



Convention on the Conservation of Migratory Species of Wild Animals

Secretariat provided by the United Nations Environment Programme



16TH MEETING OF THE CMS SCIENTIFIC COUNCIL

Bonn, Germany, 28-30 June 2010

UNEP/CMS/ScC16/Doc.19/Rev.1

Agenda Item 14.1

DRAFT PROPOSAL FOR THE INCLUSION OF THE TIGER ON CMS APPENDIX I

(Introductory note prepared by the CMS Secretariat)

1. The draft proposal for the amendment of CMS Appendix I attached to this note has been submitted by Roseline Beudels-Jamar, Coordinator of the Terrestrial Mammals Working Group. The proposal calls for adding the tiger (*Panthera tigris*) to Appendix I of the CMS Appendices.
2. It has been submitted to the Scientific Council for its consideration. Based on a positive evaluation from the Scientific Council, the Secretariat will address appropriate Parties and invite them to consider and subsequently submit the proposals to the Tenth Meeting of the Conference of the Parties.

Action Requested:

The Scientific Council is requested to:

- examine the proposal and see whether it can be formally submitted.

Proposal for amendment of Appendices
Proposal to add in Appendix I

Panthera tigris

Document compiled by IRSNB, based on several publications, in particular:

- **Nowell, K. and Jackson, P. (compilers and editors) 1996. Wild Cats. Status Survey and Conservation Action Plan. IUCN/SSC Cat Specialist Group. IUCN, Gland, Switzerland.**
- **many other published and unpublished material (see list of references).**

**PROPOSAL FOR AMENDMENT OF THE APPENDICES
TO THE CONFERENCE OF THE PARTIES OF THE CONVENTION ON THE
CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS**

A. PROPOSAL

Inclusion of the tiger (*Panthera tigris*) on Annex I

B. PROPONENT:

C. SUPPORTING STATEMENT

1. Taxon

- 1.1 Classis: Mammalia
1.2 Ordo: Carnivora
1.3 Familia: Felidae
1.4 Nomenclature: *Felis tigris* Linnaeus 1758. Type locality: "Asia", fixed by Thomas (1911:135) as "Bengal" [India]
Synonyms: *Panthera tigris*
1.5 Common names: English – Tiger
Finnish -
French – Tigre
German -
Italian -
Spanish – Tigre
Swedish -

1.6 Taxonomy and evolution

The oldest remains of a tiger-like cat, called *Panthera palaeosinensis* have been found in China and Java. This species occurred about 2 million years ago at the beginning of the Pleistocene and was smaller than a tiger. Early true tiger fossils stem from Java and are between 1.6 and 1.8 million years old. Distinct fossils from the early and middle Pleistocene were discovered in deposits from China, Sumatra and Java. A subspecies called Trinil tiger (*Panthera tigris trinilensis*) occurred about 1.2 million years ago and was found at the locality of Trinil, Java, Indonesia. In India, and northern Asia the tiger appears for the first time in the late Pleistocene. Fossil tigers were also found in eastern Beringia (but not on the American Continent) and Sakhalin island. Tiger fossils of the late Pleistocene have also turned up in Japan. These fossils indicate that the Japanese tiger was not bigger than the island subspecies of tigers of recent ages. This may be due to the phenomenon in which body size is related to environmental space (see insular dwarfism), or in the case of a large predator like a tiger, availability of prey. Until the Holocene, tigers occurred also in Borneo where it is not present today.

Treatment in WILSON & REEDER (2005)

Panthera tigris (Linnaeus 1758), is a polytypic species, with 8 recognized subspecies. These are *Panthera tigris tigris* which occurs in India, Nepal and Bhutan, the probably polyphyletic Indochinese and Malaysian *Panthera tigris corbetti* Mazak 1968, the southern Chinese subspecies, *Panthera tigris amoyensis* (Hilzheimer 1905), near extinct if not extinct, and the Sundaic insular subspecies *Panthera tigris sumatrae* Pocock 1929 of Sumatra, *Panthera tigris altaica* Temminck 1844. The other three

subspecies are now extinct or probably extinct, the Caspian or Persian tiger, *Panthera tigris virgata* (Illiger 1815), the Javanese tiger *Panthera tigris sondaica* Temminck 1844, and the Bali tiger *Panthera tigris balica* Schwarz 1912.

Occurrence of tiger within the CMS Central Asian Mammal Concerted Action

Polytypic species, *Panthera tigris* (Linnaeus 1758), with 8 recognized subspecies. One northern subspecies, *Panthera tigris virgata* (Illiger 1815), probably extinct, was endemic to the Concerted Action area. Another northern subspecies, *Panthera tigris altaica* Temminck 1844, may have permanently inhabited the north-eastern margin of the Concerted Action area and certainly broadly entered its northern margin in the course of annual migrations. One southern subspecies, *Panthera tigris tigris* occurs on the south-eastern margins of the Concerted Action area in India, Nepal and Bhutan. The two remaining continental subspecies, the Indochinese and Malaysian, probably polyphyletic *Panthera tigris corbetti* Mazak 1968, and the southern Chinese, near extinct if not extinct, *Panthera tigris amoyensis* (Hilzheimer 1905) are extralimital, as are the three Sundaic insular subspecies *Panthera tigris sumatrae* Pocock 1929 of Sumatra, *Panthera tigris sondaica* Temminck 1844 of Java, and *Panthera tigris balica* Schwarz 1912 of Bali, the latter two extinct.

Subspecies

The surviving subspecies in descending order of abundance are:

* The Bengal tiger or the Royal Bengal tiger (*Panthera tigris tigris*) is found in parts of India, Bangladesh, Nepal, Bhutan and Myanmar. It lives in varied habitats: grasslands, subtropical and tropical rainforests, scrub forests, wet and dry deciduous forests and mangroves. Males in the wild usually weigh 205 to 227 kg (450–500 lb), while the average female will weigh about 141 kg. However, the northern Indian and the Nepalese Bengal tigers are supposed to be somewhat bulkier than those found in the south of the Indian Subcontinent, with males averaging around 520 lbs (236 kg).

