

BEAR CONSERVATION IN INDIA

(With four text-figures)

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Key words: Himalaya, northeastern India, *Ursus arctos isabellinus*, *U. thibetanus*, *Helarctos malayanus*, *Melursus ursinus*, Transfrontier Reserve, poaching, shifting cultivation

Of the eight bear species currently existing in the world, four are found in India: brown bear *Ursus arctos isabellinus*, Asiatic black bear *U. thibetanus*, sun bear *Helarctos malayanus* and sloth bear *Melursus ursinus*. The abundance of each species in India is determined by habitat type, its location within the global distributional range of the species, its biology, the quantum and continuity of habitat available, and the anthropogenic pressures it faces. All species are in Schedule-I of the Indian Wildlife (Protection) Act 1972, the highest legal protection status.

India marks the southeastern end of the brown bear's distribution range; the black bear in India occupies a large portion of the southwestern part of the species' range, sun bear the western end, and sloth bear most of the species' range. Populations at the periphery of the range of the species are usually more exposed to pressures, and have greater chances of going extinct.

The habitat available to the largely herbivorous, hibernation-dependent brown bear in the Trans- and Greater Himalaya is probably limited to c. 10,000 sq. km, and is disturbed by anthropogenic pressures such as grazing and medicinal plant collection. There are about 23 protected areas in the range of the brown bear, within which there are around 300 animals. The omnivorous black bear has a vast forested habitat in the Outer and Greater Himalaya and northeastern India (c. 300,000 sq. km), with at least 56 protected areas and a minimum of 3,000 animals. Black bears in the higher reaches of the Greater Himalayan ranges hibernate, while those in the Outer Himalaya and northeastern India, where they range as low as 500 m, do not. Although disturbed, black bear habitat in the Himalaya is still continuous and productive as a result of orchards and croplands. Poaching for gall bladder, fat, meat and skin is a threat to the species. The sun bear is extremely rare in India, and is confined to the forests along the Myanmar border. Hunting, shifting cultivation and capture of young for trade, after killing the mother, are the threats across the species' range. The myrmecophagous sloth bear still has a vast habitat (250,000 sq. km), harbouring a minimum of 10,000 bears. Yet it is threatened by habitat degradation and fragmentation, poaching for gall bladder, and capture of young to be trained as performing bears.

Long-term conservation of the brown bear in the Himalaya is possible only with: (i) cessation of hostilities between India and Pakistan, leading to the formation of a Transfrontier Reserve protecting the bear habitat, (ii) a total ban on the capture of young for bear baiting with dogs, and (iii) ensuring that the protected areas are not unduly disturbed between May and October. Protection against poaching and capture of cubs is a must for the conservation of the black bear and the sloth bear. Weaning the people in the former range of the sun bear from shifting cultivation, and protection from poaching, may revive the habitat and population of the sun bear.

INTRODUCTION

India is unique in having four of the eight extant species of bear. They are the brown bear *Ursus arctos isabellinus*, the Asiatic black bear

U. thibetanus, the sun bear *Helarctos malayanus*, and the sloth bear *Melursus ursinus*. This uniqueness is due to India's geographic location at the junction of the Palaearctic and Indo-Malayan biogeographic zones, which enabled Palaearctic species (brown and black bear) and an Indo-Malayan species (sun bear) to range into the Indian subcontinent. The sloth bear probably

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radiated from the ancestral stock of brown bear during the mid-Pliocene (Kurten 1968), and evolved within the Indian subtropical region.

The brown bear in Asia is the same species as the North American grizzly, but the populations inhabiting the Himalaya and the northern mountain ranges of the Tien Shan and Altai have been ascribed to a separate subspecies. This is due to its smaller average size, generally whitish claws, and the guard hairs often being pale at the tip. The Asiatic black bear is considered the ecological equivalent of the American black bear (*Ursus americanus*) in terms of body form and habits (Roberts 1997, Schaller 1977). The sun bear is the smallest of the eight bear species, and the only one inhabiting lowland tropical rainforests throughout much of southeast Asia (Servheen 1999a).

BEAR HABITATS IN INDIA

Mainland India has been categorised into nine biogeographical zones (Rodgers and Panwar 1988), eight of which are important for bears. The vegetation descriptions given below are from Champion and Seth (1968).

The northernmost Palaearctic zone, the Trans-Himalaya, lies north of the main Himalayan range in Jammu and Kashmir, and within the dry inner Himalayan valleys of Himachal Pradesh. Vegetation here consists primarily of dry steppe and alpine scrub, dominated by xerophytic plants that reflect the extremely dry and cold climatic conditions. Typical throughout the region are the streamside *Salix*, *Populus* and *Hippophae* associations, and *Juniperus* and *Betula* woodlands on mountain slopes, primarily in Himachal Pradesh. The brown bear occasionally visits these areas.

The Himalayan Zone includes the mountains of southwest Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Sikkim, West Bengal and Arunachal Pradesh. It encompasses a complex topography, and a mixture of vegetation formations with distinctive altitudinal zonation.

