

Understanding Asian Bears to Secure Their Future

Compiled by Japan Bear Network



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Nikko-WWFJ
Green Investors Fund



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Introduction

Koji Yamazaki

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Asia, where 6 of the 8 living bear species including the Asiatic black bear, brown bear, sun bear, sloth bear, panda and polar bear occur, has the potential to be a very important area in terms of bear conservation in the world. Unfortunately, however, there is limited information available regarding the status and biology of those Asian bears.

The IUCN bear status report published in 1999 included a comprehensive summary on the status of each bear species in the world, and therefore was a highly meaningful work. However, the descriptions on Asian bears in that IUCN report were partially insufficient. Furthermore, after the IUCN report was published, there have been many additional scientific reports published and therefore updated information has been available concerning bears in both Europe and North America, but in contrast, such additional information from Asian areas have been sparse.

Asian bear biologists, of course, have not taken the above situation lightly, and have been ashamed that more significant improvements have not occurred, despite the challenges faced such as social instability and budget shortages in several Asian countries. We, however, realize that there is a need to break through the wall of adversity faced in order to secure the future of bears in Asia. Thus, this Asian bear country report has tried to summarize the status and conservation of bears in each country and has been compiled by Asian biologists who want to improve upon the current situation. Just in October 2006, the first IBA conference in Asia, the 17th International Conference on Bear Research and Management, will be held in Japan. We hope that the conference is not just a transient event, and therefore the making of this report are part of the strategy used for future bear conservation.

When we began editorial work on this report, we decided to incorporate cultural descriptions of bears as well as the scientific descriptions. We chose to do so because there should be special mention of the history between human and bear relationships in Asia, which seems to be different from that found in Western countries. As for choosing the authors for each country, we asked basically young nationals or persons who made Asia their permanent place of residence in order to support the development of talented local researchers.

In this report, we could only include 17(16) Asian countries due to both the shortage of bear biologists and lack of accumulated information in Asia. For example, the editorial board tried to find adequate authors using every connection they had in Pakistan and eastward where bears occurred, but the selection procedure faced rougher going than we had anticipated and the selections sometimes had to be changed again and again. The reasons were occasionally political in nature, but the most considerable obstacle in Asia could be a limitation of professional biologists who are able to obtain their livelihood through their research work, and thus able to fully concentrate on bear research.

The authors have tried to add new information on bears that has been obtained since the publication of the last IUCN report, but the included information was not always the latest. Asian countries are widely varied with regard to spoken languages. The report, however, had to be written by our foreign language, in English, and therefore we are afraid that we have not been able to convey accurately all the delicate shades of meaning we intended. For these faults, we submit to your criticism. However, as we mentioned above, we are appreciative of your understanding that this report is our first challenge and thus it is our first step. We strongly believe that the insufficiencies seen this year will be improved upon in the coming years as the Asian bear network develops.

We did not mention much information on the range of Asian bears in this report, because a range map is currently being developed by the Bear Specialist Group of the IUCN, and thus we expect that information to follow in a separate publication.

This report appears in print in English, but the report is also distributed through our website in digitized form (e.g. PDF file format) both in English and in each native language. This is because one important aim of publishing the report is not only to share scientific information on Asian bears with people working on bears such as biologists, but we also want it to be shared widely with the public of each country as one of the strategies used in making an advance toward adequate bear management in Asia.

This report is one of the commemorate publications of the Japan Bear Network (JBN) that was established

in 1996 as a nonprofit organization composed of people concerned with the Japanese bear. The editorial board began functioning in December 2003, and all of the editorial works have been done by their voluntary labor.

We would like to thank all of the people who have kindly assisted us with the editorial procedure, and also

thank the Japan Fund for the Global Environment and the Nikko-WWFJ Green Investors Fund for the grants that made this publication possible.

Finally, we would like to make note that all of the manuscripts were peer-reviewed by a cooperation of bear biologists from all over the world.



Photo by Koji Yamazaki

A cub of Japanese black bear in Ashio Mts.

General Biology of Species in This Report

Malayan sun bear (sun bear, honey bear)

IUCN category: Data Deficient, CITES listing: Appendix I

The Malayan sun bear (*Ursus malayanus*, *Helarctos malayanus*) inhabits forests of Southeast Asia in northeastern India, Myanmar, Bangladesh, southwestern China, Thailand, Laos, Cambodia, Vietnam, Malaysia, Brunei, and Indonesia. Two subspecies have been proposed based on morphological and craniometric differentiation: Bornean sun bear (*H. m. eurypilus*) are smaller than all other sun bears (*H. m. malayanus*) from Sumatra and mainland Asia (Horsfield 1825; Meijaard 2004).

The Malayan sun bear is the smallest of the eight living bear species, with extremely long curved claws, inward curved front legs, proportionally large feet strong jaw muscles and disproportionately large canines, and the longest tongue of all bears.

Tropical evergreen rainforests are the sun bear's main habitat. These rainforests cover a variety of habitat types, varying from lowland dipterocarp forests, peat swamp forests, freshwater swamp, forests on limestone/karst hills, hill forests, lower montane forest, dry deciduous forests, and other forest types on mainland Southeast Asia.

Sun bears are omnivores, and primarily feed on termites, ants, beetle larvae, bee larvae and honey, and a large variety of fruits when available (Wong et al. 2002; Fredriksson et al. in press). Little is known about the behavior or social structure of wild sun bears. Sun bears do not seem to have a defined breeding season and usually one cub is born (Schwarzenberger et al. 2004)

(Gabiella M. Fredriksson)

Asiatic black bear (Asian black bear, Himalayan black bear, moon bear)

IUCN category: Vulnerable, Critically Endangered (Iran, Pakistan), CITES listing: Appendix I

Asiatic black bears (*Ursus thibetanus*) are medium-sized bears, with adult males weighing 50-200 kg and adult females 40-125 kg. They are distributed widely in Asia, from Japan in the east to Iran in the west. Asiatic black bears are currently reported to inhabit Iran, Afghanistan, Pakistan, India, Nepal, Bhutan, China, Russia, Bangladesh, Myanmar, Thailand, Laos, Cambo-

dia, Vietnam, North and South Korea, Taiwan, and Japan. Seven subspecies have been recognized: *U. t. japonicus* (Japan), *U. t. formosanus* (Taiwan), *U. t. ussuricus* (South East Russia, North and South Korea, and North Eastern China), *U. t. gedrosianus* (Iran and Pakistan), *U. t. laniger* (Western Himalayas), *U. t. mupinensis* (South Western China) and *U. t. thibetanus* (other regions) (Pocock 1932; Wozencraft 2005).

Asiatic black bears feed mainly on plant parts; however they also feed on insects, beehives, mollusks and other mammals when opportunity allows. Their food habits change seasonally and geographically. In the warm temperate zone, they generally feed on leaves, herbaceous vegetation and bamboo shoots (in spring and early summer), and on berries, arboreal fruits and arboreal mast crops (in autumn).

Asiatic black bears can breed at age 4 or 5. The mating season varies geographically, from as early May to as late as August. In northern part of their distribution, mating is reported to take place in June and July. Cubs are usually born in January or February. Litter sizes are most often two. Hibernation can be relatively long in the cold north, which may last from October to April. In warmer southern areas, black bears can be active year-round (Nowak 1991).

(Toru Oi, Sayaka Shimoinaba, Gong Jien)

Brown bear (grizzly bear)

IUCN category: "Lower Risk", CITES listing: "Appendix II, Appendix I (Populations of Bhutan, China, Mexico and Mongolia, Ursus arctos isabellinus)"

Brown bears (*Ursus arctos*) are second only to polar bears (*Ursus maritimus*) in size among the 8 bear species. Adult males weigh from 130 to 400kg, and adult females from 80 to 230kg (McLellan 1994; <http://www.bearbiology.com/brwnbear.htm>). This variation is owing largely to nutritional status (which in turn depends largely on foods available). They have the widest geographic distribution of any bear species, including Europe, the Middle East, much of Asia, and western North America. In Asia, brown bears are distributed in Turkey, Iran, Afghanistan, Pakistan, India, Bangladesh, Nepal, Bhutan, northeastern and western China, Mongolia, Russia, and Japan's Hokkaido Island. Their habitat also widely varies considerably, and includes desert, steppe, forest, and tundra.

Brown bears are omnivorous, eating a variety of

foods. Their diet varies regionally. However, their main food is vegetative materials such as fruits, herbs, and tubers. They also feed on insect, fish, and small and large mammals.

The mating season is from May to July, and 2-4 cubs are born in January or February during the hibernation period. Females usually become reproductively active at 4-5 years of age, and reproductive senescence has been estimated to occur at 28-29 years of age (Schwartz et al. 2003).

(Tsutomu Mano)

Sloth bear

IUCN category: Vulnerable, CITES Listing: Appendix I

Sloth bears (*Melursus ursinus*) are confined to the Indian subcontinent, distributed in India, Sri Lanka, Nepal, Bhutan, and Bangladesh (Garshelis et al. 1999). Two subspecies *M. u. ursinus* and *M. u. inornatus* are recognized, the latter subspecies being endemic to Sri Lanka.

Sloth bears have a dull black, shaggy coat with a white 'U' shaped chest blaze, and a whitish muzzle. They possess special adaptations for foraging on termites, including protrusible lips, a broad palate, and a missing pair of middle upper incisors. Body lengths of adult bears vary from 140 to 190 cm. Tail lengths vary from 10 to 12.5 cm. (Prater 1980; Ward and Kynaston 1995). Male bears usually weigh 80 to 145 kg, and females weigh 55 to 95 kg.

Sloth bears use a variety of habitats including forests, grasslands, and scrub (Joshi et al. 1995; Akhtar et al. 2004) generally at elevations below 1,000 m (Garshelis et al. 1999; Johnsingh 2003). Despite their specializations for termite-foraging, fruit is an important part of their diet (Gokula et al. 1995; Joshi et al. 1997). Mating occurs mainly during May-July, and cubs are born 6-7 months later during November-January (Joshi et al. 1999; Chauhan et al. 2003). Litter size is usually one or two. Females typically carry offspring on their backs for several months, and cubs may remain with their mother for 2 years or slightly longer (Garshelis et al. 1999).

(Netrapal Singh Chauhan, Shyamala Ratnayeke)

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Chapter 1

The Status and Conservation of Bears in Pakistan

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Canadian Circumpolar Institute, University of Alberta

The Asiatic black bear (*Ursus thibetanus*) and the brown bear (*Ursus arctos*) occur in Pakistan. Roberts (1977, 1997) and Servheen (1989) published detailed information on various aspects of the biology, ecology, status and distribution of bear species from Pakistan. However, this information is limited in scope for conservation in the recent years, and it was not until the early 1990s that focused research began on bears in Pakistan. This report updates information on the status and conservation of wild bears in Pakistan and proposes various tactics to secure them in the wild.

Biology

Asiatic black bear

The Asiatic black bear was once found throughout the dry mountain steppe forests to the west of the Indus River and across the mountainous regions in the northern part of the country. Since the 1930s, human activities have caused fragmentation, resulting in isolation of small bear populations in various mountainous areas throughout the country. At present, the Asiatic black bear exist in two separate populations considered different sub-species, i.e. the Balochistan black bear (*U.t. gedrosianus*) and the Himalayan black bear (*U.t. thibetanus*).

The primary habitat of the Balochistan black bear is rugged, arid mountains with sparse shrub vegetation. This bear population is mostly confined to arid-subtropical thorn forests in southern Balochistan typically associated with the dwarf Mazri Palm. It has comparatively short, coarse fur and quite often appears as a more reddish-brown color than the Himalayan sub-species. Its population in northern Balochistan is very small and exact trends are unknown. Its arid and treeless habitat (at 610-1,829 m elevation), is unusual for the species (Fig.1.1). It feeds on insects, lizards, fruits of the Russian olive *Elaeagnus hortensis* and the starchy rhizomatous stems and fruit of the dwarf palm *Nannorrhops ritchieana* (Roberts 1977).

The Himalayan black bear of northern Pakistan has black body fur reaching a length of 50 mm. There is a ruff of extra-long, coarse hair fringing the cheeks and

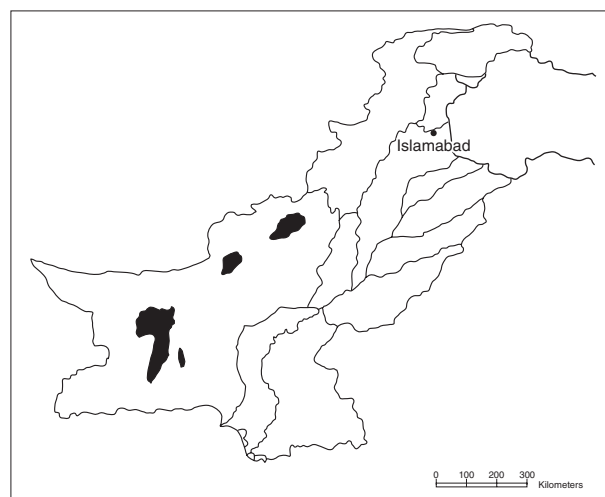


Fig.1.1: Distribution of Balochistan black bears in Pakistan.

running down each side of the neck. The body is jet black except for the muzzle which is reddish brown. The head and body length of an adult male with the tail is 80 cm (Roberts 1997). It generally prefers forested hills and mountains and tropical moist forest below alpine elevations, and is found at elevations of 1,000 to 3,050 m (Fig.1.2). Black bears migrate seasonally, spending warmer months at higher elevations and descending during colder months. Their diet varies with the locality and includes nuts, berries, fruits, roots and buds. In September and October, they are particularly fond of acorns of *Quercus balut* in the drier regions and *Q. dilatata* in Kaghan and Azad Kashmir. During years when acorns are scarce, bears may raid crops (Arshad 2004). In early summer, bears feed mostly on mulberries, and are known to raid apricot orchards in June. In October, black bears feed on maize planted on hillside terraces. Occasionally, when urged by hunger, they will destroy crops of barley and buck-wheat. Black bears generally hibernate in winter but may occasionally forage for food. According to Roberts (1997), mating is in October with the young born in February; the young stay with the mother throughout summers and sometimes even into the second year. Females with first-year the young do not usually breed the next season. In the

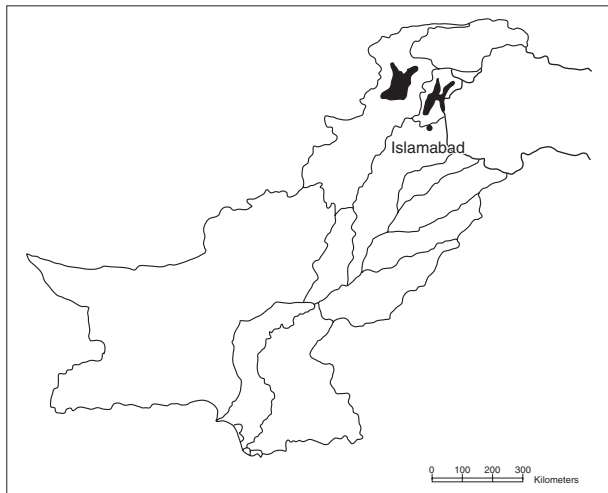


Fig.1.2: Distribution of Himalayan black bears in Pakistan.

north, mating season begins in early summer; the young are usually born in the mothers' winter dens. Young stay with their mothers for two to three years. Unlike the brown bear, they do not ascend above the tree line in alpine regions.

Brown bear

Brown bears found in Northern Pakistan vary in size and color. Most are sandy or reddish brown. They are larger than Asiatic black bears and resemble grizzlies of North America. In Pakistan, they are common in the few areas where they exist in the mountains of the north-west along the Chinese border. Until the 1960s they were also reported from several valleys of the western Karakorums, such as Naltar, Ishkoman (Sheikh 2004). They have been recorded at elevations of 2,439 to 5,183

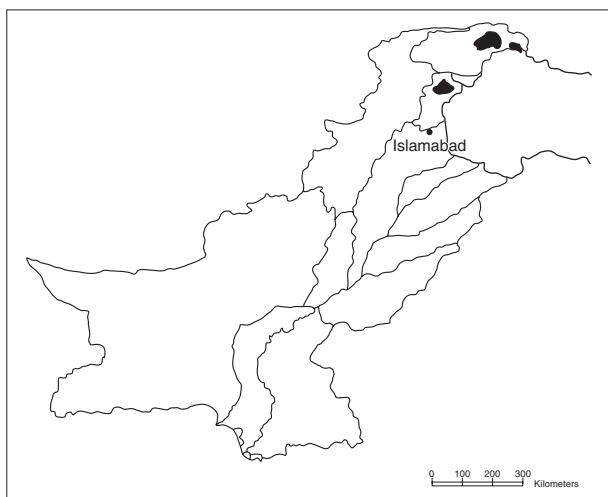


Fig.1.3: Distribution of Himalayan brown bears in Pakistan.

m (Fig.1.3). They prefer temperate grasslands, alpine meadows, sub-alpine scrub zones areas above the tree line and grassy marshes, flat grasslands, grassland slopes and stony flood plains in the higher mountains, but occasionally descend to valleys or ravines with stunted *Juniperus* and birch forests in search of succulent plants.

In spring and summer they feed mostly on alpine bulbs and roots; the bulk of their diet is vegetable matter although they occasionally kill domestic sheep and goats. In summer, they feed on insects and small crustaceans living beneath rocks. Rodents also occur in their diets. On the Deosai plateau, although the diet of brown bears consists mostly of roots and grasses, a small amount of animal matter is also ingested (Kok et al. 2005). Females give birth to young just at the end of winter hibernation, mating occurs in spring to early summer, and females breed at the age of five years (Roberts 1997).

Status

Asiatic black bear

In the 1970s, the Balochistan black bear was reported in the juniper forest zone of Khalifat, in northern Balochistan, and near Ziarat. As of 2000, it appears to be confined to arid sub-tropical thorn forest in southern Balochistan in areas associated with dwarf Mazri palm (IUCN and Government of Balochistan 2000). A recent WWF-Pakistan survey of part of the Pub Range of Balochistan indicated the presence of only a few animals and a declining trend for this sub-species. Abundance is not known, but local hunters reported 8-10 animals still surviving in this area. In 1998, a WWF survey team reported scats and footprints of black bears in the Sulaiman range of Balochistan. Sheikh and Molur (2005) reported a total population of 50-120 in Balochistan, distributed in the localities of Khuzdar, Sheengar, Pub Range, Kohi-e-Siya in Kharan, Takhte-Suleman, Muth, Marghar, Neel Takhi, Tanbo, Khaseen Kund, Paritagar, Tattoo, Chishki, Pichighar, Moonmandi, Sukhdasht, and Koi Zindodasht. Habitat degradation caused by human intrusions in its core habitat has reduced its range in last few decades tremendously. Forests habitat is affected due to human intrusion, climatic harshness, and drought. The main threats to the species include habitat degradation, killing, and the fact that local people consider it an enemy. Black bears are also threatened due to loss of habitat and from local gypsies, who capture cubs for bear baiting and dancing.

According to the IUCN National Mammals Assessment, the estimated population of the Himalayan black bear is about 800-1,000 in fragmented populations

(Sheikh and Molur 2005). They mostly occur in the Neelum valley of Azad Kashmir, and sparsely in the Deodar forests of northern Dir and lower Chitral, and in Indus Kohistan (mainly in Palas valley and forests around Astor, Rondu and pine forests in Baltistan region of the Northern areas). This sub-species is declining and is threatened by hunting, capture, and trade of young cubs for exhibits. The main threats to Asiatic black bears are deforestation and loss of habitat. Other threats include occasional persecution by locals on the notion that they kill young goats and sheep and raid cultivated crops of sorghum and dates (Arshad 2004).

Brown bear

Brown bear populations are declining and some have been extirpated during the past 100 years. Nawaz (2004) reported that populations from Chitral, Hazara and Waziristan have gone locally extinct and that brown bears had retracted eastwards, including Lalazar, Kabkot, Sadpara, Khunjerab National Park, and Askoli. As of 2006, it was distributed over three mountain ranges and four intermountain ranges, the western Himalayas, northern Karakorums, and to the Pamir range in Afghanistan. The Deosai Plains host the most stable population of about 40, which is so far the largest known population of brown bears surviving in Pakistan. Miller and Schwartz (1996) reported that the nearest bears from Deosai are about 200 km distant.

The habitat in Deosai Plains is stable because of protection and law enforcement. Habitats in other localities in the northern Pakistan are continuously declining in quality and are getting further fragmented. Except for Deosai, which is a strictly managed national park, the main threat to the brown bear population is increasing habitat fragmentation. Forest clearing, agriculture extension and infrastructure development contribute to habitat shrinkage and indirectly affect its population. Disturbance and destruction of habitat also occurs through overgrazing and livestock use.

Human-bear relationships

Bears have always been a central part of folklore and many indigenous stories. Many local people symbolize bears as enemy species. Local names of bears are presented in Table 1.1. Bears have also been traditionally hunted with the same notion of a non-desirable wild species (Sheikh and Molur 2005). Gujjars (mountain shepherds) in Azad Kashmir and Northern Areas report that brown bears occasionally develop the habit of killing domestic goats and sheep, which may lead to retaliatory killing. If bears are killed, locals then sell their fur and also collect fat for local medicinal and traditional uses. Gall bladder, paws and fat are considered very useful to heal pains and preparing local medicines.

Captive bears are taught to wrestle and dance by gypsies who earn their living from exhibiting them. Some gypsies also use them for fighting with dogs, which is referred to as “bear baiting” (Joseph 1997). An investigation by the World Society for the Protection of Animals (WSPA) into bear baiting in 1993 found evidence of many different contests involving bears. WWF-Pakistan undertook a detailed survey, and exposed for the first time a network of hunters, wildlife dealers, gypsy bear owners, and land owners that enabled bear baiting to thrive. Chaudhry and Arshad (1994) reported that bears are used for baiting with their teeth and claws removed and they are virtually defenseless fighting against as many as four to eight dogs in one day.

Government organizations, the WSPA, and various conservation groups continued to collaborate in eradicating this practice, and were finally successful in getting a presidential order in 2001 calling for bear baiting to be banned. While bear baiting events have dropped substantially over the past few years, a few isolated events are still reported. The continued existence of bear fighting events is because gypsies are extremely poor, and exhibiting dancing bears at public places or weddings is among their main sources of income. Providing alternative livelihoods for gypsies is the key to solving this problem.

The number of import and exports of bears into and out of Pakistan is not known. However, a reasonable as-

Table 1.1: Local names of bears in Pakistan.

Species	Scientific name	Local Names in different languages
Himalayan Black bear	<i>Ursus thibetanus thibetanus</i>	Kaala Reech (Urdu), Ukhch (Chitrali), Reech (Punjabi)
Balochistan Black bear	<i>Ursus thibetanus gedrosianus</i>	Kaala Reech (Urdu), Mum (Balochi), Bhaloo (Urdu), Reech (Punjabi)
Himalayan Brown bear	<i>Ursus arctos isabellinus</i>	Bhura Reech or Barfani Reech (Urdu), Spang Dren (Balti), Harput (Kashmiri), Drinmor (Ladakh), Krui Ukhch (Chitrali), Reech (Punjabi)

sumption is that it is low. To date, there has been no bear farming in Pakistan.

Present management systems

According to IUCN National Red Lists, Balochistan black bears are categorized as Critically Endangered, Himalayan black bears as Vulnerable, and brown bears as Critically Endangered (Sheikh and Molur 2005).

The National Council for the Conservation of Wildlife (NCCW) is the prime wildlife authority in Pakistan dealing with the conservation and management of wild species in coordination with provincial wildlife management systems. The NCCW participates in status surveys, population assessments, and habitat assessments. Baiting animals is banned by the Pakistan legislature, and capture of bear cubs is also prohibited by provincial wildlife acts in all provinces such as by Northwest Frontier Province (NWFP)'s Conservation and Management Act (1975), and the Baluchistan Wildlife Protection Act (1974) and Rules (1975).

In the Northern Areas of Pakistan, the Deosai Plains are an internationally known refuge for Himalayan brown bears. The Himalayan Wildlife Foundation (HWF) was set up in 1993 to safeguard the declining population of Himalayan brown bears in Deosai, and through its consistent efforts, the area was declared as Deosai National Park (DNP) in 1994 with the primary objective of stabilizing the brown bear population. Many communities and villages exist along the Park's periphery. Over ten years of monitoring has indicated that, despite various natural and anthropogenic threats, the Deosai bear population is steady. The Northern Areas Forest department has now taken over DNP's management and administration. HWF has confined its role to assisting in community coordination, public information and awareness initiatives, research, and planning. An important part of HWF's recent work includes consolidation of buffer zones in community areas around DNP, and creation of regional corridors allowing movement of wildlife from Deosai to peripheral valleys in Kashmir.

The NWFP Wildlife Department has been active in the conservation of bear species and also cooperated with national and international organizations in various efforts to safeguard the species in the wild. With the help of the department, WSPA built a sanctuary, Kund Park, in NWFP, which received the first bear to be confiscated from a bear baiting event following the 2001 ban on bear baiting. After completion of the sanctuary in 2000, WSPA handed the running of the sanctuary over to the authorities in the NWFP. The sanctuary ensures that, on arrival, all bears are quarantined for sev-

eral weeks, vaccinated against infections such as hepatitis, and checked for worms and external parasites. As of December 2004, there were 7 bears in the sanctuary.

In Punjab, bears are legally protected by the Punjab Wildlife Protection, Preservation, Conservation and Management Act of (1974). Since 2001, bear baiting has also been banned. In Sindh, bears are protected under the Sindh Wildlife Protection Ordinance (1972). The Sindh Wildlife Department also coordinates occasionally with other provinces to stop the traffic of bears and other legal violations.

The Forest Department of Balochistan is responsible for protecting the small isolated black bear population in Balochistan, but its efforts are limited due to lack of resources and information on the species. WWF-Pakistan intends to assist the Balochistan Government in establishing a Protected Area for the Balochistan black bear, and to prepare a recovery plan. Conservation efforts will include establishing the population status and threat levels, identifying core habitat, collecting relevant socio-economic and ecological data, and proposing feasible recommendations. Himalayan brown bears and black bears are both protected by law in Azad Jammu and Kashmir, however, there have been incidents of poaching and killing. Table 1.2 provides information on various agencies and their appropriate role in the conservation and management of wild bears in Pakistan.

Recommendations

A critical issue that jeopardizes the future conservation and management of bears is that they have not been studied and investigated in detail. There has been no coordinated research or regional cooperation, and research techniques used have been inappropriate. For example, because the province of Balochistan is vast it requires a well-coordinated system to effectively monitor bear populations. However, wildlife supervision is not easy without tools and equipment, and for the same reasons, many bear captures are never reported. Poachers visit core habitat sites including Khuzdar, Sheengar, Pub Range, Kohi-e-Siya in Kharan, Takhte-Suleman, Muth, and Marghar to capture cubs.

The authorities need support in provision of manpower, and access to suitable technical and financial resources. Continuous public awareness is the cornerstone of any coordinated approach to saving bears and is required to give clear reasoning why it is not morally or religiously right to support bear baiting and dancing events. Religious support may prove effective in generating public opposition to these events. The

Table 1.2: Agencies with appropriate role in the conservation/ management of wild bears in Pakistan.

Organization	Role	Project Objective	Species of Concern
NCCW	National Authority for the Conservation, Sustainable Use and Management of wildlife	Policy, Regulations, status Assessments and Coordination	All species
NWFP Wildlife Department	Provincial Government Department	Status, Biology and Conservation	Himalayan black bear
Forest Department Balochistan	Provincial Government Department	Conservation	Balochistan black bear
Punjab Wildlife Department	Provincial Government Department	Conservation	Both bear species
Sindh Wildlife Department	Provincial Government Department	Conservation	Balochistan black bear
WSPA	Conservation organization	Conservation, advocacy	Both bear species
Himalayan Wildlife Foundation	NGO	Conservation, management, community participation	Both bear species
WWF - Pakistan	Conservation Organization	Status assessment, ecology and conservation	Both bear species
Wildlife Conservation Society	Conservation organization	Conservation	Asiatic black bear
IUCN Pakistan	Conservation Organization	Status assessment, inputs in appropriate policies	All species
Sustainable Use Specialist Group-IUCN	Sustainable use and Conservation	Conservation through Community participation	Balochistan black bear
Pakistan Animal Welfare Society	Animal Welfare	Advocacy	All animals

Islamic tenants specifically forbid the baiting of animals and they may be effectively used to curb this problem. The Government should take further interest in increasing conservation efforts and take control of the ongoing activities of several individuals and NGOs for a holistic management plan for bears. Projects, initiatives and key recommendations might include:

- (1) national-level habitat assessment,
- (2) conservation education,
- (3) strict implementation of the existing policies, laws and management plans,
- (4) integrated research on wildlife-human conflicts,
- (5) upgrading zoos and bear facilities, and training staff in bear handling,
- (6) establishing bear sanctuaries in Balochistan and Punjab,
- (7) motivated and incentive-based research involving universities on bears in the wild,
- (8) professional exchange and international cooperation with leading bear scientists and institutions,
- (9) research funding from small grants programs to universities and village organizations.

Future legislation on bear conservation must include:

- (1) objective criteria for selecting protected bear sites,
- (2) provision for establishing private and community, protected areas to safeguard bears,
- (3) encouraging private individuals, corporations, and NGOs to establish nature conservation areas under private/charitable/corporate ownership,
- (4) enhancing the management effectiveness of existing protected areas.

Acknowledgements

Information on the status of the species was obtained from 'Status and Red List of Pakistan Mammals' edited and compiled by Sheikh and Molur (2005), wherein information on species distribution and status trends was also contributed by Abdul Munaf Qaimkhani, Rafiq Rajput, Masood Arshad, Syed Iqmail Shah, Rizwan Irshad, Ahmad Khan, Nuzhat Sial, Mohammad Iqbal, Abdul Qadeer Mehal, Tahir Rashid, Saeed-uz-Aman, Salman Ashraf and Hamid Ali Khan. Author appreciates Umeed Khalid and Ali Nawaz for information regarding ongoing conservation efforts in Pakistan.

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Web Resources:

- <http://asp.isb.sdnpk.org/biodiversity/redlist/mammals/MammalsOfPak.htm>
- <http://www.bearbiology.com>
- <http://www.wfpak.org>
- <http://www.nmnh.si.edu/vert/mammals/mammals.html>
- <http://www.wspa-international.org>

Chapter 2 The Status of Bears in India

2.1 The Status of Brown Bears in India

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In India, the brown bear (*Ursus arctos*) is largely confined to the rolling uplands and alpine meadows above timberline in the Himalaya, ecologically separated from the forest dwelling Asiatic black bear (Schaller 1977). But in the northwestern Himalaya, the brown bear is also reported to occur in subalpine forests (Sathyakumar 2001).

In this paper, I review the distribution and relative abundance of the brown bear in Himalaya (the Himalayan brown bear) in India based on review of existing literature, results of recent field surveys, a questionnaire survey, expert knowledge, and a few interviews with field researchers, forest and wildlife managers, and staff of the Forest and Wildlife Departments in northern India. I compare the results of this survey with the results of a similar survey carried out in 1994-95 (Sathyakumar 2001) and make an assessment of changes in the status of the Himalayan brown bear in the India during the last decade. I provide an estimate of potential Himalayan brown bear distribution range and its population in India.

Methods

In 2005, a questionnaire was developed and sent to the managers of Protected Area (PA, i.e., National Park and Wildlife Sanctuary) that had either reported presence of the Himalayan brown bear in the past or that was located within the distribution range of the Himalayan brown bear in India. The questionnaire requested details on bear sightings or sign (feces, feeding/resting signs, tracks) in the PAs and adjacent areas (Forest Divisions, catchment areas), qualitative relative abundance of bears (unknown, rare, fairly common, common, very common, abundant), past and present relative abundance, population, habitat threats and their extent and magnitude, bear-human conflicts, and bear conservation and management. The questionnaire was sent to all the managers of PAs ($n = 30$) that are located in the Himalayan brown bear distribution range in India, viz., Jammu and Kashmir, Himachal Pradesh, Uttarakhand, and Sikkim. Informal interviews were held with a few field researchers and PA managers to validate and en-

hance the available information. An approximate distribution range map for the Himalayan brown was prepared based on rule-based modelling using a GIS and refined from expert knowledge and questionnaire responses. The rule-based model works on basis of Boolean logic, which relies on well-established available knowledge and prescribes the area to be either suitable (1) or unsuitable (0). Altitude range (3,000 to 4,500m) that is potentially used by the brown bear during summer was used in the model; Arc/Info was used to develop the distribution map.

Results

Distribution

In India, the Himalayan brown bear occurs in very low densities in the subalpine and alpine regions (between 3,000 and 5,000m) in the Greater Himalayas and in some parts of the trans-Himalayan regions. Brown bears are largely confined to the northwestern and western Himalayan ranges (Fig.2.1.1) in Jammu and Kashmir, Himachal Pradesh, and Uttarakhand (Table 2.1.1). Very little information exists on the past and present status of Himalayan brown bear in India.

Jammu and Kashmir: The Himalayan brown bear is reported to occur in 8 PAs (Table 2.1.2). It is also reported to occur in suitable undisturbed alpine areas in the Forest Divisions (FD) of Lidder, Sindh (Bacha MS, Department of Wildlife Protection, Jammu and Kashmir State, personal communication 2005), Marwa, Kistwar, Poonch and Badhruwa (Kitchloo NA, Department of Wildlife Protection, Jammu and Kashmir State, personal communication 2006) and in the Zaskar and Suru Valleys in Ladakh - the Trans-Himalayan region that occurs north of the main Himalayan range (Sathyakumar 2002). It is reported as 'rare' throughout the state except for a few localities where it is reported to be 'fairly common' during spring or summer seasons such as Zaskar Valley in Ladakh (Sathyakumar 2002).

Himachal Pradesh: The Himalayan brown bear is present in 10 PAs in Himachal Pradesh and in some water-

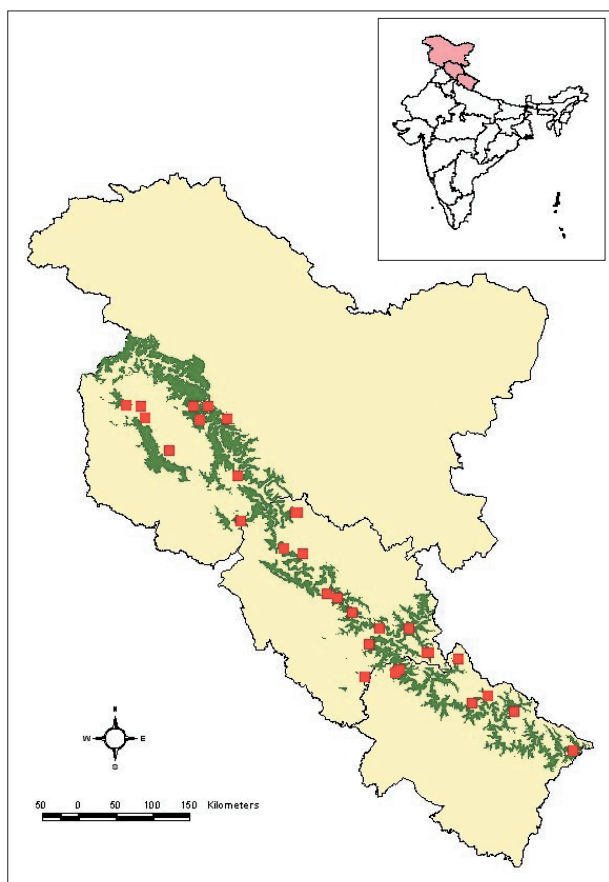


Fig.2.1.1: Himalayan brown bear distribution in the Western Himalayan region of India (Jammu and Kashmir, Himachal Pradesh and Uttarakhand States). ■ indicate Protected Areas.

sheds outside PAs (Table 2.1.2). Outside of PAs, it is reported to occur in Malana Valley, Hamta Pass, Solang Valley Bara Bangal, Parbati valley, Ropa Valley, Kaksthal, Manali, Pooh and Lingti and Ensa Valleys (Lahul and Spiti). It is reported to be “fairly common” in Bara Bangal, Ropa (Kinnaur District), and Ensa (in Spiti) valleys (Sathyakumar 2001).

Uttarakhand: The Himalayan brown bear populations in Uttarakhand are present in and near the Nanda Devi NP and Biosphere Reserve (BR) (Lamba 1987), Kedarnath WS (Sathyakumar 1994), Valley of Flowers NP, Govind WS, Askot WS, and in alpine regions of Yamunotri, Gangotri, Badrinath, Mana, Almora, and Pithoragarh. Himalayan brown bears are rare in Kedarnath WS (Sathyakumar 1994, 2001), Nanda Devi NP & Govind NP & WS (Table 2.1.2) and their relative abundance in other areas is not known.

Sikkim: The brown bear was reported as ‘present’ in the upper reaches of Kanchenjunga NP and in suitable undisturbed alpine areas in Sikkim (Gee 1967; Sathyakumar 2001). However, with the exception of two unconfirmed reports, there have been no recent confirmed reports of the brown bear in Sikkim. The 2005 survey results indicate that brown bear is not present in the PAs of Sikkim (Gut Lepcha, Department of Forests, Environment and Wildlife Management, Government of Sikkim, personal communication 2005).

Habitat and population estimates

The potential Himalayan brown bear habitat in India was grossly under-estimated as 4,300 km² in 1995 (Sathyakumar 2001). During the 2005 survey, a distribution range map for the Himalayan bear in India was developed using rule-based model (altitude range limits of the species) in the GIS and the recent information on the presence/absence of this species in India (Fig.2.1.1). The potential Himalayan brown bear distribution range in India is estimated to be about 36,800 km² of which 28,000 km² is in the northwestern and western Himalayan region (the southern side of the Greater Himalaya) and 8,800 km² is in the trans-Himalayan region of Ladakh (Sathyakumar and Qureshi 2003).

Because no population or density estimates are available for the brown bear in India, an average density of 1

Table 2.1.1: Himalayan brown bear distribution in Protected Areas (PA) and other localities in India, 2006.

State	PAs	Other localities	Elevation (m)	Status
Jammu & Kashmir	8	>10	3000-4500 (GH) 3000-5500 (TH)	rare
Himachal Pradesh	10	>10	3000-4500	rare
Uttarakhand	5	>15	3000-4500	rare
Total	23	35	3000-5500	rare

TH - Trans Himalaya; GH - Greater Himalaya

Table 2.1.2: Himalayan brown bear populations and their past and present relative abundance in Indian Protected Areas based on questionnaire responses, recent surveys and interviews.

State Protected Area (Area in km ²)	Relative Abundance		
	Past (Year)	1990s (Year)	2005
Jammu and Kashmir			
Dachigam NP (171)	rare (1989)	rare (1999)	rare
Gulmarg WS (139)	unknown	unknown (?)	rare
Hirapora WS (115)	unknown	unknown (1995)	rare
Kistwar NP (400)	unknown	unknown (1995)	rare
Lachipora WS (96)	unknown	unknown (1995)	rare
Limber WS (44)	unknown	unknown (1995)	rare
Overa-Aru WS (511)	unknown	rare (1991)	rare
Thajwas (Baltal) WS (211)	unknown	unknown (?)	rare
Himachal Pradesh			
Gangul Siahbehi WS (109)	unknown	unknown (1995)	rare
Great Himalayan NP (755)	fairly common (?)	rare (1998)	fairly common
Kais (14)	fairly common (?)	fairly common (1994)	rare
Kanawar WS (54)	rare (?)	rare (1994)	rare
Kugti WS (379)	fairly common (?)	common (1993)	fairly common
Lippa Asrang WS (349)	unknown	unknown (1995)	rare
Rupi Bhaba WS (738)	rare (?)	rare (1994)	rare
Sangla (R/Chitkul)WS (650)	rare (?)	rare (1994)	rare
Sechu Tuan Nala WS (103)	unknown	unknown (1995)	rare
Tundah WS (64)	fairly common (?)	fairly common (1993)	unknown
Uttaranchal			
Askot WS (600)	unknown	unknown (1995)	unknown
Govind NP and WS (953)	rare (1988)	rare (1992)	rare
Kedarnath WS (975)	unknown (1981)	rare (1991)	rare
Nanda Devi BR (5150)	rare(1983)	unknown (1993)	rare
Valley of Flowers NP (88)	unknown	unknown (1995)	unknown

WS - Wildlife Sanctuary; NP - National Park; BR - Biosphere Reserve; CR - Conservation Reserve

bear/50 or 75 km² was used to estimate the population of brown bear in India, resulting in an estimate of about 500-750 individuals.

Conservation problems

Population threats

Himalayan brown bears in India are threatened largely due to poaching (retaliatory killings) by migratory graziers and local villagers to reduce livestock depredation. In Himachal Pradesh, migratory graziers (gaddis and bakkarwals) often kill bears to reduce livestock depredation (Sathyakumar 2001). In Zaskar and Suru Valleys, Ladakh, brown bear-human conflicts are fairly common during summer, and local villagers resort to retaliatory killings when livestock losses are severe (Sathyakumar 2002). However, poaching for skins or trophies is rare.

Bear-Human conflicts

One of the serious limiting factors for Himalayan brown bear conservation in India is the response of people to bear-human conflicts. Reports of livestock killing by Himalayan brown bears and occasional attacks on humans are fairly common in the north western and trans-Himalayan regions. For instance, in some villages of Zaskar Valley, and Ladakh, where brown bear-human conflicts were reported as 'high', about 38% of livestock depredations were due to brown bears and there were substantial losses due to other large carnivores such as snow leopard, wolf and feral dogs. In Zaskar, there were reports of a Himalayan brown bear attack on two villagers and a case of retaliatory killing of brown bear by villagers when livestock depredations were high (Sathyakumar 2002). Reasons for such high livestock depredation by brown bears and other large carnivores were: (1) unsupervised grazing of livestock in the higher slopes, (2) livestock grazing supervised by children near villages, and (3) poor or no search effort

by villagers to locate missing livestock which were presumed to be killed by bears and other large carnivores.

There are also reports of brown bear raiding maize fields and horticultural lands near villages in some parts of the northwestern Himalaya.

Habitat threats

Based on the 2005 estimate, the potential Himalayan brown bear distribution range in India is about 36,800 km² of which, <10% is protected under the existing PAs in India. In India, Himalayan brown bear habitat loss is largely due to projects such as infrastructure development, road building, and other human activities. Habitat degradation is due to unsustainable use of alpine regions such as livestock grazing, medicinal plant extraction and other human use.

Management

The Himalayan brown bear is listed as “Vulnerable” in the Red Data Book (International Union for Conservation of Nature and Natural Resources IUCN 2006) but not listed as “threatened” in the 1996 Red List of Threatened Animals (IUCN 1996). It is also listed on Appendix I of CITES (GOI 1992) and on Schedule I of the Indian Wildlife (Protection) Act (1972) as amended in 2003. Wildlife species that are listed in Schedule I of the Indian Wildlife (Protection) Act are considered to be “endangered species” and are accorded highest protection. The number of PAs in India has risen from 131 in 1975 to 597 as of December 2005, and there are proposals for new and modified PAs, largely Conservation Reserves and Community Reserves.

Recommendations

The recently (2003) amended Indian Wild Life (Protection) Act, 1972 offers options for creation of new categories of PAs, such as Conservation Reserves and Community Reserves. The State Government may declare an area that has wildlife habitats and species and that is located adjacent to a PA or that links two PAs as a ‘Conservation Reserve’ in consultation with the local communities for wildlife conservation. Similarly, the State Government may declare any private or community land that has wildlife habitats and species and that is located adjacent to a PA or that links two PAs as a ‘Community Reserve’. Many important Himalayan brown bear habitats or populations that occur outside the PA network but form corridors or links to existing population units could be protected with the help of local communities and through creation of Conservation

and Community Reserves. Over 70% of the PAs containing bear populations are <500 km² and suffer from human and livestock pressures from within and outside.

Identifying sub-alpine and alpine habitats adjacent to PAs and corridors between PAs is crucial. The Jammu and Kashmir Government has created 10 Conservation Reserves recently. Such efforts have to be taken up in Himachal Pradesh also.

To control poaching and smuggling, there is a requirement for additional well trained wildlife staff to protect and manage PAs in India. Adequate facilities, incentives, remote-area allowances, equipment, and motivation are required for wildlife staff in all areas. Wildlife awareness programmes for the Indian Army, border police personnel, and the general public are needed. The Government should regulate all development activities, such as dam and road construction, by ensuring completion of Environmental Impact Assessment studies prior to project approval (Sathyakumar 2001).

Status surveys should be conducted for Himalayan brown bears in most parts of its distribution range in the Greater Himalaya. Monitoring of Himalayan brown bear populations based on direct and indirect evidences in PAs has to be initiated.

Scientific research on the ecology of Himalayan brown bear is necessary, as information on food and feeding habits, habitat utilisation, bear-human conflicts and movement patterns are crucial for the long-term conservation and management of this species in India.

Acknowledgements

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2.2 The Status of Asiatic Black Bears in India

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The Himalayan region and the hills of northeast India cover approximately 5,91,800 km² (18%) of India's geographical area and supports one of the largest populations of the Asiatic black bear (*Ursus thibetanus*) in Asia. The distribution of the Asiatic black bears in India is contiguous with Nepal (eastward from Uttarakhand to Sikkim) and Bhutan (eastward from Sikkim to Arunachal Pradesh).

This report presents information on the distribution and relative abundance of the Asiatic black bear in India based on a review of existing literature, results from recent field surveys, results of questionnaire surveys carried out in 1994-95 and 2005, and expert knowledge. An assessment of change in the status of the Asiatic black bear within Protected Areas (PAs) is made based on a comparison between 1994-95 survey results (Sathyakumar 2001) and results of the 2005 survey (Sathyakumar and Choudhury 2005).

Status

Conservation status

The Asiatic Black Bear is listed as "Vulnerable" in the Red Data Book (IUCN 2006). It is also listed on Appendix I of CITES and on Schedule I of the Indian Wildlife (Protection) Act in 1972 as amended in 2003. The Forest Conservation Act (1980) and the National Wildlife Action Plan (1983) afford protection to the habitats of this species. The number of PAs in India has risen from 131 in 1975 to 597 as of December 2005 and there are proposals for new and modified PAs, consisting largely of Conservation Reserves and Community Reserves (Sathyakumar and Choudhury 2005).

Current distribution

Currently, Asiatic black bears are distributed throughout the Indian Himalayan ranges in the northwest (Jammu and Kashmir; Himachal Pradesh), west (Himachal Pradesh and Uttarakhand) (Fig.2.2.1), central (Sikkim and northern West Bengal) and east (Arunachal Pradesh) (Fig.2.2.2). In the western and northwestern Himalaya, Asiatic black bears inhabit forested hills ranging from 1,200 m to 3,300 m, and in the eastern and northeastern Indian Himalaya ranging from 70 m to 4,300 m (Prater 1980; Sathyakumar and Choudhury 2005). Its Himalayan range overlaps with that of the

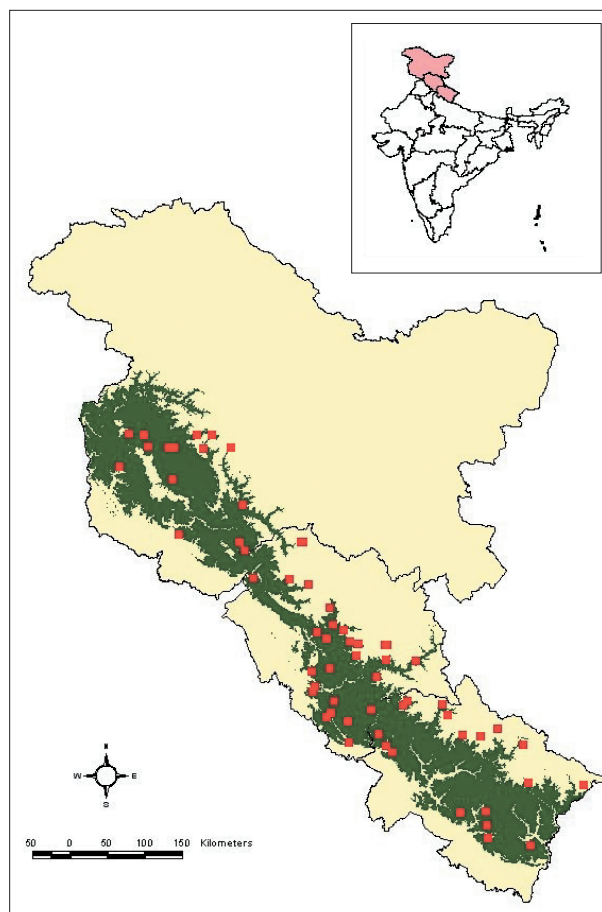


Fig.2.2.1: Asiatic black bear distribution in the Western Himalayan region of India (Sathyakumar and Choudhury 2005). Jammu and Kashmir, Himachal Pradesh and Uttarakhand States. ■ indicate Protected Areas.

sloth bear (*Melursus urinus*) below 1,200 m and of the brown bear (*Ursus arctos*) above 3,000 m. In northeast India, Asiatic black bear range overlaps that of both the sloth and the sun bear (*U. malayanus*) (Choudhury 1982, 1997a, b).

Results of the 2005 survey revealed that Asiatic black bears occur in 83 PAs (Table 2.2.1), and 98 Forest Divisions (FDs), Reserved Forests (RFs), and Forested Valleys (FVs). Protected Areas (PAs) include National Park, Wildlife Sanctuary, Conservation Reserve and Community Reserve.

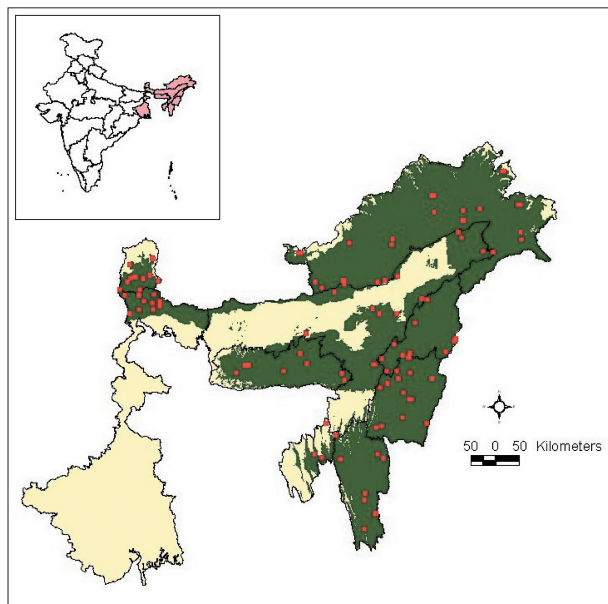


Fig.2.2.2: Asiatic black bear distribution in the Eastern Himalayan region of India (Sathyakumar and Choudhury 2005). West Bengal, Sikkim, Arunachal Pradesh, Assam, Meghalaya, Mizoram, Manipur, Nagaland and Tripura States. ■ indicate Protected Areas.

Jammu and Kashmir: The Asiatic black bear is reported to occur in 16 PAs and 20 FDs, RFs and FVs. Survey respondents reported the status of Asiatic black bears as 'fairly common'. The best known populations of Asiatic black bears in India are in this state (Table 2.2.2) (Sathyakumar and Choudhury 2005). The Asiatic black bear is also reported from the Banihal CR, Sumchan Saphare WS, and proposed PAs Pir Panjal NP, Ghambiar Mongtu WS, Dhera-ki-Gali WS, Ans River WS, and Nowshera WS. It is also reported from over

20 other areas including FDs in Lidder (Pahalgam), Naranaga, Sindh, Wangat, Anantnag, and Reserved Forests (RF) in Gugnar, Biano, Pir Panjal, Zaberwan, Bandipora, and Kahai (Bacha MS, Dept of Wildlife Protection, Jammu and Kashmir, personal communication 2005). In the Jammu region, Asiatic black bears are reported to occur in the FDs of Marwa, Rambandh, Batote, Doda, Badhruwa, Kistwar, Poonch, Rajouri, Nowshera, Reasa, Mahor, Udhampur, Jammu, Ramnagar and Bilwar (Sathyakumar and Choudhury 2005).

Results of the 2005 survey have added a substantial amount of information on the status of Asiatic black bears in this state. Eight PAs and 5 newly created CRs not previously known to have Asiatic black bears reported their presence in 2005. Survey respondents reported that feeding sign and scat were commonly encountered in these areas as well as a high incidence of bear-human conflict. Sabarwal (1989) reported a density of 1.3-1.8 bears/km² in the Lower Dachigam area of Dachigam NP, likely due to a high abundance of fruit during 1988-89. Bear encounter rates along transects for the same period were 0-3.5 bears/km, and 25-40 bears were estimated to use Lower Dachigam from late June through October (particularly in early September). The status of this species did not change in 10 PAs during the last decade. Marginal population increases were reported in three PAs and marginal decreases reported in three PAs (Table 2.2.2) (Sathyakumar and Choudhury 2005).

Himachal Pradesh: Asiatic black bear in Himachal Pradesh are present in and around 21 PAs (Table 2.2.2) (Sathyakumar 2001). Outside of PAs, Asiatic black bears are reported to occur in an additional 25 areas outside PAs, including forested areas of Pangi (Chenab catchment) and Bharmaur valleys (Ravi catchment) in

Table 2.2.1: Asiatic black bear distribution in Protected Areas (PA), Forest Divisions (FD) and Reserved Forests (RF) in India, 2006. (Source: Sathyakumar 2001; Sathyakumar and Choudhury 2005).

State	PAs	FDs & RFs	Elevation (m)	Status
Jammu and Kashmir	16	>20	1,000-3,300	fairly common
Himachal Pradesh	21	>25	1,000-3,300	fairly common
Uttaranchal	10	>15	1,000-3,300	fairly common
West Benbal (northern)	4	>1	200 - 3,000	rare
Sikkim	3	>2	300up	rare
Arunachal Pradesh	9	>10	100up	common
Assam	7	>15	70 - 1,900	rare
Meghalaya	3	>4	80 - 1,500	very rare
Mizoram	6	>2	100-2,100	very rare
Tripura	1	>1	200-1,000	occasional
Manipur	1	>2	150-2,900	rare
Nagaland	1	>1	120-3,800	fairly common
Total	82	>98		

Table 2.2.2: Asiatic black bear populations and their past and present relative abundance in Indian Protected Areas based on questionnaire responses, recent surveys and interviews. (Source: Sathyakumar 2001; Sathyakumar and Choudhury 2005).