* The Indochinese tiger (*Panthera tigris corbetti*), also called Corbett's tiger, is found in Cambodia, China, Laos, Burma, Thailand, Vietnam and mainland Malaysia. These tigers are smaller and darker than Bengal tigers: Males weigh from 150–190 kg (330–420 lb) while females are smaller at 110–140 kg (242–308 lb). Their preferred habitat is forests in mountainous or hilly regions. It should be noted that the Malayan Tiger, found in the southern part of Malaysia, is considered by some as being a separate subspecies.

* The Sumatran tiger (*Panthera tigris sumatrae*) is found only on the Indonesian island of Sumatra, and is critically endangered. It is the smallest of all living tiger subspecies, with adult males weighing between 100–130 kg (220–286 lb) and females 70–90 kg (154–198 lb). Their small size is an adaptation to the thick, dense forests of the Sumatra island where they reside, as well as the smaller-sized prey. Recent genetic testing has revealed the presence of unique genetic markers, indicating that it may develop into a separate species, if it does not go extinct. This has led to suggestions that Sumatran tigers should have greater priority for conservation than any other subspecies.

* The Siberian tiger (*Panthera tigris altaica*), also known as the Amur, Manchurian or North China tiger, is confined to the Amur-Ussuri region of Primorsky Krai and Khabarovsk Krai in far eastern Siberia, where it is now protected. Considered the largest subspecies, with an average weight of around 227 kg (500 lb) for males. The Amur tiger is also noted for its thick coat, distinguished by a paler golden hue and a fewer stripes. A six-month old Siberian tiger can be as big as a fully grown leopard.

* The South China tiger (*Panthera tigris amoyensis*), also known as the Amoy or Xiamen tiger, is the

most critically endangered subspecies of tiger and is listed as one of the 10 most endangered species in the world. It will almost certainly become extinct. It is one of the smaller tiger subspecies. The length of the South China tiger ranges from 2.2–2.6 m (87–104 in) for both males and females. Males weigh between 127 and 177 kg (280–390 lb) while females weigh between 100 and 118 kg (220–260 lb). From 1983 to 2007, no South China tigers were sighted.

Extinct (or probably extinct) subspecies

* The Caspian tiger or Persian tiger (*Panthera tigris virgata*) appears to have become extinct in the late 1950s, with the last reliable sighting in 1968. The Caspian tiger was a large subspecies and reached nearly the dimensions of the Bengal Tiger. The heaviest confirmed weight of a male was 240 kg. The ground colour was comparable to that of the Indian subspecies, but differed especially in the tight, narrow striping pattern. The stripes were rather dark grey or brown than black. Especially during the winter, the fur was relatively long. The Caspian tiger was one of two subspecies of tiger (along with the Bengal) that was used by the Romans to battle gladiators and other animals, including the Barbary Lion. The Romans travelled far to capture exotic beasts for the arena. There are still occasional reported sightings of the Caspian Tiger in the wild.

* The Balinese tiger (*Panthera tigris balica*) was limited to the island of Bali. These tigers were hunted to extinction—the last Balinese tiger is thought to have been killed at Sumbar Kima, West Bali on 27 September 1937; this was an adult female. No Balinese tiger was ever held in captivity. The tiger still plays an important role in Balinese Hindu culture.

* The Javan tiger (*Panthera tigris sondaica*) was limited to the Indonesian island of Java. It now seems likely that this subspecies became extinct in the 1980s, as a result of hunting and habitat destruction, but the extinction of this subspecies was extremely probable from the 1950s onwards (when it is thought that fewer than 25 tigers remained in the wild). The last specimen was sighted in 1979, but there was a re-ignition of reported sightings during the 1990s.

2 Biological data

2.1 Distribution (current and historical)

The geographic distribution of the tiger once extended across Asia from eastern Turkey to the Sea of Okhotsk. In the historical past tigers were widespread in Asia, from the Caucasus and the Caspian Sea to Siberia and Indonesia. During the 19th century the tiger completely vanished from entire western Asia and became restricted in the remaining parts of its range almost exclusively to isolated pockets. This fragmented relic range extends from India in the west to China and Southeast Asia in the east today. The northern limit is close to the Amur River in south eastern Siberia. The only large Island inhabited today is Sumatra. From Java it probably disappeared in second half of the 19th century and from Borneo it is known only from fossil remains.

2.2 Habitat

The tiger is found in a variety of habitats: from the tropical evergreen and deciduous forests of southern Asia to the coniferous, scrub oak, and birch woodlands of Siberia. It also thrives in the mangrove swamps of the Sunderbans, the dry thorn forests of north-western India, and the tall grass jungles at the foot of Himalayas. Tigers are found in the Himalayan valleys, and tracks have been recorded in winter snow at 3,000 metres (Prater 1971). The extinct Caspian tiger frequented seasonally flooded riverine land known as Tugai, consisting of trees, shrubs, and dense stands of tall reeds and grass up to six

metres in height. (When hunting in these reed thickets, tigers sometimes reared up on their hind legs or leaped upward in order to see their surroundings: Heptner and Sludskii 1972.) The tiger's habitat requirements can be summarized as: some form of dense vegetative cover, sufficient large ungulate prey (Sunquist and Sunquist 1989), and access to water.

2.3 Migratory status, migrations and/or transborder movements

Migratory behaviour: Tigers are the most mobile of the large cats. Some populations undertake long-distance seasonal migrations in response to the migrations of ungulates they prey on. Individual displacements of over 1000 km have been recorded (Heptner and Sludskii, 1992). Other populations depend on shorter altitudinal migrations, again triggered by those of ungulates (Heptner and Sludskii, 1992). In addition Tigers have very large home ranges, which they exploit predictably, as a function of prey and cover availability. Female Indian tigers (*P. t. tigris*) have home range sizes from 200 to 1000 km² (extremes recorded 64 to 9252 km²); male's home ranges are between 2 and 15 times larger. Tigers may thus cover as much as 16 to 32 kilometers in a single night. (Sunquist and Sunquist. 2002).

Migratory status under CMS definitions: The seasonal migratory behaviour of some Tiger populations and their daily exploitation of a large home range clearly qualify the species as migratory under CMS definitions. In the past many of the documented movements were trans-border, in particular in central Asia and the Middle East. The considerable loss of range and local extinctions that the species has suffered has led to the discontinuation of many of these trans-border migrations. This does not affect the migratory status of the species under CMS (4th CMS COP, Nairobi 1994). In any case, trans-border movements persist, notably between India and Nepal, India and Bhutan, India and Bangladesh (Sundarbans), Russia and China. Jhala et al. (2008) regard those trans-border movements as vital to the survival of particular tiger populations.

