. Wildcat in France - Philippe Stahl
23. Wildcat in Italy - Bernadino Ragni
24. Cats in Bolivia - José Tello
25. Lesser Cats in Northeast India - Biswamoy Biswas and colleagues of the Zoological Survey of India
26. Geoffroy's cat and pampas cat in Argentina - Jorge Rabinovich
27. Carnivores in southern Africa - Chris Stuart
28. Carnivores in Nagarhole National Park, India - Mel Sunquist and Ullas Karanth
29. Carnivores in Chitwan National Park, Nepal - J.L. David Smith
30. Survey of Protected Areas and Wildlife Species in Mozambique with Recommendations for their Conservation - José Tello.

WWF has played a leading part in promoting tiger conservation through its campaign "Operation Tiger", which, in addition to India, funded projects in Bangladesh, Bhutan, Indonesia, Nepal and Thailand, and, recently, supported a tiger survey in China. All these projects involved the willing collaboration of the governments of the countries involved. It should be noted that the Indian Government has included Project Tiger in its Five Year Economic Development Plans and already spent the equivalent of well over \$20 million dollars of its own funds.

India's snow leopard project will, it is hoped, encourage other countries to take action to conserve the high altitude areas where this cat lives so that natural habitat and wildlife survives. The International Snow Leopard Trust, based in Seattle, USA, is playing an important role in promoting international conservation action.

In the USSR, the Siberian tiger has survived in the Far East as a result of official conservation efforts.

In most countries some level of legal protection has been given to cats, and governments have become parties to CITES.

#### 4.4. Habitat Conservation

Whatever other measures are taken, failure to conserve habitat can only result in continuing decline and extinctions. Pressures on tropical forests for settlement, exploitation and local resources continue to grow. There is little or no hope of preserving more than a minute area of pristine forest, and efforts have to be concentrated on reconciling forest use of various kinds with conservation. Efforts to do this have not been successful so far. There is general recognition of the failure of a "Tropical Forest Action Plan" launched by FAO (FAO 1985) to promote sustainable use of the forests, and inter alia, ensuring "stable stocks of wilderness and wildlife...with preservation of their genetic diversity". It was estimated that, to make an impact on worldwide deforestation, some \$8,000 million needed to be spent in only five years, of which half was to come from bilateral and multi-lateral development assistance agencies and half from national governments, small farmers and the private sector. The plan is now being revised.

Wetlands are also seriously threatened. An important conservation effort has been proposed in the Brazilian pantanal. The World Bank has offered a loan of \$100,000,000 for a 110,000 km<sup>2</sup> reserve if the Brazilian government matches it. This is a very important jaguar area. In Africa, few wetlands are protected, and since they are centres of settlement and livestock raising, as well as concentrating wildlife, sound management programmes are required if wildlife is to survive.

African savannahs are under pressure from grazing and settlement. Many large reserves have been maintained which are refuges for cats, but there seems little hope of extending the network. It is important to ensure that wildlife needs are met in multi-use areas outside reserves which are critical migration routes and seasonal centres.

#### 4.5. Captive Breeding

While the ultimate aim must be to conserve species in the wild, captive breeding can reinforce conservation by permitting biological studies, as well as ensuring a reserve which might provide stock for reintroduction at some stage. However, it must be emphasized that reintroduction of carnivores, especially big cats, which may prey on livestock and sometimes kill people, is fraught with difficulties. Recent success in in vitro fertilization of a tigress in the USA might promise a way of introducing fresh genes into small populations threatened by in-breeding, thereby avoiding the problems of introducing mature cats.

Captive breeding programmes for the Siberian tiger and the snow leopard have been very successful as a result of careful scientific management. International studbooks have been established also for Sumatran tiger P.t. sumatrae, South China tiger P.t. amoyensis, Amur leopard P.p. orientalis, Chinese leopard P.p. japonensis, Ceylon leopard P.p. kotiya, Persian leopard P.p. saxicolor, clouded leopard, Asiatic lion P.l. persica, flat-headed cat, and cheetah. Consideration is being given to captive breeding Iberian lynx, using injured animals recovered from the wild.

It is important that a sound founding stock for a captive breeding programme be established before a species or subspecies has reached critically low numbers. Unfortunately the most endangered cats are poorly represented in captivity. There are no Iriomote cats in captivity.

### 5. Conclusion

The general priorities for conservation of the wild cats are clear:

1. Preservation of habitat and prey species, and
2. Strict control of trade in cat products.

To achieve these objectives the Cat Specialist Group works with other specialist groups and the World Conservation Union's organs dealing with protected areas, forests, wetlands, arid zones, ecology and law. Our experience in preparing the Cat Action Plan has emphasized how little is known of the status of almost all wild cats. Their secretive nature makes them difficult to study. Nevertheless, much has been achieved in recent years, and we hope that the action plan will stimulate more fieldwork, because more knowledge of status, range and habitat requirements is vital to successful conservation.