State Protected Area (Area in km ²)	Relative Abundance		
	Past (Year)	1990s (Year)	2005
Jammu and Kashmir			
Ajas CR (48)	unknown	fairly common (?)	fairly common
Bran-Harwan CR (19)	unknown	fairly common (?)	fairly common
City Forest (Salim Ali) NP (10)	unknown	fairly common (?)	fairly common
Dachigam NP (171)	abundant (1969)	very common (?)	common
Gulmarg WS (139)	unknown	fairly common (?)	fairly common
Hirapora WS (115)	unknown	fairly common (?)	rare
Khiram-Shikargarh-Panyar-Khangund CR (118)	unknown	fairly common (?)	fairly common
Khrew-Khonmoh CR (117)	unknown	fairly common (?)	fairly common
Kistwar NP (400)	unknown	unknown (1995)	fairly common
Lachipora WS (96)	fairly common (1986)	fairly common (?)	fairly common
Limber WS (44)	fairly common (1986)	fairly common (?)	fairly common
Naganari CR (22)	unknown	fairly common (?)	fairly common
Overa-Aru WS (511)	very common (1990)	fairly common (1991)	fairly common
Rajparian (Daksum) WS (49)	unknown	common (?)	fairly common
Thajwas (Baltal) WS (211)	unknown	fairly common (?)	rare
Wangat CR (59)	unknown	fairly common (?)	common
Himachal Pradesh			
Bandli WS (41)	unknown	unknown (1995)	rare
Chail WS (109)	unknown	unknown (1995)	fairly common
Churdar WS (66)	unknown	unknown (1995)	unknown
Daranghati WS (167)	unknown	fairly common (1994)	unknown
Gamgul Siahbehi WS (109)	rare (1991)	unknown (1994)	fairly common
Great Himalayan NP (755)	unknown	fairly common (1994)	fairly common
Kias WS (14)	fairly common (?)	fairly common (1994)	fairly common
Kalatop-Khajjiar WS (69)	rare (1991)	fairly common (1994)	fairly common
Kanawar WS (61)	fairly common (?)	fairly common (1994)	common
Khokhan WS (14)	unknown	unknown (1995)	common
Kugti WS (379)	fairly common (1992)	fairly common (1993)	fairly common
Lippa Asrang WS (349)	unknown	common (1993)	unknown
Majhatal WS (58)	unknown	unknown (1995)	fairly common
Manali WS (32)	common (1987)	rare (1991)	rare
Nargu WS (278)	unknown	unknown (1995)	fairly common
Rupi Bhaba WS (738)	very common (1992)	common (1994)	fairly common
Sangla (R/Chitkul) WS (650)	common (?)	very common (1994)	unknown
Sechu Tuan Nala WS (103)	unknown	unknown (1995)	unknown
Shikari Devi WS (72)	unknown	rare (1994)	fairly common
Talra WS (40)	unknown	unknown (1995)	unknown
Tundah WS (64)	common (1992)	very common (1993)	unknown

WS - Wildlife Sanctuary; NP - National Park; CR - Conservation Reserve

Chamba District; Dhaula Dhar range (Beas catchment), Bara Bangal, Chota Bangal, and Bir in Kangra District; Parbati valley, Pandrabis, Bashleo Pass (Sutlej catchment), and Solang and Jagatsukh valleys in Kullu District; upper catchments of Bata and Giri in Solan and Shimla Districts; catchments of Sutlej and Yamuna, Pandrabis, Shimla ridge, Karsog, Shali, Kandyali, Hatu, and Moral Kanda areas in Simla District, the Ropa valley, and Kalpa and Kaksthal areas in the Kinnaur District (Sathyakumar 2001).

Vinod and Sathyakumar (1999) conducted surveys between 1996 and 1999, and reported Asiatic black bear encounter rates along transects ranging from 0.01 to 0.02 bears/km and scat encounter rates of 0.10 scats/km in the Great Himalayan NP. The status of Asiatic black bears in Himachal Pradesh has remained largely unchanged or has marginally improved between the 1995 and 2005 surveys (Sathyakumar and Choudhury 2005). Survey respondents reported bear-human conflicts to be high around PAs in this state. Chauhan

Table 2.2.2 (Cont'd): Asiatic black bear populations and their past and present relative abundance in Indian Protected Areas based on questionnaire responses, recent surveys and interviews. (Source: Sathyakumar 2001; Sathyakumar and Choudhury 2005).

State Protected Area (Area in km ²)	Relative Abundance		
	Past (Year)	1990s (Year)	2005
Uttaranchal			
Askot WS (600)	fairly common (1988)	rare (1994)	fairly common
Corbett NP (521) & TR	unknown	rare (1993)	rare
Govind NP & WS (953)	fairly common (1988)	rare (1992)	common
Kedarnath WS (975)	fairly common (1981)	fairly common (1994)	common
Mussorie WS (11)	unknown	very common (?)	common
Nanda Devi NP (625)	fairly common (1983)	rare (1993)	fairly common
Nanda Devi BR (5150)	fairly common (1983)	fairly common (1993)	fairly common
Rajaji NP (820)	unknown	unknown	rare
Valley of Flowers NP (88)	unknown	fairly common (1995)	fairly common
West Bengal			
Buxa TR (759)	unknown	rare (1999)	rare
Mahananda WS (158)	unknown	unknown (1995)	rare
Neora NP (88)	unknown	common (1999)	fairly common
Singalila NP (79)	unknown	rare (1999)	fairly common
Sikkim			
Fambong LhoWS (52)	unknown	unknown (1995)	rare
Khangchendzonga NP (1,784)	unknown	common (1999)	fairly common
Pangolakha NP(128)	unknown	common (1999)	rare
Arunachal Pradesh			
Dibang WS (4,149)	unknown	common (1999)	fairly common
Eagle' s Nest WS (217)	unknown	common (1999)	fairly common
Itanagar WS (140)	unknown	fairly common (1995)	fairly common
Kamlang WS (783)	unknown	fairly common (1994)	fairly common
Kane WS (55)	unknown	rare (1991)	rare
Mehao WS (282)	unknown	common (1999)	fairly common
Mouling NP (483)	unknown	common (1999)	fairly common
Namdapha NP & TR (4,985)	rare (1990)	rare (1996)	fairly common
Pakke WS (862)	unknown	common (1999)	fairly common
Sessa Orchid Sanctuary (100)	unknown	common (1999)	fairly common
Taley Valley WS (425)	unknown	unknown (1994)	fairly common
Assam			
Barail WS (326)	common (1986)	fairly common (1996)	fairly common
East Karbi Anglong WS (222)	common (1989)	fairly common (1996)	fairly common
Marat Longri WS (451)	rare (1989)	rare (1992)	very rare
Manas NP (500)	rare (1985)	rare (1995)	very rare
Nameri NP (200)	rare (1985)	rare (1998)	very rare
North Karbi Anglong WS (96)	fairly common (1984)	rare (1999)	rare
Sonai-Rupai WS (220)	rare (1985)	rare (1998)	very rare

WS - Wildlife Sanctuary; NP - National Park; CR - Conservation Reserve

(2003), based on an assessment of wildlife-human conflicts at Great Himalayan NP during 1989-98, reported that 26% of livestock depredation was by Asiatic black and Himalayan brown bears, and these occurred primarily in alpine rangelands (58%) where livestock grazing is generally unsupervised, with depredation occurring

largely during the month of September (41%).

Uttaranchal: Asiatic black bears are present in and around 11 PAs (Table 2.2.2). Bears are also reported in 15 areas outside PAs including FDs of Tons, Uttarkashi, Tehri, Badrinath, Pithoragarh, Narendra Nagar, Chak-

Table 2.2.2 (Cont'd): Asiatic black bear populations and their past and present relative abundance in Indian Protected Areas based on questionnaire responses, recent surveys and interviews. (Sathyakumar 2001; Sathyakumar and Choudhury 2005).

State Protected Area (Area in km ²)	Relative Abundance		
	Past (Year)	1990s (Year)	2005
Meghalaya			
Balphakram NP (220)	unknown	unknown (1995)	very rare
Nokrek NP & BR (80)	unknown	unknown (1995)	occasional
Nongkhyllam WS (29)	unknown	rare (?)	occasional
Mizoram			
Dampa WS (500)	unknown	unknown (1995)	rare
Lengteng WS (60)	unknown	unknown (1995)	rare
Murlen NP (100)	unknown	unknown (1995)	rare
Ngengpui WS (110)	unknown	common (1999)	rare
Phawngpui NP (50)	unknown	common (1999)	rare
Tripura			
Trishna WS (195)	unknown	unknown (1995)	???
Manipur			
Kailam WS (188)	unknown	unknown (1995)	very rare
Nagaland			
Fakim WS (6)	unknown	unknown (1995)	fairly common

WS - Wildlife Sanctuary; NP - National Park; CR - Conservation Reserve

rata, Ram Nagar, Almora, Bageshwar, Nainital, and Kedar Nath Wildlife Division. Bears have also been reported in the Yamunotri and Gangotri valleys, and the upper catchments of Ram Ganga, Ladhiya valley and in some parts of the Tarai FD (Sathyakumar 1993, 1994, 2001).

Surveys between 1995 and 2005 revealed that the population status of Asiatic black bears in Uttarakhand has marginally improved or marginally declined (Sathyakumar and Choudhury 2005). For example, the status of Asiatic black bears has improved during a 10 year period in Nanda Devi NP from no sightings or evidence in 1993, to 1 sighting and 4 scats in 2003 (Sathyakumar 2004). Encounter rates of Asiatic black bears along transects in this park ranged from 0 to 0.66 scats/km. In Valley of Flowers NP and the buffer zones of Nanda Devi BR, 28 individuals (including 5 females with cubs) were sighted during a 1-month period (November-December 2005). Encounter rates along transects ranged from 0 to 0.4 bear scats/km in Valley of Flowers NP during surveys conducted in the autumn of 2005. In Rajaji NP, Asiatic black bear ranges overlapped with those of sloth bear and were reported to be 'rare' (Table 2.2.2). In Rajaji NP, Asiatic black bears were photographed at remote camera traps on 10 occasions out of 900 trap nights (Sathyakumar and Choudhury 2005).

West Bengal: The status of Asiatic black bears in West Bengal has not changed during the last decade. Survey respondents reported that black bears occur in and around 4 PAs in the northern part (Table 2.2.2) and in forested areas of Darjeeling, Kalimpong Hills, Kolbang, Rehit and Pankasari RFs. The current status of Asiatic black bears in Sanchal WS is unknown but they have been reported to occur in this PA. The status of bear populations did not change in 1 PA during the last decade, but showed marginal increase in 2 PAs (Table 2.2.2) and marginal decline in 1 PA (Sathyakumar and Choudhury 2005).

Sikkim: The Asiatic black bear is reported in 3 PAs. Sathyakumar (2001) reported that bears occur in suitable undisturbed forested areas between 1,200 and 3,000 m elevations in Sikkim. Status has improved in 1 PA (Table 2.2.2) and declined in 2 PAs (Sathyakumar and Choudhury 2005).

Arunachal Pradesh: With > 80% of its geographical area under forest cover, Arunachal Pradesh has a nearly continuous distribution of Asiatic black bears, but these populations are seriously threatened by poaching. Black bears are reported to be 'fairly common', occurring in suitable undisturbed habitats throughout Arunachal Pradesh (Sathyakumar 2001). They are reported to oc-

cur in 11 PAs in this state (Table 2.2.2) (Choudhury 2003; Katti et al. 1990; Choudhury 2003). Asiatic black bears have also been reported to occur in other areas such as Hot spring, Ditchu (Lohit District), Taley Valley RF, Anini Social FD, and Siang districts. Information on relative abundance of this species in the mid-1990s, and the 2005 survey indicated a marginal decline in relative abundance. A survey of animal use by people revealed that in 2 villages of Lower Dibang Valley district alone, at least 52 bears were killed in a single year (Choudhury and Rengma 2005). Its status has not changed in 3 PAs during the last decade (Table 2.2.2), but showed marginal increase in 2 PAs and decline in 6 PAs (Sathyakumar and Choudhury 2005).

Assam: Asiatic black bears occur throughout the hills of Assam and have also been reported to occur in plains areas (Choudhury 1997a). During the 1994-95 survey (Sathyakumar 2001), Assam state was not considered for survey as it was believed that this state did not hold any black bears, although a few individuals were thought to inhabit areas along the border with Arunachal Pradesh. During the 2005 survey, we gathered information on the presence of Asiatic black bears in 7 PAs (Table 2.2.2). Bears outside of PAs are also fairly common in the forested areas of Karbi Anglong district (Choudhury 1993) and North Cachar Hills district. The status of black bears has not changed in 2 PAs (Table 2.2.2) during the last decade, but showed marginal increase in 1 PA and decline in 4 PAs (Sathyakumar and Choudhury 2005).

Mizoram and Meghalaya: Asiatic black bear distribution extends into the states of Mizoram and Meghalaya, where it is reported to occur in 5 PAs and 3 PAs respectively (Table 2.2.2). However, survey respondents reported the species as 'rare' in these areas. They are also reported as 'rare' in the Garo, Khasi, and Jaintia Hills, Saipung RF and Narpuh RF areas; occurring only in suitable undisturbed forest in these areas. The status of the species in Mizoram and Meghalaya has marginally increased in 2 PAs during the last decade (Table 2.2.2), but showed decline in 6 PAs (Sathyakumar and Choudhury 2005).

Tripura, Manipur and Nagaland: According to survey respondents, the hill ranges in Tripura contain small scattered populations. They are reported in Trishna WS and in Kailashahar FD, Manu, Kanchanpur FD, Longthorai RF, and Deo RF although their status is not known. Manipur, Mizoram, Nagaland and Arunachal Pradesh are the only four states in India where the distribution ranges of Asiatic black bear and sun bear overlap. In Manipur, black bears are found throughout hilly

areas (Choudhury 1992). Bears are reported to occur in Kailam WS, and Kangpokpi-Tamenglong Protected Forest. In Nagaland, the Asiatic black bear is reported as 'fairly common' in Fakim WS, and is well distributed across the state (Sathyakumar and Choudhury 2005). A survey of patterns of animal use by humans revealed that large numbers of black bear are killed every year. A small sample ($n = 15$ persons) in Phesama village revealed harvesting at least 52 bears in their lifetime (Choudhury and Rengma 2005). The status of the species in Tripura has not changed during the last decade, but marginally improved in Manipur and Nagaland (Sathyakumar and Choudhury 2005).

Habitat and population estimates across India

Potential Asiatic black bear habitat in India was estimated as 14,500 km² in 1995 (Sathyakumar 2001). More recently Sathyakumar and Choudhury (2005) developed a distribution range map for the Asiatic black bear in India using a rule-based GIS model based on forest cover, altitude range limits of the species and the recent information on the presence/absence of this species in India (Fig.2.2.1 and 2.2.2). Using this model, potential Asiatic black bear distribution range was estimated to be approximately 269,350 km² (Sathyakumar and Choudhury 2005; 71,445 km² in the Western Himalayan region and 191,445 in the Eastern Himalayan region and North east Hills). Density estimates were 10/100 km² (Dachigam NP), 6/100 km² (some areas in Arunachal Pradesh) and 3/100 km² (most of the distribution range). Based on these density estimates, Sathyakumar and Choudhury (2005) used densities of 1/30 and 1/35 km² to extrapolate an estimated Asiatic black bear population in India of approximately 6,750 - 9,000.

Changes in relative abundance

Prior to the 1994-95 survey, there was no information on the relative abundance of Asiatic black bear in PAs (Sathyakumar 2001). In the 2005 surveys, 24 PAs reported marginal increases, 30 reported no change, 28 reported declines, and 21 new PAs reported presence of this species for the first time. Although reports of the species in other areas (outside PAs) increased from 53 to 98 localities, the population seems to have declined in most areas (Sathyakumar and Choudhury 2005).

Human-bear interactions

Conflicts with humans

One of the most serious limiting factors for Asiatic black bear conservation in India is the response of people to human-black bear conflict. Reports to the Forest

and Wildlife Department of Asiatic black bears killing livestock and attacking humans are common, largely in the north western and western Himalayan region. For example, in Uttaranchal, Asiatic black bears accounted for 28.5% of 540 attacks on humans by large carnivores between 1991 and 2001. Of these attacks, 9% resulted in a human fatality (Chauhan 2004). In the Great Himalayan NP, 350 of 1348 (26%) incidents of livestock predation during 1989-98 were by Asiatic black or Himalayan brown bears (Chauhan 2003). In Arunachal Pradesh, Asiatic black bears cause damage to maize, which is a major crop for many hill tribe people. Possible reasons for the increased incidence of reported livestock predation and attacks on humans by Asiatic black bears are: (1) shrinking habitat due to extension of agricultural lands, other human encroachment, and habitat degradation which have led to increased use of agricultural lands by bears, (2) increasing human and livestock population in and around PAs and forested areas, and increased dependence on forests by humans leading to increased frequency of bear-human encounters, (3) unsupervised livestock grazing, and (4) increased awareness among local people regarding compensation paid by the government for damage caused by wildlife, leading to an increase in the proportion of incidents reported (Sathyakumar and Choudhury 2005). As a result, any increase in black bear populations in the recent past is very unlikely with the exception of a very few undisturbed areas (Sathyakumar 2001).

Poaching

Asiatic Black bear populations in India are largely threatened due to poaching for gall bladder and skin. Although the former is believed to be of medicinal value, the latter is for trophy or ornamental purposes. Many Chinese medicine texts recommend Asiatic black bears as source for medicinal bile. Although bears are protected in India, it is difficult to prosecute in poaching cases because of lack of *prima facie* evidence in the courts. Poaching and illegal trade across international borders is thought to be widespread. India has long boundaries with Pakistan, China, Nepal, Bhutan, Bangladesh and Myanmar, much of which is remote, rugged mountainous terrain, making it difficult to police the borders and control cross-border trade.

Growing demand for bear products in Asia has led to serious impacts on bear populations in India. In Arunachal Pradesh and other northeastern states, indigenous people hunt black bear for its skin and meat. For example, the "Nishi" (earlier known as Daffla) people wear bear skins on the back of their neck and use them in making dao (knife) holders. All huts of indigenous people have a display of wild animal skulls and skins, many including parts from Asiatic black bears.

Habitat degradation

Based on the 2005 estimate, the potential Asiatic black bear distribution range in India is about 270,000 km² of which <10% is protected under the existing network of PAs (National Wildlife Database, Wildlife Institute of India, Dehra Dun 2005). Throughout India, there are major threats to Asiatic black bear habitats. Habitat degradation is largely due to development projects and human dependence on forests for fuel wood and fodder, as well as the extraction of other forest products such as montane bamboo (*Arundinaria falcata*, *Chimnobambusa jaunsarensis*, *Thamnocalamus falconeri*, *T. spathiflorus*). In Arunachal Pradesh and Sikkim, habitat loss is mainly due to development activities. In the northeast states, *jhum* (shifting cultivation) has led to serious impacts on Asiatic black bear habitat. In Meghalaya, about 95% of the land is privately owned and the state government does not have a mandate to protect wildlife or their habitats in these areas (Sathyakumar and Choudhury 2005).

Recommendations

The recently (2003) amended Indian Wild Life (Protection) Act of 1972 offers options for creation of new categories of PAs such as Conservation Reserves and Community Reserves. Crucial Asiatic black bear populations that occur outside the PA network but form corridors to existing population units could be protected through creation of Conservation and Community Reserves and by community participation. Over 70% of the PAs with bear populations are <500 km² and suffer from human and livestock pressures from within and outside. Identifying forested areas adjacent to PAs and forest corridors between PAs is crucial. The Jammu and Kashmir Government has recently created 10 Conservation Reserves. Such efforts have to be taken up in other states, particularly in the northeast Indian States.

To control poaching and smuggling, additional well-trained wildlife staff to protect and manage PAs are needed. Adequate facilities, incentives, remote area allowances, equipment and motivation are required for wildlife staff in all areas. Wildlife awareness programmes for the Indian Army, border police personnel, and the general public are needed. The Government should regulate all development activities, such as dam and road construction, in Sikkim and Arunachal Pradesh by ensuring completion of Environmental Impact Assessment studies prior to project approval. Additionally the short cycle of *jhum* (shifting cultivation) in northeastern states needs to be replaced with longer cycles (Sathyakumar 2001).

Status surveys should be conducted for Asiatic black

bear in most parts of Sikkim, West Bengal, Arunachal Pradesh, and other northeastern hill states. Monitoring of Asiatic black bear and populations based on direct and indirect evidence in PAs should be initiated.

Scientific research on the ecology of Asiatic black bears is necessary, because information on food and feeding habits, habitat utilisation, bear-human conflicts and ranging patterns are crucial for the long-term conservation and management of this species in India.

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2.3 The Status of Malayan Sun Bears in India

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In India, the Malayan sun bear (*Ursus malayanus*) is found in the north-eastern hilly region, and it is known as sun shaom in the local language of Manipur state. Until the year 2002, there were no reports of its occurrence in this region. Thus, information on the status, distribution, ecology, behaviour and ranging pattern of sun bears has been lacking. Only recently, based on reports of the forest department, field surveys and scientific reports of Chauhan and Jagdish Singh (2005b), the occurrence of sun bear has been confirmed in this part of the country.

Status

Distribution

The sun bear is the least known bear species, and one of the most neglected large mammals in India. The lack of information on the status and distribution and ecology of the sun bear in Northeastern states is a serious limitation for conservation of the species.

Sun bears are found in tropical rain forests. The main forest types are tropical semi-evergreen forest, tropical moist deciduous forest, sub-tropical wet hill forest, bamboo forest, wet temperate forest, and moist temperate forest. The status and distribution of sun bears depends on the extent and availability of lowland forest habitats and the presence or absence of human beings and cattle. Due to interspersed human habitation with degraded and fragmented lowland forest habitats and heavy resource competition, sun bear populations have become fragmented and isolated. As lowland forests have been converted into agricultural areas, plantations and human settlement, most suitable sun bear habitats have been eliminated.

In India, the historic distribution of sun bears was in the tropical rainforest in the northeastern region (Higgins 1932; Gee 1967; Cowan 1972; Prater 1980). There were reports of its occurrence in north-eastern hilly region during the 1960s and 1970s. Thereafter, the sun bear population rapidly declined, and its occurrence became doubtful in this region. According to the report of Servheen (1999), there were no sun bears in India in the 1990s.

Recently, reports of sun bear occurrence have become once again from the northeastern states of Arun-

achal Pradesh, Nagaland, Manipur and Mizoram. Co-existence of sloth bear with sun bear has also been reported in some areas, but this needs to be confirmed. There have been one sun bear photographed using a camera trap in Arunachal Pradesh in India. Sun bears probably occur in Mouling NP, Mehao WS, Dibang WS, Kamlang WS, Namdapha NP in Arunachal Pradesh; Fakim WS in Nagaland; Murlen NP and Phawngpui Blue Mountain NP in Mizoram and in surrounding forest areas along the Mynmaar border (Table 2.3.1, Fig. 2.3.1). Our recent survey on the status and distribution of sun bears in Manipur (Chauhan and Jagdish Singh 2005b; WII-NWDB 2006) confirmed the presence of sun bears in the Chandel and Ukhrul districts along the boarder of Myanmar but suggested that distribution was patchy.

Both direct and indirect evidence of sun bears (scats, claw marks and foot prints) were observed by inhabitants of these areas. Out of 264 interviewed respondents, 17 % confirmed presence of sun bears by direct sighting, 34.8 % by indirect evidences, 10 % by both direct sighting and indirect evidences and 38 % could not tell about its presence or absence (Chauhan and Jagdish Singh 2005b). A few cubs were kept in villages. Sun bear relative abundance seemed to be higher in Chandel than Ukhrul.

Sun bears were reported to be sighted and indirect evidences were observed from the vicinity and forest areas of 15 villages in Ukhrul district (Table 2.3.2) (Chauhan and Jagdish Singh 2005b).

In Chandel district, the sun bear was reported to be present in the forest areas adjoining the 23 villages (Table 2.3.2).

While visiting forest areas and in the vicinity of these villages, the respondents observed 87 carcasses (hunted bears or natural death), 91 gall bladders, 68 skins, 69 bones, 87 nails and 22 jaws of sun bear in the Ukhrul and Chandel districts during the past 7-8 years (Chauhan and Jagdish Singh 2005b). Many people in these villages were reported to be involved in illegal hunting of bears and other wild animals, and sale of the body parts. The extent of poaching for illegal trade of bear body parts was very high. Hunting of sun bears for food, sale of body parts and sale of young ones captured when the mothers were killed has reached an alarming level throughout its range in Ukhrul and Chan-

Table 2.3.1: Protected area with confirmed or supposed occurrence of Malayan sun bears in North-eastern states.

	No.	Protected area	Area (km ²)
Arunachal Pradesh	1	Mouling NP	483
	2	Mehao WS	281.5
	3	Dibang WS	4,149
	4	Kamlang WS	783
	5	Namdapha NP	1,985.2
Nagaland	6	Fakim WS	6.4
Manipur	7	Yangoupokpi Lokchao WS*	184.8
Mizoram	8	Murlen NP	200
	9	Phawngpui Blue Mountain NP	50

*PA: occurrence confirmed, PA: occurrence supposed

"No." coincide with the numbers in Fig. 2.3.1.

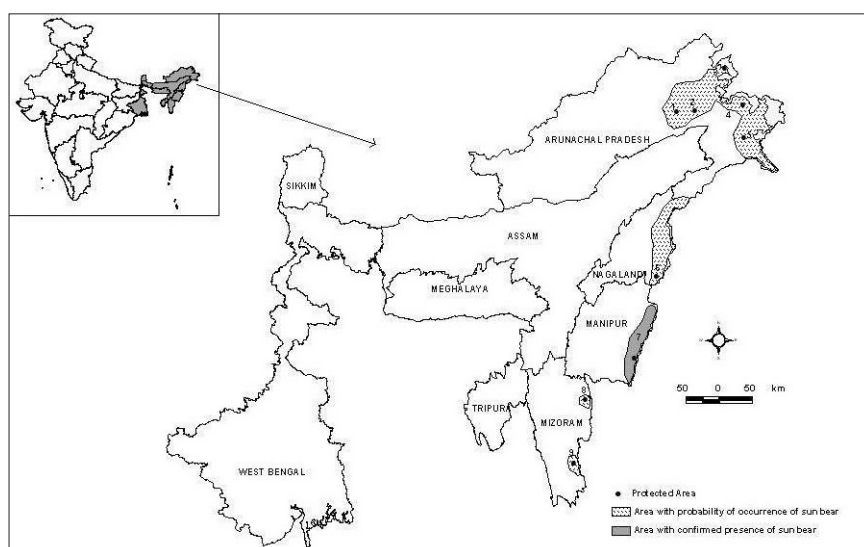


Fig.2.3.1: Occurrence of sun bears in North eastern states of India. The numbers in the figure indicate the protected areas where Malayan sun bears occur (see Table 2.3.1).

del districts of Manipur.

Direct and indirect evidences of sun bears in some parts of the Namdapha Tiger reserve, Arunachal Pradesh were reported (Chauhan and Jagdish Singh 2005b). A systematic survey on sun bear distribution and ecology is important in the state of Arunachal Pradesh.

Bears in captivity

As 2006 there were two adult sun bears in the Imphal zoo in Manipur. A sub-adult sun bear was recently brought to the Aizawl zoo in Mizoram, but it died after few days (Personal communication from Chief Wildlife Wardens).

Legal status

According to the IUCN (2006) criteria, the sun bear is listed as 'Data Deficient', and CITES Listing is on Appendix I. The sun bear is protected under Schedule I of the Indian Wildlife (Protection) Act 1972 (Amended in 2003). Despite this, illegal trade for body parts takes place in India. Sun bear parts and cubs are seen openly for sale in many areas in Manipur, where there are also reports of killing some crop depredating sun bears.

Population threats

In India, sun bear populations are severely threatened due to loss, degradation and fragmentation of habitats, poaching for trade in body parts, by keeping them as pets in villages, and by human-sun bear conflicts.

Table 2.3.2: Occurrence of Malayan sun bears in forests adjacent to villages of Ukhrul and Chandel districts, Manipur state.

Village in Ukhrul district	Sightings (High/Rare)	Village in Chandel district	Sightings (High/Rare)
New Tusom	High	Khonomphai	Rare
Mapum, Siroy hill	High	Yangoubung	Rare
Siroy	High	T. Yangnom	Rare
Tolloi	Rare	Langol Khunou	Rare
New Wahong	Rare	Langol Khamlang	Rare
Yangoudokpi	Rare	New Shijang	Rare
Ramphei	Rare	Chasan Tengnoupal	Rare
Skipe Kugua	Rare	New Maipi	Rare
Sambui Kopuhaphung	High	Kampang Khullen	High
Khankhui	Rare	Machi	Rare
Chamu Kholaphu	High	Machi Uyuiphi	High
Phungyar Phungyar	Rare	Kambang Khunou	High
Kachai	Rare	Narum Mangkot	Rare
Ngainga	Rare	Lamphoupasna	Rare
Konkan Thana	Rare	Kwatha	High
		Kwatha Maru	Rare
		Kwatha Warkhong	High
		Kwatha Lamnamung	High
		Kwatha Khongangpokpi	High
		Maipi Mongsang	Rare
		T. Bongmol	Rare
		Maojang	Rare
		Chajang K.	Rare

Poaching of sun bears is a critical problem in their areas of occurrence. Trade of bear parts is severely affecting the existing sun bear populations. Gall bladder is believed to be of medicinal value. Bones, teeth and claws are also used by villagers as trophies or body ornaments to ward off evils. In Manipur, inhabitants suffer from both economic loss due to crop damage (rice, maize, sweet potato, pulses, oilseeds, sugarcane, plum, and pumpkin) and human injuries from sun bears. There are reports of some retaliatory killing of crop depredating sun bears in Chandel and Ukhrul districts. Control on poaching will require proper intelligence network and greater enforcement efforts.

In many areas of sun bear range such as Burma, Laos, Cambodia, and Vietnam, poaching of bears for sale or for food is unregulated and increasing (Mills and Servheen 1991). Market economies and opening of borders now allow free trade of bears and parts of bears, accelerating killing of bears. Likewise, gall bladder from sun bear in India is reported to be illegally exported to Singapore, Bangkok and Hong Kong (Survey data of Manipur, India).

Habitat threats

In North-eastern states in India, sun bear populations are severely affected due to increasing human population and continuous loss of habitat. Habitat degradation and fragmentation resulted from overgrazing, extraction of non timber forest produce, illicit cutting and lopping of trees, fruit collection, plantations, expansion of agriculture and development activities has caused diminished supply of natural food to sun bears and consequently decline of their populations. Consequent to habitat degradation and in search of food, straying of sun bears from forest areas into human habitation and crop fields is reported (Chauhan and Jagdish 2005b). Bears invade agricultural crop fields and attack on people when encountered suddenly.

Human-bear interactions

Human-sun bear interactions include crop depredation by sun bears and retaliatory killing of bear by aggrieved people, poaching of bears for trade in body parts, meat consumption, sale of cubs, human injuries by bears and impacts of human activities or non timber forest pro-

duce collection on bears and habitats.

Sun bears are known as fierce animals when surprised in the forest. Local people stated that the sun bear attack on humans and inflict serious wounds if surprised (Chauhan and Jagdish Singh 2005a). We documented 95 human injury cases in Ukhul and Chandel districts during 1990-2002 (Chauhan and Jagdish Singh 2005a). Victims were primarily males (98%). Injuries were caused to face, nose, eyes, neck, hands and legs. Bear attacks were recorded in all the seasons, but most cases occurred during autumn and winter. Most (66%) cases occurred in forests, followed by crop fields and near villages. Victims were involved in cattle grazing, farming or crop protection or moving in forests or vicinity of villages or non-timber forest produce collection. Most incidents occurred during morning, evening and night time. There are no records of human-caused mortality.

People living in these areas are generally poor and can not afford crop losses. Some retaliatory chasing and killing of bears by aggrieved people was also reported by the villagers in these forest divisions.

Management

Very little management of sun bears is conducted in India. No habitat management exists for sun bears anywhere in India. There are some efforts by the forest department to check poaching and deforestation. But due to remoteness of these areas and law and order problems caused by militants, management of wildlife areas is difficult. Management of this species is made more difficult by lack of knowledge on the impacts of human activities on the sun bear habitats, ecology, behaviour, food habits, activity pattern and conflicts.

Existing sun bear populations in India require proper management attention. There is an urgent need to conduct systematic surveys on population status and to evaluate threats in order to formulate conservation strategies for sun bears.

Public education and awareness

For wildlife conservation, involvement of local people, field managers, staff and their support is necessary. But there is little knowledge or concern about the status of sun bears in most countries within their range. This is mainly due to the fact that in Southeast Asia, wildlife conservation is focused on species of higher local and international concern such as tiger, elephant, and rhinos.

Through education and awareness programmes, con-

servation ethics can be inculcated among local people. Programmes on ecosystems, conservation, natural history of sun bears, bear habitats, feeding habits, behaviour, activity pattern, human-sun bear interaction and safety measures are important for local communities. Constitution of village committees would help in confidence building and creation of awareness among the people of the affected areas through the outreach programmes. This will greatly help conservation of sun bears in India, and safeguard the interest of the local communities.

Recommendations

- (1) Systematic survey of the status and distribution of sun bear in the remaining range in Arunachal Pradesh, Nagaland, Mizoram and Assam needs to be carried on priority basis to develop a database on its presence and absence. Areas inhabited by bears should be identified and a sun bear distribution range map developed. There is a need for site-specific application of methods to assess distribution, relative density and the impacts of biotic pressure on sun bear populations.
- (2) A study on habitat use pattern of sun bears is required. The availability of suitable habitats can be mapped on general land use maps so that necessary steps can be taken to protect and restore such habitats for conservation of sun bear populations.
- (3) Factors leading to degradation and fragmentation of sun bear habitats should be identified in areas occupied by this species, and strategies should be developed to remove these threats. Cattle grazing, illicit cutting and lopping of trees should be completely banned in bear areas.
- (4) Poaching of sun bears for trade of bear parts is severely affecting the existing sun bear populations in the North-eastern states, and it may lead to extirpation of the species. Strict punishment should be imposed on people involved in hunting of sun bears. Control of poaching will require proper intelligence network and greater enforcement efforts. Trade in bear parts and keeping them as pets should be thoroughly checked by making intelligence system very effective. Forest officials and staff should be properly trained and equipped in dealing with bear trade and related illegal activities.
- (5) The sun bear inhabited areas with preferred habitats should be protected; management action for improvement of these habitats should be a priority. Steps for restoration of degraded habitats through planting of fruiting species used by bears, and removing encroachment from forest land need to be planned and

undertaken.

- (6) Conservation of sun bears should be accorded both international and national priority to deal with poaching for illegal trade of bear body parts. Using new provisions of Indian Wildlife (Protection) Act 1972, conservation and community reserves could be established by different states to protect sun bear populations both within and outside the protected area network.
- (7) Local people venture into forests any time of the day to collect non-timber forest product, which may be of bear interest also i.e. food plants. There should be restrictions on collection of these forest produce from the bear areas. Villagers should be discouraged from collecting bear food items..
- (8) Selected forest patches away from potential bear areas are required to be delineated where local people can be allowed for regulated extraction of fuel wood and lopping activity. Keeping in view the dependency of local people on forests and increasing demand for fuelwood and non-timber forest produce, afforestation activities in suitable areas need to be planned and implemented.
- (9) People should be discouraged from using bear bile as medicine, meat for consumption, skull and bones as trophies, and other body parts for religious beliefs.
- (10) A study on assessment of nature and the extent of human-sun bear conflicts and circumstances is required to develop mitigation strategies. Crop damage and attacks on people decreases local support for bear conservation.
- (11) People should be alert and vigilant while in wildlife areas. To reduce crop depredation by sun bears, protection measures such as co-operative crop guarding, use of live fences and wire fence, scaring sounds or frightening devices, scare-crows and dummies, or fire sticks and crackers especially during the crop maturation stages in areas frequently raided by bears are suggested.
- (12) People still possess the remnants of a conservation ethic. The education and awareness programmes about ecosystems, conservation, natural history of bears, habitats, feeding habits, behaviour, activity pattern, human-bear interaction and safety measures are important for the local community. Constitution of village committees would help in confidence building and awareness messages will help to gain community support for anti-poaching endeavors.
- (13) Very limited information is available on the ecology of sun bears. Basic research on the sun bear should be the highest priority. Basic information on the status, distribution, ecology, food habits, activity pattern and conflict aspects of the sun bear is required in India. Research on assessment of impacts

of forestry practices, timber harvest, and monoculture plantations on the sun bear habitats is also important. The study will greatly help in management and conservation of sun bears in India.

Acknowledgements

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2.4 The Status of Sloth Bears in India

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Sloth bears (*Melursus ursinus*) have a variety of local names in India, such as bhalu and reech (Hindi), richwa (Bhojpuri), asval (Marathi), puni karadi (Malyalam), and elugu bunti (Telgu). Sloth bears were once very common throughout the Indian Peninsula (Brander 1982). During the 1940s and 1950s, many naturalists noticed a sharp decline in sloth bear sightings in the wild, as well as of dancing bears on the streets (Photo 2.4.1) (Seshadri 1969; Krishnan 1972; Singh 1973). This decline was related to loss of forests, and degradation and fragmentation of habitats.

At present, the population within protected areas is comparatively stable, whereas the population outside protected areas is declining. This decline is mainly because of increasing threats by human activities. Thus, this species is designated as an endangered species.

Status

Distribution

Sloth bears inhabit a wide variety of habitats in India; forests with rocky outcrops, grassland and scrubland are frequently used (Akhtar 2004; Akhtar et al. 2000, 2002, 2004b; Balakrishnan and Easa 1986; Gopal 1991; Gokula 1991; Gokula and Varadharajan 1995; Yoganand et al. 2005). Bear distribution and habitat use

patterns have been greatly affected by increasing human activities.

Table 2.4.1 presents a list of national parks and wildlife sanctuaries occupied by sloth bears, based on surveys conducted during 1990-2005, information from the State Forest Department, National Wildlife Database maintained at the Wildlife Institute of India (WII-NWDB 2006), and relevant books and scientific reports. Sloth bears are reported to occur in 174 protected areas (PAs), which include 46 national parks (NPs) and 128 wildlife sanctuaries (WLS) (Fig.2.4.1). They are also found in managed forests outside PAs (Fig.2.4.1).

In northern India, sloth bears are distributed from the lowlands of Nepal and the Siwalik hills, to the forested tracts up to southern region of India. Along the northern part, they overlap with the range of Asiatic black bears (*Ursus thibetanus*) in some areas. The two species coexist in some protected areas, such as Corbett NP, Rajaji NP and Kaziranga NP. In the east, sloth bear range extends through southern Bhutan, and into the North-eastern states of Assam, Mizoram and Arunachal Pradesh. In the northeastern region, sloth bear and Asiatic black bear ranges both overlap with the westernmost range of the Malayan sun bear (*Helarctos malayanus*) (Higgins 1932; Gee 1967; Servheen 1999). All three species coexist in some parts of this region (Choudhury 1993). Sloth bears are absent in Jammu and Kashmir, the Himalayan region of Himachal, and the northwestern deserts of Rajasthan (Fig. 2.4.1).



Photo by Jagdish Singh RK and Chauhan NPS

Photo 2.4.1: A sloth bear kept in a charmer's house and is used for road side show.

Uttaranchal, Uttar Pradesh, Rajasthan and Gujara:

Along the Shiwalik foothills of Uttaranchal and Uttar Pradesh, sloth bears are common in Corbett, Rajaji and Dudhwa NPs and occasionally seen in Sonanadi, Chandraprabha and Katarniaghat WLSs. These 3 national parks and 6 wildlife sanctuaries with sloth bear populations encompass 3,700 km². In Rajasthan, sloth bears are found in 3 national parks and 14 wildlife sanctuaries. Sloth bears are very common in Ranthambhore NP and Jawahar Sagar, Kela Devi, Kumbhalgarh, Mount Abu, and Van Vihar WLSs. The total protected area occupied by sloth bears in Rajasthan encompasses 5,500 km². In Jessore and Ratanmahal WLSs in Gujarat, density of sloth bears is higher than any other protected area within its distribution range. Sloth bears are reported as common in Balaram Ambaji and Shool-

Table 2.4.1: List protected areas with sloth bear population and status in India.

State	Protected area	Area (km ²)	Status	Bears/ 100km ²
Uttaranchal	Corbett NP	520.80	CM	8
	Rajaji NP	820.00	CM	4
	Sonanadi WS	301.18	RR	3
Uttar Pradesh	Chandraprabha WS	78.00	UN	UN
	Dudhwa NP	490.00	VC	12
	Katerniaghat WS	400.69	CM	6
	Kishanpur WS	227.00	RR	UN
	National Chambal WS	635.00	UN	UN
Rajasthan	Ranipur WS	230.31	RR	4
	Bandh Baratha WS	192.76	UN	UN
	Bassi WS	152.90	RR	UN
	Bhensrodgarh WS	229.14	UN	UN
	Darrah NP	265.80	CM	6
	Jawahar Sagar WS	100.00	VC	18
	Kela Devi WS	676.38	VC	UN
	Kumbhalgarh WS	578.25	VC	15
	Mount Abu WS	288.84	VC	6
	National Chambal WS	280.00	UN	UN
	Phulwari Ki Nal WS	511.41	UN	UN
	Ramgarh Vishdhari WS	301.00	RR	5
	Ranthambhore NP	392.00	VC	9
	Sariska NP	492.00	RR	UN
	Sawai Man Singh WS	103.25	CM	6
	Sitamata WS	422.94	UN	UN
	Tadgarh Raoli WS	495.27	CM	5
	Van Vihar WS	59.93	VC	16
Gujarat	Balam Ambaji WS	542.08	CM	7
	Jambogodha WS	130.38	UN	UN
	Jessore WS	180.66	VC	96
	Ratanmahal WS	55.65	VC	62
Madhya Pradesh	Shoolpaneswar (Dhumkhal) WS	607.70	CM	5
	Bagdara WS	478.00	CM	4
	Bandhavgarh NP	448.85	VC	18
	Bori WS	485.72	CM	7
	Fossil NP	0.27	RR	UN
	Kanha NP	940.00	CM	14
	Kheoni WS	122.70	UN	UN
	Panna NP	542.67	VC	15
	Madhav NP	375.22	RR	UN
	National Chambal WS	435.00	UN	UN
	Noradehi WS	1194.67	CM	6
	Pachmarhi WS	417.78	CM	12
	Palpur Kuno WS	344.68	RR	4
	Panpatha WS	245.84	CM	9
	Pench (Priyadarshini) NP	292.85	UN	UN
	Pench WS	118.47	RR	UN
	Phen WS	110.74	CM	7
	Ratapani WS	823.84	CM	8
	Sanjay NP	466.88	CM	12
	Sardarpur WS	348.12	UN	UN
Chhattishgarh	Satpura NP	585.17	CM	9
	Singhori WS	287.91	UN	UN
	Achanakmar WS	551.55	VC	15
	Badalkhol WS	104.45	CM	13
	Barnawapara WS	244.66	UN	UN
	Bhairamgarh WS	138.95	CM	10
	Gomardha WS	277.91	UN	UN
	Guru Ghasi Das (Sanjay) NP	1471.13	VC	15
	Indravati NP	1258.37	VC	9
	Kangerghati NP	200.00	UN	UN
	Pamed WS	262.12	CM	UN
	Semarsot WS	430.35	UN	UN
	Sitanadi WS	553.36	VC	17
	Tamorpingla WS	608.51	VC	18
	Udanti WS	247.60	VC	14

RR - Rare, CM - Common, VC - Very Common, UN - Unknown

State	Protected area	Area (km ²)	Status	Bears/ 100km ²
Bihar	Bhimbandh WS	681.99	CM	UN
	Valmiki NP	335.65	RR	UN
	Valmiki WS	544.67	UN	UN
	Kaimur WS	1342.00	CM	5
	Gautam Budha WS	259.50	UN	UN
Jharkhand	Rajgir WS	35.84	UN	UN
	Palamau WS	794.33	CM	UN
	Betla NP	231.67	CM	UN
	Dalma WS	193.22	CM	8
	Hazaribagh WS	186.25	RR	UN
West Bengal	Koderma WS	177.35	RR	UN
	Palkot WS	183.18	UN	UN
	Topchanchi WS	8.75	UN	UN
	Buxa NP	117.10	RR	UN
	Buxa WS	368.99	RR	UN
Assam	Gorumara NP	79.45	RR	UN
	Jaldapara WS	216.51	CM	4
	Neora Valley NP	88.00	UN	UN
	Barnodi WS	26.22	UN	UN
	DibruUNSaikhowa NP	340.00	UN	UN
Arunachal Pradesh	Karbi Anglong WS	317.81	RR	UN
	Kaziranga NP	858.98	CM	6
	Manas NP	500.00	UN	UN
	SonaiUNRupai WS	220.00	UN	UN
	Marat Longri WS	451.00	UN	UN
Mizoram	Itanagar WS	140.30	UN	UN
	Namdapha NP	1985.23	UN	UN
	Pakhui WS	861.95	UN	UN
	Dampa WS	500.00	UN	UN
	Murlen NP	100.00	UN	UN
Orissa	Baisipalli WS	168.35	UN	UN
	Chandaka Dampara WS	175.79	CM	6
	Karlapat WS	147.66	RR	UN
	Khalasuni WS	116.00	UN	UN
	Kotagad WS	399.50	RR	UN
Maharashtra	Kuldiha WS	272.75	UN	UN
	Satkosia Gorge WS	745.52	UN	UN
	Simlipal NP	845.70	CM	6
	Simlipal WS	1354.30	CM	7
	Andhari WS	509.27	UN	UN
Goa	Bhamragarh WS	104.38	CM	UN
	Bor WS	61.00	RR	UN
	Chandoli WS	317.67	CM	7
	Chaprala WS	134.78	UN	UN
	Gautala WS	260.61	UN	UN
Andhra Pradesh	Gugamal NP	361.28	CM	UN
	Katepurna WS	73.63	UN	UN
	Melghat WS	778.75	VC	12
	Nagzira WS	152.81	VC	13
	Nawegaon NP	133.88	CM	UN
Goa	Painganga WS	324.62	UN	UN
	Pench NP	257.26	CM	UN
	Tadoba NP	116.55	VC	14
	Wan WS	211.00	UN	UN
	Yawal WS	177.52	CM	7
Andhra Pradesh	Cotigao WS	85.65	UN	UN
	Mollem NP	107.00	UN	UN
	Mollem WS	133.00	UN	UN
	Eturnagaram WS	806.15	CM	UN
	Gundla Brahmeswaram WS	1194.00	UN	UN
Andhra Pradesh	Kaundinya WS	356.70	UN	UN
	Kawal WS	893.00	CM	UN
	Kinnersani WS	656.00	RR	UN
	Lanja Madugu Sivaram WS	36.29	UN	UN
	NagarjunsagarUNSRisailam WS	3568.09	CM	9
Andhra Pradesh	Pakhal WS	879.3	CM	UN
	Papikonda WS	591	CM	UN
	Pocharam WS	130	UN	UN

RR - Rare, CM - Common, VC - Very Common, UN - Unknown

State	Protected area	Area (km ²)	Status	Bears/ 100km ²
Karnataka	Pranahita WS	136.02	RR	UN
	Sri Lankamalleswaram WS	464.42	UN	UN
	Sri Penusila Narasimha WS	1030.85	CM	UN
	Sri Venkateswara NP	353.62	RR	UN
	Sri Venkateswara WS	153.32	UN	UN
	Adichunchanagiri WS	0.84	UN	UN
	Anshi NP	250	RR	UN
	Arabithittu WS	13.5	UN	UN
	Bandipur NP	874.2	CM	6
	Bannerghatta NP	104.27	RR	UN
	Bhadra WS	492.46	CM	UN
	Biligiri Rangaswamy Temple WS	539.52	CM	UN
	Brahmagiri WS	181.29	UN	UN
	Dandeli WS	843.16	VC	UN
	Doraji Bear WS	55.87	VC	UN
	KudremUNh NP	600.32	UN	UN
	Melkote Temple WS	49.82	UN	UN
	Mookambika WS	247	CM	UN
	Nugu WS	30.32	UN	UN
	Rajiv Gandhi (Nagarahole) NP	643.39	CM	UN
Tamil Nadu	Sharavathi Valley WS	431.23	CM	UN
	Shettihalli WS	395.6	CM	UN
	Someshwara WS	88.4	UN	UN
	Indira Gandhi (Annamalai) NP	117.1	CM	9
	Indira Gandhi (Annamalai) WS	841.49	CM	11
	Kalakad WS	223.58	CM	UN
	Mudumalai NP	103.23	CM	UN
	Mudumalai WS	217.76	UN	17
	Mundanthurai NP	567.38	CM	UN
	Chendurang WS	UN	UN	UN
Kerala	Chimmony WS	90	UN	UN
	Chinnar WS	90.44	RR	3
	Eravikulam NP	97	UN	UN
	Idukki WS	70	RR	UN
	Neyyar WS	128	RR	UN
	Parambikulam WS	285	CM	7
	Peppara WS	53	UN	UN
	Periyar NP	350	CM	6
	Periyar WS	777	CM	UN
	Silent Valley NP	89.52	VC	56
	Wayanad WS	344.44	CM	UN
		66,854.53		

RR - Rare, CM - Common, VC - Very Common, UN - Unknown

Sources: State Forest departments; Wildlife Institute of India - Survey Reports; Wildlife Institute of India - National Wildlife Database; Brander (1982); Prater (1980); Seshadri (1986); Israel and Sinclair (1987); Sahraia (1982).

paneswar WLSs.

Madhya Pradesh and Chattishgarh: In the states of Madhya Pradesh and Chattishgarh, sloth bears occur in 11 NPs and 23 WLSs. They are very common in Bandhavgarh, Panna and Guru Ghasi Das NPs, and Achanakmar, Sitanadi, Tamorpingla and Udanti WLSs. In Kanha, Satpura, Sanjay and Indravati NP, and Bagdara, Bori, Noradehi, Pachmarhi, Panpatha, Phen, Ratapani, Badalkhol, Bhairamgarh and Pamed WLSs, sloth bears are commonly seen in the forests. The total area of these national parks and wildlife sanctuaries covers 15,000 km².

Bihar and Jharkhand: Sloth bears are found in 5,000 km² of forests in 2 NPs and 11 WLSs in Bihar and Jharkhand. They are commonly sighted in Betla NP, Palamau, Dalma, Bhimbandh and Kaimur WLSs.

West Bengal, Assam, Arunachal Pradesh and Mizoram: Sloth bears are reported as common in Jaldapara WLS in West Bengal and Kaziranga NP in Assam. The protected area inhabited by sloth bears in these states is 3,600 km². It is reported as rare in Buxa NP, and in Gorumara and Karbi Anglong WLSs. The status of sloth bears in rest of protected areas in Assam is not known. There are reports of sloth bears in Arunachal Pradesh and Mizoram, but their status is unknown.

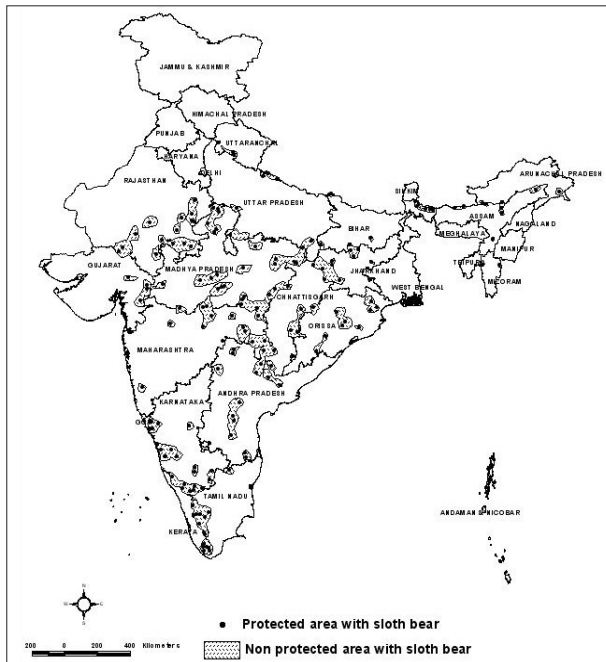


Fig.2.4.1: Distribution of sloth bears in India.

Orissa, Maharashtra and Goa: In Orissa, sloth bears are reported as common in Simlipal NP and Chandaka Dampara WLS, but also occur in 1 NP and 8 WLSs covering a total area of 4,200 km². Sloth bears are found in 4,300 km² of protected forests (5 NPs and 14 WLS) in Maharashtra and Goa. They reported as very common in Tadoba NP and in Melghat and Nagzira WLSs, but are rarely seen in Bor WLS.

Andhra Pradesh, Karnataka, Tamil Nadu and Kerala: A total of 11,000 km² of protected forests (2 NPs and 13 WLS) is occupied by sloth bears in Andhra Pradesh. They are commonly seen in Nagarjunsagar-Srisailem Tiger Reserve and Eturnagaram, Kawal, Pakhal, Papikonda, and Sri Penusila Narasimha WLSs. In Karnataka, it is very common in Dandeli and Doraji Bear WLSs. It is reported to occur in 5 NPS and 13 WLS, covering an area of 5,800 km² in the state. Sloth bears occur in 2,100 km² of protected area in Tamil Nadu. They are reported as common in Kalakad Mundanthurai Tiger Reserve, Mudumalai NP and Annamalai hills. Sloth bear range extends further into Kerala, where it occupies 2,400 km² of protected forests that include 3 NPs and 9 WLSs. They are commonly found in Parambikulam, Peppara, Periyar and Wayanad forests.

Surveys and ecological studies have indicated that sizable numbers of sloth bears also occur outside many protected areas. We have collected information on occurrence of sloth bears in Raigarh, North Bilaspur, Korea, Raipur North, Bastar Central, Durg, Kanker and

Rajnandgaon forest divisions of Chattishgarh state; Balaghat North, Balaghat South, Jabalpur, Khandwa, Chindwara West, and Umaria forest divisions of Madhya Pradesh; Dhalbhum forest division of Bihar, and Kheojhar, Deogarh, Dhenkanal, Boudh, Angul, Baripada and Ghumsar North forest divisions of Orissa. There are also reports of sloth bear occurrence outside protected areas from Uttaranchal, Uttar Pradesh, Rajasthan, Andhra Pradesh, Karnataka, Tamil Nadu and Kerala. According to the Forest Department, the total estimate for only Kanker, Jagdalpur, Sarguja, Bilaspur, Raipur and Durg circles was 4,250 sloth bears (Akhtar unpublished data).

Population estimates

Total forest cover in India is 770,000 km² (Forest Survey of India 2003), and numerous studies have been conducted on status, distribution and ecology of sloth bears. Rough population estimates are available from protected areas including national parks and sanctuaries, as well as managed forests outside PAs.

Fig.2.4.1 provide a tentative sloth bear distribution range map, based on survey data and information from the forest department and Wildlife Institute of India-National Wildlife Database (WII-NWDB 2006). In central India, a larger proportion of the sloth bear population occurs outside than inside PAs. Sloth bear populations have been estimated for various NPs and WLSs in India. For PAs, conversion of an average value of 12.1 bears/100 km² within 67,000 km² areas suggests about 8,110 sloth bears. This estimate is similar to that of the IUCN Action Plan 1999 (Garshelis et al. 1999a). Two sanctuaries, Jessore WLS and Ratanmahal WLS, established especially for sloth bears in Gujarat, have the highest reported densities; 96 and 62 bears/100 km², respectively. Silent Valley NP in Kerala has 56 bears/100 km². Desai et al. (1997) estimated 17 bears/100 km² in Mudumalai WLS. Sloth bear density estimates include Dudhwa NP (10 bears/100 km²), Corbett NP (8 bears/100 km²), Ranthumbhore NP (8 bears/100 km²), Guru Ghasidas WLS (15 bears/100 km²), Kanha NP (14 bears/100 km²), Bandhavgarh NP (18 bears/100 km²), Achanakmar WLS (12 bears/100 km²), Tamorpingla WLS (18 bears/100 km²), Udanti WLS (14 bears/100 km²) and Sitanadi WLS (17 bears/100 km²) was found to be considerably high (Akhtar et al. unpublished data). From these estimates, it appears that the sloth bear population is more or less stable in protected areas, which may be due to protection and wildlife management practices. But the sloth bear population is highly threatened and on decline in managed forests outside PAs.