2.4 Ecology

The size of a tiger's home range mainly depends on prey abundance, and, in the case of male tigers, on access to females. Adult tigers are fiercely territorial. A female may have a territory of 20 square kilometres while the territories of males are much larger, covering 60–100 km². While females can at times be aggressive towards other females, their territories can overlap and they do tolerate each other. Males, however, are usually intolerant of other males within their territory. Because of their aggressive nature, territorial disputes can be violent, and may end in the death of one of the males.

Male tigers can mingle easily with females in their territories and will even share kills. In contrast to male lions, male tigers will allow females and cubs to feed first. Females will also share kills including with individuals of the same sex.

Tigers have been studied in the wild using a variety of techniques. The populations of tigers were estimated in the past using plaster casts of their pugmarks. This method was found faulty and attempts were made to use camera trapping instead. Newer techniques based on DNA from their scat are also being evaluated. Radio collaring has also been a popular approach to tracking them for study in the wild.

In the wild, tigers mostly feed on larger and medium sized animals. Sambar, gaur, domestic buffalo, chital, boar and nilgai are the tiger's favoured prey in India. In Siberia the main prey species are Manchurian elk, wild boar, Sika Deer, roe deer and musk deer. In Sumatra Rusa Deer, wild boar and Malayan Tapir are preyed on. In the former Caspian tiger's range Saiga Antelope, camels, Caucasian Wisent, yak and wild horses were preyed. Like many predators, they are opportunistic and will eat much

smaller prey such as monkeys, peafowls, hares and fish. The diet of an Indian tiger mainly consists of large wild ungulates such as chital (*Axis axis*), sambar (*Cervus unicolor*), barasingha (*Cervus duvacelii*), nilgai (*Boselaphus tragocamelus*) and gaur (*Bos gaurus*) and other animals such as the wild pig (*Sus scrofa*) and Nilgiri tahr (*Hemitragus hylocrius*). Smaller prey such as peafowl, jungle fowl and hare are also taken.

It is an opportunistic feeder and can also kill large prey such as young elephant (*Elephas maximus*), rhino calves and wild buffalo (*Bubalus arnee*) are occasionally taken. A case where a tiger killed an adult female Indian Rhinoceros has been observed. Adult elephants are too dangerous to tigers to serve as common prey, but conflicts between elephants and tigers do sometimes take place. Tigers also sometimes prey on domestic animals such as dogs, cows, horses and donkeys. These individuals are termed cattle-lifters or cattle-killers in contrast to typical game-killers.

Old tigers or those wounded and rendered incapable of catching their natural prey have turned into man-eaters; this pattern has recurred frequently across India. An exceptional case is that of the Sundarbans, where healthy tigers prey upon fishermen and villagers in search of forest produce, humans thereby forming a minor part of the Tiger's diet.

Tigers hunt alone and ambush their prey, overpowering them from any angle, using their body size and strength to knock large prey off balance. Even with their great masses, tigers can reach speeds of about 49-65 kilometres per hour (35-40 miles per hour). When hunting large prey, tigers prefer to bite the throat and use their muscled forelimbs to hold onto the prey, bringing it to the ground. The tiger remains latched onto the neck until its prey dies of strangulation. With small prey, the tiger bites the nape, often breaking the spinal cord, piercing the windpipe, or severing the jugular vein or common carotid artery. The prey is killed instantly.

They have been reported to carry domestic livestock weighing 50 kg (110 lb) while easily jumping over fences 2 m (6 ft 6 in) high. Their heavily muscled forelimbs are used to hold tightly onto the prey and to avoid being dislodged, especially by large prey such as gaurs. Gaurs and water buffalos weighing over a ton have been killed by tigers weighing about a sixth as much. The combination of claws and power behind a tiger's paws enables it to kill an adult human with one swipe.

Tigers will occasionally eat fruits and parts of plants for dietary fibre. The average life span of a tiger in the wild is about 14 to 16 years.

3. POPULATION TRENDS AND CONSERVATION STATUS

3.1 Conservation status

IUCN:– Extinct as *P. t. balica*, *P. t. sondaica*, and *P. t. virgata*, Critically Endangered as *P. t. altaica*, *P. t. amoyensis*, and *P. t. sumatrae*, otherwise Endangered

3.2 Population estimates and trends

There may have been as many as 100,000 tigers at the end of the 19th century. A survey and literature review of the status of the tiger conducted in the early 90' (Jackson 1993a) for CITES concluded that the maximum number was probably no more than 7,700 individuals. There might be more tigers in captivity in the world nowadays than in the wild.

The current total effective population size is estimated at around 3,800 individuals (below 2,500 mature

breeding individuals), with a declining trend due to habitat loss, declining prey numbers and persecution; there are no subpopulation counting more than 250 mature breeding individuals.

1) **Bengal tiger (*Panthera tigris* ssp. *tigris*)**

Bangladesh; Bhutan; India; Myanmar and Nepal (Possibly Pakistan in the past):

Gee (1964) suggested that it was possible that there were 40,000 tigers in India early in this century, compared to about 4,000 by the time he wrote. In 1972, an official census found positive evidence of fewer than 2,000 tigers in India (Govt. of India 1972), located in four main areas of forest: the foot of the Himalayas in north and north-eastern India, the forests of central and eastern India, and a narrow strip paralleling the south-western coast. An intensive conservation programme, Project Tiger, was started shortly thereafter, and its 1989 census estimated numbers nationwide at 4,334. However, there has been widespread poaching in the early 1990s, and the 1993 census estimates 3,750 tigers (including, as with the previous total, sub-adults) (Ghosh 1994). Including a few hundred tigers in Nepal (late 1993 estimate 250: C. McDougal pers. comm.), Bhutan, Bangladesh and western Myanmar, the total population of Bengal tigers (*P.t. tigris*) was then probably not more than 4,500 (Jackson 1993a).