Dominant forest types in the northwestern Himalaya include the chir pine (*Pinus roxburghii*) forests in the Siwalik hills; subtropical evergreen forests up to 1,000 m above msl, characterised by *Persea odoratissima*, *Olea glandulifera* and *Syzygium operculatum*; moist temperate oak (e.g. *Quercus incana*) and conifer (*P. roxburghii*) mixed formations; and mixed conifer and conifer-deciduous associations with *Abies*, *Cedrus*, *Taxus*, *Acer* and *Betula*. Between 2,900 and 3,500 m, dry temperate forests dominated by *Pinus wallichiana* replace the moist temperate vegetation. Beyond this, subalpine patches of *Betula* and *Juniperus* grade into shrublands of *Berberis*, *Lonicera* and *Rhododendron*, and finally scrub and herb up to c. 5,000 m.

The central and eastern section of the Himalayan zone is more strongly affected by the monsoon rains, and the vegetation is both denser and richer. The tropical semi-evergreen forests below 1,000 m above msl, are characterised by *Phoebe hainesiana*, *P. lanceolata*, *Terminalia myriocarpa*, *Bischofia javanica* and *Schima wallichii*. Above this, are broad-leaved forests up to 2,000 m, with various *Quercus* species. Sub-alpine forests, beginning at elevations >3000 m, are dominated by *Pinus*, *Betula*, *Rhododendron* and *Acer* species up to 4,500 m, where they give way to sparse scrub extending as high as 5,500 m on southern aspects. The higher altitudes (>3,000 m) of these habitats are used by brown bear in Sikkim and middle and lower altitudes (800-2,500 m) by black bear. Below 1,000 m, black bear and sloth bear habitats may overlap.

The North-East India Zone includes the Brahmaputra valley (*Shorea assamica*, *Cephalanthus cetrandra*, *Glochidion hirsutum* and *Phragmites karka*) and Assam hills (*Shorea assamica*, *Dipterocarpus macrocarpus*, *Amoora wallichii*, *Mesua ferrea* and *Dendrocalamus hamiltonii*). These areas include the habitat of the black bear, sloth bear and sun bear.

The semi-arid tracts of Gujarat (*Tectona grandis*, *Capparis decidua*, *Carissa carandas* and

Zizyphus nummularia), Upper and Lower Gangetic plain (*Shorea robusta*, *Syzygium cumini*, *Zizyphus mauritiana*, *Glycosmis pentaphylla*), Deccan peninsula (*Tectona grandis*, *Madhuca latifolia*, *Diospyros melanoxylon*, *Z. mauritiana* and *Cassia fistula*), and the Western Ghats (*Artocarpus heterophylla*, *Mangifera indica*, *Cullenia excelsa*, *Macaranga peltata*, *Hopea parviflora*, *Mesua ferrea*, *Ochlandra travancorica*, *Buchanania lanzan*, *Phoenix humilis*, *Z. mauritiana* and *Z. oenopia*) are used only by the sloth bear.

STATUS OF BEAR SPECIES IN THE INDIAN SUBCONTINENT

Brown bear

The southern limit of the brown bear in Asia is the Himalaya, where it is largely confined to

rolling uplands and alpine meadows above the timberline, thus ecologically separated from the forest-dwelling black bear (Schaller 1977; Fig. 1). The brown bear was once abundant in the Himalaya, with Kinloch (1892) having seen 28 in one day. The brown bear has become rare in Pakistan, and summarising the survey results of Choudhry and Farooq (1995), T.J. Roberts (pers. comm.) estimates about 40-50 brown bears in Pakistan. Although Gee (1967b) reported the shooting of a brown bear in Bhutan, there is no report of brown bear in Bhutan in recent years. Brown bear occurs in Upper Mustang in Nepal (Anon. 1994a).

Sathyakumar (1999) gives an excellent review of the occurrence of brown bear in India where the populations are largely confined to the western and northwestern Himalayan ranges in