Akhtar et al. (2004, 2004a unpublished data), Bargali (2004), and Chauhan et al. (2003) estimated sloth bear

density in areas outside protected areas in India. In unprotected habitat of North Bilaspur FD, density (23 bears/100 km²) was higher than in PAs. Iswariah (1984) estimated a density of 12 sloth bears/100 km² outside protected area in Ramnagaram Taluk, Karnataka. From the figures collected by Akhtar et al. (unpublished data), areas outside PAs average 12 bears/100 km². Approximately 120,000 km² outside PAs is reported to be occupied by sloth bears. Because this is incomplete information, this figure may be low. Converting these densities to abundance results in an estimated 14,000 sloth bears outside PAs. Thus, a total population of sloth bear in India is more than 20,000.

Bears in captivity

There are about 272 sloth bears in captivity in India, of which 192 were in zoological parks and safaris, and 80 were in the bear rescue centre at Agra (Zoo Authority of India record of 2006; Seshamani and Satyanarayan 1997). Among captive bears in 38 zoos and safaris, there were 86 males, 88 females and 18 young. Of 80 bears in the rescue centre, 48 were males and 32 were females. There are probably an additional 100-150 dancing bears with charmers/kalanders in the country.

Legal status

Sloth bears are totally protected under Schedule I of the Indian Wildlife (Protection) Act 1972 (Anon 2005). They cannot be hunted, but can be killed in self defense or in special circumstances where they have caused significant damage. Trade for bear body parts and export is illegal. Sloth bears are listed as Vulnerable (A2cd); CITES listing: Appendix I.

Population threats

Sloth bear populations in India are largely threatened by poaching for gall bladder and other body parts: skin, male reproductive organs, bones, claws, teeth and meat. Gall bladder is believed to be of medicinal value, and is illegally exported to Singapore, Bangkok, Hong Kong, South Korea, Taiwan and Japan as indicated by records of TRAFFIC-India. Male reproductive organs are used as an aphrodisiac agent by local people. Bones, teeth and claws are used by villagers to ward off evil, a superstitious belief (Bargali 2004; Chauhan et al. 2003). In Chattishgarh and Madhya Pradesh, villagers illegally hunt for male bears for body parts. Bear body parts from an estimated 700-1,500 bears/yr were exported from India to Japan during the late 1970s through the 1980s (Servheen et al. 1999; Garshelis et al. 1999b). Poaching and trade in sloth bear parts is still very common in the state of Uttar Pradesh, Chattishgarh, Madhya Pradesh, Rajasthan, Orissa, West Bengal and the North-eastern states. Other important threats in-

clude trapping and removal of live bears, mainly cubs, from forests by charmers.

Habitat threats

There is continuous loss, degradation and fragmentation of forests and encroachment on forest land in India due to increase in the human population, cattle grazing, extraction of non-timber forest produce (NTFP), illicit cutting and lopping of trees, collecting honey and fruits (delicacies for bears), increasing monoculture plantations (e.g. teak and eucalyptus), expansion of agriculture, and other developmental projects. As a result, sloth bear habitats are severely affected; habitat loss and degradation poses a major threat to sloth bear populations especially outside PAs.

Human-bear interactions

Sloth bears are known for their aggressiveness. In Central India, sloth bears have a formidable reputation, and are considered one of the most fearsome of all the wild animals (Pillarisett 1993; Chauhan and Rajpurohit 1996). They are highly unpredictable in attacking people, especially when mothers are accompanied by cubs (Prater 1980; Pillarisett 1993). Human-sloth bear conflicts have been reported in most areas inhabited by sloth bears in India. Sloth bears cause extensive agricultural crop depredation (Laurie and Seidensticker 1977; Iswariah 1984; Sankar and Murthy 1995; Chauhan and Rajpurohit 1996). Krishna Raju et al. (1987) reported the occurrence of 20-30 mauling cases/yr by sloth bears in Andhra Pradesh. Human-sloth bear conflict has been reported from many parts of Madhya Pradesh and Chhattisgarh (Chauhan and Rajpurohit 1996; Chauhan et al. 1999, 2003; Rajpurphit and Krausman 2000; Bargali et al. 2005). NTFP collection by villagers was done especially early in morning and again in evening. Collection time coincided with the time when bears were foraging or returning to their den sites, thus resulting in increased human casualties. Most villages located close to den sites were affected by crop raiding and human casualties from bears. During the period April 1989 - March 1994, there were 607 human casualties caused by sloth bears in Madhya Pradesh. Of 151 cases, 103 occurred in forests, 34 in crop fields and the remaining 14 were in villages. In North Bilaspur FD, 395 human casualties occurred during 1991-2000. Men were attacked more frequently than women. Of 178 villages surveyed, 122 were affected (Bargali et al. 2005). In and around Panna National Park, 80 sloth bear attacks were reported in 30 villages during 1981 - 2000 (Yoganand et al. 2005). During April 1989-March 1995, 50 human casualties by sloth bears were reported in Bihar; 22 in Dalma WLS, and 11 in Palamau tiger reserve (Chauhan and Rajpurohit 1996). Sixty six human casu-

alties by sloth bears occurred during April 1990 March 1995 in Orissa.

Management

Using new provisions of the Indian Wildlife (Protection) Act 1972, conservation and community reserves can be established by states to protect sloth bear populations, both inside and outside the protected area network. In North Bilaspur FD, there are contiguous forest patches with few scattered villages and high concentration of sloth bears (Chauhan et al. 2003; Akhtar 2004; Bargali 2004). These areas should be considered by the state government for declaration as bear sanctuaries. In Gujarat, 3 wildlife sanctuaries have been established specially to protect sloth bears along the western edge of their range (Java 1991).

After the inception of Project Tiger in 1972, a network of protected areas was established for conservation of tigers in India. Sloth bears have also been protected as a consequence, including in Corbett, Dudhwa, and Ranthambore Tiger Reserves (TRs), along the northwestern range of the sloth bear; Kahna, Panna and Bandhavgarh TRs in the central range; Buxa and Manas TRs in the northeast of its range, and Bandipur and Periyar TRs in the southern part its range. These tiger areas with sloth bear populations constitute 4.22% of the total forest areas. But existing sloth bear populations in reserve forests outside protected areas require proper management attention.

Public education and awareness

For wildlife conservation, involvement of local people and their support is necessary. Through education and awareness programmes, conservation ethics can be inculcated among local people. Education and awareness programmes about ecosystems, conservation, natural history of bears, bear habitats, feeding habits, behaviour, activity patterns, human-bear interactions, and safety measures are important for the local community. Constitution of village committees would help in confidence building and creation of awareness among the people of the affected areas through the outreach programmes. This will greatly help conservation of sloth bear in India, and safeguard the interest of the local communities.

Recommendations

(1) We need to periodically monitor sloth bear popula-

tions across their range and update the database on status and distribution of sloth bears.

- (2) Sloth bear habitats and corridors between bear population units should be quantified and mapped on land-use maps so that necessary steps can be taken to protect and restore such habitats. Management should be focused on large, discrete population units, rather than individual protected areas.
- (3) Much of the sloth bear population in India survives outside the PA network. The existing inhabited areas need to be protected from human interference. Habitat restoration can be done through planting of species producing fruits that bears eat, removing encroachment from forest land and denning areas, checking mining activity and stone extraction from bear den sites, and controlling forest fires. Some large areas inhabited by sizeable populations of sloth bears can be protected through creation of bear sanctuaries or community and conservation reserves within the purview of Indian Wildlife (Protection) Act 1972.
- (4) Poaching of sloth bears is a critical problem in some parts of the country, and is likely to seriously affect sloth bear populations. Controlling poaching will require proper intelligence network and greater enforcement efforts, as well as an educational programme to gain community support for anti-poaching endeavors.
- (5) Trade of bear parts is severely affecting bear populations in India. People should be discouraged from using bear bile as medicine and body parts as aphrodisiac agents. Trade needs to be checked by making intelligence system effective. Forest officials and staff should be trained and equipped in dealing with bear trade and other illegal activities.
- (6) Charmers trap and remove bear cubs from bear denning areas, severely affecting bear populations. Charmers are being encouraged to cease exhibiting dancing bears, and to transfer their bears to government custody in exchange for loans or other employment opportunities.
- (7) Factors leading to degradation and fragmentation of sloth bear habitats should be identified on both an area- and state-wide scale, and strategies should be developed to remove these threats.
- (8) Some forest patches away from potential bear areas are required to be delineated where regulated extraction of fuel wood and lopping activity is allowed, while still leaving fruiting trees of value to bears.
- (9) Within bear areas, collection of forest products should be restricted. Villagers should be discouraged from collecting bear food items. Collection of NTFP from bear denning areas should be completely banned.

- (10) In summer, bear habitats are severely impacted by frequent man-made fires. Effective management, by keeping vigil on fires, using preventive measures and adoptive strict punishment for culprits, must be practiced.
- (11) Increasing human-sloth bear conflicts threatens to erode local support for bear conservation measures such as participation in protection strategy and community forestry programs. Mitigation of human-bear conflicts is a priority.
- (12) To reduce damage by sloth bears, crops should be protected by using crackers, fires and other deterrents, especially during the vulnerable, maturation stage of crops. Changes in crop patterns may be useful. To avoid human casualties, people should move in groups and make noise, especially during morning and evening hours.
- (13) Villagers still possess the remnants of a conservation ethic. The education and awareness programmes are important for the local community. Constitution of village committees would help in confidence building and creation of awareness among the residents of the affected areas through outreach programmes.

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Chapter 3

The Status of Sloth Bears in Sri Lanka

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Sri Lanka, one of the few biodiversity hotspots in the world, faces enormous challenges balancing the needs of humans and wildlife. Sloth bears (*Melursus ursinus*) are threatened throughout their range from habitat loss and conflict with humans. Despite legal protection, sloth bears in Sri Lanka are persecuted because of their reputation for aggressiveness and inflicting serious injury to humans. Moreover, there is a critical lack of knowledge about the biology and status of sloth bear populations in Sri Lanka. We present information on what we currently know about sloth bear populations in Sri Lanka and offer recommendations for their conservation.

Biology

The sloth bear is the only representative of the family Ursidae of the order Carnivora found in Sri Lanka. The subspecies, *M. u. inornatus* (Photo 3.1), is endemic to Sri Lanka, and is smaller on average than *M. u. ursinus*. Wild adult male and female sloth bears at Was-

gomuwa National Park in Sri Lanka average 75 kg and 58 kg, respectively (Ratnayeke et al. in press). Phillips (1935) reported body weights of 104 kg and 68 kg for male and female sloth bears in Sri Lanka, although it is unclear if these represented maximum weights, and whether they were obtained from wild or captive individuals.

Sloth bears are most frequently encountered in jungles remote from human habitation (Nicholas 1974; Ratnayeke et al. unpublished data). When disturbed, they may respond aggressively and attack and injure humans (Santiapillai and Santiapillai 1990; Rajpurohit and Krausman 2000), often resulting in their persecution (Ratnayeke unpublished data). Estimates of home-range size from a radiotelemetry study at Wasgomuwa National Park in Sri Lanka (Ratnayeke et al. in press) are the smallest yet reported for sloth bears: mean 95% fixed kernel home ranges (Worton 1989) were 2.2 km² (SE = 0.61, *n* = 4) and 3.8 km² (SE = 1.01, *n* = 6) for adult females and males, respectively. Although areas outside the national park were accessible to sloth bears, home ranges were almost exclusively placed within the national park boundaries. Within home ranges, open habitats such as abandoned chenas (swidden agricultural fields that have reverted to sparse forest) were used less than forested habitats that provided more vegetative cover.

Sloth bears possess special adaptations for feeding on termites (Pocock 1933; Erdbrink 1953; Sacco and van Valkenburgh 2004). Predictably, termites compose a large proportion of their diet in Sri Lanka (Fig.3.1), but seasonally available foods including fruit, honey and meat are also consumed. In the forests of Sri Lanka, fruits of two endemic species of trees, *Manilkara hexandra* and *Drypetes sepiaria*, and the dry pods of *Cassia fistula*, are among the principal plant foods consumed by sloth bears.

One reportedly unique aspect of the biology of *M. u. inornatus* is its lack of a conspicuous breeding season (Phillips 1935). Typically, *M. u. ursinus* females on the Indian mainland give birth during November - January (Garshelis et al. 1999). Our observations suggest that



Photo by Shyamala Ratnayeke

Photo 3.1: An adult male sloth bear at Yala National Park, Sri Lanka.

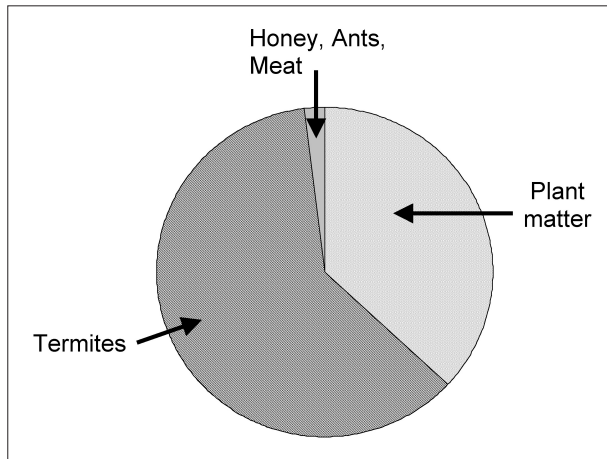


Fig.3.1: a) Percentage composition of food categories found in 666 sloth bear scats at Wasgomuwa National Park, 2002-03. Plant matter consisted mostly of fruit (*Cassia fistula* and *Drypetes sepiaria*).

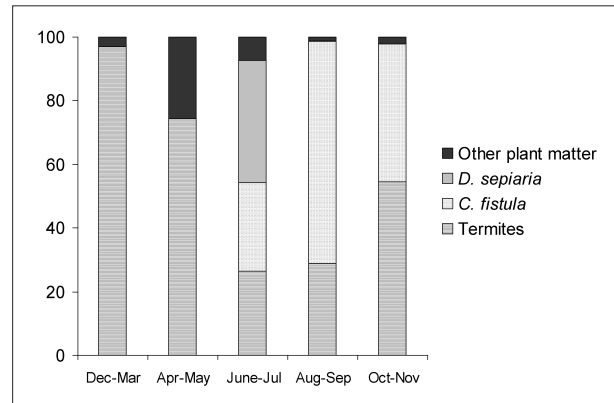


Fig.3.1: b) Percentage composition of sloth bear food items by season at Wasgomuwa National Park, 2002-2003. Fruit composed a larger part of sloth bear diets during the driest months (June - September), whereas termites were the main food item during wetter months (October - April).

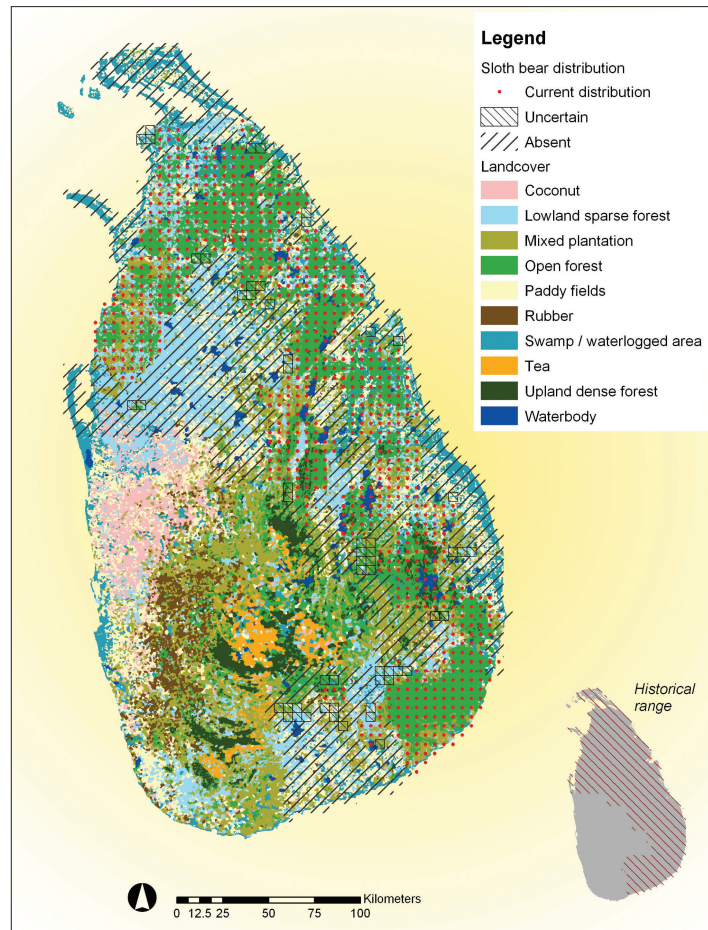


Fig.3.2: The 2004 distribution of the sloth bear in Sri Lanka. All areas within the historic range of the species were surveyed and classified as occupied or unoccupied by sloth bears, or uncertain. Each red dot represents the center of a 5x 5km cell occupied by sloth bears, whereas hatching represents surveyed cells where sloth bears were absent. Areas demarcated as “uncertain” were those with conflicting reports from respondents. The land use map was based on a 2001 satellite image (United Nations Environmental Program 2003).

births in *M. u. inornatus* occur over a somewhat broader time interval, but correspond with the general pattern reported for *M. u. ursinus*.

Status

Accounts of the distribution of the sloth bear in Sri Lanka in the early decades of the 20th century indicate that it was widespread in the lowland jungles of the dry zone (Phillips 1935). A distribution survey we conducted in 2004 indicated that the current range corresponded with the distribution of low elevation open forests where human densities (as indexed by road density) were low (Fig.3.2).

Sloth bear range constituted roughly 17-18% of Sri Lanka's total land area. Elevations where sloth bears occurred was 0-300 m, with less than 2% of sloth bear habitat above 300m. According to estimates for protected areas made by the Sri Lanka Department of Wildlife Conservation (2003), approximately 49% of current sloth bear range is within protected areas such as national parks and strict nature reserves that regulate human activity and prohibit hunting of any kind (Fig.3.3). Most (> 75%) of the remaining 51% lies in the north

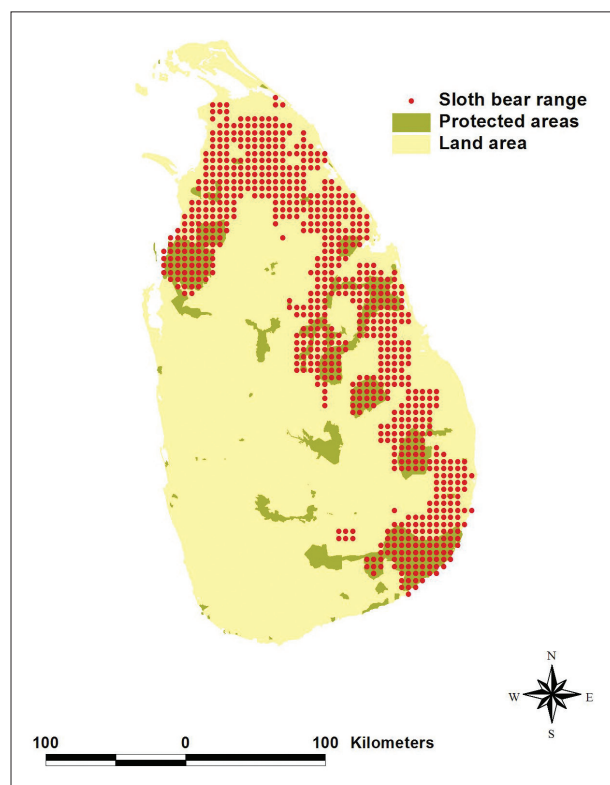


Fig.3.3 : Sri Lanka's network of protected areas and current sloth bear range.

and east of the island, within zones of ethnic conflict. The estimate of 49% in protected areas does not include some (e.g., Wilpattu National Park and parts of Yala National Park) that lie within regions of ethnic conflict, and which have remained effectively unprotected for extended periods.

In the absence of any population estimates for sloth bears in Sri Lanka, Santiapillai and Santiapillai (1990) offered a tentative estimate of 300-600 bears within the protected area network of Sri Lanka, based on a crude density value of 0.5-0.1 bears/km². Recent work suggests that Wasgomuwa National Park alone, which constitutes about 6% of protected sloth bear range and about 3% of total sloth bear range, may support more than 100-150 bears (Ratnayeke et al. in press). Sloth bear densities in some protected areas may exceed 1 bear/km², but habitat conditions vary across protected areas, and densities are probably lower in sparse forests and in unprotected sloth bear range. We therefore cannot provide island-wide population estimates, but suggest that the actual population size of *M. u. inornatus* is probably well in excess of 600 sloth bears.

Human-bear relationships

The Sinhalese and Tamil names for the sloth bear are "valaha" and "karadi", respectively. An old tradition of hunting bears for their fat, which was supposed to stimulate hair growth, is now uncommon. We conducted 266 structured interviews with rural inhabitants who used sloth bear habitat on a regular basis for hunting, chena (slash and burn) cultivation, and collecting forest products. All respondents were males between 20 and 89 years of age (median age = 45) of whom 67% were rural farmers. There were no reports of sloth bears raiding agricultural crops, and sloth bears rarely visited areas used by humans. It is interesting that crop depredation by sloth bears is reported in India and we can only speculate that the extent of habitat degradation in Sri Lanka may not be so severe that sloth bears resort to raiding crops. Sixty five percent of 222 respondents admitted to killing sloth bears, or having knowledge of a bear being killed in their locality (Fig.3.4a), although there was considerable variability in how frequently bears were killed (i.e. from 1-2 bears per month to 1-2 bears per year). Of those respondents that acknowledged that bears were killed, the majority stated that humans killed sloth bears to defend themselves from being attacked. A smaller fraction of respondents stated that they killed bears because they feared them, and a comparable number had killed bears accidentally, because they mistook them for wild boar (*Sus scrofa*, Fig.3.4b).

Human victims of sloth bear attacks were regularly encountered during the survey. We interviewed 277 victims of sloth bear attacks during the survey. The majority of attacks occurred remote from villages when individuals had entered the forest to hunt, gather forest products, or tend their chenas (plots of shifting slash/burn agriculture). Most attacks occurred at close quarters, and between 0900 and 1600 hrs.

Sri Lanka's 2001 forest cover estimates of 24.31% (United Nations Environmental Program 2003) are not dramatically different from an estimated 24.9% forest cover in 1981 (Erdelen 1988). These estimates, derived from remote-sensing techniques, do not account for the progressive degradation of primary forests through illegal felling and other anthropogenic activities (Perera 2001). The island's human population, about 79% of which is rural, increased from 232 to 303 /km² within roughly the same period, and currently stands at an estimated 316 /km² (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat 2004). Subsistence living well below the poverty level forces most rural individuals in the dry zone to use forests to meet immediate needs. We do not know whether killing of sloth bears is increasing, but it is certain that as human use of natural forests increases, human-sloth bear encounters will also increase to the detriment of sloth bears.

Commercialism of bears

In the Mannar District of Sri Lanka, the sloth bear was so numerous during the early part of the 19th century that the Government encouraged its removal by paying a bounty for every animal that was killed. Records indicate that rewards were paid for the slaughter of at least 442 animals in the Mannar District alone between 1854 and 1880 (Boake 1888). But our 2004 survey indicated that people who used forests occupied by sloth bears rarely killed them for body parts (Fig.3.4). Fat was the main body part taken, followed by skin. Although gall bladders were a prime motivation for killing bears, we had only one report of individuals from an East Asian company offering payment for a bear gall bladder along with the bear's paw, from local hunters.

Present management system

In Sri Lanka, wildlife management is the art of the possible. While much of the attention has been given to the plight of the island's only megaherbivore - the elephant - efforts to conserve the sloth bear (and other carnivores) leave much to be desired. The principal management measure so far has been listing of the sloth bear as one of the protected species (Parliament of the Democratic Socialist Republic of Sri Lanka 1993) in the island, thus giving it legislative protection against hunting. Reservation of habitat for sloth bears has been largely incidental to conservation measures for elephants. The ongoing ethnic conflict, which encom-

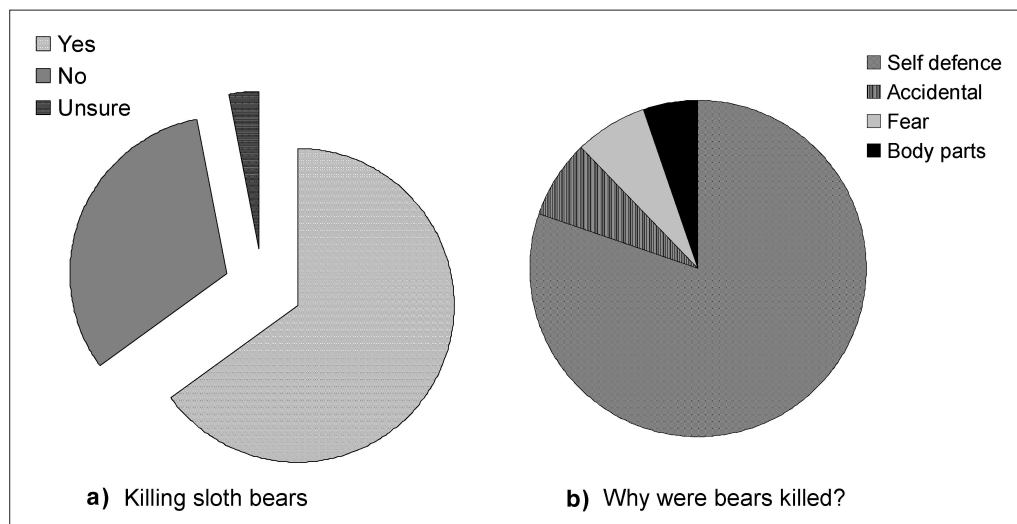


Fig.3.4: Direct threats to sloth bears in Sri Lanka (2004 survey). a) Proportion of 222 respondents who stated whether or not they knew of bears that had been killed in their locality. b) Among respondents acknowledging that bears were killed, proportion citing various reasons for the killing. "Accidental" kills were generally misidentifications, in which hunters mistook them for wild boar.

passes most unprotected sloth bear range, provides obstacles to formally establishing new protected areas. Fortunately, the policy of allowing nature to follow its own course seems to have worked to the advantage of the sloth bear outside the system of protected areas. Much of the sloth bear habitat lies in the low country dry zone, especially in the Vanni, an area that has witnessed almost 20 years of civil war. One of the positive impacts of the war on the environment is its tendency to keep people, including poachers, out of conflict areas (Santiapillai and Wijeyamohan 2003). The prospects of peace in the north and east remain uncertain, but if and when resolved, the resulting resettlement of people will bring new concerns for the future of sloth bears in these areas. The sloth bear, like other large carnivores, is a species where the basis for its management in the wild must be keeping human settlement and wildlife refuges well separated.

Recommendations

Viable populations of the sloth bear still exist in fairly substantial and contiguous extents of the open lowland forest in the Dry Zone where human impacts (as indexed by road density) are relatively low. Apparent trends in habitat conversion have been relatively slow in the past 2 decades, suggesting that sloth bears in Sri Lanka may be reasonably secure in the short term. However, human population trends suggest that fragmentation of sloth bear range and dwindling of sloth bear populations outside protected areas is inevitable. A small isolated population of sloth bears at the extreme southwestern edge of their range (Welanwita-Annasigala area) is in imminent danger of extirpation. In fact, it is highly uncertain whether sloth bears still exist immediately west of this region, (now Uda Walawe National Park), an area that once supported sloth bears. A large portion of sloth bear range in Sri Lanka lies in unprotected areas, particularly in the north and east of the island (Fig.3.3). Establishing protected areas in those regions and strictly regulating human use of protected areas throughout the island will be crucial for the future of sloth bears. A strong culture of hunting and collecting forest products exists in Sri Lanka. Consequently, human-bear conflicts and killing of bears occur throughout sloth bear range and are expected to increase as human density increases. For example 30% of the sloth bear victims we interviewed admitted they were attacked within protected areas they had entered illegally. This emphasizes the need to reduce human use of protected areas, and provide public education programs to encourage support for wildlife conservation. The future of the sloth bear in Sri Lanka will belong to

those who are willing to accommodate its presence in the habitat they share with other wildlife, while at the same time giving thought to those who will come after them. There are only two possible solutions: man or bear, or man and bear.

Acknowledgements

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Chapter 4

The Status and Conservation of Bears in Bangladesh

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There are three species of bears in Bangladesh: Asiatic black bears (*Ursus thibetanus*), sun bears (*Ursus malayanus*) and sloth bears (*Melursus ursinus*).

The presence of bears in western Bengal and from Madhupur Gar, the Garo hills of the Greater Mymensingh district, and Rangpur and Pabna districts was reported beginning in the late 18th century by several researchers (Buchanan 1833; Hunter 1876; Vas 1911; Strong 1912; Khan, 1990). However, bears were extirpated there due to habitat destruction caused by the expansion of human settlement and agricultural land at the beginning of 19th century.

Threats to bear populations are still increasing because of the expansion of human populations, and resultant over-exploitation of bear habitat and of bears themselves. However, little study has been done so far on any bear species in Bangladesh. In this report, I summarize information from my own research since 1970, extensive interviews with local people, and the literature. I expect this report to promote further research and conservation activities in Bangladesh.

Status

Distribution

Asiatic black bears: Asiatic black bears are called bhaluk in Bengali, and kala harin by tribal people such as Maghs, Chakmas, Firinghi, and Garos. The number of wild Asiatic black bears in Bangladesh has not been estimated, but is recognized to be few, and is designated in the 3rd Schedule of Bangladesh Wildlife (Preservation) (Amendment) Act of 1974. It is an endangered species in Bangladesh (IUCN 2000).

The species is distributed in the protected areas of Pabla Khali Wildlife Sanctuary, Rangamati, Kaptai National Park of Chittagong Hill Tracts, and the reserved forests of non-protected areas of Kassalong, Khagrachory, Bandarban, Dulahazra, Nykongchari, Teknaf and the Cox's Bazar in the Greater Chittagong district and occasionally in the Garo Hills of Greater Mymensingh district (O'Malley 1909; Haque 1986; Sarker and

Sarker 1988; Khan 1990, 1992, Fig.4.1). Black bears have recently been reported from bamboo clusters and tea gardens of Banchara, Srimangal, and Upazilla of the Moulavibazar district (Fig.4.1).

Sun bears: Sun bears are called chata bhalluk by local people (e.g. Muslim, Hindu), and called kala harin by tribal people such as Maghs, Chakmas, and Garos. There is consensus that few sun bears occupy Bangladesh. Thus, it is designated as Schedule 3 by Bangladesh Preservation Act of 1974, and critically endangered nationally (IUCN 2000).

Sun bears are reported to inhabit the protected areas of the Pabla Khali wildlife Sanctuary and Kaptai National Park, and the non-protected areas of forest reserves of Kassalong of the Chittagong Hill Tracts (Khan 1982; Haque 1986, Fig.4.1). I also observed this species in Korerhat of Mirsarai, and local people reported its presence from Sangu-Matamuhuri, Naikongchori, Dulahazra Cox's Bazar, Inani, Rangkeong, and Teknaf of Chittagong. It is occasionally reported from the Garo Hills of Sherpur and Netrokona (Haque 1986;

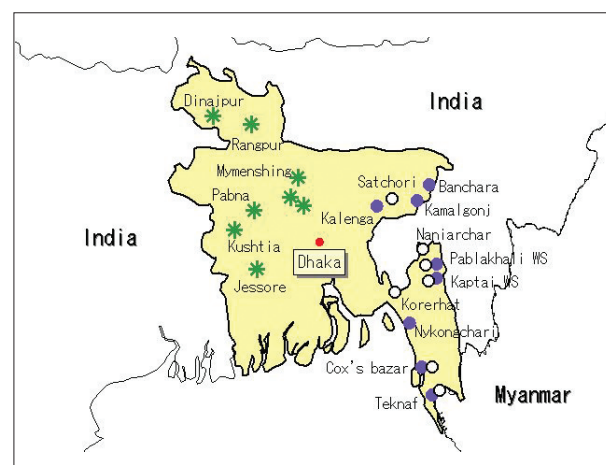


Fig.4.1: Distribution of Asiatic Black bear and Malayan sun bear in Bangladesh.

*: Extinct, ●: Asiatic black bear, ○: Sun bear

Giesen et al. 2001; Daily News 2006). Sun bears were reported from sat-chari forests of Kulaura in the Moulavibazar district near the Indian border (Giesen et al. 2001). A female sun bear and her offspring were seen in the wild by local people at Korerhat of Mirsarai Forest range in the Chittagong district in 1996, and a lactating female with 2 cubs was observed in Jorachari, Upazilla, and Rangamati. The cubs were caught and released in the Dulahazara Safari Park in 2006 (Daily News 2006).

Sloth bears: Sloth bears are called bhalluk/khala harin by Maghs, Chakmas, and Garos. This species is recognized to be rare, and is designated in Schedule 3 by the Bangladesh Preservation Act of 1974, and critically endangered nationally (IUCN 2000). At the beginning of 19th century, sloth bears were rare in Chittagong, Chittagong Hill Tracts and Sylhet, but perhaps more common in the Madhupur Gar and the Garo hills of the Greater Mymensingh Mymensingh district (Husain 1974; Rizvi 1975; Khan 1982; Sarker and Sarker 1984, 1988; Haque 1986; Sarker et al. 1995-96).

Population threats

Black, sun, and sloth bears in Bangladesh all face threats of shooting, trapping, and capturing by poachers for their flesh and skins, and selling to zoos, circus parties and bear charmers. Bear meat is considered to be delicious food used in wedding and religious festivals by local tribal people (e.g. Maghs, Chakmas, Garos). There are no reports of bear farming in Bangladesh.

Habitat threats

Habitats of the three bear species include a variety of forests, such as mixed moist deciduous forests, tropical moist semi-deciduous forest, and tropical semi-ever green forests in the hilly regions. No details are known about habitat differences among the three species. Official statistics claim that protected forest areas constitute about 8% of the total land area of the country but actually it is less than 5%.

Habitat destruction, deforestation, human settlement, urbanization, industry and agricultural expansion are threats to bears (Sarker 1992). Reserve forests are disappearing rapidly due to illegal exploitation, encroachment, and annual burning, both in protected and non-protected areas (Sarker and Sarker 1984). Impoverished local people collect firewood in bear habitat every day for their livelihood. Large quantities of bamboo are also extracted from bamboo forests year after year for household materials, although bamboo clusters and young bamboo provide shelter and food for bears. Poverty and illiteracy are also the background of forest over-exploitation.

Conflicts with humans

Bears move into village orchards in search of fruits (e.g. pumpkins, pineapple, cucumber). They also feed on carrion, and kill livestock such as sheep, goats, and ponies (Jerdon 1867; Blandfort 1888; Pocock 1939-40). Bear attacks on humans (including deaths) have been reported during fruiting season (Blandfort 1888). Local people reported that bears sometimes raid pineapple, banana, guava, leechi, and mango orchards in summer (May to July), as well as tea garden areas of Kamolganj Upazilla in Moulavibazar district.

Most years during June-July, a number of black bears enter tea gardens within Bangladesh by crossing the Indian border, causing injuries to tea garden laborers. Most such incidents happen when a wounded animal or a female bear with cubs encounters humans. At present such incidents are rare, due to the establishment of a wire net by the Indian Government along the Bangladesh boundary which prevents bears from crossing. No compensation is given to victims of a bear mauling. The government has recently initiated a compensation program, but it is limited to incidents caused by elephants (*Elaphas maximus*) in hilly forests and tigers (*Panthera tigris*) in the Sundarbans.

Present management

Government system

The Wildlife Preservation Act/Order was passed in 1973 and amended in 1974. Under this Act, in 1981 the government imposed a ban on hunting, shooting, killing, trapping and exporting any wildlife species including bears, but the ban is not properly applied by authorities. The forest department has initiated some conservation projects but little action has been taken during post-project periods, and the law enforcement agency has been ineffective in the field (Sarker 1986, 1992). Protected areas in Bangladesh have not been properly managed for conservation of wildlife, including bears. Although the Government of Bangladesh imposed a ban on felling of forest trees in 1981, in practice, timber harvest continues, both officially and illegally. Neither the Forest Department nor the Environment Department has sufficient, trained manpower or tools in the field. Persons who have killed bears and other animals are not always prosecuted.

The Ministry of Environment and Forest (MoEF) completed a project entitled "Survey of Fauna" during 1995-96 of which I was the team leader. The authority develops conservation and management plans for conservation of wildlife that will include bears (Sarker et al. 1995-1996). A few initiatives have also been taken

for establishment of eco-tourism in some areas.

Cooperation between the government and NGOs is also important. Recently only a single NGO, NISARGA, has taken the initiative for protected areas and biodiversity conservation in Bangladesh. NISARGA has published some articles in daily newspapers regarding protected areas and biodiversity. Other NGOs have made some contributions to environmental protection, such as reforestation, environmental education, and other programs, but without any follow up.

Public education

Very few programs have thus far been initiated by the government (e.g. Department of Forest, Department of Environment). Some local and international NGOs have tried to initiate awareness programs regarding wildlife, but they need additional international financial cooperation.

There are wildlife curricula at Honors and Master classes at the Dhaka, Jahangirnagar and Chittagong Universities.

Recommended actions

- (1) Detailed field survey and long term research and monitoring of bears.
- (2) Ecosystem assessment of bear habitat for determining hot spots of bears and other wild species for declaration as protected areas.
- (3) Development and implementation of conservation and management strategies and action plans.
- (4) International economic and technical support, along with national experts from universities and research organizations.
- (5) Protection of bears and other wildlife from poaching, using trained patrol guards with modern equipment, as well as improving the law enforcement agency.
- (6) Scientific management and improvement of habitat by the employment of trained personnel.
- (7) Use of indigenous knowledge and involvement of local tribal people.
- (8) Planting of native trees for the food and cover needed by bears.
- (9) Promotion of awareness and education on bears.
- (10) Arranging training, workshops, video shows, drawing exhibitions, meetings, and seminars.
- (11) Poverty reduction of local communities by creating employment in nurseries, forest planting, poultry, garment, and similar small-scale enterprises.

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Chapter 5

The Status and Conservation of Bears in Myanmar

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Two bear species, Asiatic black bear (*Ursus thibetanus*) and the Malayan sun bear (*Ursus malayanus*), occur in Myanmar. Ecology and threats to both bear species are little known due to limited research and surveys in Myanmar. Gaps in knowledge on bear ecology, threats and population trends are the main variables determining effective bear conservation (Servheen 1999). This report will fill some of these gaps and identify priorities for future research and surveys. This report integrated literature reviews, analyses of field data, field reports, personal field notes and personal communications. The available information is also extracted from (1) tiger camera trap surveys at 17 sites across the country during 1998 and 2002, (2) additional tiger camera trap surveys and other biological and socioeconomic surveys in Hukaung Tiger Reserve between 2002 to 2004, (3) biological and socioeconomic surveys in the Naungmung area in 2003, (4) biological and socioeconomic surveys in Hkakaborazi National Park in 2004, and (5) biological and socioeconomic surveys in Hponkanrazi Wildlife Sanctuary in 2005.

Status

Present distribution

The approximate distribution of both bear species as indicated by camera trap surveys is shown in Fig.5.1. The map should be treated with caution because most camera trap surveys were intended to identify tiger presence (i.e., they may have limited applications to illustrating geographic distributions of bears), and because the frequency and intensity of camera trap surveys were concentrated in northern Myanmar (Hukaung Tiger Reserve, Hponkanrazi Wildlife Sanctuary, Hkakaborazi National Park and the Naungmung area), so other parts of Myanmar may have been under-sampled. In addition, the camera trap surveys covered only a small portion of eastern Myanmar; lack of data there does not discount the presence of either bear species in eastern regions. However, occurrence records from camera trap surveys (Fig.5.1) provide, baseline information on the distribution of both bear species, overlap with protected areas, and overlap with each other.

Camera-trap data suggests that Asiatic black bears are concentrated in forested hills and mountains below alpine elevations, whereas Malayan sun bears are found at lower elevations. The very scant information on elevational distribution available from camera trapping is that Asiatic black bears were documented at 2,041-2,566 m ($n = 3$) and Malayan sun bears at 951 and 2,131 m ($n = 2$).

Population estimation

It is difficult to estimate the population of either bear species, even in surveyed areas. However, indices such as relative abundance from each survey site can provide

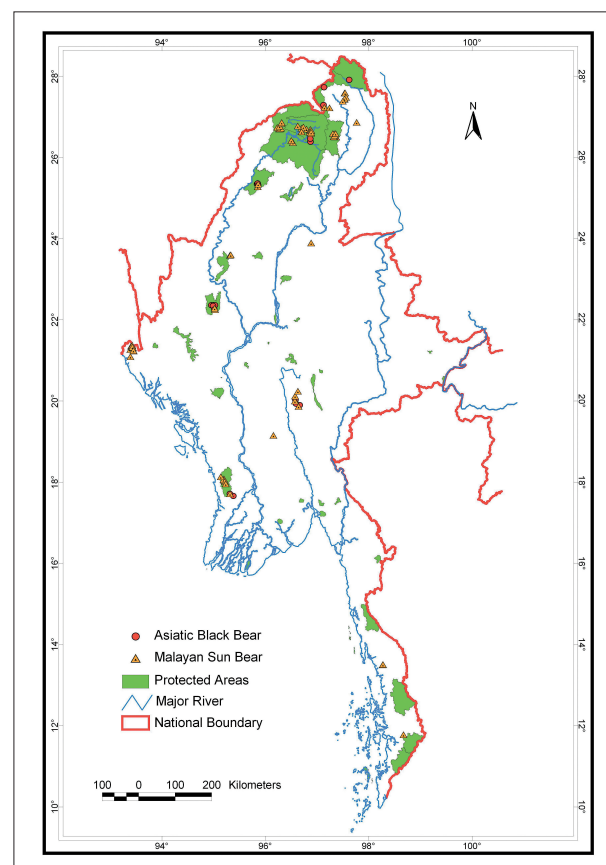


Fig.5.1: Distribution of Asiatic black bear and Malayan sun bear in Myanmar (Based on results of camera trap surveys from 1998 to 2005).

some information on relative status. Fig.5.2 shows the relative abundance of species captured in camera trap surveys in Hponkanrazi Wildlife Sanctuary in 2005 (Wildlife Conservation Society (Myanmar Program) 2005).

Threats to bear populations

In northern Myanmar, bear hunting is one of the main threats to both species. Prior to the 1990s, local ethnic people practiced subsistence hunting to meet their basic needs. However, it is now difficult to distinguish between subsistence and commercial hunting in most areas. Many local people think of hunting as one of their major income sources because they can easily sell products from hunted animals to outsiders. Additionally, increased accessibility to the Chinese market has accelerated hunting. Fig.5.3 illustrates wildlife trade routes from northern Myanmar to China. Fig.5.4 generated from survey data in Hkakaborazi National Park in 2004, provides median prices of wild animals in local

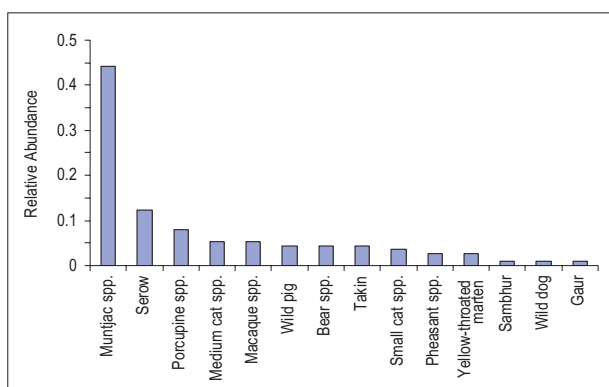


Fig.5.2: Relative abundance of species in camera trap surveys in Hponkanrazi Wildlife Sanctuary.

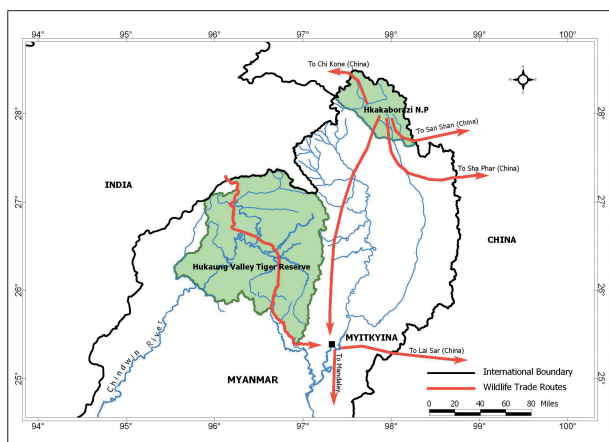


Fig.5.3: Wildlife trade routes from Northern Myanmar to China.

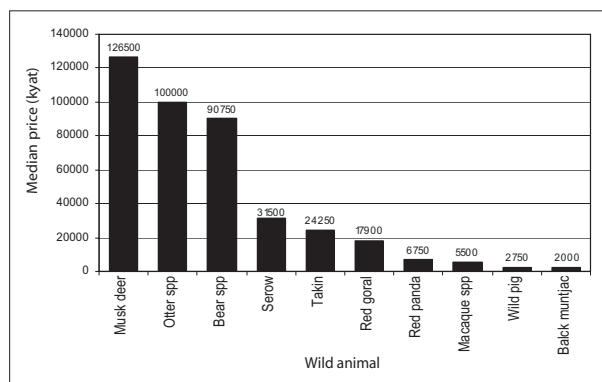


Fig.5.4: Market median prices of wild animal recorded in surveys in Hkakaborazi National Park (1US\$=900kyat).

markets. The hierarchy of market prices of different wildlife indicate the degree of vulnerability to hunting. Information received from interviewing village residents on socioeconomic issues also supports these calculations, suggesting that musk deer (*Moschus* spp.) and otters (*Lutra* spp.) have become very rare in Hkakaborazi area. Following this trend, the bear species are increasingly targeted by commercial hunters in the northern parts of Myanmar.

Characteristics of habitat

Both bear species have been documented in the following ecoregions defined by WWF (Wikramanayake et al. 2002): (1) Northern triangle temperate forest, (2) Northern sub-tropical forest, (3) Mizoram-Manipur Kachin rain forest, (4) Irrawaddy moist deciduous forest, (5) Myanmar coastal rain forest, (6) Kayah-Kayin montane rain forest, and (7) Tenasserim - south Thailand semi-evergreen forest.

Within Northern triangle temperate and Northern sub-tropical forests, both bear species have been documented in habitat types: (1) sub-alpine conifer forest, (2) rhododendron forest, (3) montane wet temperate forest, and (4) subtropical lowland forest in northern Myanmar. Whereas Asiatic black bears have been documented most often in sub-alpine conifer, rhododendron, and montane wet temperate forests, Malayan sun bears were documented most often in subtropical lowland forest.

Habitat threats

Habitat threats for both bear species differ by location. In Myanmar, the deforestation rate (percent of total land area) was more than 0.6 % in 1990 (FAO 1995) and 1.39 % in 2000 (World Bank 2004). Most bear habitats have been converted into permanent agricultural lands. Particularly, significant habitat conversion can be

observed where development is accelerated due to population growth and economic growth. Another habitat threat is fragmentation. Some areas are heavily fragmented due to contiguous permanent agricultural lands, human settlements and road construction. The remaining, small fragments of habitat can no longer support viable populations of either bear species.

Human-bear relationships

Local names of bears

In the Myanmar language, Asiatic black bears are called Myin-wun, meaning “horse bear” indicating it as the relatively bigger and stronger species, whereas Malayan sun bears are named Khway-wun meaning “dog bear” for the smaller species. Whereas Rawang and Lisu are the predominant ethnic groups in Hkakaborazi National Park and Hponkanrazi Wildlife Sanctuary, Kachin, Naga and Lisu groups are the majority in the Hukaung Tiger Reserve. Because most ethnic groups use different dialects, there are a wide variety of names in use within Myanmar. In one of the Rawang dialects, Sha-wee is used for both bear species. More specifically, the Rawang use Sa-rot-khot (meaning “ant eater”) for Malayan sun bears, Hton-phu for the solitary big male Asiatic black bear, and Hton-ma for the female Asiatic black bear. One of the Naga ethnic dialects refers to Asiatic black bears as Sabe-ah-yone (meaning “big bear”) and Malayan sun bears as Sabe-ah-deik (meaning “small bear”). In one of Lisu dialects, Wopha is collective name for both bear species, while Asiatic black bears are called Wo-bi-li and Malayan sun bears are called Hto-kwee. Asiatic black bears are named Sat-sat-ru (meaning “big bear”) and Malayan sun bears are called Sat (meaning “small bear”) in one of Kachin ethnic dialects.

Ethnology of bears

Most tribes seem to believe that bears are the symbol of strength. Most ethnic groups tell a series of bear stories. Hunting in relation to traditional beliefs or subsistence on either bear species was not reported. Additionally, based on results of surveys conducted in northern Myanmar, local traditional medicine rarely uses bear parts. However, non-traditional hunting for trading was frequently reported in the surveys.

Conflicts with humans

Human-bear conflicts have been rarely reported in northern Myanmar. There can be several possible reasons. First, human population density in that area is relatively lower than the remainder of Myanmar, and consequently, the encounter rate between humans and

bears may be low. Human population density in Hkakaborazi National Park, which is in the farthest northern part, was estimated as 2.5 people per km² (Wildlife Conservation Society (Myanmar Program) 2004). Wikramanayake et al.(2002) also estimated human population density of northern Myanmar as ranging from <5 to 5-10 people per km². The second possible reason for low human-bear conflict is that the magnitude of habitat conversion, fragmentation and degradation are quite low compared to the rest of Myanmar, because this region has large, contiguous habitat and more sustainable land-use practices. No reports of bear attacks on humans were received during the research survey period (2004-2005) in Hkakaborazi National Park and Hponkanrazi Wildlife Sanctuary. However, crop raiding by both bear species was occasionally reported in interview surveys. The national Forest Department has no compensation system.

Commercialization of bears

Bear utilization on commercial basis

In northern Myanmar, bear fat, gall bladder, meat, paws and bones are traded to Chinese traders for use as traditional medicine and for consumption in restaurants. Evidence of trading for paws of both bear species was recorded in the surveys of Hkakaborazi National Park in 2004, as shown in Photo 5.1.

The number of import and export

Import and export of bear parts is illegal in Myanmar, which makes assessing the trade volume difficult. An educated guess would be that ten to twenty of each bear species may be traded annually from northern Myanmar to China.

Breeding bears in zoos and bear farm

There are two public zoos in Myanmar: Yangon Zoo and Mandalay Yadanabon Zoo. There are likely a total of 20-30 bears (including both species) in zoos within Myanmar. Bear farms are illegal in Myanmar, but they may exist near the Myanmar-China border. It is unknown how many live bears have been traded from Myanmar to China, so this would be a valuable topic for future surveys.

Present management system

Systems of conservation and management

In Myanmar, protected areas are managed by the Nature and Wildlife Conservation Division, which is a division under the umbrella of Forest Department,



Photo by Saw Htun (WCS)

Photo 5.1: Paws of the Asiatic black bear (upper) and the Malayan sun bear (lower) recorded in Hkakaborazi National Park.

Ministry of Forestry. Other reserved forests and public forests are managed directly by the Forest Department. The Nature and Wildlife Conservation Division takes responsibility for all wildlife conservation and management of protected areas, in accordance with the following policy, laws, regulations and notifications: Myanmar Forest Policy (1995), Forest Law (1992), Forest Rules (1995), The Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law (1994), Rules Relating to the Protection of Wildlife and Wild Plants and Conservation of Natural Areas (2002), and List of Endangered Species of Myanmar (1994).

Forty protected areas (totaling > 30,000 km²) have been established and represent 7% of Myanmar's total land area. According to the law, the Malayan sun bear is protected at the highest level, the Asiatic black bear protected at a lower level. Based on the legal level of protection for the species, violators can receive different levels of penalties and punishments.

Scientists, and NGOs conserving bears

There are very few conservation NGOs in Myanmar. Most surveys, research and conservation efforts empha-

size species other than bears. Although national universities, scientists and NGOs occasionally cooperate and coordinate, bears need more effective conservation.

Public education

Limited public education programs are focused on bear conservation. Well-designed and targeted public education is needed.

Recommendations

Staff and institutional capacity is low in most protected areas. There have been very limited research and surveys on either bear species. Consequently, effective conservation efforts are difficult to develop strategically. Effective patrolling and law enforcement are also weak in most protected areas. I provide the following recommendations:

(1) More research on ecology, biology, population, distribution, and habitat preference of both bear species is urgently needed.

(2) Effective bear conservation will be difficult to achieve without commitment and support of decision makers. It is extremely important to garner political support and to maintain awareness among policy makers.

(3) More effective patrol systems and law enforcement in protected areas are necessary to reduce commercial hunting and wildlife trade, including bear parts. Banning access to areas of critical bear habitat should be integrated in park management.

(4) Boundary agreements with China are urgently needed to combat wildlife trade along the border. In addition, sharing information among law enforcement in both countries is necessary to reduce wildlife trade within each country and across their boundary.

(5) Public understanding and support are also important factors for effective bear conservation. Highly targeted education and outreach program can increase the effect of bear conservation. It is also important to identify and implement methods to educate Chinese consumers of bear products.

(6) Conservation of bears in protected areas has much more potential than in non-protected areas. Therefore, strengthening institutional capacity of protected areas containing bears via technical and financial assistance will be beneficial.

Acknowledgements

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Chapter 6

The Status of Bears in Thailand

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² World Wide Fund for Nature-Thailand

Thailand is home to the sun bear (*Ursus malayanus*) and the Asiatic black bear (*U. thibetanus*). Both species overlap widely in geographic distribution, and coexist within a seasonal mosaic of evergreen and deciduous forest types that occur only in mainland Southeast Asia. This report is a preliminary assessment of the current status of bears in Thailand.

Biology

There have been few ecological studies of bears in Thailand. This section draws from ongoing research on the habitat use and feeding ecology of sun bears and black bears in Thung Yai Naresuan Wildlife Sanctuary in western Thailand (Steinmetz unpublished data). Results indicate that sun bears and black bears eat fruits from > 160 tree species and overlap substantially (86%) in diet. Lauraceae (cinnamon family) and Labiatae (teak family) were the most commonly climbed tree families by both species in semi-evergreen and mixed deciduous forest types, respectively. Semi-evergreen forest was the richest habitat for tree taxa selected by bears, with 61 genera and >96 species. Trees in many of the most commonly-climbed families were also abundant in the forest. Opened nests of ants, termites, and bees (*Trigona* spp.) were most common in mixed deciduous forest, and absent from montane evergreen forest, where bears appeared most dependent on tree-borne fruits.