While conservationists suspected the population was below 2,000, the most recent census, conducted in 2006/ 2007 by the Indian Government's National Tiger Conservation Authority has estimated the number at 1411 wild tigers (1165-1657 allowing for statistical error), a drop of 60% in the past decade. It can be safely assumed that the current estimation is more accurate than the ones undertaken earlier, which showed inflated tiger numbers than what actually existed on the ground. Since 1972, there has been a massive wildlife conservation project known as Project Tiger underway to protect the Bengal tiger. The project is considered as one of the most successful wildlife conservation programs, though at least one Tiger Reserve (Sariska Tiger Reserve) has lost its entire tiger population to poaching.

2) **Indochinese tiger (*Panthera tigris* ssp. *corbetti*)**, also called Corbett's tiger

Cambodia, China, Laos (People's Democratic Republic); Myanmar, Thailand, and Vietnam

Estimates of the number of Indo-Chinese tigers found from eastern Burma through continental South-East Asia to Vietnam, range from 1,050 to 1,750 (Jackson 1993a) but there are few data. Rabinowitz (1993) surveyed major protected areas in Thailand between 1987-1991, and estimated the number of tigers in that country at 250, in sharp contrast to official government estimates of 450-600 (Anon. 1994c). The Malaysian Wildlife Department estimated 600-650 tigers in the Peninsula (Anon. 1994c).

Recent estimates of the Indochinese tiger population vary between 1,200 to 1,800, with only several hundred left in the wild. The largest current population is in Malaysia, where illegal poaching is strictly controlled, but all existing populations are at extreme risk from habitat fragmentation and inbreeding. In Vietnam, almost three-quarters of the tigers killed provide stock for Chinese pharmacies.

3) **Malayan tiger (*Panthera tigris* ssp. *malayensis*)**,

Exclusively found in the southern **Malay Peninsula** (Malaya) now extinct in **Singapore**:

Recent counts showed there are 600–800 tigers in the wild, making it the third largest tiger population behind the Bengal tiger and the Indochinese tiger. The Malayan tiger is a national icon in Malaysia, appearing on its coat of arms and in logos of Malaysian institutions, such as Maybank.

4) **Sumatran tiger (*Panthera tigris* ssp. *sumatrae*)**

Indonesia (Sumatra):

The wild population is estimated at between 400 and 500, seen chiefly in the island's national parks. The Sumatran tiger's effective population size is estimated at approximately 250 mature individuals, with a declining trend, and no subpopulation estimated to contain more than 50 mature individuals. While habitat destruction is the main threat to the existing tiger population (logging continues even in the supposedly protected national parks), 66 tigers were recorded as being shot and killed between 1998 and 2000, or nearly 20% of the total population.

5) South China Tiger (*Panthera tigris* ssp. *amoyensis*)

China (Fujian, Guangdong, Hunan, Jiangxi): *P. t. amoyensis* was estimated to number 4,000 in the early 1950's. Approximately 3,000 tigers were killed over 30 years as the taxon was officially hunted as a pest (Nowell and Jackson 1996). Official government statistics showed that annual average numbers of skins taken dropped from 78.6 in the early 1950's, to 30.4 in the early 1960's, to 3.8 in the early 1970's, and to one by 1979, when the government finally banned hunting (Nowell and Jackson 1996). Surveys conducted in early nineties found evidence of tiger presence and reproduction in southern and northern Hunan, northern Guangdong, and western Fujian. Tiger presence was also noted in eastern Hunan, and was also reported from central Jiangxi. The total population size at that time was estimated at 30-80 animals (Nowell and Jackson 1996).

In 2007 a farmer spotted a tiger and handed in photographs to the authorities as proof. There are currently 59 known captive South China tigers, all within China, but these are known to be descended from only six animals. Thus, the genetic diversity required to maintain the subspecies may no longer exist. Currently, there are breeding efforts to reintroduce these tigers to the wild by 2008.

6) Amur tiger (*Panthera tigris* ssp. *altaica*)

China; Korea (Democratic People's Republic of); Russian Federation. The Amur tiger is found primarily within the Russian Far East, and a few survive along China's north-east border area, and possibly also in North Korea (Nowell and Jackson 1996, Miquelle 1998). The Amur tiger's effective population size was estimated in 2005 between 334 and 417 mature individuals. In 1996, a census of the Siberian tiger population revealed only 330 to 371 adults remained in Russia's forests. The slight increase in tigers is attributed at least in part to the logging practices used in Siberia. Only about 20 percent of Russia's tiger population inhabit protected lands and much of the remaining 80 percent live within areas where commercial logging takes place. If logging in those areas involved clear cutting forests, this would be disastrous for tigers. But selective logging, a practice that extracts only the most commercially valuable trees and leaves behind the rest, is more common at present. This logging approach encourages re-growth of browse which in turn provides more food for the tiger's prey species such as boars and deer. A well-fed prey population means the tigers have a reliable food source too.

7) Caspian Tiger (*Panthera tigris* ssp. *virgata*) Probably extinct

Afghanistan; Armenia; Azerbaijan; China (Xinjiang); Georgia; Iran (Islamic Republic of); Iraq; Kazakhstan; Kyrgyzstan; Syrian Arab Republic; Turkey; Tajikistan; Turkmenistan; Uzbekistan + Russian Federation (where ?) Although the Caspian tiger formerly occurred widely in southwest Asia, its distribution in this desert environment was dendritic: the riverine flora of trees, shrubs and dense reeds and grasses called tugai, associated with watercourses, river basins and lake edges. One of the most important factors in the Caspian tiger's decline and extinction was that it was already vulnerable due to the restricted nature of its distribution: riverine habitats were also intensively used by humans. Hunting, and loss of habitat and large wild prey are the primary causes of the loss of the subspecies. The last confirmed records of the Caspian tiger are from the 1960s though it is thought that

such a tiger was last shot dead in the south-eastern-most part of Turkey in 1970. There are no Caspian tigers in captivity.

8) Balinese tiger (*Panthera tigris ssp. balica*) Extinct

Indonesia (Bali) Tigers were last positively recorded from western Bali in the late 1930s. The Bali Barat National Park was established in 1941 in tiger habitat, but it is likely that *Panthera tigris balica* became extinct by the end of World War II or possibly as late as the early 1950s. The causes of extinction include hunting, and loss of forest habitat and prey base. There are no Bali Tigers in captivity.