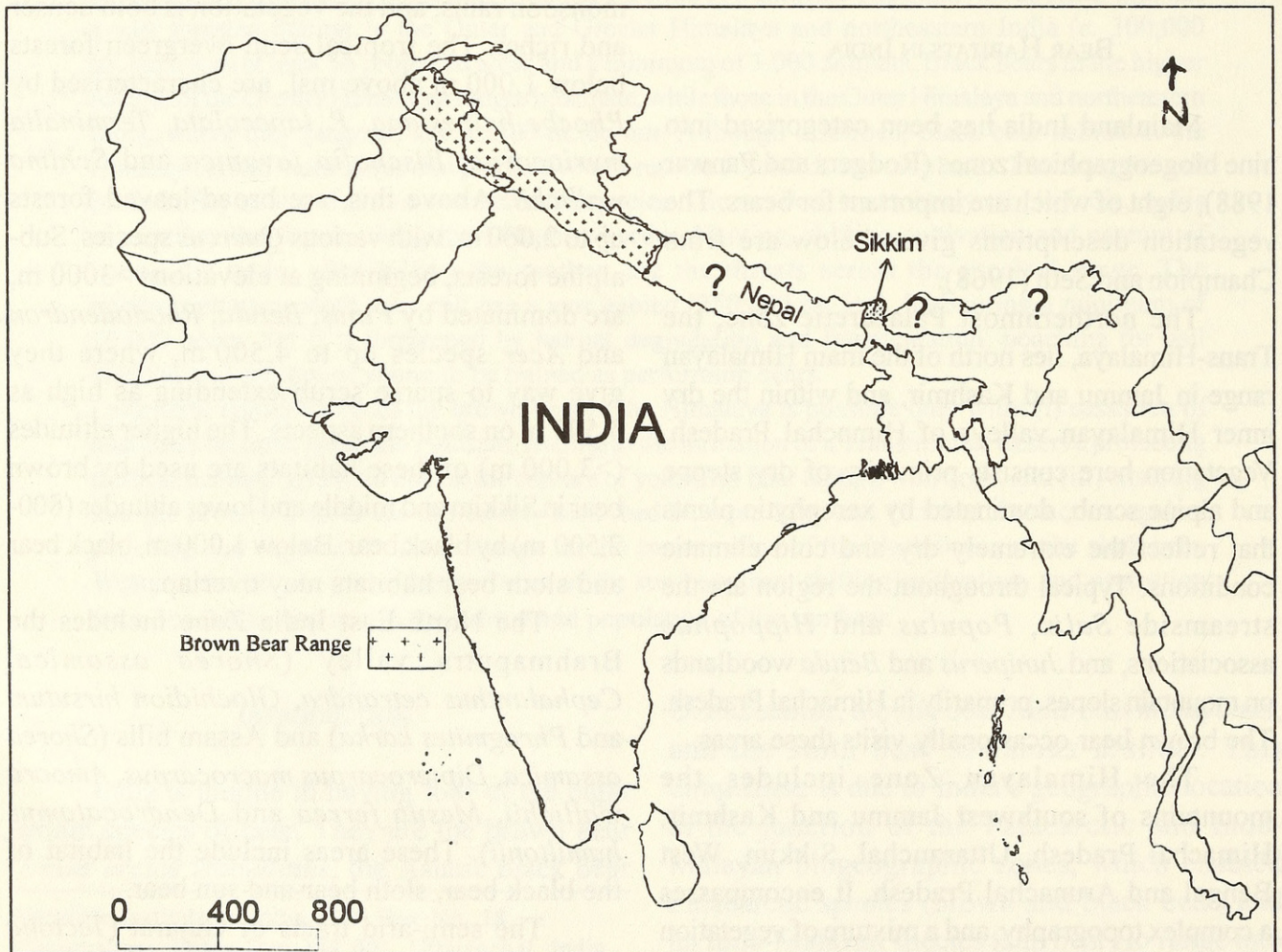


Fig. 1: Brown bear range in the Himalaya (After Roberts 1997, Sathyakumar 1999)

the states of Jammu and Kashmir, Himachal Pradesh and Uttaranchal (Fig. 1). A small population, possibly continuous with the population in Tibet, occurs in Sikkim. The subspecies in Tibet has been identified as *Ursinus arctos pruinosus* (Schaller 1977, Mallon 1985), which may range into Sikkim and Nepal. Brown bears may range into the alpine regions of the Eastern Himalaya (Arunachal Pradesh), but no confirmed reports are available. There are possibly around 300 brown bears in India.

Black bear

In Asia, the distribution range of black bear from west to east, once extended through Iran, Afghanistan, north and northwestern Pakistan, the higher altitudes of Nepal, Bhutan and the Indian Himalaya, forested tracts of Myanmar, Thailand, Indo-China, southern and northeastern China, Taiwan, Far-eastern Russia and Japan (Roberts 1997, Schaller 1977, Servheen 1999a;

Fig. 2). The habitat available to the black bear in the Outer and Greater Himalaya and northeast India could be about 300,000 sq. km. Although disturbed, the black bear habitat in the Himalaya is still relatively continuous and productive, as a result of orchards and croplands. In India, black bears have been reported to occur in 56 protected areas covering 18,340 sq. km in the states of Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Sikkim, West Bengal, Arunachal Pradesh, Meghalaya, Mizoram and Tripura. Protected areas with black bears range in size from 1 sq. km to 2,237 sq. km (an average of 330 sq. km). However, information about black bear status is scanty in most areas, and there have been no reports from Manipur and Nagaland (Sathyakumar 1999). Choudhury (1997) reports that black bears are found in the hills of northeast India, with a few records from the plains. However, during a four-month study on elephant-human conflict in Garo hills in Meghalaya in 1995, Christy Williams (pers.