Both species used lowland (< 1,200 m elevation) forest types extensively (deciduous forest: 10 climbed trees/ha; evergreen forest: 32 climbed trees/ha). However, in montane (>1,200 m) forest, black bears were predominant (climbing 14 trees/ha) whereas sun bear sign was scarce. Bear climbing activity was largely related to feeding: recent claw marks generally coincided with periods of fruiting, and one-third of the trees with recent claw marks also had old marks, indicating seasonal revisiting by bears to the same trees.

Sun bears and black bears in Thung Yai occur in the same habitats, and share many of the same foods within

them. This extensive niche overlap at two spatial scales (habitat and food type) suggests that competition between bear species has little influence on their selection of resources. However, where ground cover is sparse but tree-food resources are densely clumped - such as in montane evergreen forest - the smaller sun bear may be unable to avoid encounters with black bears. In that habitat black bears were the predominant species, and sun bears were rare.

Status

Present distribution

Bear status is presented as occurrence of each species within extant forested areas (most of which are part of Thailand's protected area system). The data (mostly animal sign) are from a national survey of endangered mammals in protected areas, conducted by the Department of National Parks, Wildlife and Plant Conservation (DoNP) during 2003 - 2006. Claw marks on climbed trees comprised most of the field data; these were classified according to methods developed by Steinmetz R and Garshelis D. Status information is supplemented with data from interviews conducted by DoNP in 2001.

Sun bear sign was recorded in 68% of the surveyed protected areas, and black bear sign in 53% of the areas (Fig. 6.1, 6.2, Table 6.1). Black bears and sun bears co-occur in at least 46% of the areas surveyed. In 28 areas (40%), no sign of either bear species was found.

In many cases one species was identified from sign at an area (first and second rows of Table 6.1), but ambiguous bear sign that could not be classified to species were also found. Such sign could be from the other species. Therefore, the number of areas at which bear species co-occur is underestimated.

At 19 protected areas sign of only one species were found (i.e., all recorded sign was identifiable to only one species). The Asiatic black bear was the only bear species recorded in five areas, all in northern Thailand: Doi Pha Chang Wildlife Sanctuary (WS), Pha Pung

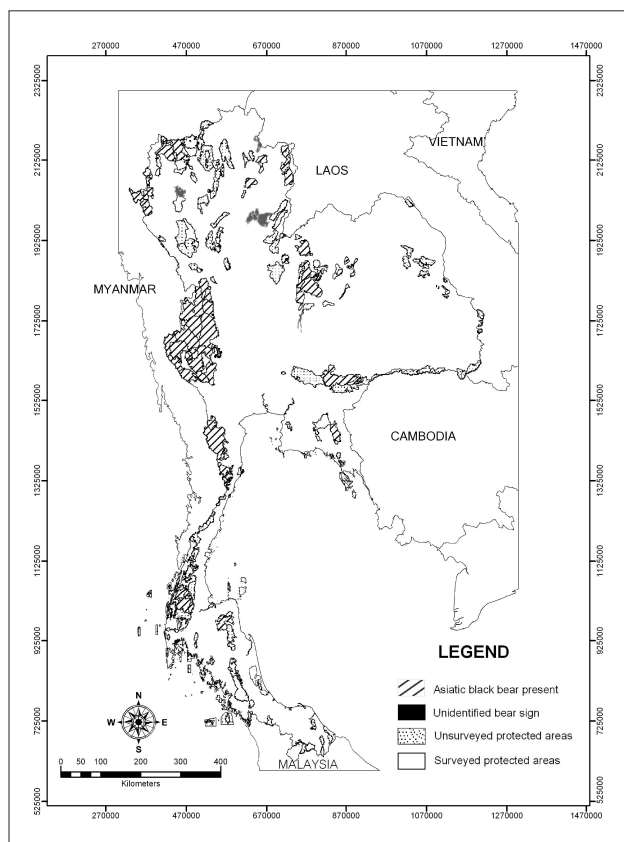


Fig.6.1: Distribution of Asiatic black bear (*Ursus thibetanus*) in Thailand, based on sign surveys conducted from 2003-2006.

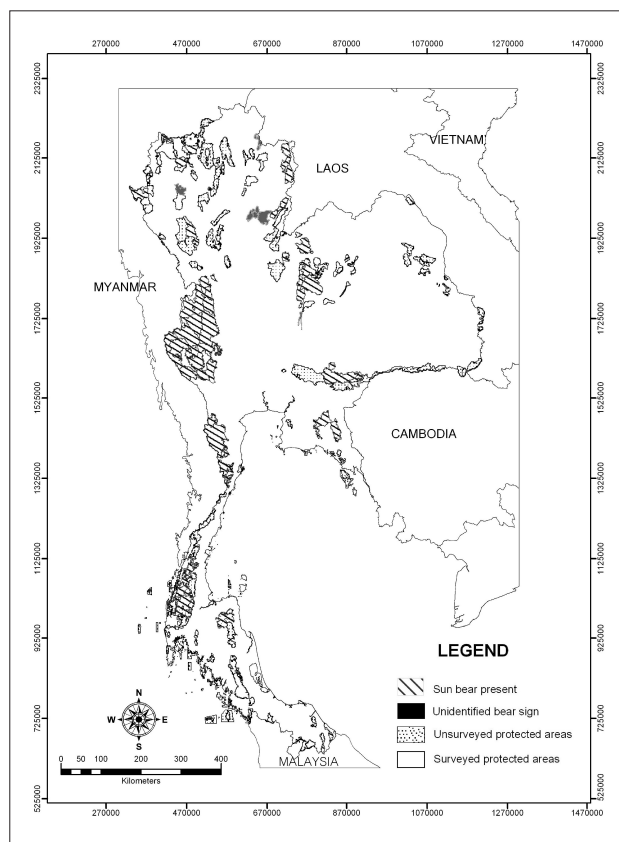


Fig.6.2: Distribution of sun bear (*Ursus malayanus*) in Thailand, based on sign surveys conducted from 2003-2006.

Table 6.1: Occurrence of Asiatic black bear (*Ursus thibetanus*) and sun bear (*U. malayanus*) in Thai protected areas, based on sign surveys (2003-06) and interviews (2001).

Occurrence	Sign surveys		Interviews	
	Number of protected areas (<i>n</i> = 78)	Percent	Number of protected areas (<i>n</i> = 197)	Percent
Sun bear present	50	64	106	54
Black bear present	41	53	123	62
Both species present	36	46	Not calculated	Not calculated
Neither species present	28	40	Not calculated	Not calculated
Sun bear only	14	18	Not calculated	Not calculated
Black bear only	5	6	Not calculated	Not calculated

WS, Lum Nam Pai WS, Mae Yom National Park (NP), Huai Nam Dang NP. The sun bear was the only species recorded in 14 areas: Khao Sanam Preang WS, Khao Ang Runai WS, Mae Ping NP, Doi Chiang Dao WS, Mae Charim NP, Mae Lao-Mae Sae WS, San Pan Dan WS, Khon Mae Yay Mon WS, Chlorm Pra Kiet Somdej WS, Nam Tok Ngao NP, Khao Sok NP, Khlong Phraya WS, Hala-Bala WS, and Sri Phangnga NP. Half

of these areas are in southern Thailand.

Sun bears occur in forested areas throughout Thailand, from the northern highlands to the extreme south. Asiatic black bears occur from the northernmost part of Thailand to the central portion of Thailand's southern peninsula, where their distribution terminates at Tai Rom Yen National Park.

Interview responses from 2001 indicated that sun

bears occurred in 106 protected areas (67 national parks, 39 wildlife sanctuaries) covering 66,075 km² of forest habitat, and Asiatic black bears occurred in 123 areas (78 national parks, 45 wildlife sanctuaries) covering 77,519 km² of forest.

Population estimates

There are no historical or current population estimates for either bear species in Thailand. Lekagul and McNeely (1988: 526) considered the Asiatic black bear to be “rather rare”, but this assertion was unsubstantiated.

Population threats

Commercial poaching and habitat loss have reduced and fragmented bear populations in Thailand (Pattanaviboon and Dearden 2003). Commercial poaching for the wildlife trade is currently resulting in an alarmingly high volume of bear parts for sale in wildlife markets along Thailand's international borders (Shepherd C, TRAFFIC 2006 personal communication). The magnitude of this threat must be very high, but is difficult to assess because the abundance of bears within extant forested areas is uncertain. However, recent work in a few protected areas has produced qualitative trend estimates, which may be useful for assessing this problem. In Thung Yai Naresuan Wildlife Sanctuary, for example, populations of both species were estimated by local woodsmen to have been reduced by about 50% over the past 20 years, mainly due to commercial poaching for gall bladders (Steinmetz et al. in press).

Arrests of bear traffickers were made in 2004, during which 3 Asiatic black bears, 2 sun bears, and 27 parts of black bear carcasses were confiscated (DoNP crime statistics). In 2005, 4 paws and 8 legs of Asiatic black bear were confiscated in arrests. One Asiatic black bear was illegally killed in 2005 in Huai Kha Kheng Wildlife Sanctuary.

Habitat threats

Remaining bear habitat is most threatened in northern Thailand because protected areas there are small and isolated (Fig. 6.3). Populations of both species are most secure (from hunting, habitat fragmentation, and problems associated with small populations) in five large forest complexes: Western Forest (18,730 km²), Phu Khieo (7,092 km²), Dong Phrayayen-Khao Yai (6,199 km²), Khaeng Krajaem (4,373 km²), and Klong Saeng (4,285 km²) (Fig. 6.1).

Habitats used by bears encompass most of the plant community diversity in Thailand, including agricultural areas (Table. 6.2, Fig. 6.3).

There are four major threats to the habitats of bears and other wildlife in Thailand.

(1) Forest degradation: This problem includes selective logging, and originates from timber capitalists, sawmill owners, and through small-scale timber use by villagers. It is linked to human population increase, which in turn, increases demand for wood for building houses, furniture and charcoal production.

(2) Forest encroachment: Forest areas are increasingly being transformed into resorts and second homes for affluent urban people. Land speculators and investors employ local villagers to clear forested land that is then sold.

(3) Unclear forest demarcation: This problem results in confusion and disputes about where different land-use activities (e.g., agriculture, forest product collection) should or should not occur.

(4) Infrastructure development: Large-scale infrastructure development is supported financially, and pushed politically through national policy combined with the international development agendas of organizations such as the World Bank and the Asian Development Bank. Paved roads, dams, electrical grids, and international water diversion schemes are planned for every region of Thailand, including in and around the major forest com-

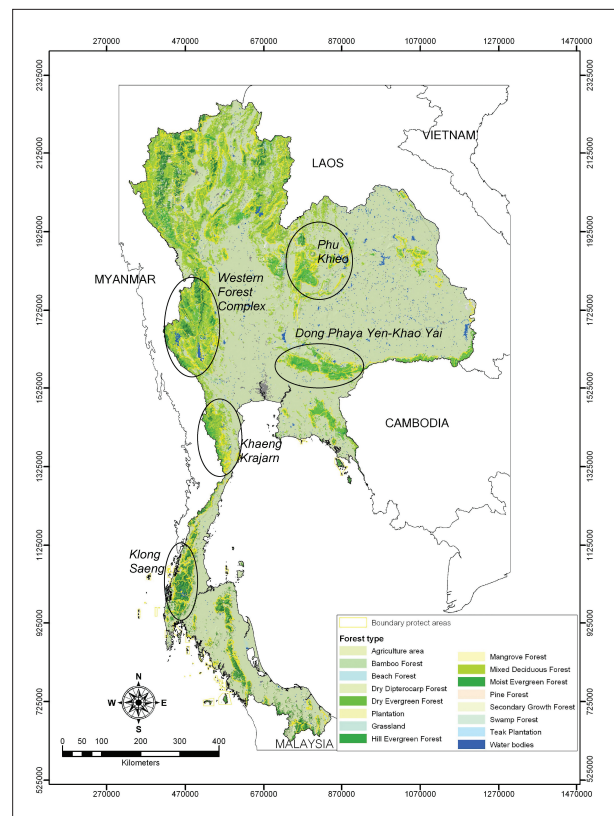


Fig.6.3: Protected areas, forest cover, and forest types of Thailand, 2006. Five key forest complexes -important for the conservation of bears- are shown.

Table 6.2: Habitat types used (signs present) and unused (signs not found) by Asiatic black bears (*Ursus thibetanus*) and sun bears (*U. malayanus*) in Thailand. Data are from sign surveys in 78 protected areas, 2003-2006.

Habitats used	Habitats unused
Evergreen forest	Pine forest
Dry evergreen forest	Mangrove forest
Mixed deciduous forest (including bamboo)	Beach forest
Hill evergreen forest (> 1,000 m elev.)	Plantations (teak, eucalyptus)
Peat swamp forest	Urban areas
Dry dipterocarp forest	Mining areas
Secondary growth	Rock
Agricultural areas	
Savanna	
Old clearings	

plexes. These developments will facilitate forest conversion and access for commercial hunters, and collectively represent the most serious threat to bears and other large mammals in the near-future.

Human-bear relationships

Local names of bears

The word for bear in Thai is “*Mee*”, and each species is given a specific epithet according to well-known domestic animals with resembling characteristics. The sun bear is called “*Mee Mah*”, meaning dog-bear. The black bear is called “*Mee Kwai*”, meaning buffalo-bear. In Karen language (the Karen are an ethnic group that inhabit the entire western border region of Thailand where most remaining forest occurs), the sun bear is called “*Pu-taung Bwee*”. The black bear is called “*Pu-taung Mer*”. When one is in the forest, however (i.e., in close proximity to bears), both species of bears are called “*Mong Pu*” - a special respectful name meaning grandfather.

Ethnology of bears

Bear gall bladders have been used medicinally in Thailand for many decades. In the past 15 years, the popularity of traditional Thai medicine has waned (with the spread of modern drugs) and within-Thailand demand for bear bile has decreased. Bear paws are still eaten by Thai-Chinese people and some tourists who believe this practice improves health.

Bears have not typically been hunted for subsistence in Thailand. Commercial hunting for bear gall bladder and bear paws has been a relatively recent development within the past 20 years. Interviews with bear hunters revealed two hunting methods (Steinmetz unpublished

data). In one method, bears are attracted to bait (e.g., a deer or pig carcass) and shot by a tree-borne hunter. In the second method, bears are stalked during the rainy season where they converge at densely clumped fruiting oak trees in certain forest types.

Bears do not have symbolism in Thai culture. However, Thai people recognize bears as large, powerful creatures, and will liken a big, strong man to a bear.

Conflict with humans

Crop raiding by bears occurs in corn plantations and orchards that are adjacent to forest reserves. Near Thung Salang Luang and Huai Nam Dung National Parks, 5-6 instances of Asiatic black bears feeding in corn fields are reported by farmers each rainy season. Black bears also feed on orchard fruit near Khao Yai National Park. However, these problems are not considered to be widespread or severe.

Commercialism of bears

Bear farming is not known to occur in Thailand. Bears are commonly kept in captivity, however (Table. 6.3), both in public (managed by the Zoological Parks Organization of the Thai government) and private zoos. Bears are also kept in wildlife breeding centers (managed by DoNP). Most bears in these centers have been obtained through confiscations from the illegal bear trade since 1995. A reintroduction of black bears from these facilities is planned for Khlong Khua Wai Wildlife Sanctuary, east Thailand. Finally, bears are kept by private owners and temples. Temples typically obtain bears from pet owners who no longer want to care for adult animals.

Table 6.3: Number of captive bears in zoos and breeding centers in Thailand, 2006.

Organization	Number of bears		Province
	Black bear	Sun bear	
Zoological Parks Organization			
Dusit Zoo	3	3	Bangkok
Chiengmai Zoo	7	2	Chiengmai
Khao Khiew Zoo	9	15	Chonburi
Nakornrajasrima Zoo	9	4	Nakornrajasrima
Songkhra Zoo	6	5	Songkhra
Subtotal	34	29	
Wildlife Breeding Centers			
Mae Lao Wildlife Breeding Center	2	0	Chiengrai
Pang Tong Wildlife Breeding Center	13	0	Mae Hong Song
Huai Yang Parn Wildlife Breeding Center	2	0	Chiengmai
Am Koi Wildlife Breeding Center	9	0	Chiengmai
Khao Koa Wildlife Breeding Center	13	2	Petchubun
Pu Khiew Wildlife Breeding Center	8	1	Chaichaaphum
Chong Gum Bon Wildlife Breeding Center	0	4	Sakraw
Kra Bok Ku Wildlife Breeding Center	13	3	Chachangsao
Bang La Mung Wildlife Breeding Center	65	27	Chonbuti
Huai Sai Wildlife Breeding Center	1	4	Petburi
Pang Nga Wildlife Breeding Center	3	1	Pang Nga
Subtotal	129	42	
Private Zoos			
Sriracha Tiger Zoo	1	0	Chonburi
Nong Nut Village	0	1	Chonburi
Safari Park and Resort	4	2	Kanchanaburi
Safari World	30	0	Bangkok
Phuket Zoo	1	2	Phuket
Crocodile farm and Samutprakarn Zoo	7	7	Samut Prakarn
Trakarn Tiger Park	1	0	Ubon Ratchatani
Pata Zoo	1	5	Bangkok
Lopburi Zoo	2	4	Lopburi
Millenian Stone Park and Pataya Crocodile farm	1	0	Pataya
Night Safari	6	12	Chiengmai
Subtotal	54	33	
Private Owners	85	39	No information
Total	302	143	

Present management system

Systems of conservation

Bears are legally protected by the Wild Animal Reservation and Protection Act (1960, amended 1992) and National Park Act (1961). These acts have established the

protected area system that protects forested areas and the wildlife within them. These laws prohibit commercial breeding of bears, hunting, and import and export of live bears or bear parts. Both species are listed in Appendix I of CITES, which prohibits international trade.

Organizations and scientists involved with bear conservation

- (1) Winit Poonawarat, Director, Wildlife Conservation Office (DoNP).
- (2) Budsabong Kanchanasaka, Biologist, Wildlife Research Division (DoNP).
- (3) Supagit Vinitpornsawan, Forester, Wildlife Research Division. (DoNP).
- (4) Thongchai Siengthienchai, Chief, Bang La Mung Wildlife Breeding Center. (DoNP).
- (5) Panit Sandprod, Director, Wildlife Breeding Division. (DoNP).
- (6) Robert Steinmetz, Ecologist, World Wide Fund for Nature-Thailand.
- (7) Dr. Sumet Kamonnoranah, Veterinarian, Khao Kheow Zoological Park.

Public education

Educating the public about wildlife conservation has been a function of the Wildlife Conservation Office (of the DoNP) since 1975. For example, books, posters, and other media have been produced and distributed to schools. Many national parks have nature centers that educate visitors.

The plight of bears gained national attention for the first time in 1995 with a high profile crackdown on wildlife restaurants that served bear paws to tourists. At that time, many live black bears and sun bears were rescued from restaurants and traders, and sent to wildlife breeding centers (Table 6.3). The Wildlife Conservation Office and Wildlife Fund Thailand (WFT, a local non-government organization) organized a year-long national public education campaign in response, using newspaper articles, fact sheets, television spots, and demonstrations. Subsequently, consumption and trading of bears decreased. In 1997, WFT, together with Global Survival Network (United Kingdom) produced a film as part of a campaign for the conservation of tigers, elephants, bears, rhinos and sea turtles. This film was broadcast in South Korea, Taiwan, Malaysia, Singapore, Hong Kong, and Thailand, with the goal of decreasing wildlife consumption. Follow-up campaigns were conducted in 1998. Since the late 1990s, there have been no education campaigns in Thailand focusing on bears.

Recommendations

Protected area management

- (1) Crop raiding by bears is not yet a serious problem. However, expansion of cultivated areas and increasing human use of forests may increase the frequency of such conflicts. Protected area managers should pre-

pare for this problem by considering the juxtaposition of locations used by bears and by corn farmers.

- (2) Patrolling and monitoring entire protected areas is currently an overwhelming and unrealistic task. To make this problem more manageable, a network of small bear recovery zones (~ 50 to 100 km²) could be established within key protected areas. The patrolling efforts of rangers could then be focused on these zones. Bear recovery zones should be locations with plentiful bear foods such as trees in the families Lauraceae and Fagaceae. Such zones would provide a biologically meaningful, geographically focused, and logistically realistic way for the efforts of protected area staff to be translated into population recovery for bears and other wildlife species.

Research

- (1) Monitor trends in bear occurrence and relative abundance using standardized sign surveys and camera trapping, across a sample of protected areas with different ecological and management conditions. This work would generate comparative lessons about which conditions promote successful bear conservation, and which do not, and provide a means to assess the results of conservation efforts (e.g., future range expansion and/or increased bear density being indicative of success).
- (2) Research the role of bears in seed dispersal. Bears are the largest-bodied seed dispersers in the forest, but details of their roles in this crucial process are little-known.
- (3) Research the process of recolonization and population recovery by bears in regenerating forest areas. This is starting to occur in at least one location (Nakhorn Ratchasima Province).

Wildlife trade and education

- (1) Work with Traditional Chinese Medicine practitioners and users to promote alternatives to bear gall bladder (many already exist).
- (2) Presently, gall bladders advertised as “bear” are exceptionally common at every wildlife market in the country, but many could be fake, or from other species of animals. To determine the actual severity of this trade, samples of “bear” gall bladders from different wildlife markets across the country should be tested, to determine what proportions are real and fake.
- (3) Initiate an education project targeted at customers of wildlife markets along Thailand’s international borders. The intention would be to dissuade potential buyers of bear products by making them aware of the beauty of bears, their conservation status in the region, and the buyers’ impacts on these factors. This

campaign could be conducted by a network of university-student environmental clubs in provinces near these markets (most universities have such clubs) with support from the Thai Department of National Parks and a national non-government organization.

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Chapter 7

The Conservation of Bears in Cambodia

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Wildlife Protection Office, Forest Administration, Cambodia

The Asiatic black bear (*Ursus thibetanus*) and the Malayan sun bear (*Ursus malayanus*) inhabit in Cambodia (Suon 2002). The species are locally known as Khlakhmom Thom and Khlakhmom Touch, respectively.

No scientific research has been conducted on the biology and conservation of either species in Cambodia. Now, the government is making efforts to enact international and national conservation measures into law. However, additional improvements are recommended.

Status

Distribution

No official information on bear distribution in Cambodia is available so far. It is generally believed that both species inhabit almost all protected forests and protected areas throughout Cambodia, especially in the northern, south-western, and eastern parts of the country where suitable habitats appear to remain sufficient. Since 2005, the Biodiversity and Protected Areas Management Project has been trying to develop a wildlife database by reviewing the reports of many forest and wildlife conservation projects in Cambodia. However, the database is still under preparation. With this attempt, it is expected that an official bear distribution map will also be produced and put into public use.

Habitat condition

During the 1960s, about 75% of Cambodia's total area of 13.2 million ha was covered by forests: 6.7 million ha were evergreen and mixed forests, 5.3 million ha deciduous forests and the rest were inundated forest, mangrove forest, bamboo, and other forests. However, civil unrest for the last two decades had caused a rapid and continuous decline in the forest resource. According to the Mekong Secretariat (1994), by 1985-86 forest cover had been reduced to only 67.4%, and by 1992-93 to 63.6% of the forest area existing before the 1960s. Similarly, the Forestry Administration (2003) indicated that forest had been reduced to 61.3% in 1992-93, and to 60.2% in 1996-97 of pre-1960s levels. FAO (2000) estimated that remaining forest in 2000 was only 52.4% of

the area forested before the 1960s.

Cambodia has a long history of nature conservation. The first national park, covering about 108 km² of forest around the Angkor Temple complex, was established in 1925. This was the first national park in South-East Asia. By 1969, the country had established six national parks and wildlife sanctuaries, covering 2.2 million ha (12% of the country). The two decades of political instability and civil war destroyed all the conservation efforts of the past (Keo 2003). As of 2006, over 4.3 million ha of forest (25.5% of the country's area) are under protection, which includes 23 protected areas and 4 protected forests, covering 3.3 million ha and 1 million ha, respectively. Protected areas were established in 1993 and were categorized into 7 National Parks, 9 Wildlife Sanctuaries, 3 Protected Landscapes, and 3 Multiple Use Management Areas. They are under the management of the Department of Nature Conservation and Protection of the Ministry of Environment (MoE). The protected forests were designated between 2000 and 2002, and are under the management of the Forestry Administration of the Ministry of Agriculture, Forestry and Fisheries.

Human-bear conflicts

There is no reporting system on crop damage and injury to humans by bears. Thus, no data are available.

Use of bear parts as a population threat

As with other wildlife species in Cambodia, bear parts (skin, meat, bone, paws, lung, heart, liver, intestines, gall bladder, and blood) are widely used for food and medicine (Suon 1999). Skin is important in decoration and is kept as a talisman for bringing about luck or protecting people from potential dangers. Bear meat is considered as delicious as other animal meat (e.g., fish, pigs and cows), thus is sometimes cooked for food. Bones are usually used as an antibiotic to treat skin problems such as abrasions and boils. Paws and some internal organs (including liver, heart and intestines) are popular soup ingredients, because Cambodians believe they improve sexual energy. In addition, soup made with bear lung is believed to have a positive effect on people with lung disease or sore throats. Another expen-

sive bear part, which is the most popular among traders, is the gall bladder. The dried gall bladder, which is chopped into small pieces and mixed with wine, is used to treat women after giving birth, as well as other problems such as hair loss, fever, low blood pressure, emaciation, inflammation, and focusing malfunction in the eyes. Similarly, bear blood combined with wine is used to reduce fever and to improve strength.

International trade of bear parts produces motivation to over-exploit both species of bears, which we believe is a serious threat to wild populations. These species may become extirpated unless we develop effective measures to stop hunting.

Bears in captivity

In Cambodia, zoos have been established by both government and private sectors. The government established the Phnom Tamao Zoological Garden and Wildlife Rescue Center in 1995 to keep confiscated animals obtained from illegal hunters and traders. This zoo now keeps 91 wildlife species, including tigers (*Panthera tigris*), elephants (*Elephas maximus*), bears, leopards (*P. pardus*), clouded leopard (*Neofelis nebulosa*), banteng (*Bos sauveli*), dhole (*Cuon alpinus*), gibbon (*Hylobates* spp.), sarus crane (*Grus antigone*), adjutant storks (*Ciconia* spp.), vultures, crocodiles, pythons, and cobras. There are 50 Asiatic black bears and 23 sun bears in the zoo. Two NGOs, i.e. Wild Aid and Free the Bear Fund, have cooperated with the Forestry Administration to look after the animals in the zoo. Since 1998, the Free the Bear Fund has assisted by providing food and medicine, facilities (including a wildlife hospital), and volunteer experts. As of 2006, there were 4 private zoos in Cambodia, most of which were involved in collecting animals illegally from the wild. There are no data on the number of bears in such private zoos.

Management system

The Royal Government of Cambodia has adopted several measures to prevent the extirpation of bears. The main strategies include establishment of the Forestry Law (enacted in 2002), and other regulations which relate to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), enforcing laws, and conducting short training courses, workshops, and education.

Establishment of the forestry law and other declarations

Article 48 of the Forestry Law states that “all kinds of wildlife species in the Kingdom of Cambodia are State property and the component of forest resources, includ-

ing all species of mammals, birds, reptiles, amphibians, insects, other invertebrates, and their eggs or offspring. Such wildlife is under the management, research and conservation of the Forestry Administration, except for fish and animals that breed in water. Wildlife specimens are dead wildlife, including the whole body, internal or external organs, the skeleton and processing products shall be under the management jurisdiction of the Forestry Administration”.

According to the Forestry Law, all wildlife are divided into the following three categories: (1) Endangered species, (2) Rare species, and (3) Common species. The Ministry of Agriculture, Forestry and Fisheries, through the proposal of the Forestry Administration, shall issue a Declaration to determine the criteria for each category and establish a separate list for endangered and rare species, which may vary between regions in Cambodia, in consultation with Ministry of Environment. Asiatic black bears were listed as Endangered Species and sun bears were listed as Rare Species in the 1994 draft of this Declaration (Forest Administration 2005).

Here, we list detailed regulations of the laws related to wildlife. (1) The 22nd and 23rd Article (Decree No. 35, dated 25 June 1988) state that hunting of all species of wildlife is not allowed. (2) The 2nd Article of the Declaration No. 359, dated 1 August 1994, states that everyone is prohibited from hunting, poisoning, transporting, selling, or trading of listed wildlife species. The 3rd Article states that catching, poisoning, hunting, transporting, selling, or trading in living animal, meat, or wildlife specimens is only permitted by special permission from the Ministry of Agriculture Forestry and Fisheries (MAFF). (3) According to Article 96 of the 2002 Forestry Law, any individual, who has transported, stocked, or exported bears without a permit shall be fined 2 to 4 times the market value, as determined by the Forestry Administration. (4) Joint Declaration No. 1563 of the Ministry of Agriculture, Forestry and Fisheries, and the Ministry of Environment, dated 20 September 1996, states the intention of the government to prevent destruction of wildlife in the kingdom of Cambodia. (5) Announcement No. 3837 of the Ministry of Agriculture, Forestry and Fisheries, dated 14 August 2001, forbids wildlife trade.

CITES

Cambodia joined CITES in 1997 and intends to continue to adopt legislation for its implementation (Resolution conf. 8.4).

In Cambodia, there are two main pieces of legislation relevant to the implementation of CITES and the conservation of bear species: the Forestry Law, dated 31 August 2002, and Sub-decree on International Trade in

Endangered Wild Animal and Plant Species, dated 29 May 2006. TRAFFIC Southeast Asia in Indochina supported the project to develop the sub-decree on international trade in endangered wild animal and plant species. Several articles within the Forestry Law and this Sub-decree were enacted to protect bears species in Cambodia.

As of 2006, there have been 3 training courses and 2 workshops regarding trade and CITES conducted in Cambodia. In 2001, there was a workshop on Basic CITES Implementation in Cambodia, in which participants included law enforcement officers (e.g., foresters, fishery officers, customs officers, cam-control officers, Police officers), representatives from the Ministry of Agriculture, Forestry and Fisheries, Ministry of Environment, and other relevant institutions and representatives from provincial authorities. In early 2003, there was an unofficial/internal training course on Basic CITES Implementation that trained officers from the Forestry Administration and the Department of Fisheries. In late 2003, there was a training course on science in CITES, including participants from Cambodia, Vietnam, Thailand, Burma, Lao PDR, and China. Cambodian participants were representatives from various relevant governmental institutions. In 2004, there was a workshop to discuss the Sub-decree on CITES. In 2006, there was a training course on Basic CITES Implementation, in which 35 customs officers participated.

Law enforcement and awareness raising

Article 76 of the 2002 Forestry Law states that forest (and wildlife) offences are criminal offences. The Forestry Administration officials qualified as Judicial Police Officials (JPO) have jurisdiction to investigate forest offences and file such cases and documents to the court. In Forestry Law Article 77, “the Sworn Forestry Administration officials are qualified as judicial police officials when certified by the General Royal Prosecutors of the Court of Appeals”. The powers of these JPO are subject to certain controls and limitations under both the Forestry Law and the Law on Criminal Procedures. In general, Forestry JPOs are subject to the coordination of the relevant Municipal and Provincial Prosecutors. Moreover, the CITES Management Authority of Cambodia has improved enforcement cooperation with other agencies, such as the Forestry Administration, the Department of Fisheries, and the Customs Department. As a result, a recent, two-day training seminar for Customs Officers was provided to 35 customs officers (26-27 March, 2006). TRAFFIC Southeast Asia and Wildlife Conservation Society provided technical and financial support for this training.

Collaboration with NGOs

There are many local and international NGOs involved in wildlife conservation issues in Cambodia. Local NGOs include Save Cambodia's Wildlife and Mlup Baytong. The international NGOs are Free the Bear Fund, FFI, WCS, ITTO, WildAid, Conservation International, Birdlife International, WWF, WPA, and NSOK International. Of these NGOs, only Free the Bear Fund and CI have projects focused on bear protection.

Thus far, all NGOs have carried out their projects individually and separately. The government of Cambodia has been attempting to improve the conservation management system in the country by putting all NGO projects into a national conservation system, so that the output of the projects can be properly planned and controlled at a national level.

Recommendations

There are still many issues to resolve in Cambodia regarding natural resources and biodiversity conservation, especially the implementation of reformed policy, legislation, and CITES. The Royal Government of Cambodia, on one hand, wants to develop the country and raise living standards of local communities above the poverty line. But the government needs to balance this goal with its commitment to ensure the sustainable use of biological resources use for future generation, as stated in the National Rectangular Strategy (which is a document proposing steps for the country's development during 2003-2008). In order to enhance conservation of bears and reduce illegal wildlife trade, the following recommendations should be followed:

- (1) Improve enforcement activities in accordance with current legislation on protection of bears and other species listed in CITES annexes.
- (2) Cooperate with ASEAN Countries and CITES-member states on implementation of CITES and protection of species listed on the annexes.
- (3) Collaborate with other national and international conservation organizations.

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Chapter 8

The Current Status and Conservation of Bears in Vietnam

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Two species of bears inhabit Vietnam: Asiatic black bears (*Ursus thibethanus*) and Malayan sun bears (*Ursus malayanus*). The biology and ecology of both species are poorly studied, especially Malayan sun bears.

Distribution

Both Asiatic black bears and Malayan sun bears are found in evergreen forest, semi-evergreen forest and deciduous forests. However, they are found more frequently in remote limestone tall forests, possibly because they prefer forests with tall trees and limited human disturbance.

Asiatic black bears have wider distribution than sun bears. The distribution of Asiatic black bears before 1970 covered all provinces with forests (Fig.8.1), whereas that of Malaysian sun bear was restricted to the Truong Son mountain range from Lai Chau Province on the northern border with China to Tay Ninh Province in southcentral Vietnam (Fig.8.2). Because of the war, the distribution range before 1970 was known from only a few survey records. Although acknowledged as rough, the distribution maps shown in Fig.8.1 and 8.2 were generally accepted as accurate by most Vietnamese zoologists. By the 1990s, the geographic distribution of both species had shrunk, become fragmented, and become confined mainly to national protected areas such as national parks (NP) and nature reserve (NR). Although records after 1990 are from survey results in restricted areas (not the entire range of distribution), it is generally recognized in Vietnam that both species' ranges have become fragmented.

Threats to bear populations

There have been no studies on abundance of wild bears in Vietnam. However, both species are recognized to have been seriously reduced in number. The main reasons for this decrease are illegal hunting and habitat loss. In Vietnam, bears are extensively hunted for meat,

traditional medicine and trade. Vietnam's Forest Protection Department reported that the number of bears illegally captured from the wild for captive husbandry (so called bear farming) increased from 446 in April 1999 to 4,012 in July 2005 (Document dated 5 April 2005). This suggests an average of 595 bears have been illegally captured alive per year. If counting the number of dead bears, the total number of hunted bears may be as many as 1,000 bears yearly. The number may have declined in more recent years, either because the number of bears in the wild has decreased, because of better enforcement from the forest protection force, and/or because some bears are now being imported from neighboring countries.

Habitat degradation

Vietnam has complex topography; about 75% of the country consists of hills and mountains. The total land area is 330,363 km². At present, remaining natural forests total about 9 million hectares, accounting for about 30% of the country's land base (Wege et al. 1999). The main forest types are evergreen forest (64%), bamboo forest (11%), mixed forest (9%), semi-deciduous forest (8%), coniferous forest (2%), limestone forests (5%), and deciduous forest (1%). In principle, these forests are suitable habitat for both species of bears; however, these forests have been fragmented and degraded because of selective logging over many years. Only about one million hectares of primary forest remains. The Vietnamese government has implemented a policy intended to stop commercial logging. However, forests continue to be degraded due to legal, commercial timber harvest that is conducted to supply wood products for developing the country's infrastructure (e.g., construction of roads, hydropower plants, new settlement), as well as illegal lumbering by local residents.

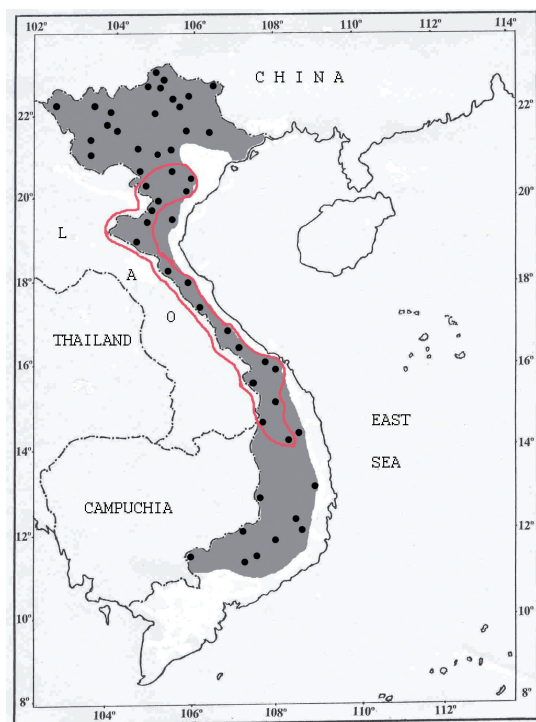


Fig.8.1: Distribution of the Asiatic black bear in Vietnam.

Shaded area represents the distribution before 1970; black dots indicate records after 1990. Provinces inhabited by Asiatic black bears include Ha Giang: Tay Con Linh NR, Bac Me NR, Du Gia NR, Bat Dai Son NR; Cao Bang: Proposed Ngoc Khe - Phong Nam NP, Pia Oac NR; Tuyen Quang: VQG Tam Dao, Tram Chu NR, Na Hang NR; Lang Son: Huu Lien NR; Bac Kan: Ba Be NP; Vinh Phuc: VQG Tam Dao; Phu Tho: Xuan Son NP, Thai Nguyen: Than Sa- Phuong Hoang NR; Lai Chau: Muong Nhe NR, Hoang Lien Son; Lao Cai: Hoang Lien NP, Van Ban District; Yen Bai: Mu Cang Chai District; Son La: Xuan Nha NR, Ta Sua NR, Copia NR, Sop Cop NR (Dang Huy Huynh 1994; Son La Forestry Department 2004a,b); Hoa Binh: Thuong Tien NR; Ha Tay: Ba Vi NP; Ninh Binh: Cuc Phuong NP; Thanh Hoa: Ben En NR, Pu Hu NR, Xuan Lien NR; Nghe An: Pu Mat NP, Pu Huong NR, Pu Hoat NR; Ha Tinh: Vu Quang NP, Ke Go NR; Quang Binh: Phong Nha - Ke Bang NP, Proposed Khe Net NR; Quang Tri (Dak Rong NR. Proposed Bac Huong Hoa NR; Thua Thien - Hue: Bach Ma NR, Phong Dien NR, Da Nang: Ba Na NR; Quang Nam: Song Thanh NP, Proposed Ngoc Linh Quang Nam NR; Kon Tum: Chu Mom Ray NP, Ngoc Linh Kon Tum NR; Gia Lai: Kon Ka Kinh NP, Kon Cha Rang NR; Phu Yen: Krong Trai NR; Dak Lak: York Don NP, Ea So NP; Dak Nong: Ta Dung NR; Lam Dong: Cat Tien District, Bao Loc District, Bao Lam District, Bi Dup- Nui Ba NP; Binh Phuoc: Bu Gia Map NP; Dong Nai: Cat Tien NP, Vinh An NR. (Le Hien Hao 1973; Pham Trong Anh 1982; Dang Huy Huynh et al. 1994; MOSTE 2000; Nguyen Xuan Dang and Pham Trong Anh in press).

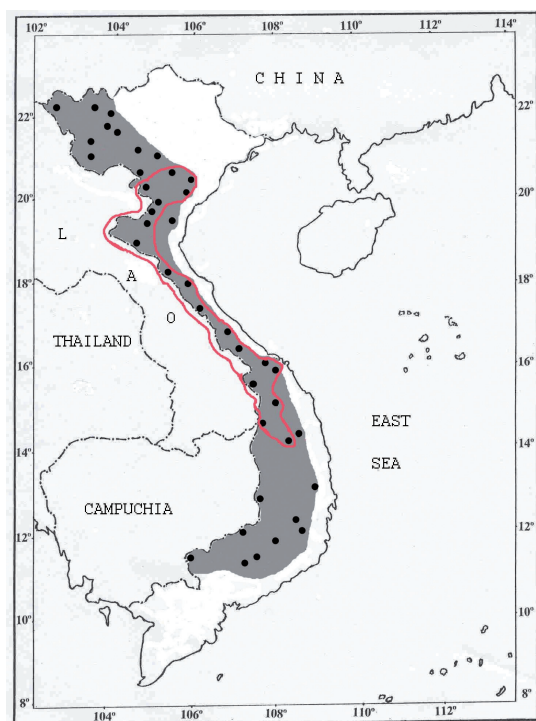





Fig.8.2: Distribution of the Malayan sun bear in Vietnam.

Shaded area represents the distribution before 1970; black dots indicate records after 1990. Provinces inhabited by Malayan sun bears include Lai Chau: Muong Nhe NR, Hoang Lien Son; Lao Cai: Hoang Lien NP, Van Ban District; Yen Bai: Mu Cang Chai District; Son La: Xuan Nha NR, Ta Sua NR, Copia NR, Sop Cop NR; Hoa Binh: Thuong Tien NR; Thanh Hoa: Ben En NR, Pu Hu NR, Xuan Lien NR; Nghe An: Pu Mat NP, Pu Huong NR, Pu Hoat NR; Ha Tinh: Vu Quang NP, Ke Go NR; Quang Binh: Phong Nha - Ke Bang NP, Proposed Khe Net NR; Quang Tri: Dak Rong NR. Proposed Bac Huong Hoa NR; Thua Thien - Hue: Bach Ma NR, Phong Dien NR; Da Nang: Ba Na NR; Quang Nam: Song Thanh NP, Proposed Ngoc Linh Quang Nam NR; Kon Tum: Chu Mom Ray NP, Ngoc Linh Kon Tum NR; Gia Lai: Kon Ka Kinh NP, Kon Cha Rang NR; Phu Yen: Krong Trai NR; Dak Lak: York Don NP, Ea So NP; Dak Nong: Ta Dung NR; Lam Dong: Cat Tien District, Bao Loc District, Bao Lam District, Bi Dup- Nui Ba NP; Binh Phuoc: Bu Gia Map NP; Dong Nai: Cat Tien NP, Vinh An NR; Tay Ninh: Lo Go Sa Mat NR. (Le Hien Hao 1973; Pham Trong Anh 1982; Dang Huy Huynh et al. 1994; MOSTE 2000; Nguyen Xuan Dang and Pham Trong Anh in press)

 Distribution before 1970
  Locations of records after 1990
 Truong Son mountain area (approx.)

Human-bear relationship

In Vietnamese, the common name of the Asiatic black bear is “Gau ngựa” (i.e., horse bear) and the Malayan sun bear is called “Gau cho” (dog bear), perhaps refer-

ring to the animal’s size and strength. Traditionally, bears are considered good friends of people. Both tigers and bears are symbols of strength. However, “tiger strength” is associated with fear and death for people, whereas “bear strength” is associated with useful heavy

labor and with helping poor people in difficult situations.

On other hand, bears are also recognized as animals of extremely high economic value. Traditionally, bear gall is considered a powerful medicine for treatment of cholera, epilepsy, bone pain, ecchymosis, and other ailments. Bear bones are also used to produce a bear balm, which is used for treatment of rheumatism and for general health improvement (Vo Van Chi 1998).

In the past, bear paws had no specific value, but now bear paws are widely used to prepare liquor which is considered a health tonic. This custom may have been imported recently from other countries. Due to low density and remoteness of their habitat from human settlements, conflicts between bears in humans are very uncommon, although claims of bears raiding corn plantations are occasionally reported.

Commercialism of bears

Husbandry of both bear species for gall extraction was banned in Vietnam on March 30, 2006 by Governmental Decree No.32/2006/ND-CP on the management of endangered, precious and rare species of forest plants and animals. However, during recent years, illegal husbandry of bears for gall extraction has developed substantially in Vietnam, and it seriously threatens the survival of bear population in the wild. The Vietnam Forest Protection Department reported that in July 2005, the number of bears in captivity had reached 4,012 (of which 3,598 were Asiatic black bears, 185 were Malayan sun bears, and 229 lacked species identification). These bears were kept in 1,088 small facilities in 57 provinces, mostly on a household basis. Most households kept 2-10 bears each; few households kept 20-40 individuals. The two largest farmers kept 80

bears each. Bears are kept individually in small (about 1.5m wide, 2.0m long, 1.5m high) metal cages (Photo 8.1). Bears are fed twice daily with rice, fish, cattle bones, squash, melons, and other fruits and roots. Eggs and honey are added to the diet after gall extraction. Gall is extracted every 2-3 months (depending on keeper) using a long-needle syringe with the help of ultrasonic equipment for gall-bladder location. Due to poor husbandry conditions and excessive gall extraction, bears usually die after 4-5 years of exploitation, and new bears caught from wild are purchased to replace them.

Vietnam still has no bear-breeding farms; all bears used for gall extraction are captured from the wild or imported from neighboring countries (e.g., Laos, Cambodia). Hunters usually kill adult females and when capturing live cubs. This obviously causes great damage to bear populations in the wild. To help control illegal bear husbandry, all captive bears received microchip implementation for individual monitoring identification in 2005 (with financial support from the Vietnamese Government and the World Society for the Protection of Animals). Bear keepers are now required to keep these bears until their deaths, and are prohibited from extracting gall as well as replacing existing, or adding new bears. Local forest protection departments are responsible for monitoring this process. The illegal bear-keepers are not poor and their main household income is usually not from bear bile trade, so banning bile extraction will not pose a great burden on their household income even if they must continue to maintain their existing stock of bears. However, if they wish to dispose of their bears, the government has offered to arrange for transfer of unwanted bears to an appropriate captive facility. Bear owners have been requested to report regularly to local Forest Protection Units on the status of their bears. When bears die, owners have been told to inform their local Forest Protection Unit immediately, both for verifying the reason of death and for certifying the death of the bear. Otherwise, the bear owner will be punished. In turn, local Forest Protection Units are supposed to send staff members to bear-keeping households regularly to verify the number of bears and the status of their health.



Photo by Nguyen Xuan Dang

Photo 8.1: A bear kept for gall extraction.

Present management system

Both bear species have been designated as "Endangered" in the Red Data Book of Vietnam (MOSTE 2000), the highest level of threat. Both are also classed in the highest protection level (Group IB - strict ban of hunting and use) by Governmental Decrees 18/HDBT (17 January 1992, on promulgating a list of precious and rare

animal and plant species and regulations for their management) and Governmental Decree 32/2006/ND-CP, (30 March 2006, on management of endangered, precious and rare species of forest plants and animals). Vietnam joined CITES in 1994 (both bear species are listed in Appendix I). In general, bears are strongly protected by laws in Vietnam. Cases of violation of bear hunting and trade in bear parts that have been found and dealt with number in the hundreds. However, because trade in bear parts is so profitable, and because local enforcement's capacity is limited, bears continued to be hunted and traded in Vietnam.

With regard to bear habitat protection, Vietnam has established a network of special-use forests/protected areas of forested land. As of March 2003, the network consisted of 27 national parks, 60 nature reserves and 39 landscape protected areas, totaling 2,541,675 ha (Vietnam SR 2003). However, management of special-use forests still faces many difficulties, such as existence of many villages inside boundaries, low financial investment, and non-enforcement of management regulations. In response, the Vietnamese government approved a new "Management strategy for management of protected areas in Vietnam until 2010" in 2003 (Vietnam SR 2003).

The main law enforcement body for habitat and wildlife conservation in Vietnam is the Vietnam Forest Protection Department of the Ministry of Agriculture and Rural Development (MARD). This Department has branches at provincial and district levels and also in each protected area to implement national laws on nature and wildlife conservation. Several other governmental agencies (e.g., the Institute of Ecology and Biological Resources, the Forest Investigation and Planning Institute) and NGOs (e.g., World Wide Fund for Nature in Vietnam, Wildlife at Risk) also contribute directly to bear conservation in Vietnam.

Public education for bear conservation in Vietnam is still poorly done. There are very few educational events focused specifically on bear conservation. Some exceptions are the recent publication of a bear protection poster by Wildlife at Risk, an issue of educational bulletin by the Centre for Nature Education of Vietnam (ENV; Photo 8.2) and some brief radio and TV broadcasts on governmental policy for the control of captive bears.

Recommendations

Despite being protected by law, bears in Vietnam continue to be hunted for use and trade. The main reasons are not enough strong law enforcement, low public awareness on bear conservation, lack of a comprehen-

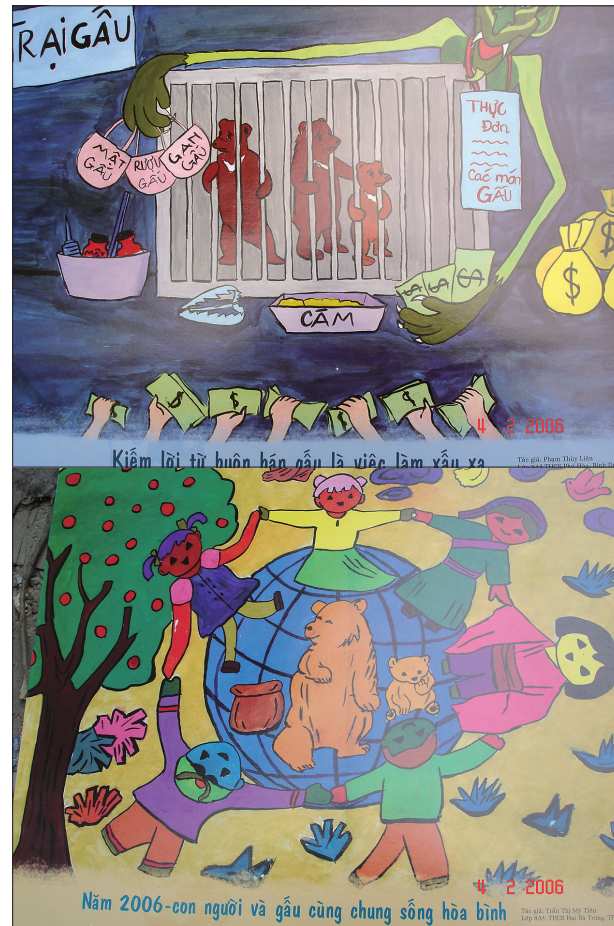


Photo 8.2: Drawings made by school pupils for a bear conservation contest conducted by the ENV organization. Messages on upper drawing: "Making benefit from bear trade is bad business" and on lower drawing: "Year 2006 is for peaceful co-existence of people and bears".

sive bear conservation action plan, and lack of investment for bear conservation activities. Conservation enforcement in Vietnam is conducted by forest rangers, border customs and market inspectors. The capacity of these forces is limited due to lack of relevant equipment, lack of relevant training on inspecting for bear parts and derivatives, and poor salaries (which opens the opportunity for corruption). Public education on bear conservation is still too weak. Especially in remote areas, people do not know the critical conservation status of the wild bear population, nor are they aware of national legislation on bear conservation. Meanwhile, their living standards are very low and the wildlife market strongly encourages them to hunt bears. Governmental investment for bear conservation is too low to solve these problems in a timely manner. For example, in the case of controlling illegal captive bears, the government lacked funds to pay for microchip im-

plantation or to provide facilities to house confiscated bears.

Research on bears in Vietnam is also poorly developed due to lack of funds. Little is known about the size of Vietnam's bear population or distribution, or problems of habitat fragmentation, to say nothing of detailed studies of bear ecology. The country also still lacks a comprehensive bear conservation action plan, which would help to guide and mobilize all sources for bear conservation.

In order to conserve bear populations in Vietnam, the following actions are high priority:

- (1) Strengthening law enforcement of bear hunting, trade and use, by increasing capacity of enforcement forces by providing them with relevant equipment, expertise training, applying of relevant incentives and punishment systems.
- (2) Developing a nation-wide campaign on not using bear parts and bear derivatives, requesting restaurants and pharmaceutical shops to halt trading in bear parts and bear derivatives.
- (3) Stronger education to increase public awareness of the urgency of bear conservation status and on national legislation for bear conservation.
- (4) Seeking funds for development of bear conservation-related studies such as assessment of current status of the bears in the wild, distribution, population size, population fragmentation, and threats to each sub-population and bear ecology.
- (5) Developing a national bear conservation action plan and having it approved by the government for funding its implementation.

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Chapter 9

The Status of Malaysian Sun Bears in Malaysia

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The sun bear (*Helarctos malayanus*) (Photo 9.1) is the only bear species inhabiting the lowland tropical forest of Malaysia. Both of two subspecies recognized by Meijaard (2004) inhabit in the country: the Malayan sun bear (*H. m. malayanus*) in Malay Peninsular, and the somewhat smaller Borneo sun bear (*H. m. eurispylus*) on Borneo. Continued habitat destruction and other human-related mortality suggest a bleak future of this forest dependent species in Malaysia. Thus, sun bear conservation should be a high priority.

Status

Current distribution

To date there has been no in-depth study of sun bear distribution conducted in Malaysia. However, inventory studies and fauna surveys carried out during the past two decades have found bears in a limited number of protected areas such as national parks, forest reserves, wildlife sanctuaries, and conservation areas. Because sun bears are forest dependent, the amount of relatively

undisturbed forest reflects the habitat available to the species and thus its potential population size. Malaysia consists of two distinct geographical regions: Peninsular Malaysia and East Malaysia. East Malaysia is located on the island of Borneo and incorporates the two states of Sabah and Sarawak (Fig.9.1, 9.2, 9.3). The total land areas for Peninsular Malaysia, Sabah and Sarawak are 131,623 km², 72,500 km², and 124,450 km², respectively; of which approximately 45%, 60%, and 67% respectively are under various kind of forest cover (Department of Forestry 2003; Sabah Forestry Department 2006; Sarawak Forestry Corporation 2006). Although the proportion of forest cover may seem high, many of these forests are not ideal sun bear habitat. Such forests include recently logged forests, smaller forest fragments, logged or secondary forests subjected to poor logging practices and high timber extraction rates, and forests with uncontrolled hunting and poaching activities.

Current Population estimates

As yet, there has been no attempt to estimate the total



Photo by Siew Te Wong

Photo 9.1: A subadult sun bear resting on a tree branch in the rainforest of Borneo.