9) Javan tiger (*Panthera tigris ssp. sondaica*) Extinct

Indonesia (Java) In the 1800s tigers were widespread on the Indonesia island of Java, but by 1970 had become restricted to the Meru Betiri Reserve on the eastern south coast. *Panthera tigris sondaica* was last positively recorded during a survey there in 1976. There have been no confirmed records since then (although leopards *Panthera pardus* persist there, and their tracks are sometimes mistaken for tiger). The primary causes of the Javan tiger's decline are hunting and loss of forest habitat, and its final disappearance from Meru Betiri Reserve is linked to the absence of suitable large wild cervid prey. There are no Javan Tiger in captivity.

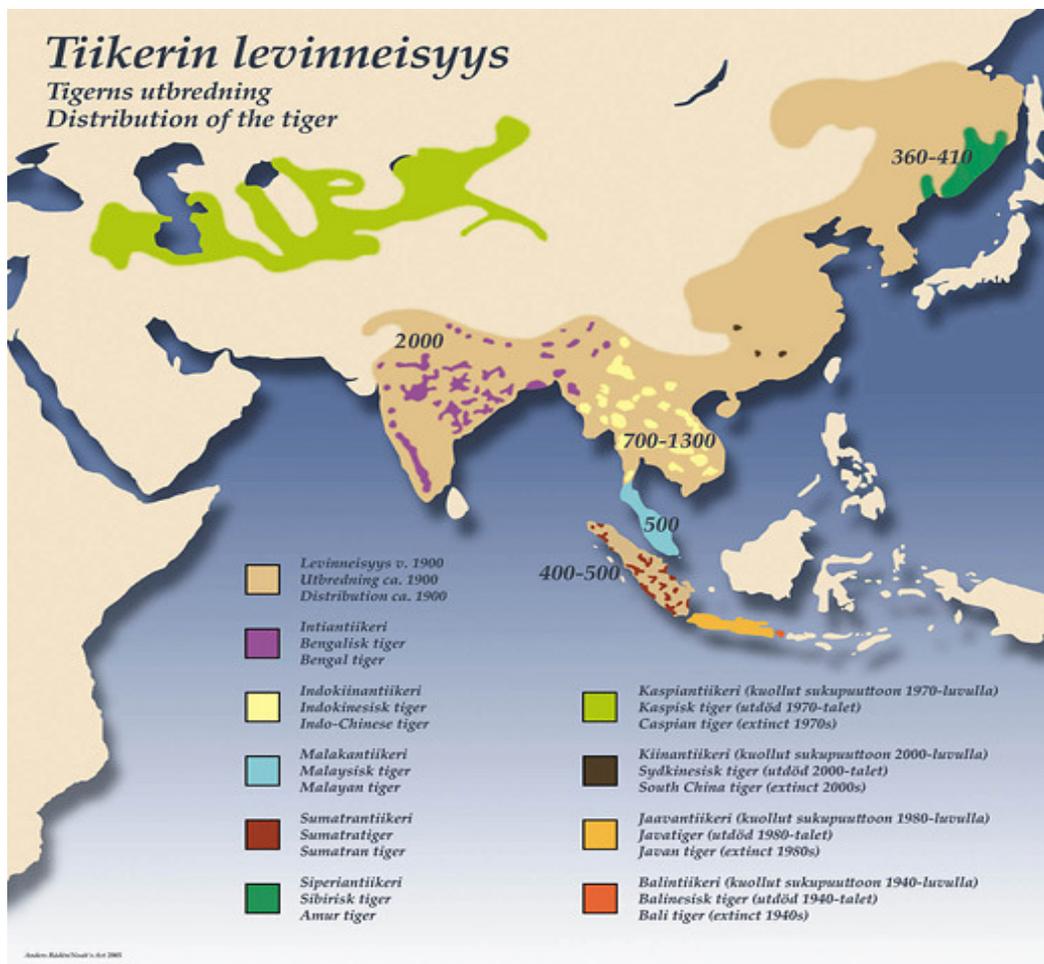


Fig: Recent historical, current range and evolution of range

4. THREAT DATA, RISK FACTORS AND CAUSES OF DECLINE

Main threats

Commercial poaching, a declining prey base due to over-hunting, and loss of habitat are the principal threats to the tiger. Maintenance of present habitat is crucial to the tiger's future, along with protection from illegal killing. Seidensticker (1986) attributed the extirpation of tigers on Bali and Java to extensive habitat fragmentation and the insularization of small habitat blocks and reserves (<500 km²), widespread loss of critical ungulate prey through disease, and over-hunting by humans.

The biggest threats to tigers are loss of habitat, loss of prey, commercial hunting, and human/tiger conflict. However, the ultimate threats to tigers must equally be overcome to have any long-term success. These include the wildlife trade, lack of political will and commitment to save tigers, and political instability. The governments of tiger countries must commit to saving tiger habitat and prevent hunting of tiger prey in these reserved habitats.

Exploitation

Tigers are shot or poisoned for livestock predation and for gain. Large numbers of tigers were killed in the 20th century in Russia and China when they were officially considered pests, and bounties were paid for their destruction. In terms of commerce, tigers have traditionally been hunted primarily for their skins: Heptner and Sludskii (1972) point to the rising price of tiger skins as being an important factor leading to their decline in Central Asia and the Russian Far East in the late 1800s to early 1900s. In addition, tiger bone and other body parts are used in traditional Chinese and Korean medicines. In the early 1900s, Russians sold frozen tiger carcasses whole to Chinese marketeers and pharmacists (Heptner and Sludskii 1972). Today, the changed political and economic conditions in the former Soviet Union, and what appears to be a combination of increased demand among Asian consumers coupled with a decreased supply of wild tigers, have made poaching for bone the pre-eminent threat to the Amur tiger. Heavy poaching, again primarily for bone, is also taking place in India, and probably elsewhere throughout the tiger's range.