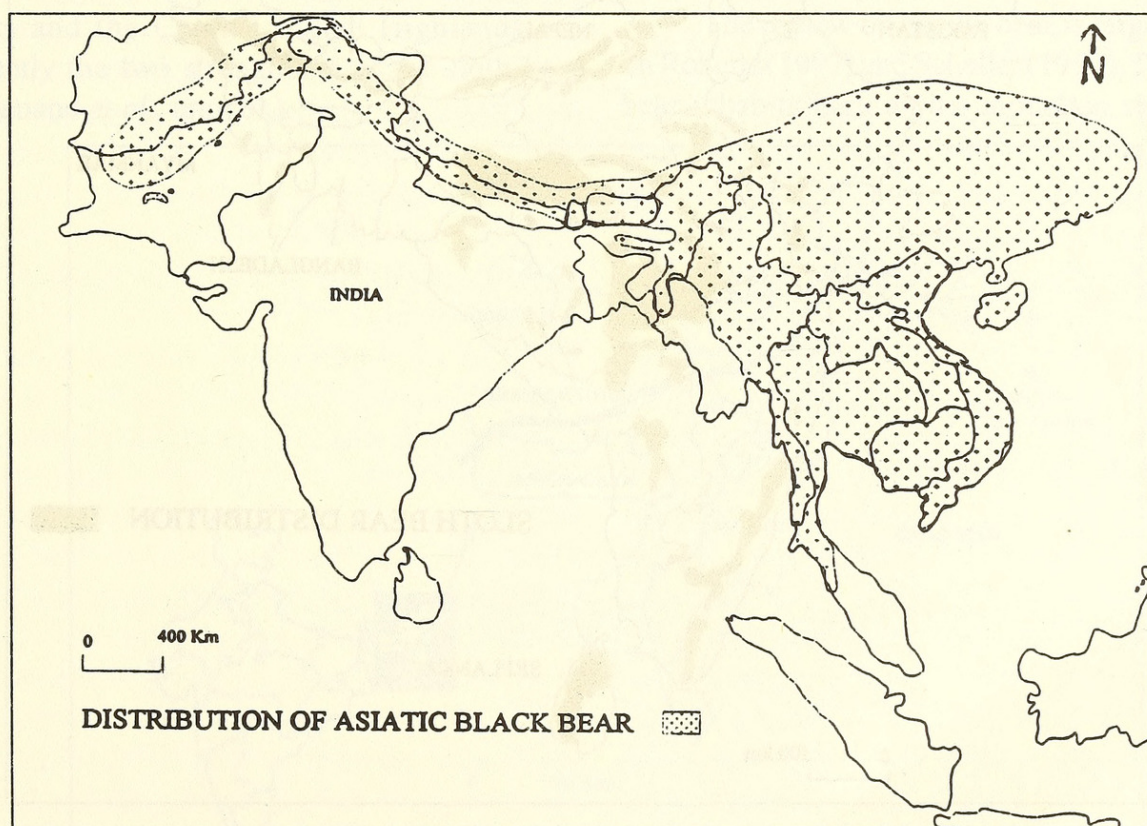


Fig. 2: Distribution of Asiatic black bear in the southern part of its range (After Servheen *et al.* 1999b)

comm.) did not find any evidence of black bear. Similarly, T.R. Shankar Raman (pers. comm.) did not find any evidence of black bear during his 120 days of fieldwork in Dampa Tiger Reserve in Mizoram in 1994-1995. There are probably at least 3,000 black bears in India.

Sloth bear

The sloth bear is restricted to the Indian subcontinent: India, Sri Lanka, Nepal and Bangladesh. In all these countries, sloth bear distribution has shrunk and become patchy over the decades (Fig. 3). In Sri Lanka, a population of about 400 is found largely in the northern and eastern lowlands (Santiapillai and Santiapillai

1990). In Nepal, sloth bears are largely confined to the lowland *terai* protected areas such as Chitwan–Parsa and Bardia. Chitwan has the highest density, and density in Bardia is reported to be lower, as it does not have extensive alluvial grasslands like Chitwan. East of Chitwan, the range extends just short of Kosi Tappu Wildlife Reserve. No evidence of sloth bear was seen in Royal Suklaphanta Wildlife Reserve in 1993-94 and sloth bear numbers in Nepal are probably less than 500 (Garshelis *et al.* 1999). Once sloth bear occurred in Suklaphanta (Spillet and Tamang 1967); Cliff Rice (*pers. comm.*) took a picture of a bear feeding in a burnt *terai* grassland in December 1976. It is difficult to understand why the sloth bear has