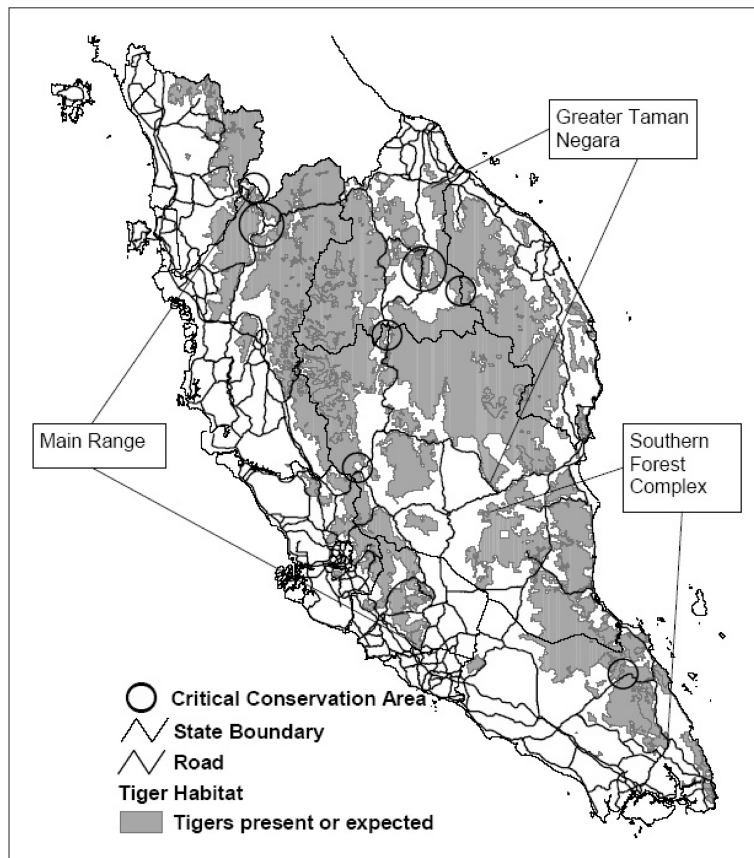


Fig. 9.1: Three important blocks of forested areas in Peninsular Malaysia. Source: Kawanishi et al. (2003)

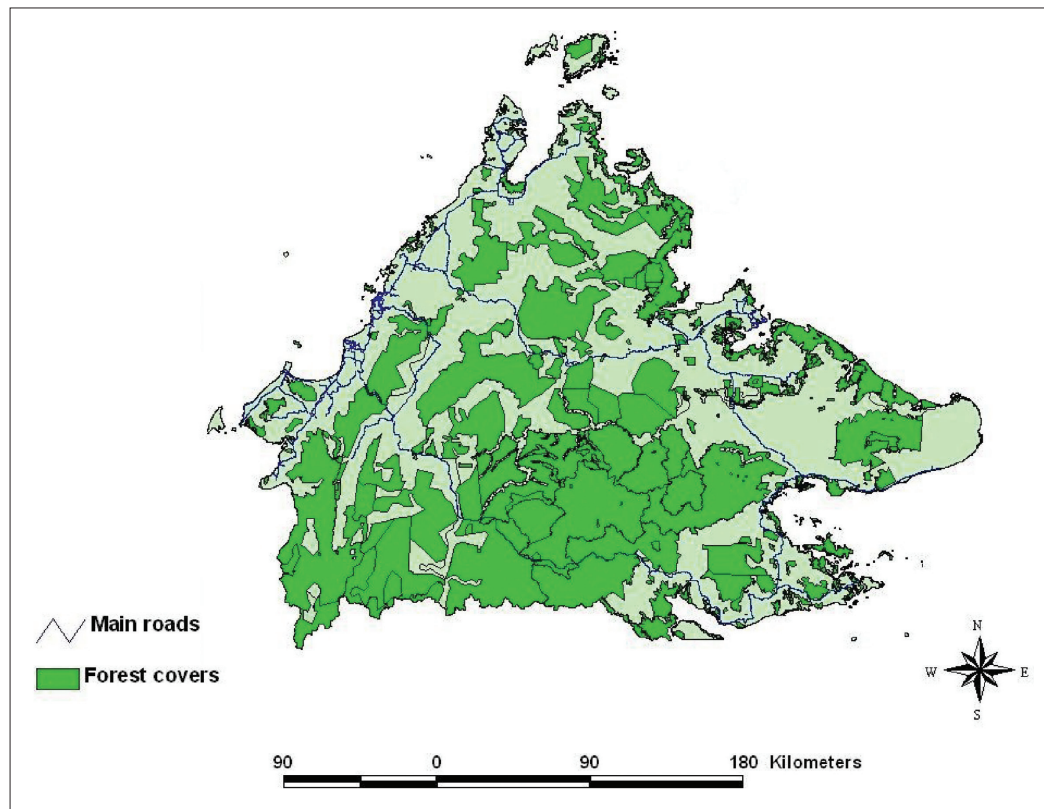


Fig. 9.2: Forest cover map in Sabah.

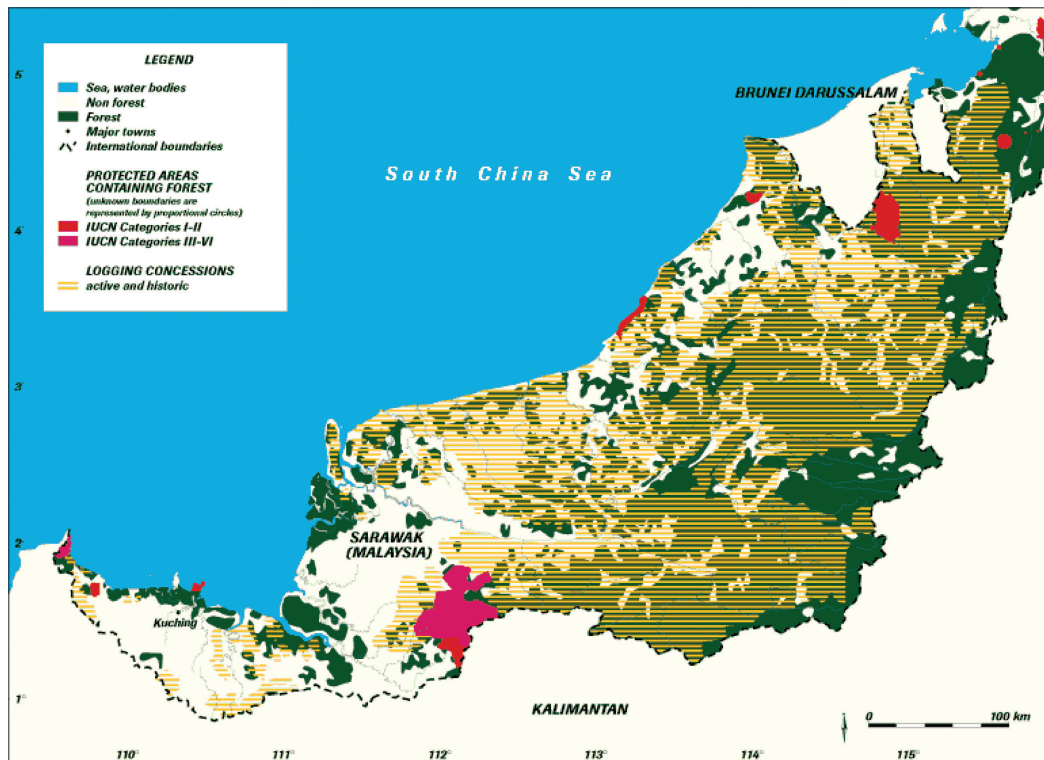


Fig. 9.3: Forest cover and logging concession in Sarawak.

size of the sun bear population. However, a few authors in Malaysia and Indonesia have estimated the density of the sun bears in various parts of its range. Except for Davies and Payne (1982) who searched for bear sign, all researchers have used camera-trapping data to estimate bear density. Kawanishi and Sunquist (2004) estimated 1.13-1.57 bears/km² in Taman Negara National Park (in Peninsular Malaysia). However, Meijaard et al. (2005) did not consider these densities reliable due to perceived methodological shortcomings. Davies and Payne (1982) reported 0.25 bears/km² in Sabah; S.T. Wong (unpublished data) estimated 0.128 bears/km² in Ulu Segama Forest Reserve in Sabah. Augeri (2005) estimated 0.042 bears/km² and 0.025 bears/km² in Kayan Mentarang National Park, and Bulungan Forest respectively (in Indonesian Borneo). Judging from the shrinking habitat alone (see section on habitat destruction) it is likely that this population is declining rapidly.

Population threats

Illegal hunting and trading, selective logging, population fragmentation and the cumulative effects of habitat destruction are the major threats to sun bear populations in Malaysia. However, there is currently a lack of knowledge of how these factors are affecting mortality rates and population recruitment.

Hunting of sun bears is strictly prohibited in Malay-

sia. However, hunting by opportunistic poachers still occurs due to a lack of enforcement. Many licensed hunting (or indeed illegal poaching) activities take place in oil palm (*Elaeis guineensis*) plantations adjacent to forest patches. Although the targeted species for hunting are wild boar (*Sus scrofa*), bearded pigs (*Sus barbatus*) or sambar deer (*Cervus unicolor*), these hunters will not hesitate to shoot bears if the opportunity arises. Bears that hide in forest patches adjacent to plantations during the day and forage in plantations at night are therefore vulnerable. Oil palm plantations have thus become an ecological trap for bears, and forest patches adjacent to plantations have become population sinks. In addition to opportunistic hunting, poaching activities conducted by well-organized foreign poachers from Thailand, Cambodia, and Vietnam in the past few years have posed additional threats to the survival of Malaysian wildlife including sun bears, in national parks, and other protected areas in Peninsular Malaysia. Sun bear meat and paws are available, although not commonly, as a delicacy to both foreign tourists and locals in some cities across the country (TRAFFIC Southeast Asia personal communication). Sun bear claws and canines, believed to possess the power to drive away evil spirits, are still available for sale in jewellers and antique shops in Sabah. In Sarawak, native rural residents who follow a traditional lifestyle and who legitimately need to hunt

these animals for their own consumption are granted the right to do so without obtaining a hunting license (Meijaard 1999). Because of this uncontrolled hunting, the sun bear in Sarawak is hunted heavily for meat, gall bladders, claws, teeth, and for trade, extremely rare, and completely extirpated from many areas (WCS and Sarawak Forestry Department 1996).

Characteristics of habitat

The tropical rainforests of Peninsular Malaysia and Borneo are well known for their high biodiversity and are one of the most diverse ecosystems on Earth. The Dipterocarpaceae family of trees dominates these tropical rainforest. In Peninsular Malaysia, most productive lowland dipterocarp forests have been lost to urban and agricultural use (mainly oil palm and rubber [*Hevea brasiliensis*] plantations). In 2004, about 17% (22,300 km²) of Peninsular Malaysia was used for oil palm plantations (Department of Statistics 2005). Forested areas of various conditions (approximately 45% of the total land area) are found in higher elevation, mountainous areas, national parks and their surrounding forests, such as Titiwangsa Main Range, the Greater Taman Negara Ecosystem, and the Southern Forest Complex (Fig. 9.1). These three areas are the most important sun bear habitat, not only in Peninsular Malaysia, but also in the entire sun bear's range across Southeast Asia.

In Sabah, about 40% of lowland dipterocarp forests have been converted to either urban area or agricultural land (mainly oil palm plantations). In 2004, about 16.1% of the land in Sabah (or 11,654 km²) was utilized for oil palm plantation (Department of Statistics 2005). This number is expected to increase in the near future. Although about 60% (35,900 km²) of Sabah remains forested (Fig. 9.2), only 23% of that area (14% of the state) has some form of protection (Sabah Forestry Department 2005). The remaining 77% of forested lands (i.e., 46% of the total land base) are designated as logging concessions, mainly Commercial Forest Reserves, which have mostly been selectively logged, or will be logged by the end 2007 (Butler 2006).

According to the Sarawak government, more than 67% (82,200 km²) of Sarawak's land is under natural forest cover (Fig.9.3) (Rautner et al. 2005). However, only around 8% (10,300 km²) has some form of protection as national parks, nature reserves, or wildlife sanctuaries (Rautner et al. 2005). With regard to long-term land use planning, Sarawak has a 6:6:1 policy (6 million ha agriculture and settlements, 6 million ha commercial forest, 1 million ha protected areas) (Rautner et al. 2005). In 2004, 4.1% (50,830 km²) of Sarawak was utilized for oil palm plantation, and this percentage will double during the next few years. At present, almost all of the 6 million ha of commercial forest has been heav-

ily logged.

Habitat threats

Forest destruction is by far the most important threat faced by sun bears in Malaysia today. These forests are highly valued for timber production and are also being rapidly cleared to make way for plantations and human settlement. Selective logging has also converted many primary forests into secondary forests. Malaysia considers forestry one of its strategic backbones to generate revenue for the country's economy through export earning; Malaysia is currently the world's largest producer and exporter of tropical hardwood. Logging affects lowland forests in Malaysia except in a few protected areas. The annual deforestation rate jumped almost 86 percent between the 1990-2000 period and 2000-2005, with Malaysia losing an average of 140,200 ha -0.65 percent of its forest area- yearly since 2000 (FAO 2005). In comparison, the other Southeast Asian countries lost 78,500 ha, or 0.35 percent of their forests annually during the 1990s (FAO 2005). Logging activities not only shrink the sun bear's habitat, they also allow poachers to enter the forest through the networks of logging roads created during the logging operation.

Sun bears are found in logged forest (Wong et al. 2004), but the effects to bears of converting primary forests to secondary plant communities are unknown (Wong 2005). Because most of the remaining forest in Malaysia has either been selectively logged or is earmarked for logging in the near future, the future of the sun bear depends heavily on logged forests. The term "logged forest" is vague because the quality of the logged forest varies from forest with a high extraction rate with very few trees remaining, through heavily disturbed forest after poor logging practices, to less disturbed forest with many larger trees left intact. The latter is usually found on steeper terrain or in relatively small places where environmental friendly logging practices such as Reduced Impact Logging (RIL) have taken place. Whether sun bears use badly logged forests, such as the severely damaged logged forests in many parts of Sarawak, is highly questionable.

Human-bear relationships

Local names of bears

The name of the Malayan sun bear in Malay is "Beruang madu" or "honey bear" probably due to their affinity for honey. Among the Malaysian Chinese, they are known as "Gou-Xiong", which translates as "dog bear," probably because of their small size, short hair, and a smaller head that is dog-like. They also emit a loud bark when threatened.

Conflicts with humans

In Malaysia, the Malayan tiger (*Panthera tigris jacksoni*), Asian elephant (*Elaphus maximus*), and Borneo orangutan produce more conflicts with humans than do sun bears. Although sun bears that live adjacent to oil palm plantations are known to feed on oil palm seeds (Nomura et al. 2004), plantation owners usually tolerate such foraging because few bears are involved, and they tend to feed only on discarded fallen seeds. Nevertheless, plantation workers are usually concerned about their safety when encountering bears, especially if bears later learn to forage near houses. Either local authorities or villagers may therefore kill the bears, not because of crop raiding, but because of safety issues (New Straits Times 2005).

Present management system

The legal status of the species

The Malayan sun bear is been listed as an Appendix I species under the Convention on International Trade in Endangered Species of Wild Fauna (CITES), to which Malaysia is a signatory. International trade of the sun bear or its parts is prohibited without proper permit.

The sun bear is listed as a "Totally Protected Species" under the Wildlife Protection Act (1972) in Peninsular Malaysian (Malaysian Government 1972), and Wildlife Conservation Enactment (1997) in Sabah (Sabah Government 1997). Hunting, killing, keeping or selling the animal or its body parts is totally prohibited.

In Sarawak, the sun bear is listed as a "Protected Species" under the Wild Life Protection Ordinance (1998). A license is needed to keep sun bears as pets, hunt, kill, capture, sell, import or export them, or possess any recognizable part of these animals (Sarawak Government 1998). Nonetheless, an unknown numbers of bears are kept as pets and a small number are kept legally in Sabah and Sarawak, where the owners possessed the bears before the laws were enacted in late 1990's.

List of government agencies, scientists and NGOs concerned with sun bears

In Malaysia, the three different geographic regions of the country each have a separate government agency responsible for conservation of sun bears. These are the Department of Wildlife and National Parks in Peninsular Malaysia, Sabah Wildlife Department in Sabah, and Sarawak Forestry Corporation in Sarawak. A few international and local environmental and conservation NGOs, such as World Wildlife Fund for Nature (WWF-Malaysia), Wildlife Conservation Society (WCS-Malay-

sia Program), and Malaysian Nature Society (MNS), have been established and have conducted conservation programs on many wildlife species for decades. However, no NGOs or public education program are specifically focused on the conservation of the sun bear. The author is the only scientist in the country who has been actively involved in sun bear research and conservation activities either now or in the past. (Wong et al. 2002, 2004, 2005; Wong 2005).

Recommendations

The Malayan sun bear remains the most neglected large mammal in Malaysia and in Southeast Asia. They are still the least known bear species in the world despite the few ecological studies that have been conducted in Borneo during the past few years (Fredriksson 2005; Fredriksson et al. in press a; Fredriksson et al. in press b; Nomura et al. 2004; Wong et al. 2002, 2004, 2005). In Malaysia, no specific management actions have been taken other than the provision of legal protection status, which is weakly enforced. There have been no reliable surveys of its distribution, population densities, population trends, number of bears in captivity, human caused mortality, trading activity, or the utilization of bear parts. In addition, there are no conservation or public education programs specifically targeted for sun bears and no habitat management plans for their conservation. Finally, wise forestry practices are not in common practice; instead, large forest areas are being cleared for plantation development and many logging practices are unsustainable. The lack of basic information on the sun bear and of a government commitment to protect remaining forests is a serious limitation to the conservation efforts and for the long-term survival for sun bears in Malaysia.

Recommendations for the conservation and management of sun bears in Malaysia include:

(1) Conduct a distribution mapping and status survey: a nationwide distribution survey on the presence-absence of sun bear in remaining forest patches. The survey should also identify: a) important habitat blocks for the long-term survival of sun bears and their identification as Sun Bear Conservation Units (SBCU); b) conservation status in each SBCU; c) population and density estimates in each SBCU; and d) conservation activities in each SBCU.

(2) Conduct a survey on trade of bear parts and captive sun bears: Collaborate with NGOs (e.g., TRAFFIC-Southeast Asia) to conduct a nationwide survey on trade of sun bears and its body parts, consumption, and identify the status of captive sun bears in the country.

- (3) Research:** Conduct ecological research in various habitats types (including logged forest) on life history, reproductive biology, population genetics, and the identification of resources critical to the sun bear's survival.
- (4) Improve logging practices and safeguard remaining forested areas:** Promote environmentally friendly logging practices such as Reduced Impact Logging (RIL), and protect keystone resources in sun bear habitat (e.g., mature fig trees, oak tree patches, and trees with cavities) from logging. The most ideal situation would be to halt logging activities and conversion of tropical forest into plantations.
- (5) Education:** Promote sun bear conservation awareness to the general public and students, and promote the legal status of the sun bear to local people who utilize bears, through the development of presentations, posters, brochures and websites.
- (6) Strengthen law enforcement:** Increase penalties for offenders and poachers who commit wildlife crimes. Increase the frequency of patrolling by qualified and well-armed law enforcement personnel in protected areas and popular hunting grounds.

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Chapter 10

The Status of Sun Bears in Indonesia

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Sun bears (*Helarctos malayanus*) in Indonesia occur on the islands of Sumatra and the Indonesian part of the island of Borneo referred to as Kalimantan. Bornean sun bears seem to be smaller than Sumatran or mainland sun bears and subspecies status may be warranted (*H. malayanus eurispylus*) (Horsfield 1825; Meijaard 2004). Bornean sun bears (Photo 10.1) weigh between 30-65 kg (45-90 kg for sun bears from Sumatra or mainland Southeast Asia although no data from the wild are

yet available for the latter).

Status

Present distribution

Accurate mapping of sun bears throughout their range is currently a priority of the Bear Specialist Group because few recent data are available. However, widespread changes to sun bear habitat have occurred over the past few decades. Some 33% of Sumatra and 54% of Borneo remained forested in the year 2000 (Stibig and Malingreau 2003) (Fig.10.1). Between 1990 and 2005, Indonesia lost 24.1% of its forest cover (<http://www.mongabay.com/>). During the 1997-98 forest fires, some 10 million ha of forest were severely damaged in Kalimantan alone (Taconni 2003).

Despite substantial forest damage, sun bears still persist in most areas which remain forested in Kalimantan and Sumatra, both inside and outside protected areas. Fresh sun bear sign has been encountered in quite heavily disturbed areas (logged-over forest) and in areas that have been surveyed for bears several years after forest fires, although sign densities in such burned areas 7 years after the fires were only 30% of sign densities found in neighboring unburned forest (Fredriksson unpublished data).

Population estimation

No population estimate can be made at present of remaining sun bear populations in Indonesia, although we believe the population is declining due to habitat disappearance, and lack of effective habitat protection and law enforcement.

Population threats from illegal hunting and capture

No data are available regarding the numbers of sun bears captured annually in Indonesia, although trade of young bears as pets and bear body parts occurs, especially near ongoing logging operations and recent oil palm plantation developments. Trade in gall bladders



Photo by Gabriella M. Fredriksson

Photo 10.1: Sun bear searching for insects.

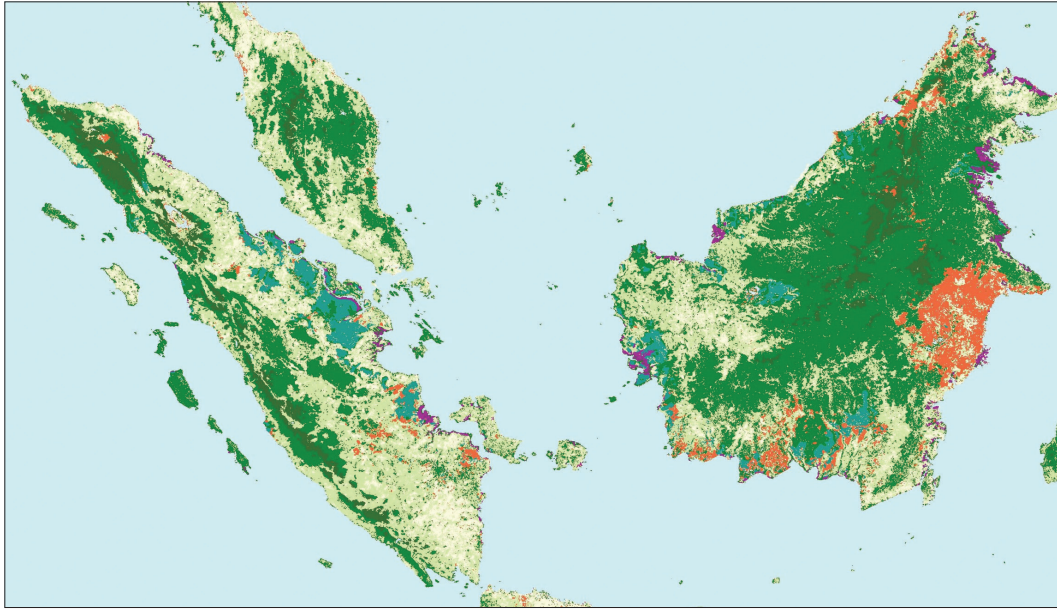


Fig.10.1: Forest cover map of Sumatra and Borneo of 2000 (EU-JRC 2000). Sun bear distribution most likely approximates remaining forest cover, although substantial forest cover (1.9% annually) has disappeared since this image was produced.

- Dark green and blue = forest cover (forest on dry land and peat swamps)
- Purple = mangrove forest, • Red = burned over areas

exists at a low scale, although this trade becomes more prominent when localized demand is high (i.e. near Korean- or Chinese-owned plywood factories, or in big cities). Hunting of sun bears occurs in most forested areas, although primarily as a by-product of targeted hunting for deer species or pigs. Bear parts (claws and canines) are sold in most curiosa/antique shops and even at the international airport in Jakarta. Law-enforcement regarding violations of wildlife laws is not yet a high priority in Indonesia.

Characteristics of habitat: present conditions and threats

Both in Kalimantan and Sumatra, sun bears have been encountered in all forest types at least up to 2,000 m elevation, with varying sign densities. Due to the lack of clearly defined climatological seasons, sun bears in Kalimantan do not seem to have a defined breeding period, and cubs have been documented year-round (Schwarzenberger et al. 2004). Sun bears in the eastern part of Borneo were quite heavily affected by the El Niño of 1997-98 that manifested itself in a prolonged regional drought. In addition to facilitating forest fires that affected sun bear populations heavily, the drought also affected fruiting patterns in unburned forest areas. Few fruit resources were available in primary forest for over a year after the drought (Fredriksson et al. in press a, b). Sun bears captured for research purposes in 1999

were observed to be in emaciated condition (both in East Kalimantan as well as in Sabah) (Wong et al. 2005; Fredriksson unpublished data).

Lowland dipterocarp forest, the most diverse habitat, continues to be converted and opened up for access at an alarming rate, directly affecting remaining sun bear populations. Increased illegal logging in all protected areas (Fuller et al. 2004) also seriously affects sun bear populations. Forest fires are a serious threat, primarily in southern Sumatra and many parts of Kalimantan.

Human-bear relationships

Local names of bears

Sun bears in Indonesia are generally referred to as 'Beruang Madu' (honey bear). Indigenous tribes frequently have their own names for sun bears (e.g. in Dayak Penihing bears are referred to as "Buhang" but in Sumatran Tapanuli Batak language sun bears are called "Go'pul" and in Aceh, "Cage").

Ethnology of bears: traditional hunting, medicinal use, bear symbolism, stories

Indigenous people hunt sun bears throughout Kalimantan and Sumatra, although in none of the areas surveyed were bears found to be a prime target species. Traditionally people would have used spears and dogs for hunt-

ing bears, usually awaiting a bear when it climbs down a tree. Currently, home-made rifles are the most frequently used tool for hunting bears (as is true of large mammals generally). Meijaard (1999) reported that bear bile in Kalimantan was used to treat ailments such as internal bleeding after surgery, bruising and cuts after falls, sore muscles, and sprained joints.

Few ethno-stories have been compiled to date referring to the use of sun bears in the symbolism of Indonesia's indigenous tribes. In some areas of East Kalimantan, medicine men use hollow canines of bears as whistles to scare off evil spirits during traditional ceremonies. Old baby-carrying baskets are frequently adorned with sun bear canines to ward off evil spirits. More recently, such ornamental "canines" have actually been carved from other types of bone. In previous times, Dayak war-coats would occasionally be made of bear skins (although chiefs more frequently wore coats made from skins of clouded leopards).

Conflicts with humans

Sun bears probably commenced crop-raiding when attractive anthropogenic foods were first planted close to their forest habitat. Early reports from colonialists in Indonesia described ways of deterring or killing marauding bears in fruit plantations (O-Viri 1925), even when adjacent forest habitat was still extensive. Sun bears raid fruit orchards and coconut trees planted near the forest edge especially after nearby forest loss/damage has occurred (Fredriksson 2005). Indonesian farmers are not compensated for any losses sustained from wildlife, and conflict is rarely reported to the Wildlife Protection Branches of the Forestry Department.

Few human injuries have been reported in Kalimantan; unverified reports have been more frequent in Sumatra (Martyr D, *in litt* 2005). Rare occurrences of sun bears attacking goats and other larger livestock have been reported in Sumatra (Martyr D, *in litt* 2005), although no depredation has been documented in Kalimantan.

In both Kalimantan and Sumatra, reports of sun bears entering oil palm plantation are becoming more frequent. Sun bears usually enter plantations at night causing little conflict with plantation workers. Although illegal, several reports exist of the members of the Indonesian hunting association (Perbakin) shooting bears in oil palm plantations or during other hunting expeditions in which wild pigs are the only legal target species.

Commercialism of bears

Bear utilization on commercial basis

Sun bears have been protected in Indonesia since 1973.

Sun bears have never been farmed for their gall bladder in Indonesia. Kurniawan and Nursahid (2002) reported that 63% of drug stores investigated during 2000-2002 traded openly (albeit illegally) in bear gall bladders or their derivatives. Packaged products containing supposed bear bile parts were found "endorsed" with issuances by the Department of Health, illustrating the level of ignorance by certain government departments on the legal status of trade in parts of protected wildlife (Kurniawan and Nursahid 2002). Some Indonesian zoos use sun bears as an attraction for visitors (e.g. sun bears playing guitars or riding bicycles) adding little to public education regarding sun bear conservation status and ecology in the country.

Imports and exports

The international trade in bears and their parts between Indonesia and other Asian countries may have been quite high in the 1970s and early 1980s. Customs records from South Korea show that between 1970 and 1980 a total of 206 kg of bear bile was legally imported from Indonesia to South Korea alone. By the 1980-1990 period this had dropped to only 1 kg (Mills et al. 1995). This international trade went on despite the fact that the sun bear became officially protected in Indonesia in 1973 and Indonesia became a signatory to CITES in 1979.

Breeding bears in zoos

Most zoo's and animal parks in Indonesia keep sun bears. As of April 2006, data from a limited sample of 8 zoos indicated a captive population of 93 sun bears. Additionally, at least 77 bears who were confiscated from illegal private captivity in recent years were held in wildlife rescue centers on Kalimantan and Java. The total number of captive sun bears in Indonesia (both legal and illegal) could possibly be in the hundreds.

Present management system

Protected status of sun bears in Indonesia

The sun bear became officially protected in Indonesia following the Surat Keputusan Menteri Pertanian (Decree of Minister of Agriculture) No. 66/Kpts/Um/2/1973. This was followed up by the Act of the Republic of Indonesia No. 5 Concerning the Conservation of Natural Resources and their Ecosystems (Ministry of Forestry 1990).

List of governmental agencies, scientists and NGOs involved with bear conservation

Enforcement of laws related to sun bears is the responsibility of the Forestry Department's branch for Wildlife

Conservation (PHKA at the national level, KSDA at the provincial and district levels). In reality, KSDA offices are greatly understaffed given the size of area they are charged with controlling and patrolling, and the scope of organized wildlife crime challenging them.

Several international NGO's (i.e. WCS, WWF, TNC, FFI, SOCP, BOSF) collaborate with the Forestry Department to increase the effectiveness of their wildlife protection efforts, both in patrolling protected areas as well as dealing with prosecuting wildlife crime instances and confiscating protected species. These efforts have yet to lead to a serious commitment from the Forestry Department to protect wildlife in Sumatra or Kalimantan.

Sun bear research has barely started in Indonesia. To date, only two studies have been conducted on wild sun bears in Indonesia (both by international scientists) and the first Indonesian student has just started a research project on mapping the distribution of sun bears in Sumatra. In the last few years, research on the reproduction of captive sun bears has been conducted in Taman Safari through the Institute of Agriculture in Bogor (IPB).

Recommendations

The main limitation for sun bear protection is the lack of balanced land-use planning, with large forest areas still being cleared for plantation development or unsustainable logging practices. Law enforcement regarding wildlife crimes is weak at best in most areas. These factors, together with the occurrence of serious forest fires each dry season, affect much of remaining sun bear habitat.

To properly plan conservation priorities for sun bears, it is important to map their current distribution and to conduct surveys assessing relative densities of populations outside of the current protected areas system. Conservation of such remaining sun bear habitat in most areas in Kalimantan or Sumatra will usually involve the protection of important water-catchment areas, which we hope will increase the likelihood of setting aside new areas for conservation.

Poaching of sun bears, although currently at a relatively low level, could easily become a serious threat, especially if bear populations in mainland Southeast Asia continue to decline and if demand for Indonesian sun bear parts grows. Because law enforcement in Indonesia is weak, remaining sun bear populations could become easy targets. Assessment and monitoring of trade in sun bear parts as well as effective law enforcement must be initiated. Increased information regarding sun bear threats and conservation needs could stimulate For-

estry Department officials to increase their law enforcement activities against sun bear poaching and trade in body parts. Few protected areas in Indonesia are properly managed, and encroachment and illegal logging occur in most parks. All protected areas in Sumatra and Kalimantan would benefit from a boost in effective management and enforcement of conservation laws.

Low awareness levels among all layers of the public regarding the conservation status of sun bears is prevalent in Indonesia, and only in a few places have conservation education programs been initiated. The shortage of local researchers with interest in sun bears has also added to the lack of interest in sun bear conservation issues. In order to raise the overall levels of interest and knowledge about the species, we encourage training local students to conduct field projects on sun bears throughout Kalimantan and Sumatra.

In Balikpapan and East Kalimantan, the sun bear was recently chosen to become the mascot of the district (Fig.10.2) and awareness programs have been initiated. Although educational programs are important, sun bears cannot await the next generation to ensure their continued survival. Immediate improvements are needed in law enforcement, especially regarding forest protection activities and illegal hunting of bears.



Fig.10.2: Sun bear logo from Balikpapan.

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Chapter 11 The Status of Bears in Russia

11.1 The Biology and Conservation Status of Brown Bears in the Russian Far East

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The Russian Far East (RFE) is located in the northeastern region of Eurasia. The RFE has a total area of 3,112,700 km² and is made up of eight subjects (geographical units) of the Russian Federation (Fig.11.1.1). The RFE region is bordered by the Eastern Siberian Sea, the Chukotka Sea, the Eastern Bering Sea, the Sea of Othotsk, the Sea of Japan and the Pacific Ocean. The RFE is mostly mountainous, and its southern regions are dominated by the low elevation Sikhote-Alin and Jugjur Mountains. In Kamchatka, mountains rise to as high as 4,750 m. Low level plains include the central Kamchatka Valley, the Kolimskoye Plateau, and the Anadirskoye Plateau.

Biology

During spring (March-May) in northern regions, bears eat berries (e.g., *Rhodococcum vitis-idaea*, *Empetrum nigrum*) prior to the emergence of vegetation, and in the south they eat Korean pine nuts (*Pinus koraiensis*) and Mongolian oak (*Quercus mongolica*) acorns. Ungulates are also an important food source. Bears also scavenge coastal regions for kelp, mollusks, fish, and remains of marine mammals and birds (Revenko 1993).

In summer (May-August), diets are made up of mostly of herbaceous plants (Bromley 1965; Perovskiy 1991; Revenko 1993; Berzan 1997; Seryodkin et al.

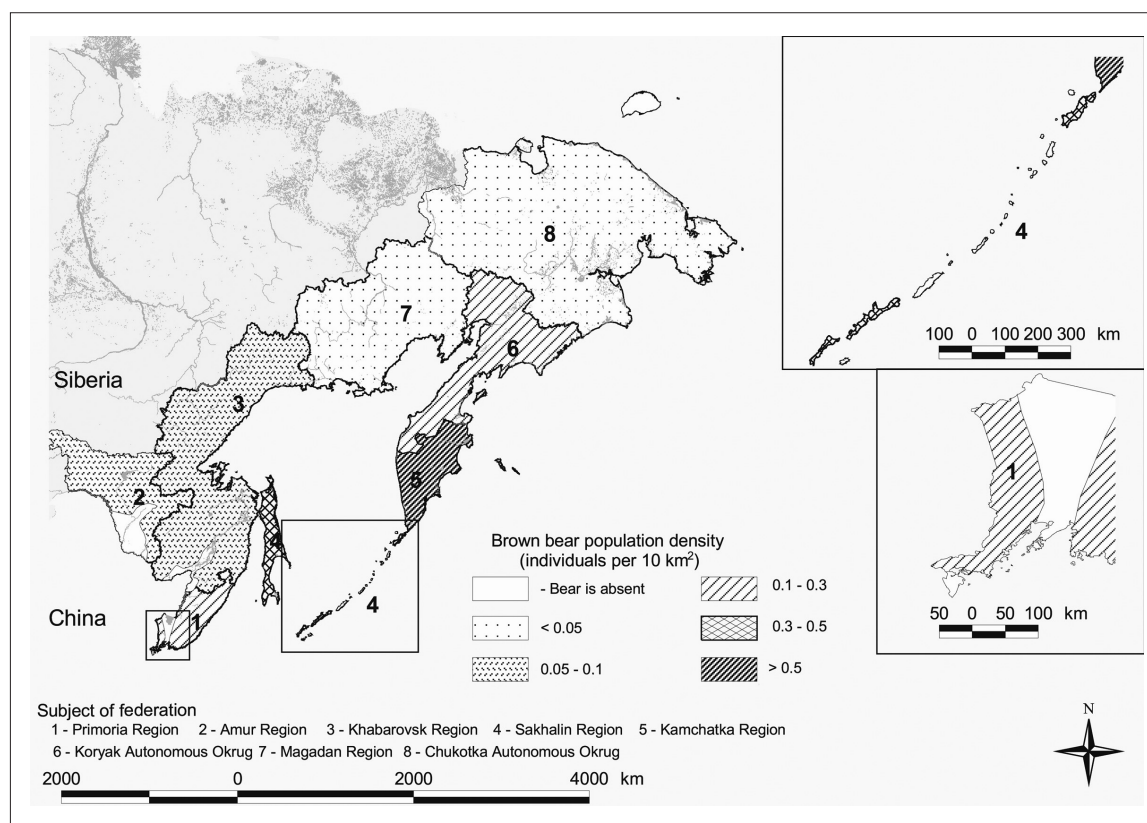


Fig.11.1.1: Present distribution and population density of brown bears in the Russian Far East.

2003a). Important food plant families include: Apiaceae, Fabaceae, and *Petasites tatewakianus* (Asteraceae) in southern regions, and *Filipendula camtschatica* (Rosaceae) in northern regions. Berries including (*Padus* spp., *Rubus* spp., *Lonicera edulis*, *Crataegus* spp., *Rosa* spp.) are also very important, as are some mammals and invertebrates (e.g., ants).

In autumn (August–November), bears try to eat foods high in calories. In most regions of the RFE, brown bears consume Pacific salmon (*Oncorhynchus gorbuscha*, *O. keta*, *O. nerka*, *O. kisutch*), Siberian dwarf pine nuts (*Pinus pumila*), and berries (*Rhodococcum vitis-idaea*, *Vaccinium uliginosum*, *Empetrum nigrum*) (Ostroumov 1968; Chernyavskiy et al. 1993; Revenko 1993; Yudin 1993b; Seryodkin and Paczkowski 2004). In most of the Amur Region, high-calorie foods are limited to two species of berries (*R. vitis-idaea*, *V. uliginosum*) and Siberian dwarf pine nuts (Yudin 1993b). In the Primoria and Khabarovsk Regions and a small portion of the Amur Region, the fall diet is composed of Korean pine nuts, oak acorns, and to a lesser degree, berries of *R. vitis-idaea* (Bromley 1965; Yudin 1993b; Seryodkin et al. 2003a).

In the Sikhote-Alin Zapovednik (strict nature reserve), the mean annual 100% minimum convex polygon (MCP) home range was $489 \pm 170 \text{ km}^2$ ($n = 7$) for adult males (with a maximum of 645 km^2), for adult females $91 \pm 40 \text{ km}^2$ ($n = 5$) (Seryodkin IV, Kostyrya AV, Goodrich JM unpublished data). In Kamchatka, the home range of a radio-equipped adult female during June–August was $1,164 \text{ km}^2$ (Paczkowski et al. 2005). Home ranges of adult bears often overlap in areas of high food density (Revenko 1993; Seryodkin et al. 2002; Seryodkin and Paczkowski 2004).

Brown bears most commonly use excavated dens, and to a lesser degree rock caves and ground nests (Yudakov and Nikolaev 1987; Chernyavskiy et al. 1993; Yudin 1993b; Nikolaenko 2003; Seryodkin et al. 2003b; Paczkowski et al. 2005). The average denning period in the Sikhote-Alin was 146 days (Seryodkin et al. 2003b). When food sources have been abundant, bears enter dens later than during food shortages (Pikunov 1987; Yudin 1993b; Seryodkin et al. 2002). Females with cubs as well as young bears enter dens earlier, and leave later, than do adult males. During food shortages bears may not enter dens at all (Bromley 1965; Yudin 1993b; Seryodkin et al. 2002).

Bears usually mate during June to early August (Bromley 1965; Voronov 1974 in Yudin 1993a; Chernyavskiy et al. 1993). In Kamchatka, mating occurs as early as April and May (Revenko 1993). During the mating period, bears mark, rub, scratch and bite trees, shrubs, and rocks (Aramilev and Solkin 1993; Revenko 1993; Berzan 2005; Paczkowski et al. 2005).

In the Sikhote-Alin, females with cubs comprised 37.5% of all sexually mature female bears. Females had 1–4 cubs which stayed with her for about 2 or sometimes 3 years (Nikolaenko VA, Kronotsky State Biosphere Reserve, July 2003, personal communication). Average litter was 2.08 in the Sikhote-Alin region and 2.2 in Kamchatka (Krivochizhin and Dunichenko 1987).

In the Primoria and Khabarovsk regions, Amur tigers (*Panthera tigris*) sometimes prey on brown bears (Bromley 1965; Seryodkin et al. 2005) and wolves may be a threat in other regions (Averin 1948; Nikanorov 2002). Competitors for pine nuts and acorns include the Asiatic black bear (*Ursus thibetanus*), wild boars (*Sus scrofa*), Siberian chipmunks (*Tamias sibiricus*), red squirrels (*Sciurus vulgaris*), rodents, and birds (*Nucifraga caryocatactes*, *Garrulus glandarius* and others). Competitors for berries include birds such as curlews (*Numenius* spp.). Asiatic black bears, wolverines (*Gulo gulo*), eagles (*Haliaeetus albicilla*, *H. pelagicus*), and crows (*Corvus corone*, *C. macrorhynchos*, *C. corax*) may compete for carrion.

In Kamchatka, bears preferentially select birch forests, coastal sedge meadows, riparian forests, dwarf Siberian pine and alder patches, low elevation tundras, spruce-larch forests and mountain tundras (Revenko 1993). In the northern RFE, bears use tundra, forested tundras and forest zones. Important biotopes in the forested zones are spits along river banks, dwarf Siberian pine thickets, coastal areas, sparse larch forests and dwarf Siberian pine scree (Chernyavskiy et al. 1993). In early spring, bears use biotopes in swales and riparian habitat types. In the Sakhalin and Kuril Islands, bears primarily use spruce/fir forest and larch forests. Secondary associations include *Calamagrostis* and sasa bamboo (*Sasa* spp.) with larch, stone birch, broadleaf species (Yudin 1993a) as well as coastal areas. In the southern RFE, Korean pine-broad-leaved forest and broad-leaved forest are important habitats (Bromley 1965; Yudin 1993b). On the Othotsk coast, dwarf Siberian pine is a major food sources. In the Amur Region, berry patches and dwarf Siberian pine stands are important. Generally, bears gravitate to river valleys, southern aspects, berry patches, creek gullies, pine patches and oak forests (Yudin 1993b). Denning habitat is usually in spruce/fir forests.

There is a great deal of morphological variation amongst the bears of the RFE, and various authors have suggested that existence of from 3 to 7 subspecies (Ognev 1931; Geptner et al. 1967; Chernyavskiy 1986; Yudin 1991b). Chernyavskiy (1986) suggested 3 subspecies for the region: *Ursus arctos yenisensis* Ognev, 1924 (Eastern Siberian bear; edges of the north east region), *U. a. piscator* Pusheran, 1855 (Kamchatka bear;

Kamchatka peninsula), and *U. a. lasiotus* Gray, 1867 (Ussurisk bear; southern Stanovoy plateau including the Khabarovsk Region excluding the northern most edges, as well as the Amur, Primoria, and Sakhalin Regions). The Kamchatka bear (Photo 11.1.1) can be distinguished by a very wide front of the skull, wide malar arch, an elevated frontal lobe, robust high sagittal crest, and large body size. The Ussurisk bear is large but narrower with dark coloration, and the Eastern Siberian subspecies is smaller with lighter colorations.

Status

Brown bears are distributed throughout most of the RFE including on Sakhalin, Paramushir, Iturup, Kunashir, Karaginsky, and Shantarsky Islands (Fig. 11.1.1). They are not found in many deforested (e.g., industrial, agricultural) areas of the Zeysko-Bureinskay and Prikhankayskaya plains, and not found around the



Photo by Ivan V. Seryodkin

Photo 11.1.1: A Kamchatka brown bear on a river during the salmon spawning period.

periphery of large cities.

The current brown bear population of the RFE is estimated at 30,900-39,300 (regional data from the government hunting departments throughout the RFE, Table 11.1.1). The population has been increasing in the northern regions of the RFE over the last ten years. The highest density is in the South Kamchatka Zakaznik at 2.7 bears/10 km² (Gordienko TA, Gordienko VN unpublished data).

The biggest threat to bears in the RFE is poaching for gall bladders for medicine and paws for food. Bears are viewed as competitors for salmon and threats to reindeer mostly in northern regions, whereas in southern regions poaching is mostly for bear parts.

The official harvest of bears in the RFE is no more than 3-4% of the population estimate. Very little effort has been made to estimating poaching, but in northern regions illegal harvest is usually equal to the legal harvest (Valentsev and Paczkowski 2004). In southern regions, poaching rates are several times higher than legal harvest rates (unpublished data). Bears are often shot during chance encounters, in areas of high bear concentrations, near dens, or caught along trails using neck snares.

Habitats used by bears in the RFE are extremely varied, ranging from arctic tundras in the north to sasa bamboo forests in southern region, and are too diverse to describe accurately in this report.

Habitat degradation and fragmentation is one of the main reasons for declining bear numbers in the southern RFE (Seryodkin and Pikunov 2002). Logging activity, forest fires, and transportation technology are increasing human access and anthropogenic disturbances to previously remote habitats.

In the southern RFE, major problems include the destruction of bear's foraging base by human activity such as logging and forest fires in Korean pine and oak for-

Table 11.1.1: Population and density estimation of brown bears in the Russian Far East.

Region	Area (km ²)	Population estimate (number of bears)	Density range (bears/10 km ²)
Magadan	461,400		
Chukotka AO	737,700	3,600-6,000	0.03-0.05
Koryak AO	301,500	2,500-4,000	0.08-0.13
Kamchatka	170,800	10,000-12,000	0.58-0.7
Sakhalin	87,100	2,500-3,500	0.29-0.4
Khabarovsk*	824,600	8,000-9,000	0.1-0.11
Amur	363,700	2,000-2,500	0.05-0.07
Primoria	165,900	2,300	0.14
Total	3,112,700	30,900-39,300	0.1-0.13

* including the Jewish Autonomous, AO: Autonomy

ests, and commercial and illegal harvesting of Korean pine nuts on public and protected lands. The intensive human harvest of Pacific salmon depletes another important food source.

Many anthropogenic factors are also reducing the quantity and quality of bear habitat, including increasing agricultural activity, resource exploration and extraction, as well as new roads and pipelines (Yudin 1993b).

Human-bear relationships

Brown bears are called “buriy medved” (brown bear), “chyorniy medved” (black bear) or “mooravyatnik” (anteater) in local names. “Urkuyem” is used to describe a mythical bear that has very small hind legs and is very large in size. Allegorical names include “toptyigin” or “kosolapiy”. Also used is the name “chyorniy zver” meaning black animal. Natives of the Sakhalin Islands call bears “gorniy gilyak” meaning mountain man.

Brown bears have long been the object of legend amongst native peoples who used all parts of the bear: meat and fat for food, hides for clothes and artifacts, and gall bladders for healing purposes. The Itelmen people of Kamchatka used bear hides to make sheets, blankets, shirts, and dog harnesses. Some internal organs were used to shield the face from the sun (Stellar 1999). Both historically and currently, the gall bladder is used for the healing liver disease, stomach aches, dysentery, swollen eyes, abscesses, ulcers, rheumatism, and joint pain. Bear fat was used for healing pneumonia, asthma, tuberculosis, burns, and open wounds. The development of firearms allowed for increased hunting methods such as hunting in dens, hunting from boats along the sea and rivers, spring hunting on the snow, and hunting with dogs (laikas). Bears were also captured and killed using illegal neck snares.

Bears in the RFE typically exhibit a peaceful attitude towards humans, especially in northern regions and Kamchatka (Revenko 1991; Yudin 1993a). Attacks on humans are usually associated with wounded bears, females with cubs, and garbage problems on the edge of settlements and in bear habitat (Gordienko and Gordienko 1997; Yudin 1991a; Chernyavskiy and Krechmar 2001). Nevertheless, every year there are unprovoked attacks on humans which sometimes result in human deaths. Unprovoked attacks are more frequent in years of food shortages. In Kamchatka conflicts along rivers are often associated with large amounts of caught salmon (Gordienko and Gordienko 1997).

Brown bears occasionally have conflicts with domestic livestock and domesticated reindeer (Bromley 1965; Chernyavskiy and Krechmar 2001; Zheleznov-Chukot-

skiy 2002; Kostin and Eryomin 2004). In southern regions, bears sometimes consume small amounts of oats and corn, and destroy apiaries (Bromley 1965). Bears cause problems for hunters by ransacking cabins, eating bait, and eating hunter kills.

There are 5,698,300 people living in the RFE, most of whom live in a few large cities concentrated near the sea, large rivers, railroads, or main roads. High unemployment has driven residents to try to earn a living in natural areas by harvesting berries, Korean pine nuts, mushrooms, ginseng, large game, small game, forest products, or fish. These activities often conflict directly and indirectly with brown bears, especially in the southern regions of the RFE. Most people in remote settlements, within high conflict regions, consider bears to be a problem species and a commodity.

Commercialism of bears

Gall bladders and paws are commonly smuggled out across the Russian border, where they are in demand from countries in Southeast-Asia, most notably China. In 2005 in Primoria Region, bear gall bladders were sold for up to \$US 2.50/g, and paws were \$US 37.50/kg, whereas gall bladders in the Kamchatka Region were worth about \$1.25/g. Bear parts are rarely seized by customs officials, but in 2004, 800 brown and Asiatic black bear paws, originating from Primoria, were seized at the Chinese border. Skulls and hides both have commercial value as trophies. Foreign trophy hunting is common in the northern regions of the RFE. In Kamchatka there are up to 300 licenses issued annually for foreign trophy hunters, and a hunt can cost \$US 6,000-7,000 (Vashukevich 2002).

There are no commercial bear farms in the RFE. Brown bears, as representatives of a subspecies, are kept in several zoos.

Present management system

Brown bears in the RFE have the status of a hunted game species. According to game rules, brown bears may be hunted between 1 August and the end of February. Within these limitations, each subject of the Russian federation establishes specific seasons. There are regional monitoring plans which focus on the status, population, and distribution of brown bears. Additionally, there are planning and conservation efforts, and research on population structure, population distribution, population ecology, forage base, and habitat conditions. Perhaps the most developed monitoring system in the RFE is in the Kamchatka Region, where brown bears

are an important game species.

Research and conservation of brown bears in the RFE is part of the scientific programs of the Science Academy of the Russian Federation (Far East Branch): Pacific Geographical Institute (Vladivostok, Petropavlovsk-Kamchatksy and Anadyr), Biology and Soil Sciences Institute (Vladivostok) and the Institute of Biological Problems of the North (Magadan). In the Russian Academy of Agricultural Science, scientific work is conducted by the Russia-wide Science Institute of Hunting and Game management (VNIIOZ). Monitoring and protection of wildlife is being carried out by the following zapovedniks: Sikhote-Alin, Ussuriysk, Lazovsky, Bastak, Bolonsky, Bolshekhkhtsirsky, Botchinsky, Bureinsky, Dzhugdzhursky, Komsomolsky, Zeysky, Khingansky, Kurilsky, Poronaysky, Magadansky, Koryaksky, Kronotsky. Protection and regulation of bear and hunting resources is allocated to the Federal Veterinary and Phytosanitary Department (hunting monitoring section) within the Ministry of Agriculture of the Russian Federation. Non-governmental organizations involved in brown bear research and conservation include the Wildlife Conservation Society (WCS) and the World Wildlife Fund (WWF).

Academics who have been involved in research and conservation of bears in the RFE include D.G. Pikunov, I.V. Seryodkin, V.G. Yudin, A.S. Valentsev, F.B. Chernavskiy, A.V. Krechmar, M.A. Krechmar, N.K. Zheleznov (Science Academy of the Russian Federation); Y.M. Dunishenko (VNIIOZ); J. Paczkowski, J.M. Goodrich (WCS), and I.E. Chestin (WWF).

Education programs focusing on wildlife and habitat conservation is the responsibility of ecological instructors, zapovednik information/education centers, and non-governmental environmental groups. Most educational efforts are focused on school groups or zapovednik visitors. In Kamchatka, there is currently a brown bear education program developed by WCS that provides resources and materials to deliver well-organized lesson plans on brown bear-related subjects.

Recommendations

Conservation of brown bears and sound management of the population can be attained by addressing the following:

- (1) Develop statistically robust methods for estimating trends in brown bear populations, tailored to specific regions of the RFE.
- (2) In order to mitigate habitat fragmentation, establish a network of corridors between protected and secure areas specifically in the southern RFE.
- (3) Increase penalties for the possession and transpor-

der transport of bear parts.

- (4) Limit logging activity, particularly in Korean pine and oak stands which are critically important to the brown bear forage base.
- (5) Estimate poaching levels for all regions of the RFE.
- (6) Improve hunting management and infrastructure specifically for hunting-lease operators by both governmental and non-governmental organizations.
- (7) Tailor hunting license allocation to the specifics of each region, and consider critical habitat types.
- (8) Assess the legal and illegal harvest of Pacific salmon, pine nuts, and berries and their effects on the bear population.
- (9) Increase access to education programs and non-lethal bear deterrents.
- (10) Conduct intensive research programs using GPS collared bears to gather data on movements, habitat use, and threats in the RFE.
- (11) Educate local residents and hunters about the importance of the brown bear, not only as a hunting resource, but also as an integral part of the ecosystem.

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11.2 The Conservation Status of Asiatic Black Bears in the Russian Far East

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Biology

The Asiatic black bear inhabiting the south of the Russian Far East (RFE) belongs to Ussury subspecies (*Ursus thibetanus* G. Cuvier 1823). This is the northeastern edge of the species' range. These animals are characterized by black color, a prominent crescent-shaped marking on the chest, and large rounded ears. Mature males are up to 2m in height, and in autumn, after accumulating fat, weigh up to 250 kg. Females are smaller.

Asiatic black bears live primarily in mountain broad-leaf and Korean pine (*Pinus koraiensis*)/broad-leaf forests (Kucherenko 1974) which, in the Amur-Ussuriiskii region, grow primarily along river valleys and on mountain slopes at 600-800 m elevation. Best habitats for black bears are the broad-leaf valley forests of the Manchurian flora type, which contain a significant admix of Manchurian walnut (*Juglans mandshurica*), Amur cork tree (*Phellodendron amurense*), Mongolian oak (*Quercus mongolica*), and linden trees (*Tilia amurensis*), with a thick understory that includes grape and Magnolia vines (*Vitis* spp.), linden tree, hazel nut (*Corylus* spp.), mock cherry (*Padus* spp.), and grassy covers of cow parsnip (*Heracleum borbatum*), angelica (*Angelica ursima*), and butterbur (*Petasites palmate*). Productive oak groves, both with and without Korean pine and the aforementioned tree species, shrubs, vines and grasses, are secondary forage for Asiatic black bears. Black bears are seldom encountered in sparse forest, in wetland deciduous forests, in mountainous spruce (*Picea* spp.), pine (*Pinus* spp.) taiga, or in birch (*Betula* spp.) and alder (*Alnus* spp.) thickets. They avoid unforested areas altogether. Black bears also avoid pure narrow-leaf and deciduous forests, and are found in them only when berries are abundant and when there is a shortage of their primary and secondary forage. They can live in narrow-leaf forests in low densities when there are productive oak groves and clusters of Korean pine.

An analysis of 23 winter dens showed that in 73% of instances ($n = 164$) bears used tree cavities, in 16% denning was on the ground under upturned tree root nests and in and/or in areas of wind-thrown trees, in 8% of instances denning was in cliffs or caves, and in 2% of instances, dens were dug into the ground (Abramov et. al.