It has to be recognized that some big cats may become a problem in livestock areas. But better management of livestock would certainly reduce the toll. Our task is to persuade ranchers to take the necessary steps.

Success in conserving the big cats means that biodiversity within their large ranges will also be preserved, because they are at the top of food chains, and their prey and associated species must survive in their natural habitat.

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6. REFERENCES

Borner, Markus. 1975. Status and Conservation of the Sumatran Tiger, A report to World Wildlife Fund International. mss.

Broad, Steven. 1986. The Harvest of and Trade in Latin American Spotted Cats and Otters, Wildlife Trade Monitoring Unit, Cambridge.

Broad, Steven, Richard Luxmore and Martin Jenkins. 1988. Significant Trade in Wildlife: A Review of Selected Species in CITES Appendix II, IUCN Conservation Monitoring Centre/CITES.

Campbell, Kenneth and Marcus Borner. 1987. Cheetah in the Serengeti. A Report to WWF International.

Caro, Tim. 1988. Global Cheetah Project.

Cat News. 1987. Transfer of Siberian Tiger from CITES App.II to App.I. Gland, Switzerland.

Cat News. 1989. The Status of Leopard in Sub-Saharan Africa. Gland, Switzerland.

CITES. 1982. Identification Manual for Fauna. CITES, Lausanne.

FAO. 1982. Tropical Forest Resources. FAO, Rome.

FAO. 1985. The Tropical Forestry Action Plan. FAO, Rome.

FAO. 1990. Interim Report on Forest Resources Assessment 1990 Project. FAO, Rome.

Fur Institute of Canada. 1986. Furbearers. Toronto.

Green, Michael. 1987, The Conservation Status of Leopard, Goral and Serow in Bangladesh, Bhutan, Northern India and Southern Tibet: A Report to the U.S. Fish and Wildlife Service. IUCN Conservation Monitoring Centre, Cambridge.

Hoogsteijn, Rafael, Edgardo Mondolfi and Armando Michelangeli. 1987. Observations on the Status of Jaguar Populations in Venezuela and its Preservation Rules. mss.

ICONA. 1990. Status and Conservation of the Pardel Lynx in the Iberian Peninsula. Council of Europe, Strasbourg.

Indian Board for Wild Life. 1972. Project Tiger: A Planning Proposal for Preservation of the Tiger in India. Ministry of Agriculture, New Delhi.

IUCN. 1990. Red List of Threatened Animals. Gland, Switzerland.

Karanth, Ullas. 1987. Tigers in India: A Critical Review of Field Census, in Tigers of the World: The Biology, Biopolitics, Management and Conservation of an Endangered Species, eds. Ronald L.Tilson and Ulysses S. Seal, Noyes Publications, Park Ridge NJ.

Khan, Mohd. 1987. Tigers in Malaysia: Prospects for the Future, in Tigers of the World: The Biology, Biopolitics, Management and Conservation of an Endangered Species, eds. Ronald L.Tilson and Ulysses S. Seal, Noyes Publications, Park Ridge NJ.

Khan, Reza. 1987. The Problem Tiger of Bangladesh in Tigers of the World: The Biology, Biopolitics, Management and Conservation of an Endangered Species, eds. Ronald L. Tilson and Ulysses S. Seal, Noyes Publications, Park Ridge NJ.

Koehler, Gary. 1991. Final Report to WWF on Survey of South China Tigers. mss.

Lekhagul, Boonsong and Jeffrey A. McNeely. 1977. Mammals of Thailand. Sahakarnbhat, Bangkok.

Lu Houji. 1987. Habitat Availability and Prospects for Tigers in China, in Tigers of the World: The Biology, Biopolitics, Management and Conservation of an Endangered Species, eds. Ronald L. Tilson and Ulysses S. Seal, Noyes Publications, Park Ridge NJ.

Lu Houji and Sheng Helin. 1986. Distribution and Status of the Chinese Tiger, in Cats of the World: Biology, Conservation and Management, eds. S. Douglas Miller and Daniel D. Everett, National Wildlife Federation, Washington DC.

Ma Yiqing. 1988. Historical Changes in the Distributional Area of Siberian Tiger in China, in Abstracts: Symposium of Asian-Pacific Mammalogy, Beijing.

MacDougal, Charles. 1988. Tigers in Nepal. CAT NEWS 9.