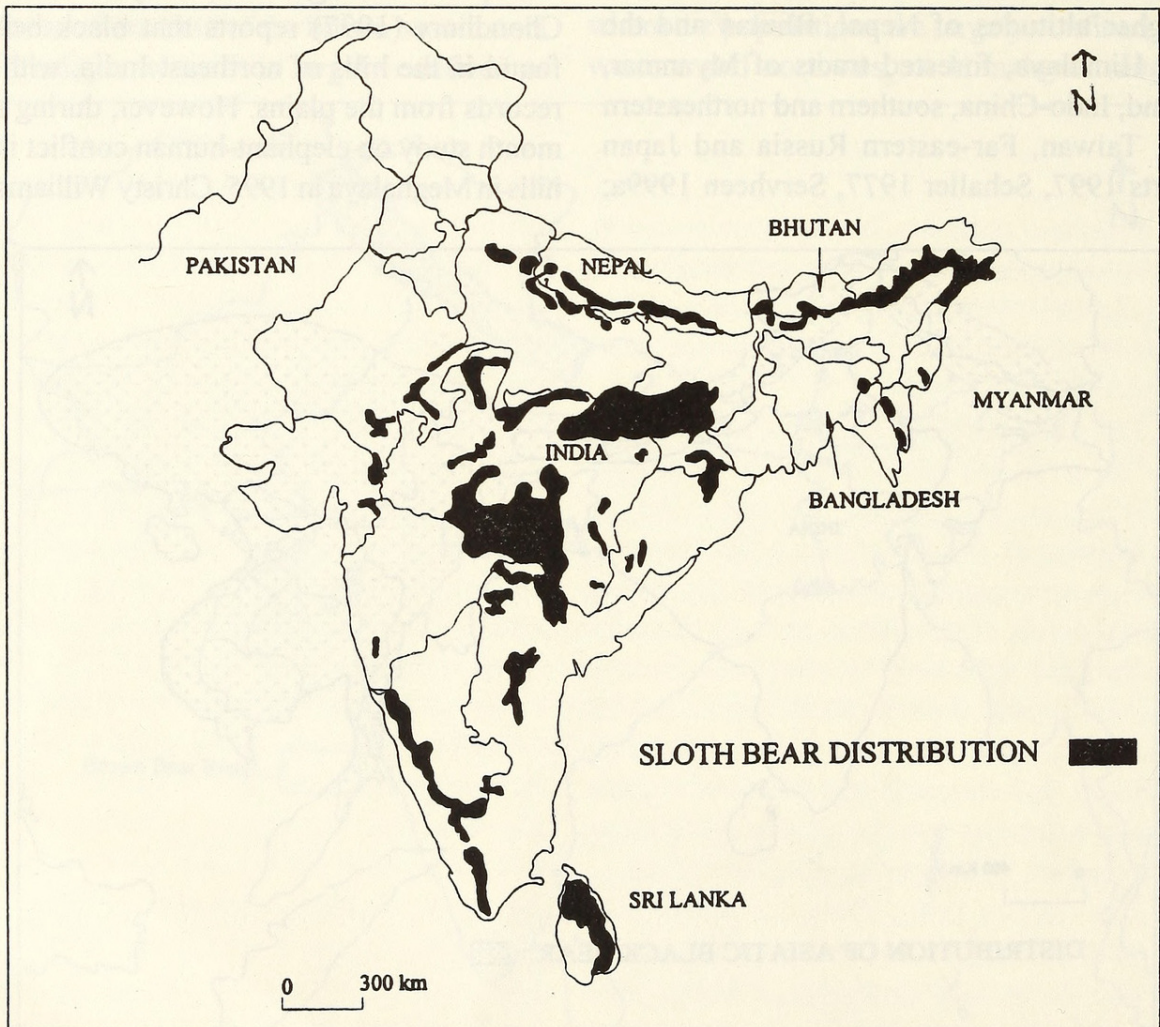


Fig. 3: Sloth bear distribution in the Indian subcontinent
(After Yoganand, K., C.G. Rice and A.J.T. Johnsingh)

become extinct in Suklaphanta, which has extensive alluvial grasslands supporting the best population (c. 2,000 of the total 5,000) of swamp deer *Cervus duvaucelii duvaucelii* (Gopal 1995). A recent report by the WWF-Nepal Program (2002), however, indicates that "there may be only a few individuals in and around the Reserve." Sloth bears may still occur in the remnant, Mixed Evergreen Forests of Bangladesh. One sighting of a sloth bear with a cub in Dampa Tiger Reserve in December 1994 (T.R. Shankar Raman, pers. comm.), and evidence in Balpakram National Park (Christy Williams, pers. comm.) have been reported.

In India, a population of about 10,000 sloth bears still occurs, widely distributed over a habitat of 250,000 sq. km, although the habitat is discontinuous and highly disturbed in most places. The sloth bear ranges throughout peninsular India, up north to the foothills of the Himalaya, inhabiting most low altitude, non-arid areas where forest cover still remains. The forests of Western Ghats and the Central Indian Highlands are currently the two strongholds of the sloth bear (Yoganand *et al.*, unpubl.).

Sun bear

Servheen (1999b) summarises the historic range and current distribution of the sun bear. Of interest are the historic records of sun bears in places like eastern Tibet and Sichuan, China (Lydekker 1906), Manipur and Assam (Higgins 1932) and the upper Chindwin district in present day Myanmar (Wroughton 1916), places where the species is now extinct. The sun bear is now found in Southeast Asia from Myanmar eastward through Thailand, Indo-China and Malaysia. It is also found on the islands of Sumatra and Borneo. Although Ullas Karanth (pers. comm.) has obtained a camera trap photograph of the species, in Nandapha Tiger Reserve in Arunachal Pradesh (Fig. 4), in the late 1990s, its occurrence in India is very rare, and probably confined to the forests along the India-Myanmar border.