1977). Only 1 instance of denning in a tree (not in a cavity) was documented. Bears use large size trees for dens. Of 164 instances of denning in tree cavities, linden trees were selected most often (40%), poplars next (33%), and Korean pines (13%), oaks (8%) and elms, ash and yellow birches (6%) less often. Of 979 known dens in 14 districts in Primorskii Krai, only 242 (25%) were occupied (Pikunov et al. 1991). On the eastern slopes of the Sikhote-Alin mountain system, where Asiatic black bear density was 2.0 bears/10 km², 59% of bears spent the winter in earthen dens or in cliffs, and 41% in hollows. Only one out of every 4 or 5 suitable den was actually used in any given year (Aramilev 1990b).

It is unprofitable, given current timber harvest practices, for loggers to cut trees with cavities and, as a rule, they are left standing despite harvest regulations that prescribe the felling of defective trees. Our research shows that on the coast of the Sea of Japan, Asiatic black bears use root openings or hollows in stumps of Mongolian oak for winter dens. The presence of available dens speaks to the fact that there is no shortage of den-sites for black bears, and that they select what is most convenient in any given year.

Status

The Asiatic black bear is currently distributed throughout Primorskii Krai, with the exception of the upper reaches of the Bikin and Samarga Rivers where the Manchurian flora community reaches its northern extreme and is replaced with the Okhotsk flora community. Black bears are also absent from the majority of the Prikhankaiskii lowlands, the Ussuri River valley, and areas adjacent to industrial centers in southern Primorskii Krai. Black bears in Khabarovskii Krai live along the coast of the Sea of Japan in a coniferous broad-leaf forest zone that stretches from the border with Primorskii Krai north to the Botchi River. They live along the right bank of the Amur River in a coniferous broad-leaf forest zone that stretches downstream to the city of Komsomolsk-na-Amur. Individual pockets of Asiatic black bears live in the Bolshe-Khekhtsirskii

Reserve (Zapovednek). Black bears live along the left bank of the Amur River in broad-leaf and coniferous/broad-leaf forests in the Kur and Urmi River watersheds. Bears live in the western portion of Everiskaya Autonomous Oblast in a broad-leaf and coniferous/broad-leaf forest zone, a habitat in which they are also found in southeast Amurskaya Oblast.

Recently, Asiatic black bears have been encountered near villages and areas with intensive human development, areas where they were rarely seen in the 1960-70s. The Russian range for the Asiatic black bear is shown in Figure 11.2.1.

According to Kucherenko (1974), average bear density in 1956-1966 was 0.8-1.1 bears/10 km² in the Khor River watershed. In the Bolshaya Ussurka, Bikin, Milo-

gradovka, Margaritovka, Avvakumovka River watersheds, average bear density was 0.7-1.0 bears/10 km². Black bear abundance in the Sikhote-Alin mountain system in 1970 was estimated at between 5,800 and 7,200 animals, of which 4,000-5,000 were in Primorskii Krai.

The number of bears in Khabarovskii Krai is unlikely to exceed 2,200-3,000 animals. The total number of bears in Primorskii Krai and in the greater Priamur region was estimated at 6,000 to 8,000 (Kucherenko 1974).

Depending on the region, Asiatic black bear density varies from 0.15 to 1.10 bears/10 km². Average black bear density across its entire range in Primorskii Krai, assuming a 6% standard error, is between 2,900 and 3,200 animals (Abramov et al. 1977). Furthermore the Russian government's hunting survey service has been estimated bear population size each year (Table 11.2.1, Gubar 2000). But these assessments of Russia's Asiatic black bear population are probably low. If data for bear density over its entire range are used, the number of Asiatic black bears is significantly higher than this estimate.

Asiatic black bear density at a field station in a Korean pine broad-leaf forest zone was 1.9 bears/10 km², was 0.5 bears/10km² at a field station on the coast of the Sea of Japan, and was 0.3 bears/10 km² in the headwaters of the Margaritovka River. In spring surveys on the coast of the Sea of Japan and in the headwaters of the Margaritovka River, we found no sign of females with cubs. Assuming that females with cubs make up 40-45% of the total population, population density of Asiatic black bears during the spring survey in the headwaters of the Margaritovka River was 0.5-0.55 bears/10 km², and 0.8-0.9 bears /10 km² for the coast on the Sea of Japan (Aramilev 1990a).

Figure 11.2.2 shows official population numbers and harvest of Asiatic black bears in Primorskii Krai during 1998-2002. The official harvest in Primorskii Krai was 0.9-2.7% of the total number of bears. The size of the



Fig. 11.2.1: Range of the Asiatic black bear in the Russian Far East.

Table 11.2.1: The estimated numbers and harvest of Asiatic black bears in the Russian Far East in 1998-1999 (Gubar 2000).

No.	Territory	Estimated numbers in 1999	Total harvest in the 1998-1999 Season
1	Amurskaya Oblast	20	-
2	Primorskii Krai	2,500	15
3	Khabarovskii Krai	2,900	-
4	Evreiskaya Autonomous Oblast	200	-
	Total	5,620	15

Note: In 1998-99 Asiatic black bears were hunted only in Primorskii Krai.

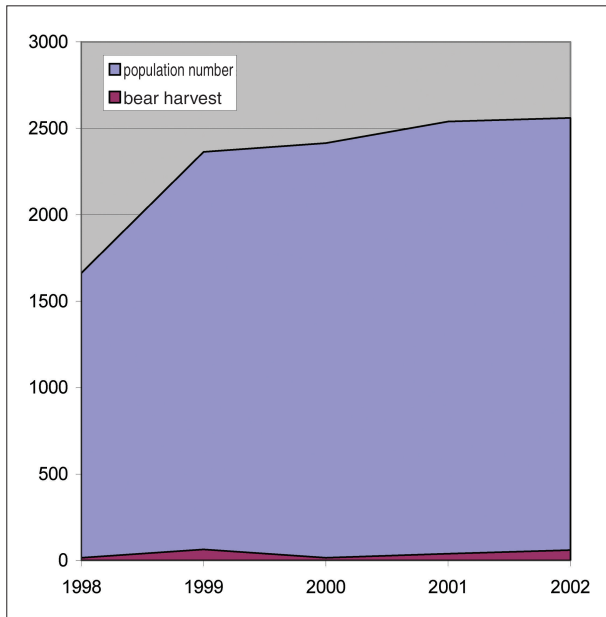


Fig. 11.2.2: Official population numbers and harvest of Asiatic black bears in Primorskii Krai (Data of the Primorskii Krai Hunting Management Department).

illegal hunt of Asiatic black bears, based on data gathered during a survey of the Amur tiger, was 290-320 in Primorskii Krai and 90-100 in Khabarovskii Krai. Thus, accounting for poaching, around 14% of the Asiatic black bear population is annually taken. Given that the bear's annual population increase is around 28-30% (Aramilev 1990a), a 14% harvest is not a concern. In fact, the situation is somewhat more complex. So the current harvest of Asiatic black bears by predators and humans is equivalent to the annual population increase.

Human bear relationships

Local people call Asiatic black bears "black bear" or "white-breast bear". They also use "black bear" to refer to black-colored brown bears (*U. arctos*). Since becoming populated by people of European descent or culture the mid-19th century, Asiatic black bears have no special place in the culture and life style of local population in Khabarovskii Krai and Primorskii Krai, including indigenous people. Many people who do not hunt are unable to distinguish brown bears from Asiatic black bears.

When there is an abundance of pine nuts in dwarf Korean pines, Asiatic black bears can be found as high as 1,200 m elevation. Anthropogenic factors also play a significant role in determining habitat suitability. Human use of Asiatic black bear habitat to collect non-tim-

ber forest products, for tourism, and for recreation, lowers the frequency that bears use these areas, and given more intensive anthropogenic pressure, they will roam in yet more remote locations. At the same time, given moderate levels of intrusion (e.g., only collecting non-timber forest products) Asiatic black bears can live adjacent to large human settlements.

Black bears frequently visit apiaries in search of honey. The damage caused by bears to apiaries is significant. One bear can destroy about 10 beehives. Damage to oat and corn fields is generally minor, because normally only 1 or 2 bears visit any given field. Some cases of non-predatory or defensive attacks of bears on humans have been documented. But attacks are more frequent in situations where the bear is followed by people. About 10-20 bear attacks on a human are documented annually.

Present management system

In the southern part of the RFE, Asiatic black bears are considered a game species (i.e., hunting is legal). During the period 1983-1997 they were listed in the Red Data Book of Russian Federation, but removed from the Red List in 1997 when numbers recovered. Hunting department authorities and hunting territory managers are officially responsible for protecting the Asiatic black bear. Specialists of the Pacific Institute of Geography, Soil-and-Biology Institute (FEBRAS), Lazovskii and Ussuriskii Nature Reserves, and the Far Eastern Department of Game and Fur Farming Institute, together with Institute of Sustainable Nature Resources (NGO) have conducted research on the ecology of the Asiatic black bear. Protecting the Asiatic black bear is successfully done on small hunting territories. The incentive for hunting territory managers in protecting the Asiatic black bear is to sell trophy hunters an assured hunt.

Asiatic black bears are protected in 9 closed reserves in the southern RFE, with a total area of 11,570 km². Black bears also live in 3 federal reserves with a total area of 2,100 km². All of these protected areas include portions that lack suitable Asiatic black bear habitat, but additional research is necessary to determine that area. The total Asiatic black bear range in Russia is approximately 121,560 km², and protected areas make up 11.2% of that range.

There are no public educational programs specifically focused on Asiatic black bears in the RFE. Priorities in public education programs have been on Amur tigers and Far Eastern leopards (*P. pardus*) and their conservation needs.

Recommendations

No contemporary data exist on Asiatic black bear range, on density in various habitat types, or on numbers across its entire range or in specific regions. There are also no reliable data on the true harvest of Asiatic black bears. Information from hunting organizations allows us to predict Asiatic black bear presence in Primorskii and Khabarovskii Krai, in western Evreiskaya Autonomous Oblast, and in southeastern Amurskaya Oblast. Available assessments of population numbers may be inaccurate. Official hunting data are based on the number of licenses issued. The kills through poaching can be determined only through special research. That said, surveys of Asiatic black bear numbers carried out on model territories put the density at hunting territories in the range of 1.0 to 2.0 animals/km² of typical habitat. The number of Asiatic black bear remains high in reserves.

A number of measures must be implemented to protect the Asiatic black bear in the southern RFE. First, work must be done to determine the bear's contemporary range and density in different habitat types. This would be followed by an effort to determine total numbers and population structure for each type. Monitoring population status on hunting territories and protected territories in the south of the Russian Far East is a necessary component of the protection effort.

Real conservation efforts will come when the price of a license is reduced, and a grading system for trophy

hunts is devised. Hunting in dens should be prohibited, but hunting using bait in fields should be allowed. Changes in the harvest rules in the forests of the RFE are needed to allow defective trees, suitable for Asiatic black bear dens, to remain standing. There is also a need to identify areas with high den concentrations to create protected forest areas for wintering bears.

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Chapter 12

The Status of Bears in Mongolia

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Two sub-species of bears occur in Mongolia: brown bears (*Ursus arctos jeniseensis*), and Gobi bears (*U. a. isabellinus*) (Photo 12.1). This report reviews the status of these two sub-species.

Brown Bear (*Ursus arctos jeniseensis*), 1758 Biology

The taxonomy of the brown bear on a subspecies level in Mongolia is still unclear. In 1953, Russian zoologist A. G. Bannikov first mentioned that *U. a. baicalensis* was distributed in the Khentii, Hovsgol, and Mongolian Altai forests. He also reported that *U. a. beringianus* Middendorf may occur in the Khalkh and Nomrog River Valleys of Eastern Mongolia (Bannikov 1954). Later Russian scientists (Stroganov 1962) classified this subspecies as *U. a. jeniseensis* Ognev. Earlier, Lonnberg (1923) and Allen (1938) had mentioned that the Ikh Khyangan Range Forest (in Eastern Mongolia) may be home to *U. a. beringianus* Middendorf (*mandshuricus* or *basiotus*). This bear is differentiated from *U. a. jeniseensis* by a bigger body and a longer skull. Brown bears (*U. a. jeniseensis*) in Altai, Khangai, Khentii and Hovsgol are differentiated from *U. a. arctos* by their

longer, thicker, and softer hair. Coloration is variable, but mainly brown. Legs, back and sides are dark-brown. Adult males may weigh 140-400 kg (mean 300 kg) compared with 100-210 kg (mean 200 kg) for females. At birth, cubs weigh 350-700 grams (Bannikov 1954; Bold 1967).

Mating takes place from late June to early July, and young are born from about January to February. Litter sizes of 1-2 are most common (Bold 1967).

In Mongolia, brown bears occupy a wide range of habitats including dense forests, sub-alpine mountain areas, and tundra. Common habitats of browns bear in Mongolia are remote and dense forests with fallen trees, marshes and forest glades. During spring and summer they prefer alpine areas and river valleys with forest glades and nearby reservoirs where they rest in tall grasses and bushes. In the Mongolian Altai, brown bears live in small willow groves or rocks. Depending on climate and location in Mongolia, bears hibernate from October-November until March or even May, i.e., 5-6 months. During years in which food is abundant, bears begin hibernation later, at the end of November. Brown bear dens mainly occur under thick fallen trees or gaps among roots and rocks.

Brown bears in Mongolia mainly eat plants such as grasses, sedges, bulbs, and roots. They also eat insects such as ants, as well as fish and small mammals. In some areas they have become significant predators of ungulates such as moose (*Alces alces*), caribou (*Rangifer tarandus*), and red deer (*Cervus elaphus*) (Bold 1967; Dulamtseren 1970). Foods used depend on landscape, plant condition and plant quality. In early spring, brown bears in Mongolian forests feed on poplar, offshoots of trees, moss, roots, nuts from the previous season, and ants. From the beginning of summer, they feed mostly on berries, fruit, nuts, green plants, insects, fish, and often scavenge. They occasionally predate moose, wild boar (*Sus scrofa*), roe deer (*Capreolus capreolus*), red deer, and musk deer (*Moschus moschiferus*). At the end of summer and beginning of autumn, bears mainly feed on plants because of the abundance of various ripe berries, nuts and plant roots. Brown bears in the Mongolian Altai feed on pikas (*Ochotona*



Photo 12.1: A) Brown bear, B) Gobi bear (National Natural History Museum, Ulaanbaatar).

spp.), marmots (*Marmota* spp.), and other rodents. Bears in northern Mongolia often visit oat fields in the fall, where local people sometimes kill them (Bold 1967; Dulamtseren and Ganbat 2000).

Status

Geographic distribution

In Mongolia, brown bears occur in 4 separate populations: in Hovsgol, western Altai, the Hentei Mountains, and in the upper Onon and Uldz valleys (Fig. 12.1). The species is not common anywhere in the country and recent regional extinctions have been reported (Bold 1967; Mallon 1985; CITES reference-book 2001).

Population

According to a report by the Institute of Biology, Mongolian Academy of Sciences (1986), there were about 500 brown bears in Mongolia inhabiting 50,000 km² in 4 provinces. Since then, no population surveys have been conducted for brown bears in Mongolia. However, circumstantial evidence suggests that the number of brown bears and their area of distribution have declined sharply since the early 1990s. Most likely, this is primarily due to illegal hunting and increased demand for bear body parts in the medicinal trade (Zahler et al. 2004).

Threats

Brown bears in Mongolia have almost no natural threats except for occasional natural starvation, of which instances occurred in 1962, 1971 and 1988 (Bold 1967;

Dulamtseren and Ganbat 2000). During starvation events, brown bears visited river valleys and mountain steppes of eastern Mongolia, 130-200 km from their main areas of distribution. In autumn 1988 after a prolonged drought in most forests of Mongolia, there were 103 reported cases of starving and vagrant bears in Central, Khentii and Selenge provinces (Dulamtseren and Ganbat 2000). At that time, local people shot 47 vagrant bears. All of the bears were emaciated and some lacked internal fat entirely. There were two cases of bears visiting towns, one of which occurred in the capital city, Ulaanbaatar (Dulamtseren and Ganbat 2000). There has been increased illegal hunting of bears to take the gall bladder and claws to be sold for Asian markets. Foreign hunters occasionally hunt brown bears.

Human-bear relationships

Mongolians call the brown bear “khuren baavgai,” which means “brown bear.” The name for adult males is “sharmaakhai,” for females “evsh,” and for cubs “bambaruush” or “bambarsh.” There are some specific local names for brown bears in Mongolia. Buryats (minority people) call them “baakhaldai” and/or “khun guruus” which means “man-animal.” Western Mongolians call them “ayu” and/or “khun khar guruus,” which means “man-black-animal,” and they call cubs “almant-sag.”

Brown bears were traditionally hunted by local people for their meat and fur. Reindeer herders in northern Mongolia and Buryats, especially old hunters, hunted bears at least once per year. Beginning in the 1990s

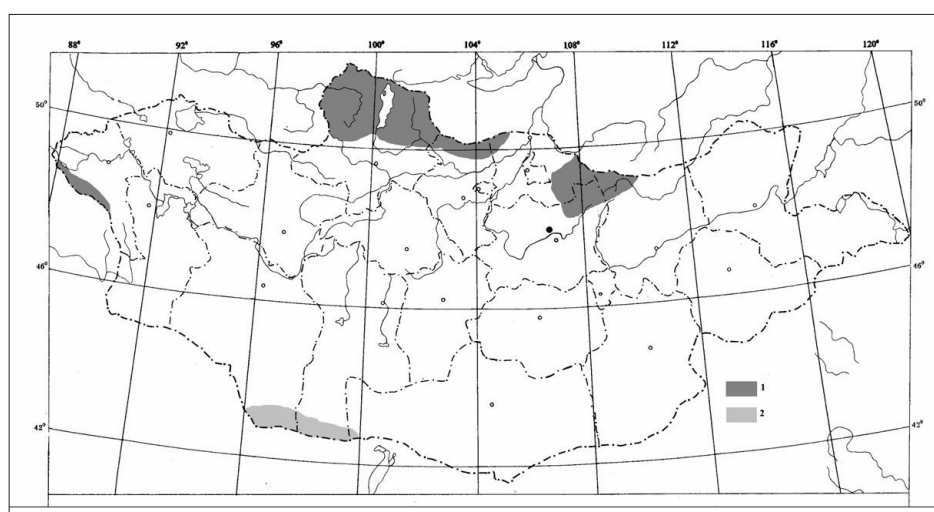


Fig 12.1: Distribution of bears in Mongolia. 1. Brown bear *Ursus arctos jeniseensis*. 2. Gobi bear *U. a. isabellinus*. The map was drawn according to Dulamtseren (1970), Sokolov and Orlov (1980), and Mijiddorj (2006).

when border trading was opened between China and Mongolia, many bears have been killed for their gall bladder, skin, internal fat and meat, to sell to Chinese traders. As of 2006, a bear gall bladder could be sold for about US\$500, the skin US\$800, paws about US\$100 each, and meat and internal fat about US\$3/kg. In an October 2004 *UB Post* newspaper article, it was reported that three Vietnamese nationals were captured attempting to smuggle 80 bear gall bladders out of Mongolia. Even if this were the only smuggling effort involving brown bear parts, it was still likely a sizeable fraction of the brown bears left in Mongolia (Zahler et al. 2004).

Historically there are not many records of brown bear conflicts with humans. However, during the 1970s, 2 brown bears were killed in Khentii Mountains due to their constant predation on livestock.

Commercialization of bears

Mongolia has no bear farms for utilization on a commercial basis. Only the Mongolian State Circus has some brown bears for show. There are also no data on the import and export of bears to or from Mongolia.

Present management systems

The Mongolian brown bear is currently listed in Appendix II of CITES. No other conservation measures have been taken for the brown bear in Mongolia. Due to the lack of legislation on this species, their hunting status remains unclear.

Recommendations

Detailed range and population assessments should be done in the near future. The species should be included on the list of rare animals in Mongolia as vulnerable. Enforcement of laws prohibiting illegal sale of bear products on a local market level is also necessary.

Gobi Bear (*Ursus arctos isabellinus*)

Biology

In 1943, Bannikov (1954) reported a dead Gobi bear in the Tsagaan Bogd Range, and he mentioned that this animal might be *Ursus pruinosus*. The skin was smaller than that collected from a specimen in northern Tibet

by Przewalskii and Kozlov, and its claw structure was different. V. E. Sokolov and V. N. Orlov identified it as an independent species, the Gobi bear (*U. gobiensis*) based on their craniological study (Sokolov and Orlov 1992). However, Tuya Tserenbata (Great Gobi Project 2006 personal communication) has recently conducted a genetic study on the Gobi bear and re-classified it as *U. a. isabellinus*.

The general appearance of the Gobi bear is similar to that of the brown bear, but smaller (see Photo 12.1). The body length of an adult male taken by hunters from Tsagaan Bogd Mountain was 168 cm, its crest height 92 cm, and its weight 90 kg (Bold 1967). Some males can reach up to 120 kg (Sokolov et al. 1996). Females are smaller than males, and the length measured from one skin was only 98 cm. Summer color is a homogeneous brown, but in winter and spring color changes to a light brown and/or grayish brown. The feet and neck are darker than the body. Claws are straight, bright, and short, but not sharp.

Status

Distribution and range

In the 1920s and 30s the Gobi bear was found in the eastern Aj Bogd Mountains of the western Trans-Altai Gobi. In the late 1980s, the Gobi bear was distributed from Atas-Uul mountain (96° 20' E) in the west, to the Khutsiin Shand mountain (99° 30' E), the Tost and Nemegt mountains, the Khairkhan and Zakhui Zarman oases, the Edreng range, and south to the border with China, a range of 250 km in length and no more than 50 km in width (Sokolov et al. 1996; Tulgat 1993a). The current distribution is restricted to a narrow line in the Trans-Altai Gobi along the Mongolian and Chinese border from the east slopes of the Atas Uul Mountains, and from the Talin Meltsiin Uul mountains to Khutsin Shand Spring. They can be found in Segs Tsagaan Bogd, Shar Khuls and Tomortoi Khokh Ranges, Atas and the Inges Mountains from Tsagaan Bogd to the east, Baruun Toroi Range to the west, and the Zaraa and Buurin Khar Mountains to the north (Fig.12.2). There are 2 different estimates of range area: 10,000-15,000 km² (Tulgat 1993b) and about 18,000 km² (Mijiddorj 2006), both of which are less than half of the previous range.

Ecology and habitat

The Gobi bear mainly occurs in hilly rock areas, close to ponds and springs of oases such as Shar Khuls, Tsagaan Tokhoi, Tsagaan Burgas, Ulziibelgikh, and Khushuut. The main habitat of the Gobi bear is directly connected with open water sources and oases, where it

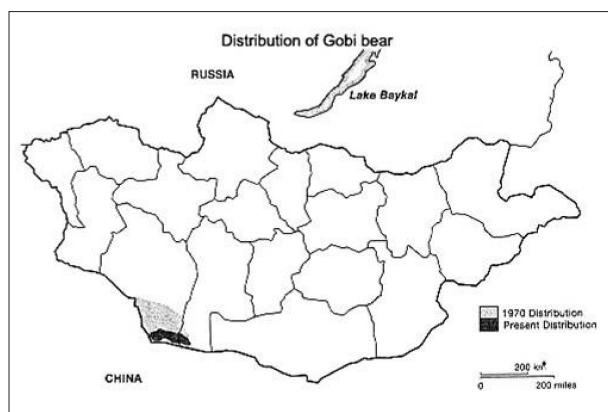


Fig. 12.2: Distribution of the Gobi bear in Mongolia (Mijiddorj 2006).

mainly feeds on *Anabasis* sp., *Sympegma* sp., and in summer prefers *Rheum* spp. roots, *Nitraria* spp. berries, *Lycium* spp., *Glycyrrhiza* spp. roots, upper sprouts of *Ephedra przewalskii*, leaves of *Zygophyllum potanini*, and young shoots of *Phragmites communis*. During times of low food supply, they scavenge on carcasses of ibex (*Capra ibex*) and other animals. In summer, they mainly feed on *Nitraria sibirica* berries. Bold (1967) mentioned that the Gobi bear is polygamous, however, Tulgat (1999) concluded that it is monogamous based on his observational study.

Population and threats

During the 1960s there were an estimated 15-20 bears (Bold 1967), 20 in 1970 (Bold and Dulamtseren 1975), 25-30 at the beginning of the 1980s (Sokolov et al. 1996), 50-60 towards the end of the 1980s, 30 in the early 1990s (Tulgat 1995), and 25-35 in the beginning of 2002 (Mijiddorj 2002). As of 2006, the population numbered at least 20 (Amgalan et al. 2005). One possible reason for the low population is that bears cannot find each other during the mating season at the few water sources of Gobi region (Mijiddorj 2006).

Human-bear relationships

Mongolians call the Gobi bear “mazaalai.” Male, female and cub names are similar to the brown bear names. Local people from the Gobi area call the Gobi bear “khun khar guruus,” which means “man-black-animal” and they call cubs “almantsag.”

Because of its highly endangered status and rarity, Mongolians traditionally do not hunt Gobi bears. However, since the 1940s, there have been 16 documented Gobi bear deaths at the hands of humans: 6 were killed by Russian geologists mistakenly believing them to be

brown bears, 5 by border guards (for unknown reasons), 4 by locals defending themselves from bear attacks, and 1 for the Natural History Museum (Mijiddorj 2006).

There is only one report of the capture of a Gobi bear cub by nomads, who fed it for a short time and released it (Bold 1967). Also, in 1969, a cub caught by nomads from Tsagaan Bogd mountain, was brought to the state circus in Ulaanbaatar and was fed and trained for 1 year (Mijiddorj 2006).

Present management Systems

Conservation measures

Hunting has been prohibited since 1953. Gobi bear habitat is included within the Great Gobi Strictly Protected Area, where supplemental feeding is being conducted. Rangers are responsible for monitoring scientific research within Gobi bear habitat. Gobi bears are categorized as rare species in the Mongolian Red Book (Shiirevdamba 1997) and CITES Appendix I. According to present “Law on Fauna,” a person who hunts or captures rare animals without an appropriate permit will be held criminally responsible and will be imprisoned for 3-5 years. The Mongolian government is starting a captive breeding program.

Limitations of current systems

Similar to brown bear conservation, very limited funds have been available for the Gobi bear until 2004, when UNDP/GEF’s “Conservation of Great Gobi and its umbrella species project began.

Recommendations

The development and implementation of protection measures based upon ecological research (which will require satellite telemetry) is needed. We suggest that vegetation and undergrowth in and around oases, ponds and springs be protected and restored. Also, there needs to be an investigation on the feasibility of opening and restoring waterholes in areas with inadequate supplies. An increase in the number of feeding stations providing high quality food during the gestation period would also help in monitoring the bear throughout the year. We suggest that border guard points and local nomadic settlements should be removed from important water sources and oases, where bears can then be translocated. Gobi bears should be reintroduced into the range they occupied during the 1920s and 30s. One critical legislative action should be listing as category I endangered in the IUCN Red Book.

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Chapter 13

The Status of Bears in China

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China is one of only two countries with four species of bears (although the status of giant pandas [*Ailuropoda melanoleuca*] is not treated in this report). In terms of diversity and scope of habitats, China is one of the world's most important countries for bear conservation. Figures purporting to provide abundance and density of bears abound, but none are documented sufficiently to merit recognition as scientific estimates; all estimates of bear density and abundance are better viewed as guesses. The geographic distribution of brown (*Ursus arctos*) and Asiatic black bears (*U. thibetanus*) is fairly well documented (uncertainty remains regarding sun bears, *U. malayanus*). Sun bears in China are rare and have received very little study. An oft-repeated guess is that about 150 remain, although the recent national survey on terrestrial wildlife species estimated a total of about 700 (State Forestry Administration 2003), restricted to specific areas southern, southwestern and western Yunnan and southeastern Tibet. We restrict this report to brown and Asiatic black bears.

Biology

Asiatic black bear

Asiatic black bears were formerly found over almost all of China. However, due to human development and habitat destruction, its distribution has contracted. Asiatic black bears no longer occur in the northwest and central part of the country. Publications have identified 4 subspecies of *U. thibetanus* in mainland China, and population estimates vary greatly among sources. *U. t. mupinensis* is the most wide-spread subspecies and found from Gansu and Shaanxi provinces in the Yellow river areas in the north to Guangdong and Guangxi provinces in the south, and from the Qinghai-Tibet plateau in the west to the east reaching Zhejiang province. *U. t. thibetanus* is found in the southwest part of Yunnan, southern Qinghai, southeast Tibet and northwest Sichuan. *U. t. ussuricus* is found in the northeast part of China, and *U. t. laniger* only occurs in the southern slopes of the Himalayas (Table 13.1).

Asiatic black bears in China can breed at age 4 or 5.

The mating season varies (geographically) from May to August (Reid et al. 1991). Cubs are often born in a short period from late December or early January. Hibernation can be relatively long in the cold north and northeast, which may last from October to April. In warmer southern areas, Asiatic black bears can be active year-round.

Brown bears in western China

Chinese publications claim the existence of 4 subspecies of *U. arctos* within China: *U. a. lasiotus* (in the northeast), *U. a. arctos* (in the Altai Mountains), *U. a. pruinosus* (on the Tibetan plateau), and *U. a. isabellinus* (in the Tianshan Mountains). Other than descriptions of phenotypic differences that typically characterize bears in these regions, no recent documentation exists to support these subspecific designations. Whether or not distinctions are real, it is clear that brown bears in western China are geographically and ecologically distinct from those in China's northeast (Fig.13.1). It is unclear if brown bear populations within western China are isolated from one another. Unsurprisingly given that primary productivity in most of western China is low and that these bears lack easily obtained sources of protein, body size of western Chinese brown bears is small-to-medium (although Liu 1996 reports a female weighing 212 kg). Reproductive rates have not been documented, but litter sizes are most often reported as 1 or 2, with triplets being quite rare.

Brown bears inhabit most mountainous areas of China's arid and largely unforested west, and are occasionally reported from valleys and wetlands between mountain ranges (but not, at least in recent years, from the large arid basins such as the Dzungarian, Tarim, and Chaidam). Brown bears in western China occupy an ecological niche more similar to those of grizzly bears in the Arctic tundra of Alaska and northern Canada than to the largely-forest dwelling brown bears elsewhere in Eurasia. Although few studies of food habits have been conducted (Xu et al. 2006), all indications are that these bears are largely carnivorous, subsisting largely on pikas (*Ochotona* spp.), marmots (*Marmota* spp.), and carrion, and supplementing this diet with

Table 13.1: Population estimates from Chinese sources.

Time Period	<i>U. thibetanus</i>	<i>U. arctos</i>		Source
		NE China	W China	
1980s	-	-	1,801-3,841 ^c	Piao (1992)
Early 1990s	12,000-18,000	1,000	5,430-6,570	Wang (1998)
Early 1990s	9,800-16,200	500-600	5,400-6,500	Li et al. (1996)
Early 1990s	3,663	1,188	-	Zou and Ma (1997) ^a
Early 1990s	46,528	2,570	12,213	Piao (1996) ^b
Early 1990s	17,478-19,785	550	3,412-6,074	Hou and Hu (1997)
1994	17,458-19,548	560-650	5,350-6,642	Ma et al. (1998, 2001)
1994	14,062	-	16,648	Liu (1996) ^c
Late 1990s	-	-	2,984-4,000	Zheng (2003) ^d
Late 1990s	27,888	982	13,925	Piao et al. (1996) ^e
Late 1990s	817-1,403	488-744	-	Zhang (2002) ^f
Late 1990s	~ 28,000	~ 1,000	~ 6,300	SFA (2003)
Unclear	19,835-23,247	668-811	5,438-6,641	Hou et al. (unpublished) ^g
Unclear	17,479-19,785	700-800	4,910-6,272	Hu and Hu (1998)

^a Provinces of Heilongjiang, Jilin, and Liaoning only^b Also published by Fan and Song (1997)^c Tibet only^d Qinghai only^e Hand-written on original 1996 report; numbers also published in Beijing Evening News (2004)^f Heilongjiang only^g China West Normal University, Nanchong, Sichuan

Fig.13.1: Approximate geographic distribution of 3 bear species in mainland China, as of the late 1990s. Information is from broad-scale terrestrial wildlife surveys conducted by provincial and county forestry workers as part of a nationally-organized effort. Symbols represent counties where the species was reported as present; density of symbols does not necessarily reflect relative abundance of bears.

what little of nutritious value can be gleaned from the sparse vegetation in these arid and unproductive regions. Noteworthy is that a number of field investigators have reported “hot spots”, i.e., small regions in which brown bears are frequently observed (e.g., within the Qiangtang Nature Reserve in Tibet, the Arjin Nature Reserve in Xinjiang, and Yeniugou and the Kekexili Nature Reserve in Qinghai) but that which differ in no obvious manner from vast regions surrounding them in which they are very rarely encountered. Most likely these are areas conducive to excavating pikas and/or marmots.

Brown bears in northeastern China

Brown bears in the forested northeast are larger in size (often about 200 kg, Ai 1992) than those in China's west. They inhabit a variety of mixed deciduous-conifer and purely coniferous forests, but are restricted to those areas distant from centers of human activity.

Status

Asiatic black bear

No well-founded wild population estimates for Asiatic black bears in China exist so far. Estimates of Hu and Hu (1998) are 12,175-12,499 for *U. t. mupinensis*, mainly in Tibet and Sichuan provinces, 3,500-4,500 for *U. t. thibetanus*, and 1,270-1,830 for *U. t. ussuricus* (mainly in Heilongjiang province with a total population 817-1,403). Comparison with historic data suggests a general population decrease since the 1950s. Habitat loss is thought to be the major reason for the decrease, followed by poaching and illegal capture of bear cubs. Beginning in the 1950s, large amounts of forests were removed to fulfill the timber needs for economic construction. Bears often choose caves in big tree trunks to den during winter. Difficulty in finding denning sites after large-scale logging usually results in the loss of bears from cold, hunger, and diseases in the winter. For example, in the national industrial timber-producing forests of Heilongjiang province, the population estimate ($1,171 \pm 298$) of 1998 was substantially lower than that of 1992 ($3,057 \pm 730$), a more than 60% decrease in 6 years (Zhang 2002). In its southern range, in many heavily logged areas, bears are hard to find. Population insularization in various areas throughout its range also resulted from rapid human development such as road and power dam construction, mining and settlement expansion. Bear hunting was often a source of income and meat for some people in the forest and mountain areas before the enacting of the national wildlife protection law. People often searched in the woods to kill bears in their dens in winter. In the 1980s, in re-

sponse to the initiation of businesses farming bears for bile, several thousand bears were removed from the wild to be placed in bear farms for bile extraction. Poor farming skills, especially those of small household facilities, led to high mortality rates during the early years of bear-farm development, and thus to unsustainable levels of capture of wild bears to maintain bear populations in farms.

The most recent national survey on terrestrial wildlife estimated a total of about 27,500 black bears (State Forestry Administration 2003), which is higher than all other estimates. This estimate partly resulted from the real population increases in some areas. Conservation efforts such as better wildlife protection law enforcement, improved public awareness, setting-up of new nature reserves, and improvement of existing nature reserves, as well as other habitat protection and improvement projects such as the natural forest protection project and reforestation project may all contribute to the recovery of the wild bear populations in some areas in recent years. However, the apparent increase needs to be interpreted with caution. Although the population in some areas has increased, the same survey shows that in areas such as Anhui and Hainan the bear population has declined severely and may even have become extirpated.

Brown bears in western China

Guesses of the abundance of brown bears in western China (Table 13.1) have ranged from as few as ~3,400 to as many as >20,000 (combining Liu's 1996 number for Tibet with that of Zheng 2003 for Qinghai). Piao (1992) estimated about 2,800 in Tibet. The recent national survey on terrestrial wildlife estimated a total of about 6,300 (State Forestry Administration 2003). Given the size of the area and difficulty of obtaining a reliable estimate, it is not surprising that abundance remains essentially unknown. Population trends over recent years are also unclear. Schaller (1998) believed that numbers were considerably reduced compared with early in the 20th century, whereas many local officials and pastoralists believe brown bears have increased in recent years. The national survey (State Forestry Administration 2003) suggested population declines in Yunnan, Tibet and Gansu.

Brown bears in China's west seem incompatible with dense human habitation, but do coexist with low intensity pastoralism. Direct killing for medicinal use seems rare, but brown bears are feared and disliked by almost all local people in western China, and are often killed out of concern for possible human conflicts. Direct attacks on humans are uncommon and even livestock depredations (although they occur) are rarely reported as a major problem by pastoralists. In contrast, bears are of-

ten reported to damage pastoral encampments and to raid stored food. Local public support for conservation of brown bears is essentially absent. Weapons are rare: firearms being illegal among the general public, and infrequently carried even by law enforcement personnel). Considerable habitat remains for brown bears in western China, although the widespread government policy of poisoning pikas may reduce habitat capability and potentially kill bears through secondary poisoning.

Brown bears in northeastern China

Brown bears inhabit the Da Xinganling, Xiao Xinganling ranges as well as associated forestry areas of northern Heilongjiang and associated Inner Mongolia near the Heilongjiang (Amur) River (Zhang 2002). This population is probably contiguous with that in Russia. There are also small, evidently isolated and declining populations in Jilin (Feng et al. 2001). It is unclear whether any persist in neighboring Liaoning (Piao et al. 1996; Zou and Ma 1997). Guesses at the total number of wild bears ranged from <500 to >2,500 in the early 1990s, and from <500 to almost 1,000 in the late 1990s. The national survey of 2003 estimated a total of about 1,000. Timber cutting and poaching are reported as continuing threats to all these northeastern populations. Most sources believe the bear population declined substantially during the 1980s and 90s (Zou and Ma 1997; Zhang 2002).

Human-bear relationships

Bears in traditional Chinese thought were regarded as symbols of strength and bravery. In the ancient times, bear parts were often presented as precious tributes to emperors and high officials. Simultaneously, bears were one of the major target animals sought by hunters, especially during winter when people had less farming work and more spare time. Denning bears were the most vulnerable. Bear carcasses were an important source of meat and income for some local people in the remote and mountainous areas, especially in the years before 1989 when laws on wildlife protection were absent and the implementation of other wildlife protection regulations was poor.

Dishes prepared from bear parts, especially bear paw, are still commonly regarded as particularly invigorating and nutritious. Bear bile has long been an important traditional Chinese medicine believed to be efficacious in curing fever, cough, convulsion, and other ailments. In the past, wild bears were often sought for their gall bladders to meet the demand for gall. Bear farming and bile extracting skills was introduced from North Korea to the northeastern province of Jilin at first in the early

1980s, and rapidly spread to other provinces such as Heilongjiang, Liaoning, Sichuan, and Yunnan to form quite a lucrative business.

Bear-human conflicts consist mainly of bear depredation on crops. Crop depredation appears to have been intensifying in recent years in some areas, especially in areas where bear populations have evidently recovered. Major reasons for this are improper and expanding farming practices. Because crop productivity is relatively low in the remote and often steeply-sloping mountainous areas of bear distribution, large areas of land are needed for human subsistence. People have moved into bear habitat areas at high elevations on mountain slopes or deep within bear habitat for farming, which usually worsens the conflicts. Bear attacks on livestock and marauding of property also occurs in some cases. Bear attacks on humans are very rare, but have been documented. For example, during 2003-04, 6 cases of Asiatic black bear attacks on human were reported in Sichuan province. Although reasons behind are not fully clear, displacement and severe stress caused by habitat destruction, human construction and development activities are believed to be important factors.

Commercialism of bears

Commercial bear farming (both by government and private organizations) is an important economic activity in China: as of the early 1990s, there were an estimated 8,000 Asiatic black bears as well as lower numbers of sun and brown bears held in commercial breeding facilities (Zhang and Xu 2004). Capture of young bears from the wild is illegal and from most reports, has become uncommon as captive facilities have improved breeding techniques. In recent years, national and provincial authorities have acted to close-down small, poorly-run bear farms, and consolidate bear farming at larger, more easily monitored operations. However, a small number of wild-born bears are still occasionally reported captured (Green et al. 2006; Cochrane G, Animals Asia Foundation, HK unpublished data). Gall is routinely extracted from adult bears in captivity, and there is consensus that bear farming is economically viable, and that sufficient amounts are now being produced that the retail price gall (at least from farmed animals) has recently declined. In recent years, there has been a trend toward using bear bile not only for medicine, but also used to produce other commodities such as shampoo and cosmetics. This trend prompted the joint issuance by 5 ministries and administrations of the Chinese government in 2004 of a notice to strengthen the conservation of bear and management of medicinal products,

limiting the use bear bile only to key medicinal products.

More pertinent to conservation of wild bears, there is also an unresolved dispute about whether propagating bears in captivity aids or obstructs *in situ* conservation. Chinese government authorities claim that bear farming reduces the incentive to poach wild bears; some non-governmental groups claim that by encouraging the marketing and use of bear products, the opposite effect is produced. There is logic to both arguments, but we have yet to see empirical data that could be used to support either. We suspect that the overall impact of captive breeding on wild bears in China is neutral, and that conservation efforts aimed at wild bears must focus on conditions in the wild.

Present management system

Under the National Wildlife Law of 1988, sun bears are categorized as 1st class, and both brown and Asiatic black bears are categorized as 2nd class protected species. In practice, the distinction between 1st and 2nd class is unimportant: taking, raising, selling and transporting is permissible only under permit by national (for 1st-class) or provincial (2nd-class species) authorities. Permits to remove bears from the wild are almost never issued directly to individuals or institutions, although small quotas are issued usually to prefectural (and sometimes county) forestry bureaus for dealing with problem bears. Usually local forestry authorities will organize the removal of the problem animals, often by killing. China has rapidly increased the number and area covered by nature reserves, although many of these have yet to initiate any protective measures, and even the best-managed reserves must share land-use decisions with local governments which often prioritize short-term economic development over biodiversity conservation.

That bears are legally protected is known by almost all, but this knowledge has done little to improve attitudes toward bears. Most agriculturalists who suffer crop damage or pastoralists who lose sheep to bears obtain little technical or financial assistance; the government essentially asks them to make personal sacrifices on behalf of the entire country. Research into specific modes of bear-human conflicts has only begun and is poorly funded; measures to reduce bear-human conflicts are essentially absent in China.

Recommendations

Given the tremendous importance of China for conser-

vation of bears worldwide, the paucity of reliable research into their status, habitat needs, and practical measures to reduce bear-human conflicts in China is noteworthy. Little study has been conducted on bears in China and only a few research projects are currently under way. Chinese scientists have made substantial achievements in improving their capability of raising bears in captivity and producing bear gall for commercial use. Meanwhile, controversy over the ethics of bear farming has detracted from focusing on the great need to better understand and manage China's *in situ* bear populations. Many bear populations are declining; it is likely that better habitat protection and wildlife protection law enforcement are still indicated here (nature reserves notwithstanding). Rapid economic development has intensified bear-human conflicts on land resources. Special efforts should be put on avoiding further insularization of bears (e.g. in nature reserves). Other bear populations may be increasing, requiring development and implementation of comprehensive plans to make the compromises that cohabitation of bears and people necessarily requires.

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Chapter 14

The Status of Bears and Restoration Projects on the Korean Peninsula

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Two species of bear inhabit the Korean peninsula: the Asiatic black bear and brown bear. However, the danger of extinction is very real for both species, mainly due to past hunting, poaching, and habitat destruction, and thus they are now both designated as threatened species.

In North Korea, research on bear breeding and commercial use was conducted by the Zoology Institute of North Korea from 1986 to 1995. In addition, research on various other subjects has been conducted since 1996. In South Korea there has been no research on bears except for a population estimate survey of wild bears during 1980-1984. Recently, the restoration project of Asiatic black bears was revived by the Species Restoration Center of the Korean National Park Service (SRC). This report is based on the above-mentioned research and the personal information from a zoologist in North Korea.

History of human-bear relationships

The bear is an animal symbolic of the Mother Goddess in Korea. According to the myth of Korean creation, Dan-gun, the founder, was born 4,340 years ago, the son of God and a female incarnate bear. The nation founded by the bear's son lasted for two thousand years.

Since the early 15th century, bear gall bladder has been believed to be a very useful medicine and sold/traded commercially. In addition, the common use of firearms has made poaching a serious threat to bear populations since 1910. Furthermore, during the period of colonization by Japan, the government tried to exterminate bears from Korea because they were believed to be harmful animals (Photo. 14.1). In the early 20th century, over 200 bears were poached or hunted every year, and by the middle of the 20th century the number of bears poached or hunted decreased to fewer than 50 bears/yr (Table 14.1).

In South Korea, the population of bears suffered a serious blow from the Korean War in the 1950s, and by



Photo 14.1: A brown bear captured at Yi-Cheon in Hamgyeong-Namdo (province) (9 Feb. 1922).

Table 14.1: Number of bears captured in the northern half of the Korean peninsula between 1915 and 1943.

Year	1915	1916	1923	1933	1934	1935	1936	1937
<i>n</i>	261	168	193	98	104	62	50	58

Year	1938	1939	1940	1941	1942	1943	Total
<i>n</i>	63	46	36	50	43	37	1,269

Sources: The statistical yearbook of the Chosen Government-General under the Japanese colonization era (1933-1943) (Yoshida 1923)

poaching until the 1970s. The South Korean government has protected Asiatic black bears as Natural Monument no.329 since 4 November 1982. Since the 1980s, bears have faced extinction due to the fragmentation, and deterioration and decrease of habitat as a result of expanding human activities such as road construction.

Status

Brown bear

Historically, brown bears were distributed only in the eastern part of North Korea, Kangwon-Do (province), Ryunggang-Gun (county), and Bubdong-Gun (county), which were made up mostly of high mountainous areas such as Geumgang Mountain (Won 1968).

A North Korean zoologist reported that, at present, the major habitats are forested areas above 1,000m sea level, including the Baekdu mountain trail in Hamgyung-buk-do, the northern Soobak mountain trail in Hamkyung-nam-do and Ryanggang-do, the Rangrim mountain trail in Hamkyung-nam-do, the Bujunryung mountain trail in Hamkyung-nam-do and Ryanggang-do, and the Hamgyung mountain trail in Ryanggang-do in the northern area of North Korea (Fig.14.1). Province and counties inhabited by brown bears are listed in Table 14.2. Brown bears inhabit higher altitudes or more northern areas than Asiatic black bears in areas where their distributions overlap. The number of existing wild brown bears is estimated to be approximately 60-210.



Fig. 14.1: Distribution of brown bears on the Korean peninsula.

Table 14.2: Provinces and counties inhabited by brown bears in North Korea.

Province (Do)	Jagang	Ranggang	Hamgyung-buk	Hamgyung-nam
County (Gun)	Rangrim, Hwaryung	Sanjiyun, Bakam, Gabsan, Woongheung	Moosan,	Jangjun, Bujun

Asiatic black bear

(1) North Korea

Provinces and counties that Asiatic black bears inhabit are listed in Table 14.3 (information provided by anonymous North Korean zoologists). The main distribution areas are high mountains surrounding the Myohyang mountain trail, in Pyungan-bukdo bubdong-gun (county), Changsung-gun (county), Dong Chang-gun (county), the Bukdaebongsan, Ahobiryongsan, Masikryung, and Taebaeksan Mountains (Fig. 14.2). The distribution in the northern region was reported to overlap with that of brown bears. The numbers of bears hunted from the 1980s to the 1990s are listed in Table 14.4. An estimated 300-1,000 individuals inhabit North Korea.

(2) South Korea

About 160 bears were captured in the Jiri Mountains in the southern part of Korea between 1950 and 1970. Hundreds of wild bears might have existed in South Korea at that time (Han 1997).

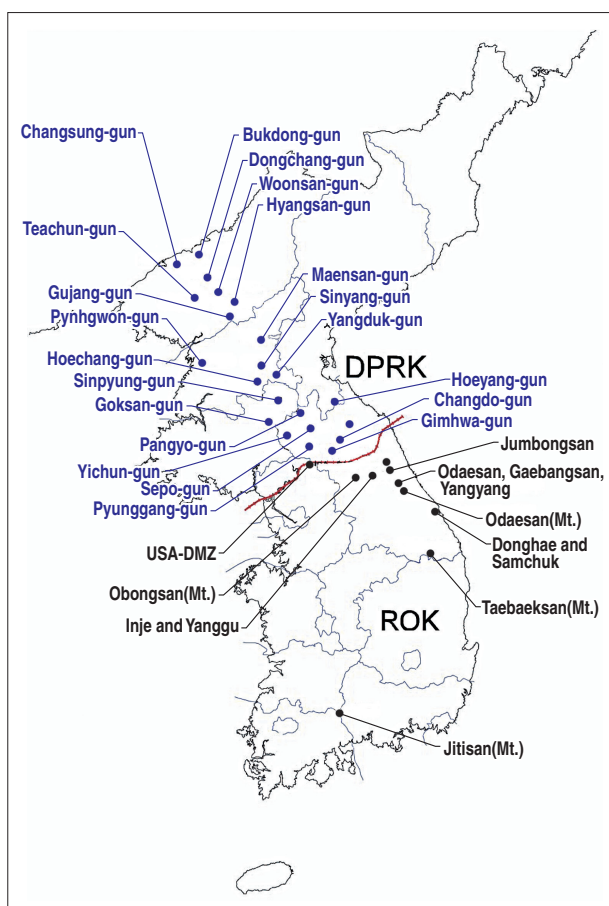
In the 1980s, a simple population survey on wild bears was conducted. According to the surveys of five mountains by the Korean Society for the Protection Wild Animals during 1980-84, at least 50 wild bears had survived (Korea Society for the Protection Wild Animals 1984) (Table 14.5). The National Institute of Environmental Research stated that about 20 wild bears remained in 2001, but no scientific research is being done on them (Table 14.6, Fig.14.2).

Table 14.3: Provinces and counties inhabited by Asiatic black bears in North Korea.

Province (Do)	Pyungan-buk	Pyungan-nam	Hwanghae -buk	Gangwon
County (Gun)	Bukdong, Dongchang, Changsung, Taechun, Woonsan, Hyangsan, Gujang	Pyungwon, Maengsan, Yangduk, Hoechang, Sinyang	Sinpyung, Goksan	Pangyo, Hoeyang, Yichun, Sepo, Pyunggang, Geumgang, Changdo, Gimhwa

Table 14.4: Capture records of Asiatic black bears in North Korea (1980s-90s).

Year	Number and Location
1984 - 1986	23 bears in Pyungan-bukdo Byukdong-gun, Changsung-gun, Dongchange-gun, Woonsan-gun, gujang-gun, Hyangsang-gun
1987	62 bears (8 in Pyungan-bukdo, 38 in Jagang-do, 16 in Ryanggang-do, Hamgyung-namdo and Hamgyung-bukdo)
1990s	The captured number decreased compared to the 1980s

**Fig. 14.2: Distribution of Asiatic black bears on the Korean Peninsula.****Table 14.5: The results of population surveys on Asiatic black bears in 5-mountainous areas in South Korea, 1980-83.**

Mountains	1980	1981	1982	1983
Seoraksan	10	10	11	10
Jirisan	30	32	34	36
Obongsan	4	4	4	2
Odaesan	3	4	4	4
Taebaeksan	3	4	4	4
Total	50	54	57	56

*Source: Korea Society for the Protection Wild Animals (1984)

Table 14.6: Population estimate for Asiatic black bears in South Korea in 2001.

Area	Estimated number
JSA (Joint Security Area)~DMZ (Demilitarized Zone)	3
Seoraksan Trail (from Seoraksan to Jumbongsan)	3
Inje and Yanggu (Maebongsan, Hansuksan)	5
all over Donghae and Samchuk (Dutasan, Chungoksan)	1
Odaesan, Gaebangsang, Yangyang	3
Taebaeksan	1
Jirisan	5
Total	21

* Source: National Institute of Environmental Research (2002)

Captive breeding

(1) North Korea

According to North Korean zoologists, captive breeding of wild bears was started for the purpose of industrial use in North Korea at the end of the 1960s. Currently bears are bred at some zoos on a small scale (Pyeongyang Jungang Zoo, 70 bears; Wonsan Zoo, 30 bears; Ganggye, Sari Zoo, fewer than 10 bears; Haeju, HamHeung, Haesan Zoo, 5-6 bears; Chungjin Zoo, 3-4 bears).

(2) South Korea

In South Korea, a breeding program was begun in the 1980s by importing bears from China, Japan, and south-eastern Asia in order to breed them for export to other countries. However, the 500 bears that were imported over a period of 5 years have been disposed inside of South Korea due to lack of a long-term plan for their export. As of 2006, strict laws and regulations inhibit any international import or transfer of bears, and the 2,000 bears that have been reproduced by artificial propagation are now being held in about 100 breeding facilities that are known to have poor conditions.

Legal protection

The North Korean government has designated a few bear habitats as natural monuments, legally protected by the government, including Jagang-do Ryonglim-gun (natural monument No. 124) and Hamgyung-bukdo Yoonsan-gun Gwanmo-bong (natural monument No. 330; Ri and Li 1994). In order to conserve them, the South Korean government designated Asiatic black bears themselves as natural monuments (natural monu-

ment No. 329) based on the Cultural Properties Protection Law in 1982.

On 19 February 1998, the Ministry of Environment (MOE) listed Asiatic black bears as a threatened species in South Korea based on the Natural Environment Conservation Act. According to the most recent version of the Natural Environment Conservation Act, revised on 10 February 2005, the Asiatic black bear was designated as an Endangered Wild Animal and Plant.

Restoration project

The ongoing restoration project (through reintroduction to South Korea) planed by MOE and conducted by the Species Restoration Center within Korea National Parks Service (KNPS) aims to recover a stable population for all endangered species, including Asiatic black bear. New research, titled "The Study for New Techniques for the Restoration of Endangered Species in Korea", was carried out from 1998 to 2001 by the National Institute of Environmental Research (NIER). In 2001, NIER experimentally released 4 bears (2 males, 2 females) from a Korean bear farm to the Jiri Mountains (National Institute of Environmental Research 2002). In 2002, MOE transferred the restoration project to KNPS, a subsidiary agency of the MOE, in order to expand the research and implementation of other aspects of the project, such as on-site monitoring of the released cubs and progress towards restoration.

All the released experimental cubs were recaptured in June 2004 after 32 months of monitoring for their environmental adaptability, and now the recaptured cubs are being bred in a small sized cage for public education.

In addition, the Species Restoration Center within KNPS (Asiatic Black Bear Management Team) signed a memorandum of understanding (MOU) for the introduction of Asiatic black bears from Russia to South Korea, then 12 cubs, about 8-9 month-old orphan bears from Russia, were introduced into the Jiri Mountains in October 2004 (6 cubs; 3 females, 3 males) and in September 2005 (6 cubs; 4 females, 2 males). Also in April 2005, an additional 8 cubs (4 females, 4 males) from North Korea were released according to the MOU on animal exchange program between South Korea and North Korea. As of 2006, there are 14 introduced Asiatic black bears remaining in the wild. As for the other 6 bears, two cubs were illegally trapped, and the remaining cubs failed to adapt to wild conditions. If > 30 bears are introduced to the Jiri Mountains, it is assumed that the population would then be able to reach 50 bears (assumed to be the critical minimum population size) through natural propagation by 2012 (Table 14.7).