MacDougal, Charles and J.L. David Smith. 1984. Status of Cats in Nepal: A Report to IUCN/SSC Cat Specialist Group. mss.

Mackimmon, John and Kathy. 1986. Review of the Protected Areas System in the Indo-Malayan Realm. UNEP/IUCN.

Martin, R.B. and Tom de Meulenaer. 1988. Survey of the Status of the Leopard in Sub-Saharan Africa. CITES.

Mendelssohn, Heinrich. 1989. Wild Cats in Israel. CAT NEWS 10.

Milliken, Tom. 1991. South Korea Fuels Illegal Trade in Rare Species. WWF News no.70.

Myers, Norman. 1975. The Cheetah in Africa. IUCN Monograph No.4.

Myers, Norman. 1987. Lion in Kingdom of Cats. National Wildlife Federation, Washington DC.

Ola and d'Auliare. 1986. Lessons from a Ravaged Jungle. International Wildlife Sept/Oct. Washington DC

Panwar, Hemendra S. 1984. Conservation of Wild Cats in India: a report to the meeting of the IUCN/SSC Cat Specialist Group, Kanha, India. mss.

Rabinowitz, Alan, Patrick Andau and Paul P.K. Chai. 1987. The Clouded Leopard in Malaysian Borneo, Oryx, Vol 21.

Rabinowitz, Alan. 1988. The Clouded Leopard in Taiwan. Oryx, Vol 22.

Reuters. 1991. Thais Will Halt Wildlife Trade. International Herald Tribune, 6 April 1991.

Roberts, T.J. 1984. The Status of Cats in Pakistan, a report to the meeting of the IUCN/SSC Cat Specialist Group, Kanha, India. mss.

- Salter, R.E. 1983. Summary of Currently Available Information on Internationally Threatened Wildlife Species in Burma. FAO.
- Santiapillai, Charles and Kenneth R. Ashby. 1988. The Clouded Leopard in Sumatra, *Oryx*, Vol. 22.
- Santiapillai, Charles. 1987. Leopard in Sri Lanka, CAT NEWS 7.
- Sanyal, Pranabes. 1988. Fishing Cats near Calcutta. CAT NEWS 9.
- Schaller, George. 1988. Snow Leopard in China. Snow Line, Newsletter of the International Snow Leopard Trust, Spring 1988.
- Seidensticker, John. 1987. Bearing Witness: Observations on the Extinction of Panthera tigris balica and Panthera tigris sondaica, in *Tigers of the World: The Biology, Biopolitics, Management and Conservation of an Endangered Species*, eds. Ronald L. Tilson and Ulysses S. Seal, Noyes Publications, Park Ridge NJ.
- Singh, R.L. 1989. Tigers and Rhinos Die in Floods. CAT NEWS 10.
- Smithers, Reay. 1983. Mammals of Southern Africa. Council for Scientific Research, Pretoria.
- Smithers, Reay. 1988. African Wildcat in South African Red Data Book - Terrestrial Mammals. South African National Scientific Programmes Report no. 125.
- Spitsin, V.V., P.N. Romanov, S.V. Popov and E.N. Smirnov. 1987. The Siberian Tiger in the USSR, in *Tigers of the World: The Biology, Biopolitics, Management and Conservation of an Endangered Species*, eds. Ronald L. Tilson and Ulysses S. Seal, Noyes Publications, Park Ridge NJ.
- Swank, Wendell G. and James G. Teer. 1987. Status of the Jaguar, 1987: A Report to the National Fish and Wildlife Foundation. Washington DC.
- Tan Bangjie. 1986. Status and Problems of Captive Tigers in China in *Tigers of the World: The Biology, Biopolitics, Management and Conservation of an Endangered Species*, eds. Ronald L. Tilson and Ulysses S. Seal, Noyes Publications, Park Ridge NJ.
- Tello, J. Lobao. 1986. The Situation of the Wild Cats in Bolivia. CITES.
- Theobald, Alison with Duane R. Pierson. 1987. Survey of Lynx and Bobcat Harvest Data, Population Estimates and Current Research as Provided by Individual State Departments of Fish and Wildlife. FFPS/US. mss.
- U.S. Interagency Task Force on Tropical Forests. 1980. *The World's Tropical Forests: A Policy, Strategy and Program for the United States*. Govt. Printing Office, Washington DC.
- Wegge, Per. 1988. Assessment of Khunjerab National Park and Environs, Pakistan. Report Report Report to IUCN. mss.
- Wilson, Vivian J. 1987. Distribution and Status of Cheetah in Zimbabwe. A report to the Parks and Wildlife Board of Zimbabwe. mss.