BEHAVIOURAL ECOLOGY OF BEARS RELEVANT FOR CONSERVATION

The review on brown bear is largely based on Roberts (1997) and Schaller (1977). The brown bear inhabits high alpine mountain slopes and

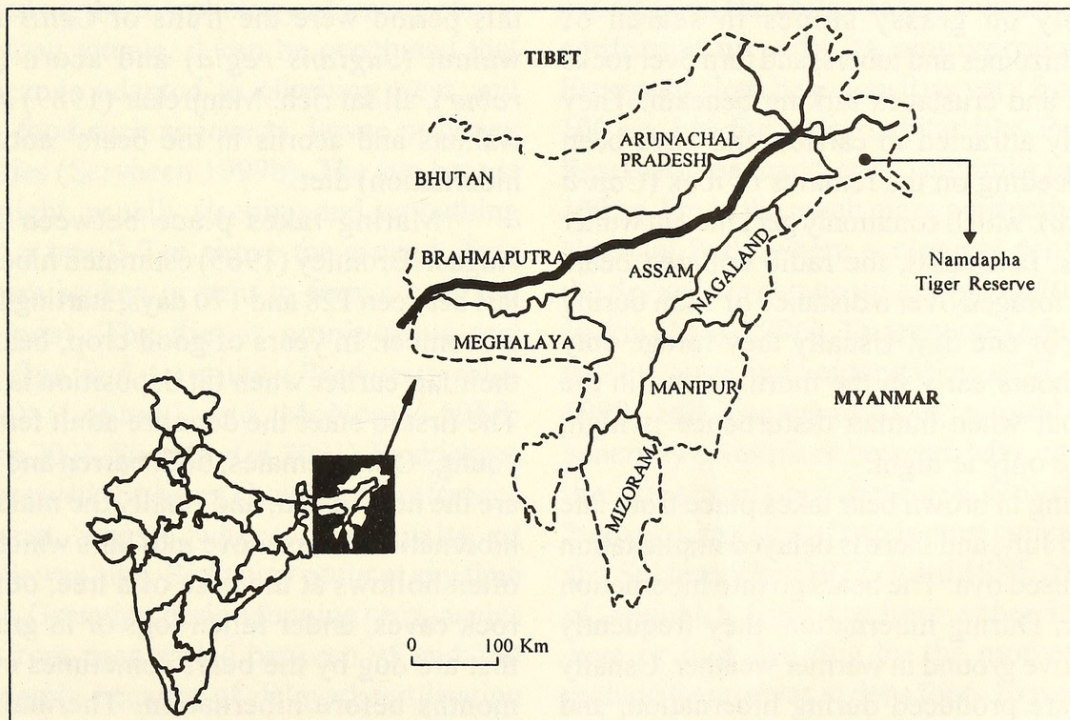


Fig. 4: Range (south of Brahmaputra) of sun bear in India

valleys above the tree line, from about 3,000 m to 5,000 m. It generally avoids coniferous forests, although it will descend to cultivated valleys in late summer to raid crops and trees in fruit. It is shy and fearful of man, avoiding upland valleys occupied by nomadic herders. It has rather poor eyesight and hearing, but an extremely acute sense of smell. It locates by smell and even digs out high altitude *Alticola* (voles) from their burrows. The brown bear is skilled in catching fish, and alpine torrents on the Deosai in Pakistan that have snow trout (*Dipticus maculatus*) are favourite hunting grounds for the bears. However, analysis of bear scats and three years of research in the Deosai have shown that 90% of their diet is made up of vegetable matter, comprising various sedges, grasses and especially starchy rhizomes and bulbs of *Carex* (sedges), *Juncus* (rushes) and *Eremurus* (foxtail lilies). Only 2 of 70 faecal samples collected contained rodent or fish bones (Anon. 1994b). Occasionally, an individual learns to kill domestic stock, and such animals become notorious, killing up to 30 sheep and goats in one night if they get into a penned enclosure (Kruuk 1972). In early summer, brown bears dig assiduously on grassy slopes in search of succulent rhizomes and tubers, and turn over rocks for insects and crustacea lurking beneath. They are strongly attracted to carrion and have been observed feeding on the remains of ibex (*Capra ibex sibirica*), which commonly get killed in winter avalanches. In Deosai, the radio collared bears frequently foraged over a distance of 5 km during the course of one day. Usually they forage only for a few hours early in the morning and in the evening, but when human disturbance is high, they forage only at night.

Mating in brown bear takes place from late June to end July, and there is delayed implantation of the fertilised ova. The bears go into hibernation in October. During hibernation, they frequently emerge above ground in warmer weather. Usually two cubs are produced during hibernation, and they remain dependent on their mother for at least

two years, often accompanying her for up to three years. Females generally start breeding at the age of five and thereafter breed once in three years. Adult males, which can be cannibalistic, are avoided by a female with cubs.

Although the Asiatic black bear is an omnivore, a major part of its diet is made up of fruits, which often need to be collected from trees. As an adaptation for climbing, it has long claws on all paws. Other food items include leaf material, insects and other animal matter in smaller proportions. In areas where the bears hibernate, their active period is limited to about six to eight months. During the active period, feeding forms the major activity. The study of feeding of black bears in Dachigam National Park in Kashmir, from early May to early October, by Manjrekar (1989), showed that fleshy fruits (soft mast) like mulberry (*Morus alba*), cherry (*Prunus avium*), peach (*P. persica*) and raspberry (*Rubus niveus*), rich in sugar and carbohydrates, contributed significantly to the diet in summer. Schaller (1969) studied the feeding of black bears in Dachigam for a short period before their hibernation, from October 6 to 21. The three major food items during this period were the fruits of *Celtis australis*, walnut (*Juglans regia*) and acorn (*Quercus robur*), all fat rich. Manjrekar (1989) also found walnuts and acorns in the bears' autumn (pre-hibernation) diet.