In 2005, the Asiatic black bear Management Team within KNPS was reorganized to become the Species Restoration Center of KNPSRI (Korea National Park Service Research Institute), and their responsibilities were expanded to conduct other kinds of restoration projects on other threatened species.

Table 14.7: Estimated increase of the bear population at Mt. Jiri, based on Vortex simulations (2004-2012).

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of wild bears	5	5	5	5	5	5	5	5	5
Number of introduced bears	6	6	6	6	6				
Number of bears adapting to the wild	4	4	4	4	4				
Subtotal	9	13	17	21	25				
Possible number of reproductive bears				6 (2 wild + 4 released)	10 (2 wild + 8 released)	14 (2 wild + 12 released)	18 (2 wild + 16 released)	24 (2 wild + 20 released + 2 new born)	28 (2 wild + 20 released + 6 new born)
Possible number of reproductive pairs				1	2	1	2	5	2
Number of offspring				2	4	2	4	10	4
Total bears	9	13	17	23	31	33	37	47	51

Assumptions

1. The number of bears which are able to adapt to wild conditions is estimated as 0.67 of introduced bears.
2. Reproduction assumed to begin at 4 years-of-age.
3. Interchange between 2 wild bears and released bears assumed to start in 2007.
4. Progeny/adult female assumed to be 2.

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Chapter 15

The Status and Management of Asiatic Black Bears in Taiwan

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The Formosan black bear (*Ursus thibetanus formosanus*), an endemic subspecies of the Asiatic black bear, is the only native bear in Taiwan. Because of severe exploitation and habitat degradation in recent decades, populations of wild Formosan black bears have been declining. This species was listed as “endangered” under the Cultural Heritage and Preservation Law in 1989. Their geographic distribution is restricted to remote, rugged areas without human disturbances. However, every limited specific conservation measurements have been implemented while illegal hunting continues to threaten their long-term persistence.

Biology

The Formosan black bear (*Ursus thibetanus formosanus*), an endemic subspecies of the Asiatic black bear (Nowak 1991), is the only native bear in Taiwan. Unlike Asiatic black bears in temperate areas, bears in Taiwan do not hibernate in winter. They are active 54–57% of the time over the entire day, and more active during summer (60%) and fall/winter (60%) than spring (47%). They are primarily active during the day in the spring and summer; and increasingly active at night in the fall/winter when acorns are abundant (Hwang and Garshelis in press).

Radio-collared bears in Yushan National Park had annual home range sizes (minimum convex polygons) of 27–202 km². Home ranges overlapped extensively (Hwang 2003; Wu 2004) and often extended well beyond the boundary of the park. Mean maximum straight-line distance between successive locations was 24.6 km (SE = 7.8, *n* = 6). Half of the collared bears traveled beyond the park boundaries where they were more vulnerable to illegal hunting. When acorns were most abundant (usually October–January), bears tended to aggregate in oak forests. Once acorns diminished, bears moved 6–24 km to spring–summer range. Females and young males avoided areas spatially or temporally

where adult males congregated during productive fall seasons. An even greater dispersion occurred in years of acorn scarcity.

Although omnivorous, Formosan black bears maintain a primarily vegetarian diet. They forage on a variety of foods, including various parts of plants, insects, mammals, and carrion. Diets of bears monitored in Yushan National Park included succulent vegetation in spring, soft fruits rich in carbohydrate (e.g., Lauraceae and Rosaceae spp.) in summer, and fat-loaded hard mast (e.g., acorn, mainly *Cyclobalanopsis* and *Quercus* spp., and walnut, *Juglans cathayensis*) in fall/winter (Hwang et al. 2002). Scat analysis indicated that bears also consumed medium-sized ungulates (e.g., Formosan muntjac, *Muntiacus reevesi*; serow, *Naemorhedus swinhoei*) more frequently than in other areas, especially when acorns were less abundant.

Status

Previous records of Formosan black bear occurrence suggested a wide distribution in forested habitats from low to high elevations throughout the island. However, loss of habitat caused by rapid human development and exploitation (fueled by an increase during recent decades in market demand for bear parts) has constrained bears to rugged and steep terrain far from human activity (Fig.15.1). Recent surveys found bears to be distributed along Taiwan’s central mountain range in 23 districts from 10 counties, ranging in elevation from 300 to 3,500 m (Wang 1999). Evidence of greater occurrence from mid- to high-elevation habitats (2,000–3,000 m) may be due to both the limited human accessibility and the stable food resources found at these elevations. The majority of documented bear occurrence was in forest habitat located within protected areas such as the Chiatianshan Nature Reserve, Shei-Pa National Park, Taroko National Park, Yushan National Park, Shuangguei Lake Major Wildlife Habitat, and Dawushan Nature Reserve (Fig.15.1).

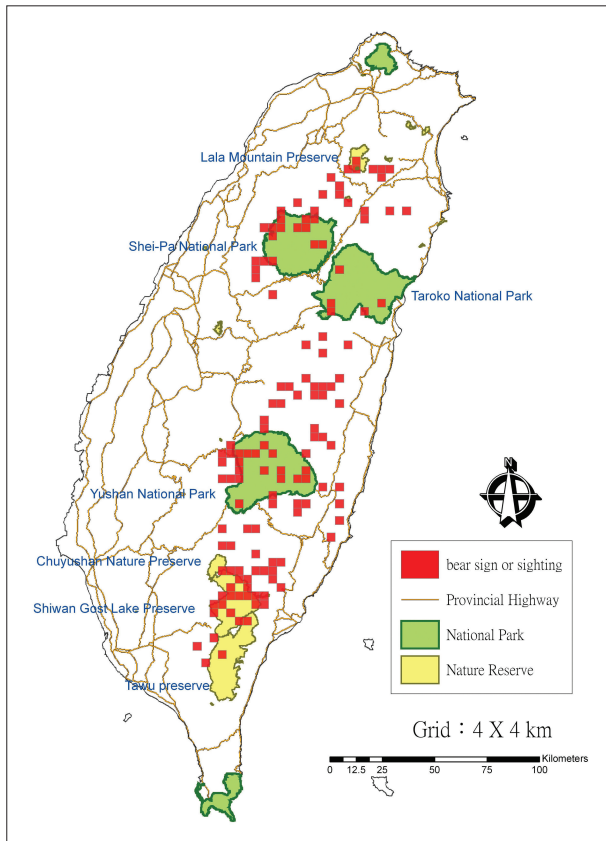


Fig.15.1: Current distribution of Formosan black bears based on sighting and sign reports since 1990 in Taiwan.

Although no population estimation has been made, 15 bears were captured during 1998-2000 in Yushan National Park. Based on the low number of reported bear sightings in Taiwan, we suspect no more than several hundred bears to occur in the remaining suitable habitat across the island. The species has been legally protected since 1989 but illegal hunting continues. Eight of 15 bears captured in our Yushan study had missing toes or paws, caused by illegal traps (Hwang 2003). This would appear to support a conclusion that poaching continues to threaten Formosan black bear populations.

Approximately two thirds of land in Taiwan is still covered with forest. Ten to 20 percent of this remaining forest is pure oak, mixed oak or broad leaf forest, all of which are good habitat for bears, especially during the fall and winter. A decision by the Forestry Bureau in 1991 to ban logging in remaining natural forest stands seems to have provided a big boost to habitat protection for bears. As of 2006, the primary threat to bear habitat appears to be continued fragmentation caused by road construction. Continued road construction not only leads to greater forest fragmentation but makes remaining forested areas more accessible to humans which may lead to increases in illegal hunting and other activi-

ties that directly or indirectly impact bears.

Human-bear relationships

The Formosan black bear is generally called black bear or dog bear in Chinese dialects. Some indigenous peoples, such as those from the Bunun or Guma communities, refer to the bear as “Tumad” or “Guma” respectively. One of the best known stories about bears is a phrase originating from Mencius: “Fish and bear paws cannot be obtained at the same time”. The meaning of this aphorism is that one is forced to choose between desired items.

In traditional Han Chinese culture, bears are animals of economic value from head to toe. According to the traditional Chinese compendium of medical material *Ben Cao Gang Mu*, bear gall, fat, bones, meat, and blood are all useful medicines. In Taiwan, bears are especially valued for their gall bladder, which for centuries has been considered a precious medicine, and for their paws, which contain specialized meat which is an ingredient in many delicacies (Chang et al. 1995). As a result, illegal hunting and selling of bears and their parts continue to be a problem in Taiwan.

It is primarily the indigenous peoples of Taiwan that hunt. Bears have traditionally had social and cultural importance to the many indigenous people such as the Bunun. The Bunun viewed killing a bear as inauspicious, maintaining the view that it was the same as killing a person. According to Bunun legend, they share a common ancestor with bears. Therefore, there existed a moderate taboo against consuming bear meat and hunting bears during certain seasons. As a result of this belief (and to honor the taboo), Bunun hunter that had killed a bear would share the bear with all members of their village in a ceremonial feast. Although taboo, killing a bear was still considered a remarkable event because it was rare and difficult. A bear hunter was therefore regarded as a hero, and the killing of a bear often became the focus of the yearly traditional hunting ceremony (Hwang 2003). Although most hunters (67%) still believed the taboo against killing a bear, traditional beliefs and values relating to bear hunting had diminished (Hwang 2003).

Most Bunun hunters kill only one or two bears in their lifetime. Furthermore, the average age of hunters when they killed bears has been steadily increasing, suggesting that fewer young people are becoming bear hunters. Most people perceive bears as potentially dangerous, and as competitors for space and food. Reasons cited by local hunters around Yushan National Park for killing bears included protection of themselves or property (48%), economic benefits (26%), meat consump-

tion (10%), and heroism (17%; Hwang 2003).

Additionally, our survey revealed that bears were generally not specifically sought after by Bunun hunters, but instead inadvertently caught in traps set for ungulates (38%) or were encountered by chance on game trails and then shot (62%; Hwang 2003). Traps with which bears were captured ($n = 56$) consisted of either wire-cable or nylon snares (75%), or steel-jaw traps (25%). Our research further indicated that the proportion of bears caught in traps had steadily increased over time (Hwang 2003).

Commercialization of bears

In Bunun communities, bears were not favored game species of local hunters because of their rarity, the difficulty of catching them, their offensive taste, and a perceived danger in hunting them. Traditionally, indigenous people have hunted ungulates primarily for cultural and economic reasons (Chen 1997), and bear meat and parts were more of an inadvertent byproduct of ungulate harvesting than a sought-after commodity. Except for meat, bear products (including gall bladders, paws, and bones) were not used by indigenous people, but were sold to outside markets. Villagers did not trade in bear parts among themselves for cultural reasons, their low-quality taste, or their high market value outside the village.

Hunters and bushmeat traders reported that in earlier times only bear gallbladder and bones had economic value. However, after the 1960's with the growth of bushmeat restaurants, bear meat became more popular and consequently hunters began selling bear parts or entire bear carcasses. For example, around Yushan National Park, prior to the 1980's just 22% of bears harvested were killed and for the purpose of sale to the bushmeat market. By the 1990s, this had increased to 59%.

Although our data indicated that prices for bear parts had not increased as rapidly as average per capita income, trade in bear meat was still higher than had been expected (Hwang 2003). Income received from the sale of bears or parts had increased dramatically, from an average of NT\$ 520 in the 1950s to more than NT\$ 80,800 in the 1990s (1 US\$ = 28-35 NT \$). Recent estimates show the average worth of one bear to be equivalent to approximately three months' income for an average laborer. In some cases, sale of a dead bear could fetch more than NT\$ 100,000 (i.e., NT\$ 1,000-1,400/kg). This is two to three times the market value of the most popular illegal bushmeat such as muntjac or wild boar (NT\$ 400-600/kg), and six to ten times the price of domestic pork.

Current management system

The Formosan black bear was classified as an endangered species by the Natural and Cultural Heritage Act on January 30, 1989. Following the enactment of the Wildlife Conservation Law on August 4, 1989, it was listed as a fully protected species within the endangered species category of this law.

The Forestry Bureau of the Council of Agriculture is the primary agency responsible for wildlife conservation, including bears, in Taiwan. The Park Service, an arm of the Ministry of Interior, is responsible for wildlife conservation within national parks, especially those in mountain areas where bears reside. Governmental agencies, such as Yushan National Park, the Endemic Species Research Institute and the Taipei Zoo, have been engaged in bear research and conservation education. Relevant education programs have included the "BEAR" newsletter (published since 1997), and the website *Conservation and Research of Formosan Black Bears* (<http://tve.npust.edu.tw/project/meibear/>), dedicated to disseminating information on current conservation efforts and research.

Recommendations

In 1994, a population habitat viability analysis (PHVA) workshop was conducted by the Taipei Zoo and the Council of Agriculture. Unfortunately, not only has there been very little follow-up, there has been limited support for field research on bears. Consequently, research and the collection of basic data on the ecology of wild bears have been restricted to only a few areas.

The future of bear conservation is reliant on developing a strong task force composed of scientists, NGO representatives, and interested government agencies provided with long term financial support. Effective enforcement against illegal hunting and trading of ungulates is one very important area in need of improvement because harvest rates of bears invariably track the harvest rates of ungulates. However, the policing of illegal hunting is sometimes hindered by organizational constraints (e.g., internal capacity, power and authority over resource use) and the logistic difficulties of working in the remote areas inhabited by bears (e.g., due to rugged terrain, thick vegetation, and lack of trails). At a minimum, measures taken to protect bears within protected areas should be strengthened to eliminate poaching. Protected areas provide the source for future expansion of bear populations.

Due to their large home ranges, safeguarding bears in Taiwan will require more than simply protecting populations within designated protected areas. Corridors be-

tween protected areas and other potential habitats should be established and effectively managed to maintain sustainable bear populations. We also suggest a ban on the use of snares for hunting, and greater regulation and monitoring of game hunting.

Given the increasing number of wealthy people in urban areas and the high economic benefits of selling bear parts and meat, there is no indication that this market will diminish within the foreseeable future unless the legal risks increase, conservation awareness increases, and/or the consumer demand declines. Public awareness can and should be increased by greater incorporation of educational material on bear ecology and conservation in schools, as well as by getting these materials into the hands of various environmental leaders.

Increased human-caused mortality of bears is highly correlated with the presence of roads, which provide hunters with not only easy access to bears in their natural habitat but also an easy way of transporting carcasses to markets. Increasing human activities and continued development of road systems have not only led to increased bear poaching activity or by-catch of bears, but to fragmenting remaining suitable habitats which may limit dispersal and movement of bears. To avoid further habitat fragmentation, human activity in remote mountain areas should be regulated, and local people should be informed about conservation of endangered species and provided with means to generate income other than trade in wildlife.

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Chapter 16 The Status of Bears in Japan

16.1 The Status of Brown Bears in Japan

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In Japan, brown bears (*Ursus arctos*) occur only in the Hokkaido, the northernmost island of Japan. They have been respected as the god of the mountain by the Hokkaido's native people, the Ainu for a long time. In the meantime, settlers from the southern main islands of Japan from the late 19th century onwards have been very afraid of bears and have killed them as pests. However, it is a fact that the brown bears occur in the area of about 70% of the island even now in spite of such a rough treatment of brown bears.

The key factors for the coexistence of brown bears and human beings in Hokkaido are whether or not we accept this consequence as a good fortune, and whether or not we establish required bear management and monitoring systems in Japan.

Biology

Taxonomy and morphology

The brown bears in northeastern Eurasia are divided into four subspecies based on cranial and dental morphology (Baryshnikov et al. 2004). Brown bears in Hokkaido (including southern Chishima = Kuril Islands) received the subspecific name *U. a. ferox* Temminck, 1842 (*U. a. yesoensis* Lydekker, 1897 is a junior synonym) and those of Sakhalin and Primorski the name *U. a. beringianus* Stroganov, 1962. The skulls of *U. a. ferox* in Hokkaido are generally smaller than the other three subspecies in northeastern Eurasia (Baryshnikov et al. 2004).

A brown bear in Hokkaido has a hump on its shoulders just as brown bears in the other regions. Fur color varies: black, dark brown, or bright yellowish brown (golden). Some bears have black fur with a golden or dark brown portion from the face to their back. Occasionally, a white patch was present on their breast (Imai-zumi 1960).

For wild bears in Hokkaido, there were only a few published reports about body measurements. In adult bears, from the Oshima Peninsula in southern Hokkaido who were live-trapped, mean body weight was 81.7 kg ($n = 17$, $SD = 17.2$) for females and 127.6 kg ($n = 8$, $SD = 33.9$) for males (Hokkaido Institute of Envi-

ronmental Sciences (IES) 2004a). Mean body weight of three adult females (6-7 years old) live-trapped in Urahoro, located in the central-eastern part of Hokkaido, was 104.7 kg ($SD = 6.4$) (Sato et al. 2004a). Among adult bears live-trapped from the Shiretoko Peninsula in eastern Hokkaido, mean body weight was 102.9 kg ($n = 31$) for females and 192.4 kg ($n = 7$) for males (no SD was given; Kohira et al. 2006). It is noted that direct comparison of body weight variation among these regions should not be done, since there seems to be a distortion of body weight, depending on type and size of traps used. In addition, a credible maximum recorded weight is for an adult male hunted in Shyari-cho, eastern Hokkaido during November, 2002, which weighed 400 kg (Nakamura 2003). This record is not much less than that of the maximum recorded weight (440 kg) of the captive bears at Noboribetsu Bear Farm (Maeda and Ohdachi 1994). Other external measures such as body length, body height, neck circumference, and width of forepaw of wild brown bears in Hokkaido were reported on in few papers (Hokkaido IES 2004a, Sato et al. 2004a). Thus, geographic, age, seasonal, and sexual variations in external measures for wild brown bears in Hokkaido should be investigated in the near future.

For the captive brown bears of Hokkaido, maximum body weight was 440 kg for males and 221 kg for females. Mean body weight of 4-6 years old bears (sample size is largest in this age class) was 115.0 kg for females and 219.0 kg for males (Maeda and Ohdachi 1994). For the other adult age class, males are also approximately twice as heavy as females. Chest girth and body weight were positively correlated ($p < 0.001$) and chest girth was a good indicator of body weight. In addition, the width of forepaw can discriminate adult males (≥ 4 years old) from young males (1-3 years old) and females (≥ 1 year old) with a 9.3% error rate (Maeda and Ohdachi 1994).

Skull size (condylobasal length) of the brown bear increases from south-west to north-east in Hokkaido (Yoneda and Abe 1976; Ohdachi et al. 1992). An adult male moved approximately 70 km distance in five days in central Hokkaido (Waseda 1999). Thus, these are interesting differences because they exist despite the small size of Hokkaido (ca. 78,400 km² for Hokkaido

mainland) relative to the potential high dispersal ability of bears.

Matsuhashi et al. (1999) revealed that there are three haplotypes of the mitochondrial control region in brown bears (see the genetic section below). Each of the three haplotypes specifically occurs in southern (south to Ishikari lowlands), central (east to Ishikari lowlands and north to Kushiro region), and eastern (Shiretoko and Akan areas) regions, respectively. Baryshnikov et al. (2004) compared cranial and dental morphology among bears of the three haplotypes. Skull size was smallest in the southern group of haplotype and largest in the eastern group. In particular, bears from eastern Hokkaido (including Kunashiri = Kunashir and Etorofu = Itrup Islands) had significantly larger skulls, smaller cheek teeth, and broader faces than the southern and central genetic groups. Thus, it is possible to suggest that the morphological difference in skull and teeth in Hokkaido brown bears might be associated with genetic differences.

Baryshnikov et al. (2004) implicitly pointed out that dietary difference is a cause of the geographic variation of cranial morphology in Hokkaido. In general, carnivorous Ursids tended to have smaller cheek teeth than omnivorous and herbivorous Ursids (but larger than insectivorous species) (Sacco and van Valkenburgh 2004). In the eastern Hokkaido, where bears have broader face and small cheek teeth, robust salmonoid fish were abundant. In addition, sika deer (*Cervus nippon yezoensis*) meat is recently an important food resource for bears in eastern Hokkaido (Sato et al. 2004b 2005a). Therefore, the broad face and small cheek teeth of the bears in the eastern group might be related to their food habits. However, bear diets are unstable even over a few tens of years (Ohdachi and Aoi 1987; Sato et al. 2004b, 2005a). Thus, we can not conclude that the dietary difference caused the morphological variation. The evolutionary interpretation of morphological variation in the skulls of Hokkaido brown bears should be carefully investigated.

(Satoshi D. Ohdachi, Hifumi Tsuruga)

Ecology and behavior

The Hokkaido brown bear is an omnivorous mammal that feeds primarily on vegetative materials. Herbaceous plants are the dominant food in spring and summer, whereas fruits are the dominant food in autumn (Aoi 1985; Abe et al. 1987; Ohdachi and Aoi 1987; Yamanaka and Aoi 1988). As for the consumption of other animals, insects such as ants of Formicidae and wasps of Vespidae are also consumed in summer. Previous studies reported a brown bear diet list consisting of 50 species in the Daisetsu Mountains, central Hokkaido (Itoh et al. 2001), and 75 species in Shiretoko Peninsula

(Yamanaka et al. 1985).

In the 1990s, some studies showed extensive consumption of agricultural crops in late summer (August and September) and an increase in the consumption of sika deer meat by brown bears as the result of population increase of sika deer in eastern Hokkaido (Sato et al. 2004; Sato et al. 2005a).

Brown bears eat various items in late summer, when the nutritional values of herbaceous plants decrease and fruits - their major autumn food - are still immature (Sato 2005). Bears living in a habitat where premature herbaceous plants are available eat herbaceous plants. And bears living in a habitat where spawning fish are available eat fish. In most regions in Hokkaido, however, bears feed on crops because of the shortage of alternative natural food during this season. Invasion into farmlands and crop damage are one of the major causes of control killing.

Fruits in the autumn diet are significant because the bears must store accumulated fat in preparation for hibernation. The amount of seed and fruit produced fluctuates annually in most broadleaf tree species. In years of low seed and fruit production, lacking their major food source, brown bears increased the use of crops as an alternative food source (Sato and Endo unpublished data).

Knowledge of the life history of brown bears is insufficient. Cubs are born in dens between late January and early February, grow up accompanied by their mother for the first year, and experience their first hibernation with their mother. Separation from their mother is considered to be at the age of 15-27 months (Mano and Tsubota 2002). After the separation from their mother, young males are supposed to disperse from their natal place, though there are only a few illustrative cases (Kohira et al. 2006). From observation in captive condition, the mating season of brown bears is from early April to early July (Tsubota 1998). During this season, tree-rubbing behavior is observed frequently in the wild, which is considered to have some communicative function among bears (Sato 2004; Sato et al. 2005b). From the study of harvested bears in the Oshima Peninsula, the minimum age of first parturition was 4 years, but reproductive success among females less than 6 years old was low and they were more apt to produce single offspring and lose them during their 1st year (Mano and Tsubota 2002). Mean interval between births was 2.3-3.0 years, and mean litter size was 1 for females younger than 7 years and 1.8 for females older than 7 years (maximum 3) in the Oshima Peninsula (Mano and Tsubota 2002). In the Rusha area of Shiretoko Peninsula, which is known to be one of the most food rich environments for bears in Hokkaido, the reproduction rate was estimated to be ranging from 0.709 to 0.960 cubs /

female a year (Kohira et al. 2006).

Studies on the movement of brown bears in Hokkaido were conducted from the late 1980s in Oshima Peninsula (Mano 1994; Hokkaido IES 1996, 2000, 2004), Shiretoko Peninsula (Yamanaka et al. 1995), Tomakomai region (Waseda 1999) and Urahoro region (Sato 2002; Kobayashi 2004). These studies showed that adult females had a smaller annual home range size than adult males. Females used almost the same areas for years, and their home ranges overlapped with neighboring females. Annual home range size of adult females estimated by minimum convex polygon was 10-20km² in Shiretoko Peninsula, 3-40km² in Oshima Peninsula, and 30-40km² in Urahoro region. These sizes were smaller than that reported from North America and Northern Europe. Difference in annual home range size for adult females among populations seems to reflect the differences in the amount of available food or habitat quality. A few cases reported the home range size of adult males because of the difficulty to track males for broad areas. Annual home range size of adult males estimated by minimum convex polygon was 200-450km² in Shiretoko Peninsula and 300-500km² in Tomakomai region.

There are some studies in seasonal changes in the habitat use of bears. In summer, bears in Shiretoko Peninsula used alpine habitat (Yamanaka et al. 1995), and bears in Urahoro region moved from forest habitat to agricultural farmland (Sato 2002). Studies of habitat selection by vegetation types have also been conducted (Mano 1994; Kobayashi 2004; Yokoyama 2005). In the 2000s, preliminary studies of bear movement using GPS collars were started in Oshima Peninsula and Shiretoko Peninsula (Hokkaido IES 2004; Kohira et al. 2004; Mano et al. 2005). Progress is expected in studies using GPS collars to understand bear movement.

From field observations, Hokkaido brown bears enter dens to hibernate during late November to mid December and emerge from hibernation during late March to late April. It was pointed out that females with a cub that year were later to start their movement after the emergence from their den than lone adults and subadults (Aoi 1990; Mano 1995). The start of hibernation is assumed to be delayed in years of high food availability during autumn, although no demonstrative study has been conducted (Hazumi and Mano 1995).

Brown bears hibernate in self-dug dens, in most cases dug under a tree root spread on a slope (Inukai and Kadosaki 1979; Okawa et al. 1979). There are only a few observations of brown bears using a rock cavity (Okawa et al. 1979) or a hollow tree (Oda 1989) for hibernation.

(Yoshikazu Sato)

Physiology

Although hibernation is a major physiological characteristic of the brown bear, there have been few findings on the physiological mechanism of hibernation in this species. Since reproduction is associated with hibernation, this association will be documented.

First, recrudescence of spermatogenesis occurs annually during hibernation and the reproductive potential of male bears exhibits high levels only during a limited period around the breeding season. The recrudescence of spermatogenesis occurs in February during hibernation in the brown bear (Tsubota and Kanagawa 1989). Actual active spermatogenesis was observed in testes that were obtained from wild bears killed by hunters during March - May just after awakening from hibernation. During breeding season, active spermatogenesis and high levels of androgen (testosterone) in blood was also noted (Tsubota et al. 1993).

Second, implantation time of pregnant female bears coincides approximately with the beginning of hibernation. The breeding season of the brown bear is from May to July (Tsubota et al. 1985, 1986) and fertilization occurs within the reproductive tracts of female bears just after breeding. However, the embryo that differentiates from the fertilized egg discontinues development for several months until November or December. This phenomenon is the so-called "delayed implantation" that can control the gestation period with fixed species-specific breeding season, parturition period and fetal development duration. Because unimplanted embryos were detected between September and November (Tsubota et al. 2001), the occurrence of delayed implantation has been indicated to be at least until late November in the brown bear. It has also been suspected from the results of peripheral hormone concentrations that implantation may occur in late November-early December (Tsubota et al. 1987, 1992, 1994b). Fetuses grow up for about 2 months (Tsubaki et al. 1985; Tsubota et al. 1987) and parturition occurs between mid-January and early February (Tsubota et al. 1994a).

From the previous studies, it is considered that reproductive success or failure at the process of implantation, fetal growth, parturition and nurture during hibernation should be determined by the nutritional condition of the Hokkaido brown bear. Thus, a parameter is required to know the nutritional condition before hibernation. Studies on body weight, blood profiles, fat volume within the marrow of a thighbone and fat volume surrounding the kidney have been carried out (Hokkaido Environment Science Research Center 1996), but a precise parameter has not been obtained so far.

There are several vulnerable local populations in the west Ishikari, and Teshio-Mashike region (Environment Agency 2002; Hokkaido Government 2001). In the near

future, we may try to increase the number of bears in captivity and reintroduce them into the wild for the vulnerable local populations. Hence, studies on technical establishment of artificial breeding such as semen collection and preservation (Ishikawa et al. 1998, 2002) and monitoring of estrous cycles (Ishikawa et al. 2003) are being performed on the Hokkaido brown bear.

(Toshio Tsubota)

Molecular phylogeny and genetics

The Hokkaido population of the brown bear has been classified as one subspecies *Ursus arctos yesoensis*. Recent molecular phylogenetic studies demonstrated that there are three lineages which are distributed allopatrically on the island of Hokkaido.

Matsuhashi et al. (1999) studied mitochondrial DNA (mtDNA) phylogeography of the brown bears collected through Hokkaido. Of the Hokkaido brown bears, they have identified 17 haplotypes of the mtDNA control region, and classified them into three genetically distinct lineages (named clusters A, B, and C) with high bootstrap values (more than 90%). In addition, Matsuhashi et al. (1999) found that the three mtDNA lineages were located allopatrically on the island of Hokkaido: cluster A was distributed in north-central Hokkaido, cluster B was in eastern Hokkaido, and cluster C was in southern Hokkaido. The borderlines between cluster areas were clearly located.

Cluster A consisted of nine haplotypes (HB01-09), cluster B comprised four haplotypes (HB10-13), and cluster C had four haplotypes (HB14-17). Among cluster A of north-central Hokkaido, HB01 to HB03 were dispersed in a wide area, HB04 was concentrated in the Hidaka mountains, HB05 was distributed in the Ishikari lowlands, and HB06 to HB09 were restricted to northern Hokkaido. Among cluster B of eastern Hokkaido, HB10 to HB12 were located in the Shiretoko Peninsula (registered as a World Natural Heritage in 2005) and HB13 was located in the inland of eastern Hokkaido. Among cluster C of southern Hokkaido, HB14 to HB17 were separately distributed from north to south, respectively.

Based on molecular clock of the mtDNA control region, divergence among clusters A-C was estimated to have occurred more than 0.3 million years ago, indicating that the three mtDNA lineages were divided not on the island of Hokkaido but in the Asian continent (Matsuhashi et al. 1999). Since haplotypes belonging to each cluster (A, B, or C) are located separately within that cluster area, microevolution in each cluster could have occurred after their migration from the continent to Hokkaido.

In conjunction with mtDNA sequences of brown bears from Hokkaido (Matsuhashi et al. 1999), Europe

(Taberlet and Bouvet 1994) and North America (Waits et al. 1998), Matsuhashi et al. (2001) reconstructed the phylogenetic relationships among worldwide brown bears. Consequently cluster A was close to the eastern European lineage. Interestingly cluster B was common in lineage to the eastern Alaskan group. No lineages common to cluster C have been found. The molecular phylogenetic data indicate that immigration of brown bears to Hokkaido from the continent could have occurred at least three times through landbridges which formed around the Japanese islands in Pleistocene. The first immigrant to Hokkaido could be cluster C, the second could be cluster B, and the last could be cluster A. The specific distribution pattern of three mtDNA lineages in the Hokkaido brown bear population has been established due to the dynamic migration history and their biological features such as matrilocality, hibernation, and ecological adaptation to environments. Since no fossils of the brown bear have been found from the Pleistocene layers on Hokkaido, it is still difficult to determine the precise dating of their migration to Hokkaido.

Tsuruga et al. (1996) examined protein polymorphism of 21 loci due to starch gel electrophoresis and found lack of polymorphism in the Hokkaido brown bears analyzed. In addition, Tsuruga et al. (1994) studied minisatellite DNA (DNA fingerprinting) and reported low genetic variations in local populations of the Shiretoko peninsula and the Oshima peninsula. Genetic population studies of brown bears from more extensive areas of Hokkaido are desired to further the understanding of their status for conservation and management reasons.

(Ryuichi Masuda)

Status

Present distribution

The brown bears inhabit the main island of Hokkaido and the islands of Kunashiri and Etorofu in Japan. Here on in described are brown bears on the main island of Hokkaido excluding the latter two islands which have been under administration of Russia through their illegal occupation since the end of World War II.

The area of Hokkaido, the northernmost island of Japan, is about 78,400 km². The Hokkaido Government has carried out distribution monitoring of brown bears with the periodical questionnaire on their distribution at a six to seven-year interval for the hunters, foresters, town officials, nature conservation groups, and so on (Hokkaido Government 1978, 1986; Hokkaido IES 1994, 2000, 2004b). The latest survey was done in 1997 and a supplemental survey was carried out in 2001 to

2002. Hokkaido was divided into 3,540 grids (5 km×5 km) and information on the existence of bears was gathered for each grid. Such information was obtained for a total of 2,169 grids, which accounted for 61% of the total number of grids of the island (Fig.16.1.1, Hokkaido IES 2004b).

Historic range

Before the beginning of modern development in the late 19th century, brown bears had inhabited all through out the island of Hokkaido including coastlines and lowland planes. They were eliminated from the lowland habitats occupied mainly by the temperate deciduous forest as the progress of the development of the lowland habitats and their changes into farmlands or residential areas.

Population estimation

Haga (1967) estimated the population size of brown bears in Hokkaido to be 3,000 assuming a stable population size and kill numbers. Inukai et al. (1985) noted that the estimated brown bear population size in Hokkaido was between 1,880 and 2,285. The cumulative total population size of brown bears according to hunters of each local district during the 1990s was between 1,771 and 3,628 (Hokkaido IES 2000). Scientific investigations on brown bear population estimation such as radio-tracking, capture and recapture, and hair or scat

sampling for DNA profiling have been carried out in some limited intensive study areas.

Bear kill statistics

Brown bear kill statistics has been obtained from 1873 to 1881, 1886 to 1888, 1901 to 1935, 1937, 1938, and 1945 to 2003. The average annual bear kills before 1938 and after 1945 were 315 and 413 respectively. After World War II, annual kills had been around the level of 500 until the early 1970s but declined to the level of around 200 in the late 1980s and increased again (Fig. 16.1.2).

Habitat conditions

Brown bear distribution ranges from the forested mountain range to the boundary of cultivated land or residential area. It also ranges from the sea level to an alpine zone of over 2,000 m. However, the most important factor prescribing brown bear distribution would be existence of the forest (Hokkaido IES 2004b). The present 55,800 km² forest area in Hokkaido occupying 71% of the island would be brown bear habitat; 55% (30,800 km²), 11% (6,090 km²), and 2% (980 km²) of that brown bear habitat are owned by the National Forestry Agency, the Hokkaido Government and universities respectively. Privately owned forest occupies only 26% (14,690 km²) of the all forests. Therefore, the public organizations own about three fourth of the forest in Hokkaido which is the highest percentage of all the prefectures in Japan.

Forested area in Hokkaido had declined from the beginning of modern development in the late 19th century until the 1970s but has been stable since the 1980s. Forest environment must have changed from the 1950s to the 1970s through the expansive afforestation policy; that is intensive deciduous forest cutting and increased conifer plantation. The present percentage of conifer plantation is 27% (15,200 km²) of the all forests.

The brown bear is a game species in Japan and has been killed for sports hunting and nuisance control purposes. Protected areas including wildlife protection areas, special protection areas of the national and quasi-national parks, and nature conservation areas in Hokkaido are 4,466 km², which is 5.7% of the island.

(Tsutomu Mano)

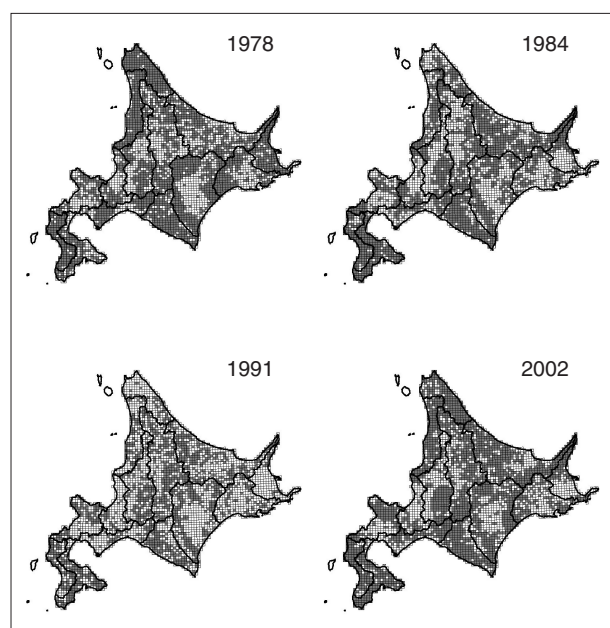


Fig.16.1.1: Brown bear distribution in Hokkaido explained by the 5×5km grids. The information was obtained through the 4-times questionnaire surveys conducted in 1978, 1984, 1991 and 1997-2002. Gray color grid shows the grid with bear existence information. Reproduction from Hokkaido-IES (2004b).

Management Issues

Bear-human conflicts

Although the incidence of bear-caused human injuries has declined since 1960s, bear-human interactions still happen occasionally. In the last two decades (1986-2005), 8 people were killed and 27 were injured by

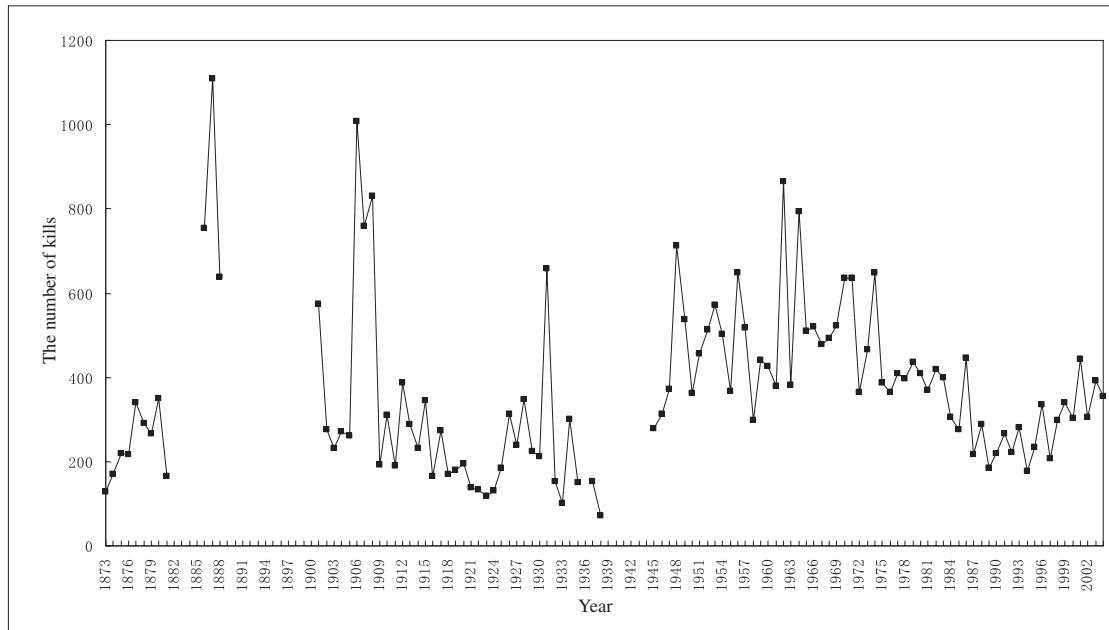


Fig.16.1.2: Brown bear kills in Hokkaido, 1873-2004.

bears. Half of them were hunters who had accidents during deer hunting or nuisance bear control. Others were people attacked when they were fishing, picking edible wild plants, or working in forestry. These incidents are mainly caused by accidental encounters with bears, which have learnt to eat human food, and bears defending their cubs or food (Hokkaido IES 2000; Herrero 1985). These incidents often affect how people feel about bears negatively and hinder the promotion of bear management. Thus it is important to educate people about bear facts in order to avoid the risk of bear damages.

As general omnivores, brown bears eat various agricultural products and damage corn, sugar beets, fruit trees, apicultures, and livestock. The amount of agricultural damage by bears is increasing gradually and has reached 100 million yen (1US\$=115 yen) in recent years. Fear of bears also causes other kinds of damage, such as stopping and delaying agricultural operations, although such damages are not included in the officially reported depredation losses. Bear-caused damage often occurs during the late summer, when the nutritional values of herbaceous plants decrease and main autumn foods (berries and nuts) are still immature. In such transition, brown bears eat various items and come down to the fields to eat matured crops (Tsuruga et al. 2002).

Another problem, which may be subject to depredation control, is roaming bears near residential areas. In Hokkaido, there are many places where residential areas and agricultural fields are located adjacent to the forests that are habitats of bears. As most people think

of bears as fierce animals, people feel latent fear and frustration from bears roaming town. When a bear appears near schools, public facilities, or residential areas, such feelings will be more exaggerated and, in the worst case, it causes panic in not only residents but also police, hunters, and mass media. There are various reasons why bears come to town: just moving to another place, eating natural foods near residential area, and being attracted by human food and garbage. Some of the potential dangers are real, but most of the cases are treated as dangerous situations without any scientific analysis of the real reason why bears come to town. Young or subadult bears just dispersed from their mothers are likely to relate to these conflicts, because they are very curious and they do not quite understand what is dangerous or not. Non-lethal measures to teach bears to avoid human and human-related areas should be conducted before implementation of lethal control actions.

(Koichi Waseda, Hufumi Tsuruga)

Public education

Public education regarding bears is necessary as an important measure to promote the conservation of bears and preventing problems between people and bears in Hokkaido. The image of brown bears continues to frighten people since the Japanese colonization of Hokkaido began in the late 19th century, and some tragic bear attacks triggered people to think of bears as fierce animals. This image still strongly remains in people's minds, and such attitudes make human-bear conflicts more difficult to resolve and often cause the unneces-

sary killings of bears.

Educational efforts have been undertaken by national parks, other governmental agencies, and nongovernmental organizations. The Brown Bear Association, composed of biologists, hunters, students, and journalists, was founded in 1978. The association has held forums on brown bears in order to educate public in various part of Hokkaido since 1989, but its activities have not been sufficient. Many of the educational activities in Hokkaido are providing information about bears through leaflets or Webpages while more proactive approaches, such as public lectures, are occasionally conducted by some NGO's. In addition, there are very little opportunities to learn about bears in school. Thus, a limited number of people, who voluntarily seek such information, have accurate knowledge of brown bears, but it is not widely disseminated in Hokkaido. Increasing the chance of accessing correct information about their behavior and ecology based on scientific research findings is the first step in enhancing public awareness. It should involve various media, including publications, brochures, TV and radio programs, and web sites. It is also important to educate people who are concerned in these media and cooperate with them. Some programs focusing on the biology and life history of bears, which bear researchers and non-governmental organizations recently produced, seem to be more effective. Though these programs are held sporadically now, it should be focused on especially children and delivered to elementary and middle school classes in the future.

More specialized information on preventing damage by bears should be provided to people who live and work near bear habitat. As agricultural damage is one of the most severe bear-related problems in Hokkaido and consequently increases demands for lethal control of bears, farmers especially should be educated about ways to protect crops and livestock. Large-scale mechanized agricultural systems make it difficult to protect their products from bears and many farmers think killing bears is the best way to defend crops. Preventive measures, such as electric fence, cleaning dense cover (such as tall grasses) around fields, and removing surplus crops entirely after harvests, should be addressed. Such education will help to increase their awareness of self-defense and diminish human-bear conflicts involving agricultural damage.

Preventing human-bear accidents is quite important in coexistence with bears, as well as preventing agricultural damage, because bear attacks subsequently increase bear mortalities and negative public attitudes towards all bears. Bear-inflicted human injuries and fatalities can be prevented if people appropriately behave in bear habitat and respond to bears when they encounter bears. It is essential for people who enjoy outdoor

activities or work in bear country, to have sufficient knowledge of avoiding bear-human incidents. Intensive education efforts are needed especially for areas where bears have become more frequently sighted recently. Detailed explanations for bear ecology and avoidance of problems should be provided to people and the contents should be adjusted to areas, seasons, and the type of activities.

As tourism is a main industry in Hokkaido, visitor education is also important. Though people consider the brown bear a symbol of Hokkaido's wilderness, it is very difficult to watch bears in the wild. However, in Shiretoko National Park, which is located at northeast end of Hokkaido and one of areas with a high density of brown bears, there are opportunities for visitors to observe brown bears. Although efforts to prevent bear-human interactions are required, the park has a great opportunity of educating many people through bear viewing programs. It will not only give chances to learn bear facts for visitors, but will also create an economic value for bears in local communities.

As described above, there are various types of bear-human conflicts in Hokkaido. Therefore, it is important to implement effective educational efforts designed for each target age group, in consideration of regional and seasonal conditions.

(Koichi Waseda, Akiko Kameyama)

Recommendations

Clarification of the responsibility for bear conservation must be the most fundamental issue in Japan. As already shown, wildlife including brown bears as considered by the Japanese legal system and the subject of who is responsible for wildlife management actions is usually ambiguous. Hunting regulations under the Wildlife Protection and Hunting Law have aimed chiefly to reduce dangers in the use of firearms or of hunting traps but have been poor from the viewpoint of sustainable hunting or biodiversity conservation. Responding to the establishment of specific wildlife management systems in accordance to the amendment of the law in 1998, the Hokkaido Government has been examining to initiate a legal brown bear management plan in 2008. Two essential issues have been recognized through examining the process:

- (1) Clarification of responsibility for bear management action, and
- (2) Practice of systematic bear damage prevention activities.

The Hokkaido bear management policies in the past have been only to issue permission for bear kills including sport hunting and nuisance control. Decisions on

the necessity for control actions and actual control actions have been ensured to persons in charge of the local government or private hunters who usually have little knowledge and experience regarding bear biology and conservation. Under such conditions, it would be difficult to introduce management options excluding immediate control kills or to guide appropriate measures for bear-caused danger and damage prevention; nothing besides bear control kills has been carried out for more than 130 years since the beginning of the modern development of Hokkaido.

It is necessary to regulate total kill numbers including sports hunting and nuisance control at a level lower than the sustainable level. However, with a lack of damage prevention programs and the leaving of the subjectivity and responsibility for bear management to private hunters, nothing but control kills would be employed as the only bear management measure in the future, which implies difficulties in regulation of total bear kills.

Thus, despite the importance and necessity of social system and structure recognized by some people, there is no prospect to embody them. Moreover, with the aging and declining population of hunters and progress of depopulation in rural areas, there is a concern that even killing problem bears could become impossible in some towns and villages within several years. The cause of the decline in hunters is due to the loss of interest in hunting by younger generations.

Agricultural crop damage caused by bears is the primary source of conflict between people and bears, and this phenomenon is characterized as the problem that should be solved for the coexistence with bears in the temperate zone. Generally, each incident of agricultural damage would be commonly caused by a specific single bear or a female with cubs, therefore people have only killed the troubled bear whenever damage occurs and have not been bothered with damage prevention. In addition, hunters who wish to satisfy their hunting instinct by control kill and the administrative agency that wishes to take the cheapest way, namely the issue of control kill permission have had a common interest in this matter. It is very regrettable that there is less social interest in brown bears now other than as a pest. This phenomenon of little social interest in necessary measures to avoid dangers and prevent damage should be changed in the future.

Thus, it is obvious that establishing a functioning bear management system to take the place of the present system owing to private hunters is urgent. In addition, appropriate measures to prevent bear-caused damage and dangers are necessary for people living next to a bear range, which should be publicized and enforced with tenacity. Although bear density has declined substantially regionally, the most forested area,

which occupies about 60% of the island, is still potentially a brown bear habitat. Consequently, this urgency and importance of the proposed brown bear management system must reach all people living in Hokkaido.

Moreover, securing talented personnel and funds for wildlife management activities in Japan, including Hokkaido, remains an unsolved issue. Provision of curricula for wildlife biology and management education of large mammals such as bears at higher education is still immature in Japan. Furthermore, interest and discussion on how governmental organizations should be involved in the management activities of the spot or population monitoring has been limited within small groups of concerned people.

Recently, with the deteriorating financial condition of the Hokkaido Government, it is becoming impossible to secure funds for wildlife conservation and management under the leadership of the government. Consideration should be given to increase the economic value of bears as a resource for tourism or sports hunting, in order to obtain funding for brown bear management and conservation.

(Tsutomu Mano)

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16.2 The Status of Asiatic Black Bears in Japan

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The Asiatic black bear is the largest mammal species in Japan outside of Hokkaido. The black bears were harvested intensively for food and medicinal resources in the past. Conflicts with humans, such as crop damage and injury to humans, are leading to increased number of bears culled over almost all their habitat except deep within mountainous areas. The effect of such kills on population viability is more serious in the eastern part of Japan. The habitat of the Asiatic black bear is also changing, and these changes influence the occurrence of conflicts with humans. Japan is now in a struggle to achieve appropriate land use by humans under depopulation, and to establish a wildlife management system with high public awareness in order to achieve the coexistence of bear and humans.

Biology

Taxonomy and morphology

The Japanese black bear (*Ursus thibetanus japonicus* Schlegel, 1857) is a subspecies of the Asiatic black bear (*Ursus thibetanus*, G. Cuvier) 1823 (Pocock 1932; Wozencraft 2005). This subspecies was originally distributed on the three main islands of the Japanese archipelago: Honshu, Shikoku and Kyushu (Fig.16.2.1). However, the Kyushu population is now recognized as extinct (Abe 2005). The distinguishing external characters of this subspecies are its small size relative to the other subspecies, and a dark colored muzzle but without prominent bushy cheek (Sclater 1862; Pocock 1932). Body length ranges from 120 to 145 cm and body weight ranges from 70 to 120 kg (Abe 2005).

Pocock (1932) reported that skulls of *U. t. japonicus* were the smallest of the seven known subspecies, and that teeth were also small. Total skull lengths reported by Pocock (1932), although within the range of lengths recently reported from Ishikawa Prefecture in central Japan (Nozaki and Mizuno 1986) and Iwate Prefecture in northern Japan (Amano et al. 2004), are near the small end of the range and appear therefore to have been taken from relatively small individuals. Additionally, the skull lengths reported in recent studies of *U. t. japonicus* (Nozaki and Mizuno 1986; Amano et al. 2004) fall within the lengths reported by Pocock (1932) for *U.*

t. formosanus from Taiwan, *U. t. gedrosianus* from western Asia, and *U. t. moupinensis* from China. These results would seem to indicate that the skull size of *U. t. japonicus* is more similar to these three subspecies than previously suspected. In order to evaluate the taxonomic status of this subspecies in greater detail, further research on variation between the Japanese subspecies and the continental subspecies based on morphology and genetic markers should be conducted.

The Japanese black bear is sexually dimorphic and males are larger than females in most skull measurements (Kadosaki et al. 1986, 1987, 1988, 1989, 1990; Nozaki and Mizuno 1986; Amano et al. 2004). Several studies have been carried out to describe patterns of skull growth and skull sexual dimorphism in this subspecies. Based on specimens from Ishikawa Prefecture in central Honshu, Nozaki and Mizuno (1986) reported that most skull measurements ceased to increase at six years of age, canine measurements ceased to increase at four years of age, and canine weight ceased to increase at five years of age in both sexes. Amano et al. (2004), in a separate study of specimens from Iwate Prefecture in northern Japan, found that most skull measurements ceased to increase at around five years of age in males and four years of age in females. By the age of one year the molar row length had reached adult size and permanent teeth fully erupted.

Amano et al. (2004) reported significant differentiation in skull morphology in Iwate, where a river basin divides bears into eastern and western populations (the Ohu Mountains and Kitakami highlands, respectively). Significant differences were found between the two populations in relative width of the skull, and in measurements of masticatory organs, especially in the length of the molar row and palatal width. Their results suggest that gene flow has been limited, despite the fact that these two populations come within 5 km of each other at the narrowest point of the river basin. Similarly, genetic divergence and morphological differentiation have been reported between bear populations on the east and west side of the Yura river basin in the Kinki district, western Japan (Saitoh et al. 2001; Amano et al. 2001). Based on these studies it may be reasonable to assume the existence of other isolated and differentiated populations of Japanese black bear in Ja-

pan. However, to determine this will require further morphological and genetic study on the entire range of known populations within Japan.

(Sayaka Shimoinaba)

Ecology and behavior

The Japanese black bear lives in environments with four distinct seasons. Although omnivorous, bears eat more vegetation than meat, and food habits vary seasonally (Hashimoto and Takatsuki 1997). In spring, bears eat herbs, young leaves and buds of trees, and if available, nuts that fell in autumn of the previous year. In summer, bears eat tree leaves, herbs, berries, invertebrates of colony-forming insects (e.g., bees, ants). Summer food habits differ among areas and time-period within the summer season (Hashimoto and Takatsuki 1997). In autumn, hard mast of beech (*Fagus crenata*) and oak (*Quercus crispula*) is the staple food in central Japan (Hashimoto and Takatsuki 1997). The importance of nuts from species within the family Fagaceae was suggested by the close association between the geographic distribution of bears and that of broad-leaved deciduous forest dominated by beech and oak (Hanai 1980).

In central Japan, large annual fluctuations in autumn nut production were reflected in large variation in bear food habits (Hashimoto et al. 2003; Mizoguchi et al. 1996). Autumn staple foods also differed between the Pacific Ocean side and the Sea of Japan side. The composition of tree species differed between the areas; oak acorns were staple food for bears on the Pacific Ocean side (Hashimoto et al. 2003), whereas beechnut was important on the Sea of Japan side (Mizoguchi et al. 1996).

Japanese black bears enter dens in winter when food is scarce. They use caves, the roots of large trees or, clefts in rocks, and rarely dig dens (Hazumi 2000). Hibernation begins in November to as late as the end of December, depending on region. Females give birth during hibernation. Parturition is thought to occur from late January to early February.

Emergence from dens tends to differ between the sexes. Female who did not give birth emerge one month earlier than females who gave birth over-winter (Hashimoto unpublished data).

Mating of captive Japanese black bear occurs from June to August (Yamamoto et al. 1998), and it is thought to be similar for wild bears. Because birth rates are positively correlated with mast production during the previous fall, it appears that reproduction is a function of nutritional status in autumn (Hashimoto 2003).

Because foods used by bears vary seasonally and annually, home range sizes also vary. Because topography of most bear habitat is steep, habitat use descriptions

are incomplete. Annual home range sizes investigated by radio telemetry were estimated as 40-100km² for males and 20-50km² for females (e.g., Hazumi and Maruyama 1986). Hashimoto (2003) reported that a female home range size expanded in summer (August), and shrank in autumn (September - November). In the Central Mountains, Izumiyama and Shiraishi (2004) reported a marked change in the elevation of home range with season.

Maita (1991) reported that activity of bears increased at early-morning twilight but this may vary seasonally and with the intensity of human activity. Bears that scavenge garbage tend to become nocturnal.

(Yukihiko Hashimoto)

Physiology

Although hibernation is a distinctive physiological characteristic of the Japanese black bear, there has been little research on the physiological mechanism of hibernation in this species. Reproduction that starts at 2-4 years old in male bears (Komatsu et al. 1994) and 4 years old in female bears (Katayama et al. 1996) is also associated with hibernation. Recrudescence of spermatogenesis occurs in March during hibernation (Komatsu et al. 1997a; Weng et al. 2006), and the reproductive potential of male bears exhibits high levels only during a limited period around the breeding season (Komatsu et al. 1996, 1997b; Okano et al. 2003).

Implantation in pregnant females coincides approximately with the beginning of hibernation. The breeding season of the Japanese black bear is from June to August (Yamamoto et al. 1998) and fertilization occurs within the reproductive tracts of female bears just after breeding. However, the embryo that differentiates from the fertilized egg discontinues development for several months until November or December. This "delayed implantation" controls the gestation period to a fixed, species-specific breeding season, parturition period, and fetal development duration. Because an unimplanted embryo was detected in August (Tsubota et al. 2001), the occurrence of delayed implantation has been shown at least until August in the Japanese black bear. From the results of peripheral hormone concentrations, it has been also suspected that implantation may occur in November-December (Sato et al. 2000a, 2001). Pregnant female bears give birth between January and February and then nurture cubs during hibernation (Sato et al. 2000b; Urashima et al. 1999, 2004).