Hunting of tigers for sport has also played a role in their historical decline. Tiger hunting was prevalent throughout the range from early times. It became very fashionable when firearms were introduced to the Indian sub-continent, where it was pursued enthusiastically by British officials and Indian upper classes. For example, when King George V hunted with the Maharajah of Nepal in 1911, the party shot 39 tigers in 11 days. The bag record is claimed by the Maharajah of Surguja, who in 1964 wrote to George Schaller that he had shot 1,150 tigers "only" over his lifetime (Schaller 1967). Russian soldiers moving east in the 19th century hunted tigers as part of their military training to increase their courage in battle (Heptner and Sludskii 1972). While historical records from India suggest that tiger populations withstood heavy offtakes for long periods of time (M.K. Ranjitsinh pers. comm.), tiger populations became more vulnerable as habitat decreased, particularly after World War II. Sport hunters from Europe and the Americas flew into India and Nepal to obtain trophies with little official control. Official records in India show that 480 tigers were shot by sport hunters in the years 1986-89. It is likely that many more were shot or poisoned. Hundreds of skins were exported annually before a ban in 1968 (Anon. 1994f).

Decline of ungulate prey species

On the other hand, subsistence hunting of ungulate prey by local people is now a powerful force driving the tiger's decline over large parts of its range. Rabinowitz (1989) noted an unexpected low abundance of tigers combined with a reduced number of banteng, gaur and sambar in Huai Kha Khaeng Wildlife

Sanctuary in Thailand. U. Karanth (pers. comm.) suggests that, in Tropical Asia, it is unlikely that tigers can reproduce successfully at prey densities below 2-5 ungulates per km² .

Further north, tigers expand their home ranges to account for the seasonal movements of a lower density ungulate prey base. The highest density tiger population in Russia, in the Lazovskiy Reserve, occurred amidst a relatively high prey density of 2.25 ungulates per km² (Bragin 1986). However, Amur tigers are naturally vulnerable to sharp declines in ungulate populations during severe winters, and starvation at this time is a common phenomenon. Hepter and Sludskii (1972) relate reports of emaciated adult tigers in winter weighing as little as 70 kg: the stomach of one contained nothing but lichens. They report that, in the Primorye region, winters with abundant snow occur on average once every four years. Such harsh seasonal conditions increase the precarious situation of the Amur tiger. Since the collapse of the USSR, poaching of both tigers and their prey has led to a rapid decline in the population from 250-430 in the mid-1980s (Pikunov 1988, Bragin and Gaponov 1990) to 150-250 (A. Amirkhanov, Deputy Minister, in Anon. 1994c)

Other threats

Severe habitat loss has occurred in this century with the growth and spread of human populations, settlement and activities. Not only have large blocks of tiger habitat been converted to human use, but wilderness has been fragmented, creating many isolated tiger populations, some so small that genetic deterioration is to be feared (Smith and McDougal 1991). As Seidensticker (1987) declared in his review of the extinctions of the Bali and Javan tigers, it is dangerous to rely on small, isolated reserves. Large tracts of contiguous habitat are essential to assure the long-term survival of wild tigers.

5. CONSERVATION MEASURES AND RESTORATION PROSPECTS

Protection status and needs

National protection status

The species is protected at the national level throughout most of its range (Nowell and Jackson 1996). Hunting is prohibited in Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Russia, Thailand and Viet Nam.

In India Tiger is an endangered animal and is listed in the Schedule I of the Wildlife (Protection) Act, 1972. This act gives it protection against hunting/poaching and trade for skins, bones and body parts. Any person who commits such an offence is punishable with an imprisonment of not less than three years extending up to seven years along with a fine of not less than fifty thousand rupees which may extend up to two lakh rupees. In the event of a second or subsequent conviction he can receive imprisonment for a term of not less than seven years and a fine which shall be not less than five lakh rupees and can vary up to a maximum of fifty lakh rupees.

Occurrence in Protected Areas:

As all Bengal Tiger populations occur within national parks, they and their habitat afford some degree of protection. However, political and institutional instability as well as illegal hunting and poaching may undermine such protection. National laws in all range states exist for the control of hunting and capture of the tigers, although wide enforcement of the legislation is difficult due to lack of funds and inaccessibility

Bangladesh: Tigers are found throughout the Sundarbans mangrove forests, including the small reserves (total area 320 km²) of Sundarbans East, South & West IV, and may number about 300 (Anisuzzaman

Khan in litt.) or 460 (Farooq Sobhan, Bangladesh Ambassador at Global Tiger Forum, New Delhi, 1994). They may still occur in Teknaf VIII, located in the extreme south-eastern tip of the country bordering Myanmar (MacKinnon and MacKinnon 1986).

Bhutan: Bhutan's nine lowland protected areas along the southern border with India are all believed to contain tigers (Jackson 1993a, Anon. 1994c). Royal Manas II, which adjoins India's Manas II**, is the largest and most significant (shown in Figure 2). Tigers occur at lower elevations in Jigme Dorji IV, an enormous reserve comprising the entire northern third of the country (Dorji and Santiapillai 1989). The Bhutanese government announced a census result of 237 at the 1994 Global Tiger Forum, noting that some tigers are shared with India (Dasho Penjore Dorji pers. comm.). Non-official estimates in 1993 (Jackson 1993a) put the population at 20-50.

India: India has 21 reserves specifically managed for tigers which cover over 30,000 km², and contain about 1,300 tigers, about one-third of the country total of 3,750 (Ghosh 1994). Over half this area consists of buffer zones, with human settlement, agriculture, and livestock grazing. Tigers are also found in about 80 other protected areas, in most of which people and livestock are present. The Wildlife Institute of India has identified 12 large blocks of remaining forest with the potential to conserve tiger populations with long-term viability (Johnsingh et al. 1991: Figure 5). They contain both State forests, managed for timber production, and 47 wildlife reserves, including those specifically managed for tiger. However, one major reserve, the Melghat Tiger Reserve, one of the first such reserves specially declared under Project Tiger, is slated to be reduced by 1/3 to just 1,046 km² in order to accommodate the large number of people living within the reserve (Aziz 1994). Tigers may disappear in a few decades from 56 other reserves because of low numbers and human pressures (Johnsingh et al. 1991). This could mean the loss of, perhaps, up to half the 3,000-4,000 tigers currently thought to survive in India.

Nepal: In Nepal, tigers are found almost exclusively in Royal Chitwan II** (shown in 2), Royal Bardia II, and Royal Sukhla Phanta and Parsa IV.