Mating takes place between June and August. Bromley (1965) estimated hibernation to last between 128 and 170 days, starting from early November. In years of good crop, bears go into their lair earlier when fat deposition is adequate. The first to enter the dens are adult females with young. Other females, both barren and pregnant, are the next to den, and finally the males. During hibernation, bears move into lairs which are most often hollows at the base of a tree, otherwise in rock caves, under fallen logs or in ground dens that are dug by the bears sometimes even a few months before hibernation. Thermal stability, snow accumulation and lack of human

disturbance are the factors that determine the selection of den sites (Hazumi and Maruyama 1983, 1986, Reid *et al.* 1991). There is evidence that the black bear does not always undergo either prolonged or deep hibernation, as it will occasionally emerge to forage even during the winter months (Roberts 1997). The emaciated males are the first to emerge, followed by the barren females and finally the females with cubs. Bears in the foothills of the Himalaya, northeast India, Myanmar, Thailand and Indo-China do not hibernate.

Usually two cubs are born between mid-January and mid-February, after a gestation of over six months (Bromley 1965, Nowak 1999). The cubs are weaned at two to two and a half years, and they become sexually mature at three or four years of age. Like all bears, the Asiatic black bear is usually solitary, and groups of three or more do not occur often, except as mother-cub associations, and as feeding associations especially during periods of clumped food resource availability. The tiger, leopard and wolf are the potential predators of black bear cubs in different parts of their range (Bromley 1965).

Based on the morphology of strong claws, jaws and long tongue, it can be concluded that the sun bear is adapted to climbing trees and extracting food such as insects, larvae or honey from cavities (Servheen 1999b). The sun bear is active at night, usually sleeping and sunbathing by day on a tree 2-7 m above the ground. Tree branches are broken or bent to form a nest and look-out post. The diet is omnivorous and includes figs and termites (*Prohamitermes mirabilis*) (Lekagul and McNeely 1988, Fredrickson 2001, Siew Te *et al.* 2001). Fredrickson (2001) observed the bears showing a preference for unburnt forests where the density of *P. mirabilis* was high. Birth may occur at any time of the year. Gestation period for nine pregnancies recorded from zoos varied between 95 and 240 days, evidently because of delayed fertilisation (Nowak 1999).

The sloth bear exhibits several adaptations to its subtropical and tropical habitat and diet. To suit the tropics, it has no underfur; however, it has a long coat that perhaps helps in defending it from insect bites and also perhaps to exaggerate its size to dissuade predators such as leopards (*Panthera pardus*) and dholes (*Cuon alpinus*) (Yoganand *et al.*, unpubl.). The monsoonal climate of the Indian subcontinent, and the resultant seasonality of resource availability, may have acted as selective pressures on the ancestor of the sloth bear to evolve to its present form, as suggested by Laurie and Seidensticker (1977). They also suggested that the sloth bear's morphological adaptations (like large powerful claws) and behavioural adaptations (like the capability to suck out insects), that were mostly driven by food hunting, are evolved for hard times when food is limited. Abundant fruit is limited to a few months, and there is also annual variability in production of fruits. The sloth bear has to subsist on other stable food resources like termites and ants that are more or less available year round. Although the sloth bear has diverged towards a diet composed largely of insects, it has retained the ability to use a variety of food in conformation with its omnivorous ancestry. Estimated sloth bear densities vary from 6 bears/100 sq. km for a dry habitat like Panna Tiger Reserve (Yoganand *et al.*, unpubl.) to 21 bears/100 sq. km in the much more productive Chitwan National Park, where ecological density during the dry season can go up as high as 70 bears/100 sq. km (Joshi 1996). The reported adult sex ratio is 1:1 (Laurie and Seidensticker 1977, Joshi *et al.* 1999, and Yoganand *et al.* unpubl.). Mating generally takes place between May and July, and the cubs are born between November and January. Litter size of two is most common (Laurie and Seidensticker 1977, Joshi 1996, Yoganand *et al.* unpubl.). Cubs are born either in a natural cave or in a den dug by the mother. Females seclude themselves in dens for 6-10 weeks, hardly coming out to forage, living on fat reserves and

metabolic water during that period (Joshi 1996, Yoganand *et al.* unpubl.).

Cubs are frequently carried on their mother's back, until they are about six months of age (Laurie and Seidensticker 1977, Joshi 1996, Yoganand *et al.* unpubl.). This is the cubs' main defence against attacks by predators or other bears. Cubs stay with their mothers for one and a half or two and a half years, becoming independent just before the breeding season (Joshi 1996, Joshi *et al.* 1999). Thus, females breed at either two- or three-year intervals. The mother-young unit is the only permanent social grouping exhibited by the sloth bear (Eisenberg and Lockhart 1972, Joshi *et al.* 1999, Yoganand *et al.* unpubl.). They may also gather at places with abundant food, such as a dense patch of fruiting plants (Joshi 1996, Yoganand *et al.* unpubl.). Tigers attack, kill and feed on sloth bears occasionally (Joshi *et al.* 1999, Yoganand *et al.* unpubl.). Leopards, dholes and even jackals may harass the bears. The anti-predator strategy of the sloth bear is either to run away or respond with a spectacular charge and stand-up display. Its aggressive behaviour may be a consequence of not being able to rely on trees for escape, in a habitat that has predators capable of climbing trees, making it advantageous to live in fairly open habitat (K. Yoganand, pers. comm.). Sloth bears probably consider humans as predators. At close quarters they react to human presence as they would to a predator (Laurie and Seidensticker 1977, Yoganand, pers. comm.). They roar and run away, or roar and attack humans, before retreating. Bear attacks on humans are common throughout the range where bears and humans co-occur (Garshelis *et al.* 1999, Rajpurohit and Krausman 2000, Yoganand *et al.* unpubl.).