From the previous studies, it is considered that reproductive success or failure in implantation, fetal growth, parturition, and nurture during hibernation of the Japanese black bear is determined by nutritional condition. Thus, a parameter is required to know the nutritional condition before hibernation. Studies on body weight,

thighbone marrow fat volume, and fat volume surrounding the kidney have been carried out, but a good predictor has not been obtained so far (Hashimoto and Yasutake 1999; Hazumi et al. 1985).

There are vulnerable local populations, mainly in the western regions of Japan. In the near future, we may try to increase the number of bears in captivity for the vulnerable local populations and reintroduce bears into the wild. Hence, studies on technical establishment of artificial breeding such as semen collection (Kojima et al. 2001; Okano et al. in press), semen preservation (Okano et al. 2004), and artificial insemination are being performed.

(Toshio Tsubota)

Genetic characteristics

Mitochondrial DNA (mtDNA) analysis suggest that the Asiatic black bear diverged from an ancient species of the Asiatic black bear, the American black bear, the brown bear, and the sun bear about 2 - 3.5 million years ago (Waits et al. 1999). The Asiatic black bear is thought to have come to Japan between 0.3 and 0.5 million years ago (Dobson and Kawamura 1998), and genetic structure might now diverge among local populations (Ishibashi and Saito 2004; Uchiyama 1998).

A phylo-geographical analysis using the western four populations revealed that two mtDNA lineages are separated by the Yura River. Haplotypes in the western three populations (western Chugoku, eastern Chugoku, and western northern Kinki) formed a separate clade from those in the north-eastern Kinki population (Ishibashi and Saitoh 2004). The two maternal lineages may have evolved in separate glacial refugia during the last glacial period. After this period, remnants with divergent mtDNA sequences may have expanded their distribution again from different refugia, and come into contact in the northern Kinki region. Such phylo-geographical structure may have been maintained for long time because females tend to be philopatric and to breed near their birth area.

Microsatellite DNA analysis has revealed that the three populations to the west of the Yura River had lower genetic diversities than the eastern northern Kinki population which is to the east of the river and appears to be connected with the central large population (Saitoh et al. 2001). Moreover, the genetic structures were significantly different among four populations. This low genetic variation in the western three populations might be caused by genetic drift and/or inbreeding events in the past (Ishibashi and Saitoh 2004); recent isolation may have then caused an additional decrease in diversity and increase in differentiation (Saitoh et al. 2001). Because loss of genetic diversity is associated with increased risk of extinction, it is also a concern for

other isolated populations, such as the Shimokita, Shikoku, and southern Kinki populations.

(Naoki Ohnishi)

Status

Changing habitat

Originally spread widely over Honshu, Shikoku and Kyushu, the Japanese black bear have decreased following the expansion of the human population. The decrease has been accelerated since the beginning of the twentieth century, when the human population started to increase rapidly. The black bear population declined especially after the 1950s, when rapid economic development began.

Japan has an area of 370,000 km² and a population of 120 million people; further, it suffers from having only 30% of its land available as flat space. Such limited land space was rapidly turned into farms and towns. The remaining 70% of Japan is mountainous, and has also suffered from human induced changes in the form of intensive logging done to fuel the redevelopment of the country after World War II. The mountains were quickly afforested with conifers such as cedar (*Cryptomeria japonica*), cypress (*Chamaecyparis obtusa*) and larch and as a consequence, bear habitat, which relies on natural forests, was disrupted and decreased rapidly.

At the same time, while black bear habitat was being altered, damage to agricultural and forestry products by bears also increased, which led to nuisance kill of bears. Control actions also contributed to the declining bear population. Especially in the areas of western Japan where forestry is one of the main industries, numerous box traps were deployed in the mountains in order to prevent bears from scratching the barks of trees grown for commercial use. In this way, an active kills throughout the year was ensured, aimed at the elimination of the "pest." Following such practices, the isolated bear populations in Shikoku and the Kii Peninsula decreased quickly.

Recently, things have begun to swing back the other direction. The rapid economic development in Japan has been facilitated by industrialization, and therefore people have migrated to cities, drawn by an abundance of job opportunities, leaving the mountainous areas depopulated. The level of depopulation became particularly severe after the 1990s, resulting in a massively reduced workforce and many neglected lands in agricultural and forestry villages. The number of hunters also decreased. With this background, the populations of many large mammals in Japan that survived previous eras, and crammed deep in the mountains, are now showing recovery nationwide. This also applies to the

black bear population (Japan Wildlife Research Center 2004, Fig. 16.2.1).

(Toshihiro Hazumi)

Threatened local populations in the Red Data Book (Ministry of Environment 2002)

- (1) Kyushu: The population on Kyushu Island is thought to have gone extinct during the 1940s. In 1987, a hunter on Mt. Sobo in Oita Prefecture captured a bear, although whether it was a wild bear is still questioned. There has been no confirmed reports of bear presence since 1987.
- (2) Shikoku: Shikoku is where many people traditionally engage in the forestry industry. This is also where nuisance kill using box traps was carried out during the 1970s in order to prevent bears from damaging tree bark, which led to a rapid decrease in the bear population. At present, the Shikoku Natural History Research Center is obtaining data relating to their presence. The population still remains in critical condition.
- (3) Chugoku: There are two isolated populations located 100 km away from each other, one in the western Chugoku Mountainous Area encompassing Yamaguchi, Hiroshima and Shimane Prefectures, and one in the Hyonosen Mountainous Area encompassing Tottori, Okayama and Hyogo Prefectures. However, there have been signs that continuity between these two separate populations in Chugoku may have been re-established, with increasing reports of bear

habitation in the middle area. But because the mountains in this region are close to developed areas, encounters between humans and bears are frequent, which leads to both deliberate capture for nuisance kill and accidental captures with foot snares set in the mountains intended to capture wild boars.

- (4) Kii Peninsula: The population here can be found in the steep mountainous areas encompassing Mie, Nara and Wakayama Prefectures. Active captures using box traps and accidental captures with foot snares in the past reduced the population in this region to a critically low number. Although such captures were now restricted and low in number, this population remains in critical condition.
- (5) Shimokita Peninsula: This population, the northernmost in Japan, has been isolated since early times due to human development activities in the narrow area where the Peninsula is connected with the mainland. The bears are culled without the knowledge of the population size, and the critical situation has not improved for this population.

(Toshihiro Hazumi)

Nationwide population

Due to the nature of its habitat - characterized by steep topography, dense vegetation, and heavy snowfall - and the fact that bears move widely and cover a wide area, it is difficult to obtain a density index for bears. Nevertheless, during spring (when snow remained on the ground) between the 1960s and 1980s, local authorities

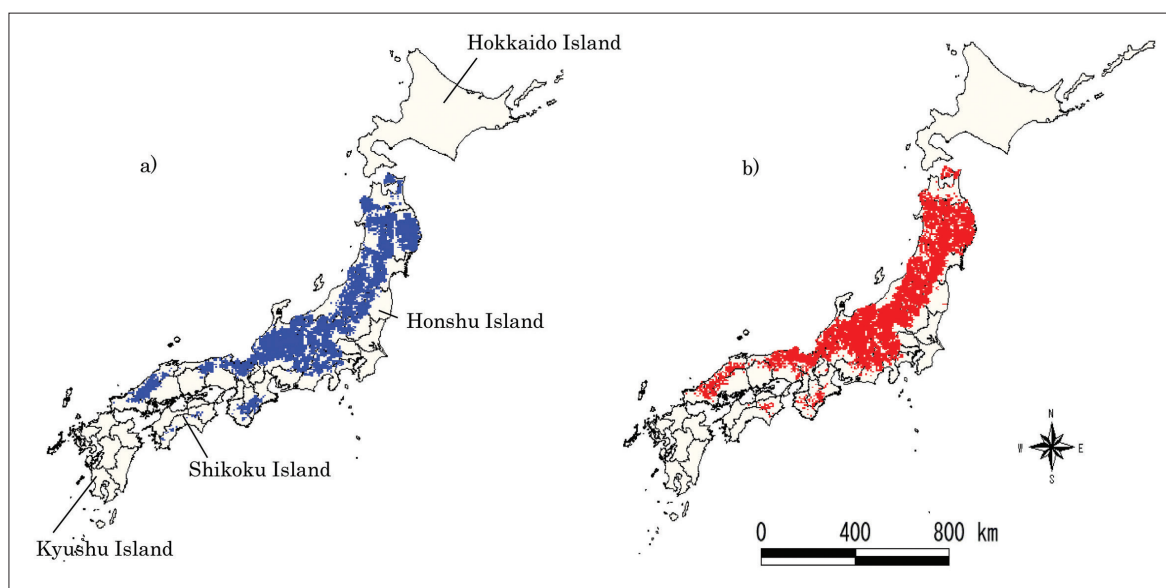


Fig.16.2.1: Distribution of the Japanese black bear in 1978 (a) and in 2003 (b). Black bear is occurred in Honshu and Shikoku Island, but may extinct from Kyushu Island for the last few decades. Each colored square represents 5×5 km mesh occupied by black bears. The data was obtained and modified from Biodiversity Information System of the Biodiversity Center of Japan, Ministry of Environment.

in Tohoku and Hokuriku areas carried out density research using sighting surveys. Based on these surveys, the Ministry of Environment estimated the black bear population nationwide to be between 8,400 and 12,600 (Japan Wildlife Research Center 2000). However, this is no longer considered an accurate estimate because of differences in methods employed by each prefecture, and the fact that it was based on data more than 25 years old. Today, the distribution of black bears is spread out across most of Honshu, with the exception of some endangered small populations. Ideally, a similar population survey should be conducted with a new and uniform design.

(Toshihiro Hazumi)

Number captured

Approximately 500 black bears are killed annually by hunters during the hunting season (15 November - 15 February) nationally. The number of bears killed as pests varies from 1,000 to 2,000 annually (from Wildlife Statistics of Ministry of Environment. Fig. 16.2.2).

The number of hunters in Japan continues to decline every year, and now falls just short of 200,000. Most of them are now older in age, and this means that there are even fewer hunters who go into the steep mountains to hunt large mammals. It is therefore unlikely that the number of kills by hunters will increase.

At the same time, there have been an increasing number of bears coming down to areas of human settlement, including agricultural areas and also towns and cities in many regions. This means that kills for pest control purposes is unlikely to decrease.

(Toshihiro Hazumi)

Conflict with humans

Conflicts between humans and the Japanese black bear can be categorized as one of two types: those resulting in injuries or death, and those causing damage to agriculture and forestry. Iwate Prefecture, located in the Tohoku region, where many injury and death causing accidents occur, is an illustrative example: damage has increased particularly since 1993 (Fig. 16.2.3). The average number of incidents for the 13 years 1980-92 was 5.0 persons; for the 13 years 1993-2005, the average was 11.4 persons.

Damage to agricultural products has also continued to increase. According to the Ministry of Agriculture, Forestry and Fisheries, the amount of damage by bears in 2003, in terms of weight, was the fourth largest, and the cost of the damage was the third largest among animal species. The amount of damage has been rapidly increasing since 1995. (Fig. 16.2.4). Damage costs are also increasing annually to three to four hundred million yen. Capture for the nuisance control using barrel traps is carried out as countermeasure from summer to fall.

In years when the reproduction of the forest food for bears is low, many bears tend to appear in human villages and damage increase. In 2004, an unusually high number of bears entered villages and other residential areas in Central and Western Japan. 94 cases of human injury (including 2 deaths) were reported, which is contrasting to the cases in 2002-03 (51 cases of human injury) (Japan Wildlife Research Center 2005). In 2005, however, both bear appearances and the number of the nuisance kills were low. For example, in Toyama Prefecture, the captured bears decreased from 121 in 2004 to

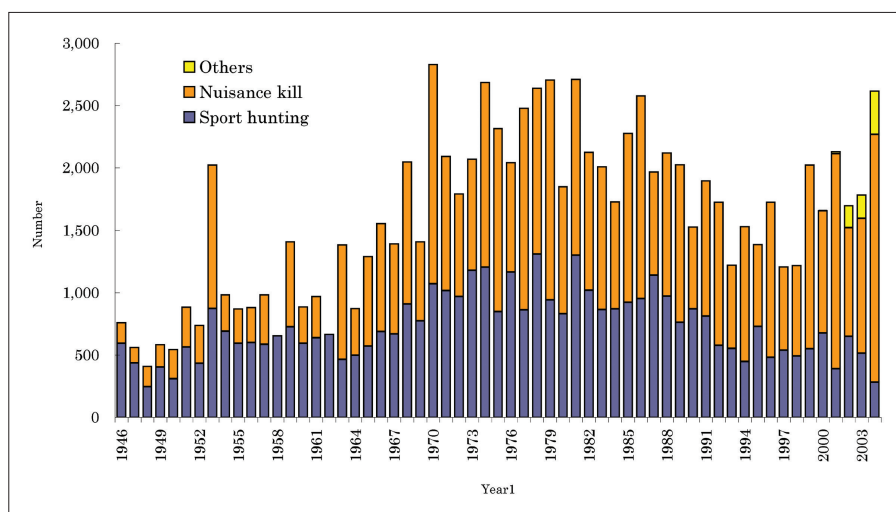


Fig.16.2.2: Annual harvest of the Japanese black bear in 1946-2004. The year runs from April 1 through March 30 of the following year, and the data of nuisance kill in 1958 and 1962 were lost. The others is harvested number by population management.

26 in 2005 (Toyama Prefecture Government). That decrease is considered to have resulted from the abundance of nuts, particularly of beeches, during the autumn, as well as the possible decrease of bears because of lots of kills in the preceding year.

Meanwhile, damage to planted trees such as cedar, continues to occur at the average level of 400-500 hectares annually (Fig. 16.2.5), and is recently expanding from to the eastern part of Japan.

Land use practices in Japan are the primary source of conflict between humans and bears. Forests occupy about 70% of the land in Japan, and farmlands; residential lands are often mixed with surrounding forests in a complicated mosaic fashion. Thus, there are many places where damage by bears can occur. In addition, the conditions of forests are changing, which might cause the change of home range use of bears and influence the occurrence of the damage by bears. Furthermore, decreasing hunting pressure resulting from the decreased hunter population and aging of Japanese society may increase the possibility of conflict. Unless these possible causes are analyzed and necessary measures are taken, conflicts between humans and bears in Japan will not diminish.

(Toshiki Aoi)

Habitat conditions

Forest conditions have been changing. Beginning with the end of World War II, Japan's government promoted artificial regeneration of lands that had been dev-

astated because of the war in an effort to increase Japan's lumber resources. Trees of considerable area of forest lands have converted into two coniferous trees: cedar and Japanese cypress. The percentage of artificial forests is now 45.2% except in Hokkaido (Forestry Agency 2005). However, the change of economy influenced forest management. Recent declines in lumber prices and Japan's self-sufficiency rate (18.5% as of 2003) have resulted in the lack of maintenance activities such as forest thinning. Consequently, many unthinned stands remain nationwide. In these unthinned man-made forests, the forest floors are not sunlit. Vine plants and undergrowth which produce food for wild animals are unavailable, making such areas poor wildlife habitat. Moreover, some forest stands have destroyed into barren land because of natural disasters such as typhoons; others might foster broad-leaved plants that have propagated as the result of the abandonment of forest management. Whichever pertains in most cases, these forests play an important role in segregating habitation areas of humans and bears. Therefore, it is necessary to assess the current state and implement appropriate forest management.

In addition, abandonment of rural mountains (Satoyama) and their surroundings may contribute to transformation of such areas into bear habitats as well as attracting bears to enter human residential areas. Recent depopulation of rural villages in Japan is becoming more serious with the increasing aging of Japanese society. Regions designated as depopulated areas account

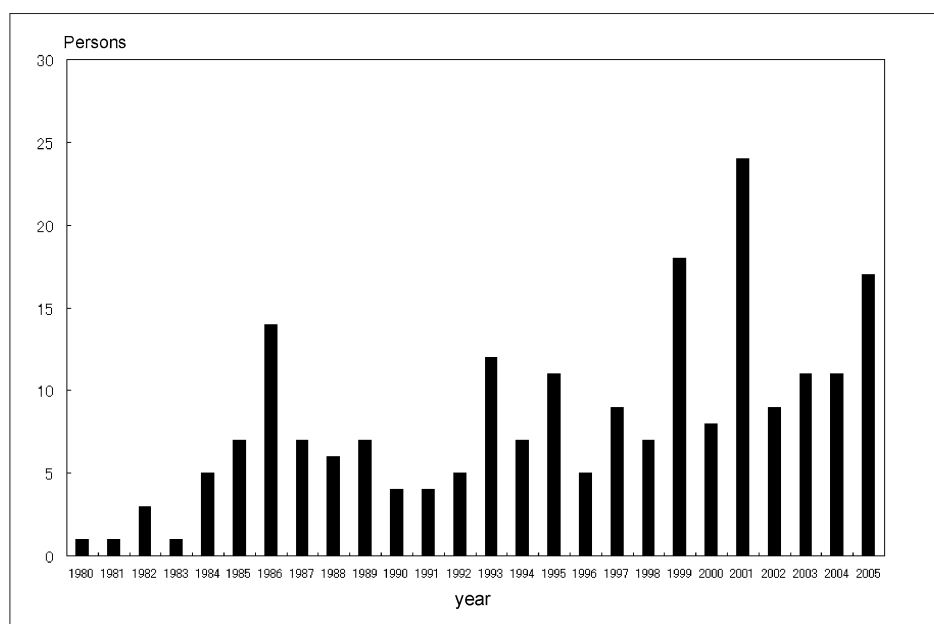


Fig.16.2.3: The number of persons injured and killed by the Japanese black bear in Iwate prefecture (Iwate Prefecture Government).

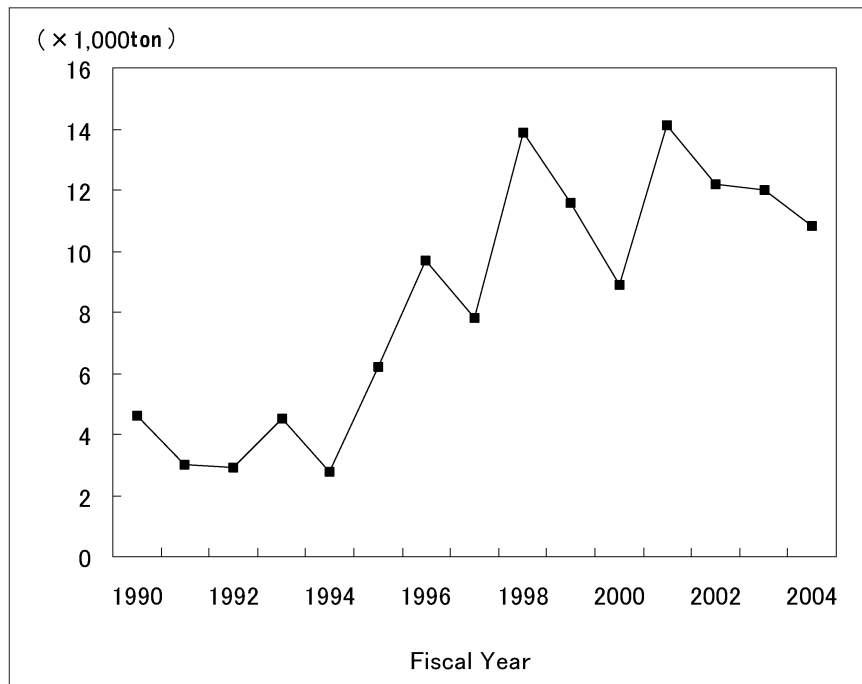


Fig.16.2.4: Annual change in the amount of nationwide agricultural products damage by bears (Ministry of Agriculture, Forestry and Fisheries 2003).

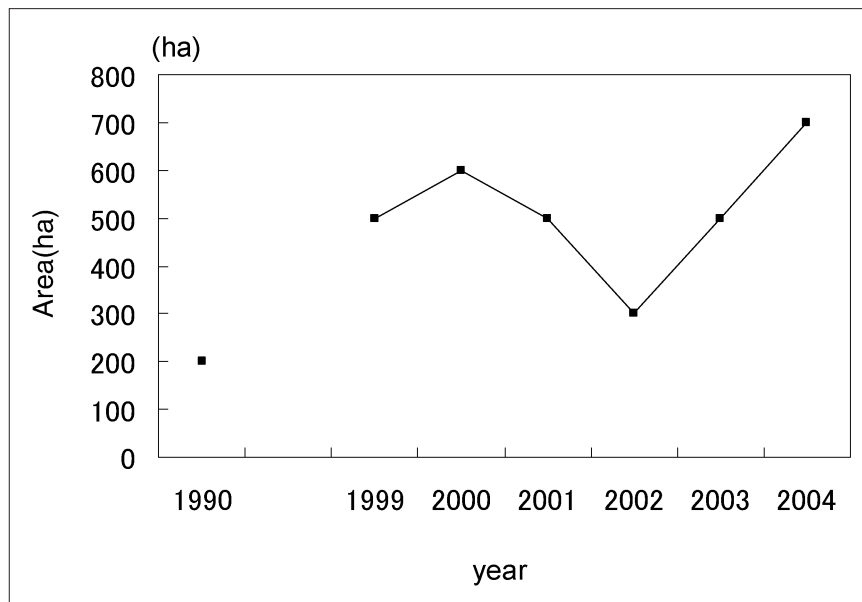


Fig.16.2.5: Affected forestry area damaged by the Japanese black bear (Forestry Agency Working Data 2005).

for 49% of national territories, but those who live in such regions account for only 5% of the population (Study Group on Depopulation 2002). In other words, rural villages, which used to be more active with more people, are now quiet with much less activity. In these

regions, people no longer use the surrounding forest mountains: the forests are reverting to their original natural forest states. In these areas, the vegetation is becoming more diversified, perhaps transforming such areas into good lands for bear habitation, with

increasingly numerous edible plants to sustain them.

Moreover, many artificial food entice bears into the human settlement and agricultural area: unharvested persimmons, chestnuts and agricultural crops, fish farms, bee farms, wasted fruits and vegetables which are unsuitable for sale.

(Toshiki Aoi)

Educational programs for the public

Educational programs for the public that deliver accurate biological information of bears is a very important adjunct to proper management programs based on scientific research data. In Japan, it is difficult to draw clear boundaries between bear habitat and developed areas for humans, because of the small spatial scale; therefore understanding and cooperation from the public toward bear management programs are vital for securing bears a future.

There are two primary targets for educational programs: local people who live in and around bear habitat, and urban people who occasionally visit bear habitat for recreational activities. Programs for school children who will become future leaders could be very effective as well. Information needed for educational programs varies depending on the targets and occasions. Regardless however, information such as the biological characteristics and status of bears, details of the bear management system, how to avoid luring bears to human settlements, and how to protect oneself from bear attacks if encountered, are needed in each area. Unfortunately it is not only urban people, but also local people who lack familiarity with mountain life and do not have adequate knowledge to co-exist with their neighbors, black bear, and are thus have an unnecessary fear of bears. In the result, they bring about needless encounters with bears.

In surveys of the general public and primary school students (Yamazaki 1993; Yamazaki unpublished data), it was noted a lack of accurate information on black bears (e.g. confusion between black bears and brown bears, over-estimation of body size, and misunderstanding of their habits). Thus most of the respondents had a negative image of bears that makes coexistence more difficult.

With this background, voluntary based educational programs have been carried out in some areas since the 1990s. Examples of workshops for the general public organized by NPOs include the Meeting for Talking about Bears (13 times since 1993) and the Meeting of the Conservation Society for Japanese Black Bears in the East Chugoku Mountain Range (5 times since

1996). Although the primary target audience is traditional bear hunters, there is another unique meeting that is even open to the general public called "Matagi Summit" (17 times since 1991). The Japan Bear Network (JBN) is a non-profit organization established in 1996 that has been holding workshops and symposiums annually for both the general public and the wildlife managers of local governments in various places. In January 2005, the JBN also held an urgent symposium due to the frequent bear appearances during the fall 2004 in western Honshu.

Those symposiums were mainly lecture style programs, but recently, outreach education programs using hands-on materials have been developing. In 2000, an educational loan program was developed that focused on coexistence with black bears in the Tokyo area. Called the Bear Trunk Kit, this program contained instructor resources such as fact sheets (Yamazaki 2001). Following this, similar programs, each adapted to the situation of its area, have been developed. In 2003, the JBN held a special event with performances using hands-on materials for zoo visitors in the Tokyo area. In 1999, the Okutama Black Bear Research Group held a special classroom with a special teacher, Linda Wiggins from the Northern Slope Grizzly Bear Project, at a primary school in Tokyo for sharing scientific knowledge about bears. With the cooperation of people from urban areas, the group and local governments also held a special event to pick unattended persimmons to avoid attracting bears to human settlements in 2002 and again in 2003. There were more than 1,000 applicants at each of the 30 capacities, suggesting that potential demand was strong. Similar programs to utilize fruits left around houses were later carried out in Hyogo, Hiroshima, and Nagano Prefectures.

Governmental organizations also conducted some educational programs. In 1994, a special exhibition regarding relations between bears and humans was held at Tateyama Museum in Toyama Prefecture. Following that, two more special exhibitions about black bears in Tokyo were presented at the Takao Museum of Natural History of Tokyo in 1997, and at Tama Zoo in 1998. However, all of the special exhibitions that were carried out in museums were by public educational organizations, not by wildlife management organizations. These museums have recently been entrusted to private sector to reduce public expenditures and thus careful monitoring is needed to assure that they are properly operated.

Presently, voluntary efforts of NPOs and individuals sustain most educational programs. In 1998, the Japanese government established an NPO foundation system, and some NPO foundations related to Japanese black bear conservation were organized, including the Japanese Black Bear Research Center, Picchio, Shinshu

Black Bear Research Group, and Shikoku Natural History Research Center. However, the financial situation of each foundation is still poor, and they have not yet employed the required number of permanent staff.

Finally, volunteer-based activities have their limitations in terms of who is responsible in case of a serious incident caused by bears. NPO foundations have benefits in that they cover for shortages in both manpower and budget of governmental organizations by using the vitality of the private sector. However, we should be reminded that for educational programs on wildlife that conflict with human interests, the involvement of governmental organizations is indispensable.

(Koji Yamazaki)

Recommendations

Every year, 1,200 to 2,600 Japanese black bears are harvested by sport hunters and killed due to being a nuisance on Honshu Island (see “Status, Number captured”). Although such high pressure has existed for many years, bears continue to appear in conflict settings. Moreover, black bear distribution has been expanding for the last 10 years (refer the status section). We thus need estimates of bear density to determine whether our management is reducing bear populations, or allowing them to increase.

In fall 2004, many Japanese black bears appeared in and around human settlements, resulting in over 2,000 bears being killed and many people being injured (Japan Wildlife Research Center 2005). These incidents helped us to realize that there were no immediate response systems for such emergency conditions. As well, we do not fully understand the causes for such appearances because we lack sufficient biological data. We also noticed there were an insufficient number of black bear biologists to record and analyze those incidents.

We should be reminded that the IUCN bear status report published in 1999 (Servheen et al. 1999) has described the status of Asiatic black bears as “highly fragmented; virtually unknown in the wild; ongoing killing of bears for parts trade; no conservation efforts”.

There are numerous subjects on securing the future of Japanese black bears, but here we suggest some ideas for improving the present bear management systems. The goal is to maintain all bear populations with genetic diversity, including isolated populations such as the Shikoku, Chugoku, Kii and Shimokita populations that are listed as endangered by the Ministry of Environment, into the future.

Establishment of an integrated information gathering system

So far, the only information available on bear management on a national scale (Honshu and Shikoku Islands) are current distribution and the approximate population estimates. The distribution information accurately indicates the present situation, but the latter lacks reliability and it seems to be an underestimate. Because accumulation of information on the range and density of population is fundamental, data gathering systems have been established independently in some areas by local governments (i.e. prefecture scale) in recent years. However nationwide data-gathering systems using standardized methods (e.g. hair sampling for more accurate population estimation) is highly desirable. For this to take place, cooperation among national and local governments, research institutes, museums, universities and NPOs is essential. Positive measures from both the Ministry of Environment and the Forestry Agency, which is are vital.

Establishment of bear management system

Establishment of integrated management units for each local bear population, beyond boundaries of local governments, is the next subject. Such management units have been suggested in the past by the Ministry of Environment, but have yet to be adequately incorporated. For example, the Specified Wildlife Conservation and Management Plan, which was enacted in 1999, has carrying out in some areas, but in most cases the plan was put into action as a local government unit, and the local bear populations were divided by the local government boundaries. Hence, cooperative work among local governments is needed. After establishing management units, preparing monitoring systems is also extremely important. Monitoring is an essential factor to give plasticity to a management plan, but it seems that little attention is paid to this in most cases. Assuming the management unit stretches over multiple local governments, allotment and responsibility of the management plan must be clarified among local governments. Once again, the Ministry of Environment must act in the role of coordinator.

Setting of management goal

Management plan goals and details should be promulgated widely. This is important to attain understanding and cooperation from the public. Population control has been widely used as a numerical goal, but recently it has been suggested that individual management (e.g. determination of nuisance of a bear and its control) also seems to be important for Japanese black bears. Range management has not been discussed to a great extent. However, the Japanese black bear distribution seems to

be expanding in recent years, and one of the reasons could be that Satoyama, a traditional agricultural area between the mountains and town (Washitani 2001), which originally divided the major bear habitat from human activity, has lost its function as a buffer zone due to the decline of these areas (Yamazaki 2004). Therefore future Satoyama management systems should be reconsidered and new-zoning plans between bears and humans must be suggested.

Lastly, in order to realizing the above objectives, we must acquire more bear biologists via the securing of funds. As of October 2006, there were only about 10 individuals (5 teachers who specialized in Japanese black bears at universities, and about 5 at universities or research institutes whose majors are not bears but who will be able to affect student training of the next generation in south of Honshu Island) specializing in Japanese black bears.

At the same time, the number of students wanting to be field biologists has been decreasing. One reason may be a change in their study objectives (e.g., preference for laboratory work), but possibly is related to instability of an offer for a job position after graduation.

Even if the students regard an ideal highly, the continuation of will is difficult unless a living income is assured. Thus, funding for bear biologists must be secured. We will have to try to secure more human resources, and this is the most influential way to improve the current management status.

(Koji Yamazaki)

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16.3 Conservation Management Laws and Systems

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The Asiatic black bear and the brown bear are considered big game animals in Japan and thus subject to the hunting regulations of the National Wildlife Protection and Hunting Law. The brown bear and the black bear hunting seasons are from October 1 until January 31 and from November 15 until February 15, respectively. Once registered, hunters can kill as many bears as they want during the season due to no bag-limit.

Hunting regulations, including registration and permits, fall under the authority of prefectural governments. No hunting is permitted within Wildlife Protection Areas, Temporary Non-Hunting Areas, Special Protection Zones within National Parks and Quasi-National Parks, and Nature Reserves. Any form of hunting is forbidden in 16 prefectures in western Japan. In the parts of Japan where hunting is permitted, only gun hunting is permitted, and the use of traps is strictly prohibited.

When deemed necessary to prevent and/or control damage caused by problem bears, the killing of bears is permitted anywhere, including protected areas. In such cases, all means of removal, including guns, box type traps and snares, are permitted. In 23 of 32 prefectures, permits to nuisance kill of brown and black bears are handled at the prefectural level. In eight of the remaining 9 prefectures, permits for black bears are handled at the municipal government level and, remaining one; at municipal levels in the specific region of the prefecture (From the document issued by Wildlife Conservation and Management Committee of the Ministry of the Environment. As of November 2005.

<http://www.env.go.jp/council/13wild/y134-02b.html>).

Applications to remove problem bears are usually submitted by mayors, agricultural cooperatives, forestry management offices, construction companies and others. A professional hunter residing in the affected municipality carries out the actual removal. In some rare cases, there are municipal offices such as that of Shari-cho (Hokkaido), in which the implementation of bear control measures are directed by a municipal official.

In Hokkaido, the use of systematic and scientific conservation management plans for brown bears targeting

the Oshima peninsula has been promoted from 2000. There have been three targets of the plan, i. e., prevention of human injuries by bears, prevention of agricultural damage by bears and guarantee of the bear population sustenance (Mano 2003). It has become clear that securing financial and social foundation must be necessary for the enforcement of required measures.

As for the Japanese black bear, conflict with humans occurs in most of the areas where bears inhabit. However, only 11 prefectures have established bear conservation and management plans. Even in the 11 prefectures which do have wildlife management plans, the upper limits of hunting quotas or nuisance kills are not always enforced.

Black and brown bears in Japan have been listed as international endangered species by the Law for Conservation of Endangered Species of Wild Fauna and Flora of Japan. Products such as furs or stuffed specimens should be registered with the government to be certified as legal materials under the law. Nevertheless, bear body parts such as gallbladders or paws were excluded for registration.

Under the national Wildlife Protection and Hunting Law, in order to possess processed bear pelts and trophies, they must first be registered with the appropriate government agency. No such registration requirement exists for possession of the gall bladder or other bear parts. This has led to inconsistencies between existing national and international laws. It is vital that these inconsistencies be addressed to improve conservation and management of the Japanese bears. (Please refer also to the “bear-parts trades” in the following section.)

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16.4 Bear Gall Bladder Use and Trade in Japan

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In Japan, bear parts including gall bladders, meat, fat and fur are utilized. However, of these parts only the gall bladders are of significant economic value, with all the other parts considered to be of little value. Bear gall bladder is known as *kuma-no-i* or *yutan* in Japanese and is used as a medicine. It is considered to be effective for treating analgesic, stomachic, cardiogenic, anti-phlogistic and other conditions, and some reports also note its effectiveness in treating hepatitis. Tauroursodeoxycholic acid (TUDCA) is an active ingredient of bear gall bladder.

Japan has substantial wild populations of two bear species -the Asiatic black bear (*Ursus thibetanus*), distributed in Honshu and Shikoku, and the brown bear (*Ursus arctos*) in Hokkaido. The living conditions of these bears differ markedly according to region, and while neither species is considered to be threatened with extinction nationally, some isolated populations are in danger of extinction (Ministry of the Environment 2002). Japan appears to be unique in being a country where bear populations are currently being maintained even while bear gall bladder is in widespread use. However, it is possible that the use of bear gall bladder in Japan is stimulating the illegal harvesting of bears and trade in bear parts, and that excessive harvesting may have negative effects on wild bear species both in Japan and elsewhere.

Between 1994 and 1998, the investigations were carried out into 13 suspicious cases of bear poaching, and in five of these cases prosecutions were brought about (Ishihara 2005). Between 1995 and 2004, a total of 647 cases of bear gall bladder importing in violation of CITES were discovered, with many of them involving pharmaceutical manufacturers. In connection with these cases, a total of 14,537 bear gall bladders were seized by Japanese Customs (Ishihara 2005). However, the actual condition is unknown.

A history of bear gall bladder use

Knowledge of the effects and methods of the use of bear gall bladder was originally brought to Japan from China, and it is thought that the practice began some time during the Asuka Period (542-646). Together with other forms of animal-derived medicines such as musk,

bear gall bladder is believed to have been used secretly as a medicine by members of the aristocracy in the Nara and Heian Periods (710-1185) (Uji 1991). During the Nara Period (710-794), it is recorded that bear gall bladder was supplied from Etchu (Toyama Prefecture) as a special product under the tax system of the time (Kamata 1996). Also, according to the Engishiki, a collection of books on ceremonial regulations completed in 927, from the tenth century onwards bear gall bladder was supplied as tribute from Mino (Gifu Prefecture), Etchu (Toyama Prefecture) and Shinano (Nagano Prefecture) (Murakami 2002).

The use of bear gall bladder spread among the common people during the Edo Period (1603-1868), mainly as a result of its prescription as a patent medicine. Around the middle of the 17th century, in Morioka Han (Iwate Prefecture) and Hirosaki Han (Aomori Prefecture), the price of a bear gall bladder paid to hunters was officially set at 20% of the price of the fur. In the middle of the 19th century, by which time the price of bear gall bladder had risen considerably, the authorities in Hirosaki Han, Morioka Han, Akita Han (Akita Prefecture) and Hachinohe Han (Aomori Prefecture) were purchasing this item directly from the hunters. The purchasing price differed greatly from one han to another, with the price paid by Akita Han being particularly high. It is believed that the han authorities paid special attention to the selling of bear gall bladder or bile as a drug.

At that time, the average price of a bear gall bladder weighing 10 momme (approx. 37.5g) was 9 ryo 2 bu, an amount sufficient to purchase roughly 990kg of rice at the time, but there are records of prices rising as high as 33 ryo in 1867 (Murakami 2002).

After the middle of the Edo Period, Toyama, a home base of medicine peddlers, began to import bear gall bladder as a medicine from Osaka's Doshomachi, which was well known as a center for pharmaceutical merchants (Nishikawa 1974; Matsui personal communication to TRAFFIC East Asia-Japan, June 2006).

The Ainu, who were the indigenous people of Hokkaido, regarded bear gall bladder and fat taken from the brown bear as essential medicines. After the Ainu were brought under the control of the mainland Japanese, whenever a brown bear was harvested, officials of the Matsumae Han (Hokkaido) would impound the fur and

the gall bladder. Thus leaving only the meat for the Ainu, the fur was used for battle surcoats of military commanders, and bear gall bladder was transferred to mainland Japan. At the time, when the name of the island of Ezo was changed to Hokkaido in 1869, brown bear gall bladder was still considered a precious raw material for making medicines. It was told that Japanese and Chinese medicine makers rushed across the sea to obtain this product (Suzuki 1991).

The bear gall bladder use situation today

At present in Japan, bear gall bladders obtained from domestically harvested bears and imported bear gall bladders are used in the form of dried bear gall bladders as well as in the form of crystallized and powdered bile, and as a component of manufactured medicines.

Bear gall bladder obtained from the bodies of harvested bears is primarily used for personal consumption or sold to pharmacies or traditional Chinese medicine (TCM) dealers. The average number of bears killed annually in Japan for sport and nuisance animal control over the past five years is 2,212. In 2004, a total of 2,623 Asiatic black and brown bears were hunted, making it the highest annual number during the past 15 years (Ministry of Environment 2006). It is unknown how the gall bladder from a harvested bear is handled because the current system makes no obligation to report such details.

According to the CITES annual report compiled by the Japanese government, legal imports of bear gall bladder into Japan during the period 1993-2003 comprised only of items taken from American black bears (*Ursus americanus*) originating in Canada and from brown bears originating in Russia. The annual amount imported varied widely over this period, with the peak year being 1996, when 2,355kg were imported. In 2004, the latest year for which figures are available, Japan imported a total of 5.7kg of bear gall bladder originating from Canada or Russia (Ministry of Economy, Trade and Industry 1988-2003). These imported products were mainly used in ordinary prescription medicines.

The regulations governing the trade in bear gall bladder in Japan differ in the cases of the import/export trade and the domestic trade. Since 1992, when all species of the bear family were brought under CITES regulations, international trade in all bear derivatives including items described as bear bile on packages has become subject to regulation. International commercial trade in derivatives from the brown bear (except for the populations in Bhutan, China, Mexico and Mongolia),

The American black bear and polar bear (*Ursus maritimus*), which are listed on Appendix II of CITES, is allowed with close monitoring and regulation. Apart from these species, all bears are listed on Appendix I of CITES, meaning that in principal the international trade in the species and their derivatives is prohibited. On the other hand, in domestic trade, species listed on Appendix I of CITES are regulated under the Species Preservation Law. However, in the cases of the Asiatic black bear, which is listed on Appendix I, and the brown bear, which is listed on Appendix II, the domestic trade in bear gall bladder is excluded from the regulations for the following reasons. Firstly, these species are not hunted animals in danger of being driven to extinction throughout their ranges in Japan. And secondly, identifying a particular species of bear from the shape of the gall bladder is difficult.

According to surveys carried out by TRAFFIC in 1994 and 1997, the amount of bear gall bladder traded by TCM retailers and pharmaceutical companies was declining, and the possibility of obtaining bear gall bladder on the market was also in actual decline. On the other hand, pharmaceutical companies responded to a 1998 questionnaire survey by the Japan Wildlife Research Center by stating that, "bear gall bladder is an irreplaceable drug." Moreover, 11.9% of members of the general public who were subjected to the same survey replied that they had obtained bear gall bladder as a commercially available drug. From the above results, it is anticipated that the demand for bear gall bladder as a drug will be maintained in the future, although it has been declining slightly in recent years.

Future tasks

At present, there are no regulations concerning the handling of bear gall bladder obtained from bears harvested in Japan, and information concerning the trade has not been consolidated. Even when bear gall bladder is smuggled into the country from abroad or taken from bears poached in Japan for sale, it is extremely difficult to establish its illegality. Moreover, it is impossible to accurately estimate the influence that the harvesting of and trade in bear gall bladder, including its illegal component, has on the living conditions of wild bears both in Japan and overseas. Accordingly, in order to eliminate the illegal harvesting of bears and the trade in bear gall bladder both in Japan and overseas, it is necessary to study the mechanism of bear gall bladder trade management in Japan.

Moreover, the utilization of bear gall bladder is an important aspect of the relationship between bears and people. Thus, in clarifying the actual situation surround-

ing the bear gall bladder trade in Japan and considering the management of this trade, it is important to preserve bears both in Japan and overseas, as well as to attempt to realize coexistence between bears and people.

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16.5 The People Worship Bears and Then Hunt Bears

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It is well known that the Ainu people have a ceremony called “Iomante” which is performed to send a bear’s soul back to “Kamui-moshir” (heaven or the spirit world), which is believed to exist in the east. They hold the ceremony to send elemental gods a message telling of how warmly the bear was tended to by people of the earthly world (“Ainu-moshir” on earth). They offer many gifts, “inau”, on the bear spirit. The process of sending the bear’s soul is seen as a communication between the gods (Kamui-moshir) and people (Ainu-moshir).

These processes are commonly found in hunter-gatherer communities within regions from northern Eurasia to North America. Many studies have shown that the processes are generally divided into two types. One of them is a ceremony performed when people hunt a bear, called “Opunire” form (means “sending off” or sending a spirit home), and found widely in the regions from northern Eurasia and North America. It is also seen among the Matagi, professional hunters who use traditional methods and inhabit the Tohoku Region, the northern section of Honshu, Japan’s largest island.

Another form is “Omante” form, a ceremony performed when people sacrifice a bear cub which they have captured and specifically raised for the ceremony for several years. This type of ceremony is found in several tribes such as Ul’chi, Orochi, and Orok (Uilta) in the lower basin of Amur River, Nivkh (formally called Gilyak) in Sakhalin, and the Ainu in Hokkaido Island.

When the Ainu capture a bear cub, they also hunt the mother bear and hold a sending ceremony for the hunted bear. A sending ceremony for a raised bear cub (Omante) is associated with the ceremony for the hunted bear (Opunire). The omante is recognized as a form evolved from opunire. However, the omante form is found only in a part of the region from the lower basin of Amur River to Hokkaido, which overlaps with a fur trading zone during the Qing Dynasty of China. Valuing bears as a sparse resource, the omante form is considered to have been influenced by and fused with the culture of fur trade and livestock farming, which then it spread throughout the region. The form originated in the Okhotsk culture developed in the eastern part of Hokkaido from the sixth to the seventh centuries. By the eighteenth century, it grew into the large-scale ceremony as we know today (Hallowell 1926;

Васильев 1948; Obayashi 1991).

These procedures of sending wildlife spirits back are important for hunting as well as hunting skills since people on the islands of Japan believe that the land of spirits (elemental gods) place equal value on wildlife and humans. This illustrates the belief that humans are animals and animals are humans, based on “La Pensee Sauvage (Wild Thought)” which underlies the values of the people in this region.

The Matagis, traditional hunters, perform the “Opunire” form ceremony after they hunt a bear although not all members of the community participate in it. The “Kebokai” ceremonies are still practiced in the Ani area of Akita Prefecture. Kebokai is a process in which the hunters send “Yama-no-kami” (the mountain deities), who influence the mountains and forest, a message in order to report their harvesting of a bear, a valuable resource, and ask for leave to utilize it. This process is conducted by a “Shikari”. Matsuji Suzuki (1920-2005), who was a “Shikari” in the Utto village in the Ani area, carried out the ceremony in the following manner. After the Matagis hunt a bear, they take it to their village, after which they select a host among hunting members of the day. When disassembling the bear in the yard of the host, they first place the bear with its head pointed northward and then skin it. Next, the process of “Kebokai” begins. They hold the head part of the skin pointed southward (the tail is pointed the opposite direction) and the “Shikari” says a prayer. In this prayer, they pledge to continue hunting in the proper way following the law of the forest and ask for the lasting harvest of bears to the mountain deities. After the “Kebokai,” all members of the village, without distinction of age or sex, are allowed to have the flesh of the hunted bear (Taguchi 1994).

Like the Ainu, the Matagis collectively and individually have the spirit common to people in the northern regions; however, they heavily depend on agriculture such as paddy or slash and burn agriculture. There are many semi-agricultural and semi-hunting (making a living in primary agriculture and other multiple works such as hunting, fishing, logging, making charcoal, or woodworking) groups and individuals in the mountain-ringed region of eastern Japan. Their hunting has served as a deterrent to crop-damaging wildlife. They have generally engaged in agriculture but have occasionally

hunted wildlife for subsistence and monetary resources. Relationships between people and wildlife in the Japanese archipelago are closely linked to the reclamation and cultivation process of lands in the region.

After the Meiji period, the Japanese have had the tendency to hold their historical perspective as one based on rice cropping and also to treat the lifestyle of the peoples in the mountain-ringed area as special cases. However, recent studies have shown that it was taboo in Japan to eat the meat of livestock used for agricultural works, but not the meat of wildlife. The Ainu and the Matagi can be called “people who worship bears and then hunt bears” (Taguchi 2006). It is necessary for us to study them in more detail by considering the processes of their social and historical development on the islands of Japan as well as to learn the way of sustainable use of natural resources from them. This will provide us with many indications for dealing with wildlife

management issues of the decreasing population, abandonment of villages, and declining pressure of human use on the surrounding nature.

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Glossaries

Balochi: The language of the Baloch people in Baluchistan province in Pakistan. It is also spoken in some parts of Sindh province and in the southern parts of Punjab neighboring Baluchistan.

Balti: The language spoken by the Balti people who live in Baltistan in the northern areas of Pakistan. The language is a sub-dialect of Ladakhi and an archaic dialect of the Tibetan language.

bear baiting: A medieval sport that sets pit bullterriers against bears. This sport, once widespread in Europe, is now found only in rural Pakistan. Under presidential order, bear baiting has been strictly prohibited by law in Pakistan since 2001.

bear balm: A balm or ointment which contains adipose extracted from the boiled bear parts.

bear dancing: A street performance in South Asia featuring bears trained to dance.

Bhojpuri: A language spoken in the state of Uttar Pradesh, northern part of India.

birth rate: The number of offspring produced in a population per a defined period of time, generally expressed as the number of new-born offspring per individual in the population.

Boolean logic: A complete system for logical operations which is an algebraic representation of relationships (and, or, not and x or) in one of two states: true or false.

Bunun: One of the major indigenous ethnic groups of Taiwan. They make their home in mountainous regions, and their traditional lifestyle is hunting, gathering and slash-burn agriculture.

Chakmas: The largest tribe in Bangladesh. This Mongoloid group originated from a marriage of Arkanese and Bengali living in the Kassalong and Karnafuli valleys.

Chitrali: The language of the Chitrali people who live in the North-West Frontier Province of Pakistan. There are various sub-languages and dialects within the Chitrali language, but most people speak Khowar, which is the dominate Chitrali language.

camera-trapping (camera trapping): A non-invasive technique that uses infrared sensors to trigger cameras whenever a living creature crosses in front of the “camera traps”. This technique is an important tool for the study of the illusive wildlife population, and is often used to estimate the wildlife population density by mark-recapture models.

cluster: One group of individuals or species which is phylogenetically similar to others shown in the phylogenetic tree.

commercial hunting: Hunting for economic or material gain.

Community reserve: A reserve which is maintained in cooperation with the local communities for wildlife conservation in India. This is as per the recently amended (2003) Indian Wildlife (Protection) Act, 1972.

control kill in Japan: Intentionally killing wildlife to prevent damage to human life, agriculture, forests, fisheries or the ecosystem. In general, the head of a local government or organization requests permission for a depredation control kill from a prefectural or local governmental authority and then asks private hunters to carry out it.

control region: The control region of mitochondrial DNA, also called the “D-loop region”. The molecular size of the control region of mammals is about 1,000 base-pairs. Because this region does not encode any amino acids, the variation in the control region is higher than that of the other gene regions within mitochondrial DNA.

Convention on International Trade in Endangered Species of Wild Fauna (CITES): An international agreement among governments, drafted at a meeting of members of the World Conservation Union (IUCN) in 1963. Its aim is to ensure that international trade in wild animals and plants does not threaten their survival.

Dafla: The former name of the Nishi, an indigenous tribe of Arunachal Pradesh in India.

Dipterocarp forest: Forests on dry land in Southeast Asia growing from sea level up to 900 m asl., dominated mainly by trees from the Dipterocarpaceae family.

DNA: Deoxyribonucleic acid; the primary genetic material in the nucleus and mitochondria of each cell; genetic information is coded by nucleotides with four bases (adenine, guanine, cytosine and thymine).

DNA finger printing: One molecular technological method for detecting individual variations of unit numbers or lengths of repetitious nucleotide sequences, using one unit of the repetitious sequence as a probe.

ecoregion: A large area of land or water that contains a geographically distinct assemblage of natural communities that share a large majority of their species and ecological dynamics, share similar environmental conditions, and interact ecologically in ways that are critical for their long-term survival.

El Niño: A warming of the ocean surface off the western coast of South America occurring every 3 to 12 years. In parts of Indonesia and Malaysia, El Niño creates severe droughts, with human-induced fires causing severe damage to forests.

endemic species: Species which are restricted to a particular locality.

Firinghi: A tribal people in Bangladesh. Little is known about them.

Garos: A tribal people in Bangladesh, Dravidian origin, admixture of proto Australoid and Mongoloid people who lived in the Susang and Khasia hills, Sylhet, Chittagong.

Gypsy (Romany): A member or a race of people who travel as traditional way of life. Their origin is thought to be Asia, but is still being debated.

haplotype: One nucleotide sequence or one set of genes inherited as a group.

hibernation: “Winter denning” or “winter sleep.” Bears hibernate in a den. Hibernating animals lower their entire metabolism, respiration rate and heart rate, and exhibit a small range of body temperature decrease and ease of awakening. Other characteristics of hibernation are the absence of food and liquid intake, and no defecation or urination. Hibernation is regarded as the adaptation to the lack of food during winter.

Hindi: A language spoken in many states in the northern part of India.

Kachin: One of ethnic groups that live in the northern part of the Union of Myanmar.

Kashmiri: One of the Indo-Aryan languages spoken by the Kashmiri people who live in Azad Jammu and Kashmir of Pakistan and in Indian Kashmir.

La Pensee Sauvage: A thought that animals are humans wearing fur, which implies there is no difference between the internal and spiritual parts of the two even though they are different in appearance. This thought is distinct from the idea that animals and humans belong to different frameworks, commonly seen among hunter-gatherer societies, described in “*La Pensee Sauvage (Wild Thought)*” written by Levi Strauss, a French anthropologist.

limestone forest: Forest growing in limestone areas.

Lisu: One of the ethnic groups that live in the northern part of the Union of Myanmar.

Malayalam: A language spoken in the state of Kerala in the southern part of India.

Marathi: A language spoken in the state of Maharashtra in India.

megaherbivore: A large animal species, such as elephants, hippos and rhinos, that consume plant matter.

microsatellite DNA: This region comprises many repeats of a few bases (eg. GTGTGTGT) on genomic DNA. Since mutation rate is high and this region does not code adaptability, many variations are maintained in a population. Microsatellite DNA analysis is the way to compare the number of repeats.

mitochondrial DNA (mtDNA): Double stranded-circular DNA molecules which are located in the mitochondria of cells and maternally inherited. One mitochondrion has several molecules of mtDNA. The molecular size of mammalian mitochondrial DNA is about 16,000 base-pairs. The evolutionary rate of mitochondrial DNA is about 10-fold faster than that of nuclear DNA.

mitochondria: A cell organelle which plays an important role in respiration and energy-releasing reactions in living cells.

Mogh: A tribe living in Chittagong that subsists on hill cultivation.

molar row: The row of the larger teeth at the back in the mouth used for crushing and grinding food in the case of bears.

Naga: One of the ethnic groups that live in northern part of the Union of Myanmar.

Nishi: An indigenous tribe of Arunachal Pradesh in India.

open forest: Natural forests, usually in the dry zone lowlands of Sri Lanka. Also referred to as dry evergreen, semi-deciduous, or monsoon forest.

palatal width: The greatest width of the palatine bones that form the roof of the mouth.

Pleistocene: The age between 1.7 million and one thousand years ago.

Protected area network: A composite area comprising national parks, nature reserves, sanctuaries and forest corridors in Sri Lanka. Hunting is prohibited, but restrictions on human access and activities vary according to the type of protected area.

Punjabi: The language spoken in the Punjab area of Pakistan and India. It is the official language of Indian Punjab. In Pakistan it is spoken by almost 60% of the population.

Rawang: One of the ethnic groups that live in northern part of the Union of Myanmar.

Reduced Impact Logging: A method of tree harvesting with minimal residual damage and degradation of the forest site through the use of pre-harvesting, harvesting and post-harvesting planning and design. It provides an alternative investment option for achieving sustainable forest management goals for tropical forests.

Satellite telemetry system: A system to detect the position of animals using satellites as receivers of radio signals emitted by transmitters attached to animals. The ARGOS system is commonly used for this purpose.

Shikari: A leader of traditional hunter in northern Ja-

pan. Shikari is considered to have a shamanistic power.
sexual dimorphism: Remarkable sexual differences in the morphology of animals.

sports hunting in Japan: Defined by the Wildlife Protection and Hunting Law (article 2) as “the capturing of game animals by the legal hunting methods”. Hunters must register with the prefectural government of the prefecture in which they wish to hunt. Hunters can hunt all game animals once registered, and there is no upper limit to the hunt total during the hunting season.

subsistence hunting: Hunting practiced by local people to provide food for themselves or their family for survival.

Telugu: A language spoken in the state of Andhra Pradesh in India.

umbrella species: The species of large habitat areas with requirements such as positioning as high ranking consumers in the food chain. By protecting umbrella species, various kinds of other species inhabiting the habitat of the umbrella species can survive.

unowned material: Japanese legal term. Japanese civil law states that real estate without an owner belongs to the National Treasury while the ownership of personal estate owned by nobody belongs to the previous owner. Wildlife is regarded as movable property owned by nobody, but become personal estate after capture.

Urdu: One of the international languages spoken by more than 500 million people around the world, especially in the Indian sub continent. It has its origin mainly from the Arabic, Turkish, Persian languages and also from Hindi.

Yama-no-kami: Japanese elemental gods including the god of the forest, fire, water, and others.

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