Indo-China Tiger

Cambodia: Tigers have been recorded in the proposed Lomphat reserve (shown in Figure 2; MacKinnon and MacKinnon 1986: 237-244), but there have otherwise been no surveys to map tiger distribution in Cambodia (Chhim Somean, Wildlife Protection Office, in Anon. 1994c).

Laos: Salter (1993) surveyed villages within and near 18 areas which have been proposed as the basis of a national protected area system. Tigers were reported present near the majority of villages in all areas.

Malaysia: Tigers have been reported from most protected areas in peninsular Malaysia (Khan 1987). The largest, Taman Negara II (4,344 km²), is shown in Figure 2.

Myanmar: Myanmar's protected areas have not been surveyed for tiger presence since Salter (1983) reported them as most abundant in Alaungdaw Kathapa II (shown in Figure 2). Salter (1983) and WCMC (unpubl. data) also mention tiger presence in other areas, including Shwe-U-Daung, Shwettaw and Tamanthi Wildlife Sanctuaries; Pidaung Game Sanctuary; Kyaukpandaung, Natma Taung and Pegu Yomas proposed National Parks; Pakchan proposed Nature Reserve on the Tenerassim peninsula (shown in Figure 2) and Dipayon and Meinmahla Kyun proposed Wildlife Sanctuaries.

Thailand: In Thailand, Rabinowitz (1993) confirmed the presence of tigers in 22 protected areas, out of 38 visited. Sixteen reserves were less than 500 km² in area. He listed eight forest complexes or sites >2,000 km² containing Thailand's largest tiger populations:

1. Huai Kha Khaeng-Thung Yai IV complex (>12,000 km²: shown in Figure 2);
2. Nam Nao II complex (ca 4,000 km²);
3. Kaeng Krachan IV complex (>3,000 km²);

4. Thap Lan II complex (>3,000 km²);
5. Huai Nam Dang (proposed II) complex (>3,000 km²);
6. Khlong Saeng IV complex (ca 2,000 km²);
7. Mae Tuen IV complex (>2,000 km²); and
8. Khao Yai II (>2,000 km²) (only one tiger left in the NP!!).

Vietnam: Evidence for tiger presence has been found recently in 14 reserves: Bach Ma Hai Vin and Nam Bai Cat Tien II; Anh Son, Bu Gia Map, Kon Cha Rang, Mom Ray, Muong Nhe (Cha), Xuan Nha and Yok Don IV; and Muong Phang, Muong Te, Pong Quang, Pia Oac and Pu Nhi Reserves (Nguyen Xuan Dang and Pham Trong Anh 1992). Muong Nhe, the largest reserve (1,820 km²), is shown on Figure 2. The others are less than 600 km² in area.

Amoy or South China tiger

China: In China, a 1990 survey found South China tiger sign in 11 reserves (Koehler 1991); a total of 19 fall within its present range (Gui and Meng 1993). Total protected area coverage is about 2,500 km². Gui and Meng (1993) identify 12 additional sites, with a total area of 6,000 km², which they recommend for protection

Sumatran tiger

A Population and Habitat Viability Analysis (PHVA) workshop held in Sumatra estimated the island's tiger population at about 400 with relatively good prospects in five major reserves, and up to 200 scattered in other areas of the island (Tilson 1992a).

Indonesia (Sumatra): The major reserves for tigers on Sumatra are Gunung Leuser II* (9,000 km²) in the north-west of the island, Kerinci Seblat (I, Barisan Selatan II complex [along the south-east coast]), Way Kambas II and Berbak IV on the northern coast. Tilson (1992a) notes that habitat within Kerinci Seblat is significantly fragmented, and tiger populations are probably also fragmented.

Amur tiger is virtually confined to the Russian Far East, although a few may survive along China's north-east border area, and possibly also in North Korea (Jackson 1993a)

Russia: Tigers occur, from north to south, in the Sikhote Alin* (3,471 km²), Lazovskiy (1,165 km²) and Kedrovaya Pad (179 km²) I. Unlike most other parts of its range, the Amur tiger in Russia lives mainly outside protected areas (Bragin and Gaponov 1989). A survey of Lazovskiy Reserve in early 1993 estimated the population at 22 tigers (14 adults and eight sub-adults), with perhaps 10 (eight adults and two sub-adults) living on the periphery (G. Salkina pers. comm. 1993; Anon. 1993g). Bragin (1986) estimated the population of the larger Sikhote Alin Reserve, of which up to 1/3 is not suitable in terms of vegetation or prey base for tigers, at 25 adults. Few confine their movements solely to the reserve (Bragin and Gaponov 1989). Korkishko and Pikunov (1994) estimated that there were nine tigers (four males [three adult, one sub-adult]; five females [four adult, one sub-adult]) in the Kedrovaya Pad in 1991; it is unlikely that they were all permanent residents. Thus, only about 20% of Russia's tiger population is found in protected areas. Outside these areas, commercial logging and hunting of ungulates are on the increase.

China: Sightings of Amur tigers in Changbai Mts IV* (1,905 km²) in north-eastern China were reported in Chinese newspapers in 1990 (Anon. 1991f).

Korea, North: Tigers may possibly survive in North Korea, and Mt Paekdu IV*, a border area reserve which adjoins China's Changbai Mts IV*, is a likely place.

International protection status

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) presently ratified by over 160 countries, makes international trade in tiger parts illegal.

The Tiger, *Panthera tigris*, is listed in Appendix I of CITES.

Additional protection needs

6. Range States

Current Range states for *Panthera tigris* are Bangladesh; Bhutan; Cambodia; China; India; Indonesia; Lao People's Democratic Republic; Malaysia; Myanmar; Nepal; Russian Federation; Thailand and Viet Nam.

The species is regionally extinct in Afghanistan; Armenia, Azerbaijan, Georgia, Iraq, Kazakhstan; Kyrgyzstan; Mongolia, Pakistan; Singapore; Tajikistan; Turkmenistan; Uzbekistan. It is possibly extinct regionally in Democratic People's Republic of Korea, Islamic Republic of Iran, and Turkey.