Conservation: problems and prospects

The survival of bear species in India is determined by their abundance, which in turn is determined by habitat type, location of the Indian range in the global distributional range of the

species, quantum of habitat available, species' biology, and the anthropogenic pressures they face. Populations at the extreme or periphery ('edge') of the range of the species are usually sparse (Hengeveld and Haeck 1982) and have a greater chance of going extinct (Beddington *et al.* 1976, Lawton 1995). The sun bear occupies the western end of its range in India. Even in the past, it had a limited range in northeast India, confined to the hills south of the River Brahmaputra (Gee 1967a). The population was also possibly very small, since only 15 of the 1,389 bears killed in Assam between 1910 and 1917 by bounty hunters, were Malayan sun bears (Higgins 1932). Hunting, shifting cultivation or *jhuming*, and capture of young for trade by killing the mother, are the threats across the species' range. A forest subjected to *jhuming* gets re-colonised by primates including gibbon, if it is left fallow for a minimum period of 10 years, especially if it has connectivity with primary forests with a source population (Gupta and Kumar 1994). But so far no study has attempted to find out at what age a previously *jhumed* forest will become suitable for the arboreal sun bear. *Jhumed* forests with a 25 year fallow period have frugivorous and omnivorous bird species similar to forests left fallow for 100 years (Raman *et al.* 1998).

As the brown bear in India occurs in the southeastern end of the species' distributional range, it is also limited by the 'edge effect' described in the previous paragraph. The major decimating factors faced by brown bear are hunting [in the past, e.g., Kinloch (1892) killed 7 of the 28 bears he saw], and capture of cubs by local tribes like the Qalanders in Pakistan to train them for the cruel practice of bear baiting with dogs. A survey by Choudhry and Farooq (1995) found that Qalanders held no less than 215 brown bears in captivity, all trained for bear baiting with dogs. T.J. Roberts (pers. comm.) reports that between 35 and 80 brown bear cubs were sold each year to the Qalanders, and in the process of securing cubs, often twins, the mother is killed

and frequently the weaker of the cubs also dies before reaching adulthood. It is possible that cubs from India may also be smuggled out for this nefarious entertainment on which a ban has been imposed by the Pakistan Government, supported by WWF-International. But the practice reportedly continues clandestinely, sustained by a few rich landowners. Continued border skirmishes between India and Pakistan would also affect the population occupying the border areas. In addition, the habitat of the brown bear is disturbed by grazing and medicinal plant collection.

The major problem faced by the black bear, which in India occupies a large portion of the southwestern part of the species' range, is poaching for its gall bladder, fat, meat and skin. While the first two are believed to be of medicinal value, the last is for trophy or ornamental purposes. Some black bear cubs may also be smuggled to Pakistan from India, as the survey by Choudhry and Farooq (1995) recorded about 300 black bears with Qalanders.

When compared with other range countries, the status of the sloth bear is relatively good in India, with India covering most of the species' range. Nevertheless, the sloth bear is threatened by habitat degradation and fragmentation in the dry tracts of its range, in the states of Bihar, Jharkhand, Chhattisgarh, Madhya Pradesh, Rajasthan, Gujarat, Maharashtra and Andhra Pradesh; also by poaching for gall bladder, bear-human conflicts, and stealing of cubs, by killing the mother, to be trained as performing bears (Yoganand *et al.* unpubl.).

Conservation of the brown bear would require the combined efforts of the Governments of India and Pakistan, by cessation of hostilities

and creation of a Transfrontier Reserve covering the wildlife habitats across the Line of Control. In addition, all the protected areas in the range of the brown bear should be freed of disturbances from May to October, the crucial period for them to recover from the loss of physical condition due to denning, and to put on sufficient fat reserves for the next hibernation. Illegal trade in bear cubs should be stopped.

To help the sun bear re-occupy its former range in India, a strict control over poaching, and a long fallow period (> 25 years) for *jhumed* forests will be needed. Landscape planning in the bear range should include a mosaic of primary forests, > 25 year old *jhumed* forests, and corridors of *jhumed* forests of other age classes. Conservation of black bear and sloth bear would require stringent measures to control poaching and illegal trade in bear parts.

Given the magnitude of enormous biotic pressures and the low level of motivation of the officers and the staff assigned to the job of controlling poaching, the long-term future of brown bear and sun bear in India looks bleak. However, things have to change for the better, addressing all the conservation problems listed above, if the bear species, their habitats and other fascinating species inhabiting their habitat, are to be ensured a future in a populous country like India.

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