Range States within the area of the Concerted Action are Afghanistan*, Armenia*, Azerbaijan*, Bhutan, China, Georgia*, India, Iran^o, Iraq*, Kazakhstan*, Kyrgyzstan*, Mongolia*, Nepal, Pakistan*, Russia, Tajikistan*, Turkey^o, Turkmenistan*, Uzbekistan* (CMS Parties underlined; * regionally extinct; ^o probably-regionally extinct).

7. Comments from Range States

8. Additional Remarks

9. References

- Baillie, J. and Groombridge, B. (compilers and editors) 1996. 1996 IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland. Cat Specialist Group. For more information, see the Specialist Group website
- Corbet, G. B. 1978. The mammals of the Palearctic region: A taxonomic review. London, British Museum (Natural History).
- Dacres, K. and B. Lundrigan. 2007. "Panthera tigris" (On-line), Animal Diversity Web. Accessed May 29, 2008 at http://animaldiversity.ummz.umich.edu/site/accounts/information/Panthera_tigris.html.
- Ellerman, J. R., and T. C. S. Morrison-Scott. 1951. Checklist of Palearctic and Indian mammals 1758 to 1946. London, Trustees of the British Museum (Natural History).
- Geptner, V.G., N.P Naumov, M.B. Urgenson, A.A. Sludskiy, A.F. Chirkova & A.G. Bannikov (eds). 1967. The mammals of the Soviet Union, vol. 2, part 1: Carnivora. Moscow, Vischay Shkola.
- Groombridge, B. (ed.) 1994. 1994 IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland.
- Heptner, V.G. and Sludskii, A.A. 1972. Mammals of the Soviet Union. Vol III: Carnivores (Feloidea). Vyssha Shkola, Moscow (in Russian). English translation edited by R.S. Hoffmann, Smithsonian Inst. and the National Science Foundation., Washington DC, 1992
- IUCN Conservation Monitoring Centre. 1986. 1986 IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland and Cambridge, UK.
- IUCN Conservation Monitoring Centre. 1988. 1988 IUCN Red List of Threatened Animals. IUCN,

- Gland, Switzerland and Cambridge, UK.
- IUCN. 1990. 1990 IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland and Cambridge, UK.
- IUCN. 2002. 2002 IUCN Red List of Threatened Species. . Downloaded on 8 October 2002.
- Jhala, Y.V., Gopal, R. & Qureshi, Q. (eds.). 2008. Status of the Tigers, Co-predators, and Prey in India. National Tiger Conservation Authority, Govt. of India, New Delhi, and Wildlife Institute of India, Dehradun. TR 08/001 pp-151
- Ma, Y. 1998. *Panthera pardus*. *Panthera tigris*. *Ursus arctos*. *Ursus thibetanus*. *Alces alces*. Pp. 116-125, 173-181, 246-249 in Wang S., chief compiler. China Red Data Book of endangered animals. Mammalia. Beijing, Science Press.
- Miquelle, D. 1998a. North Korea trip report. Wildlife Conservation Society report.
- Miquelle, D. 1998b. Tiger-leopard survey in Jilin province, China. Wildlife Conservation Society report
- Nowel, K. & P. Jackson. 1996. Wild Cats: Status Survey and Conservation Action Plan. Gland, IUCN.
- Nowell, K. 2000. Far from a cure: the tiger trade revisited. TRAFFIC International, Cambridge, UK.
- Nowell, K. and Jackson, P. (compilers and editors) 1996. Wild Cats. Status Survey and Conservation Action Plan. IUCN/SSC Cat Specialist Group. IUCN, Gland, Switzerland. (online version)
- Prater, S.H. 1971. The book of Indian mammals, 3rd edition. Bombay Natural History Society, Bombay.
- Scott, P. (ed.) 1965. Section XIII. Preliminary List of Rare Mammals and Birds. In: The Launching of a New Ark, pp. 15–207. First Report of the President and Trustees of the World Wildlife Fund. An International Foundation for saving the world's wildlife and wild places 1961–1964. Collins, London.
- Pocock, R. I. 1929. Tigers. Journal of the Bombay Natural History Society, 33(3):505-541.
- Prater, S.H. 1971. The book of Indian mammals, 3rd edition. Bombay Natural History Society, Bombay.
- Seidensticker, J. 1987. Bearing witness: Observations on the extinction of *Panthera tigris balica* and *Panthera tigris sondaica*. In: R.L. Tilson and U.S. Seal (eds) Tigers of the World: The Biology, Biopolitics, Management and Conservation of an Endangered Species, pp. 1-8. Park Ridge, New Jersey, Noyes Publications.
- Seidensticker, J., Christie, S. and Jackson, P. (eds) 1999. Riding the tiger: Tiger conservation in human-dominated landscapes. Cambridge University Press, Cambridge, UK.
- Sunquist, M., Karanth, U.K. and Sunquist, F. 1999. Ecology, behaviour and resilience of the tiger and its conservation needs. In: J. Seidensticker, S. Christie and P. Jackson (eds) Riding the Tiger: Tiger Conservation in Human-Dominated Landscapes. pp 5-18, Cambridge University Press, Cambridge, UK.
- Sunquist, M., F. Sunquist. 2002. Wild Cats of the World. Chicago: University of Chicago Press.
- Smith, J.L.D. and McDougal, C. 1991. The contribution of variance in lifetime reproduction to effective population size in tigers. Conservation Biology 5(4): 484-490.
- Sunquist, M.E. and Sunquist, F.C. 1989. Ecological constraints on predation by large felids. In: J.L. Gittleman (ed.). Carnivore behavior, ecology and evolution. Chapman and Hall, London. pp 283-301.
- Shrestha, T.K., 1997. Mammals of Nepal (with reference to those of India, Bangladesh, Bhutan and Pakistan). Kathmandu, pp. i-xv, 1-371
- Wilson, D.E. & D.M. Reeder (editors). 2005. Mammal species of the world. A taxonomic and geographic reference (3rd ed.). Baltimore, Johns Hopkins University Press.
- Wozencraft, W.C. 2005. Order Carnivora. Pp. 532-628 in Wilson, D.E. & D.M. Reeder (editors). 2005. Mammal species of the world. A taxonomic and geographic reference (3rd ed.). Baltimore, Johns Hopkins University Press.