

The Status, Distribution and Conservation of the Tiger *Panthera tigris* in Bhutan

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ABSTRACT

The tiger Panthera tigris is the top carnivore in Bhutan, where it occurs from the foothills of the Himalayas at an altitude of 200 m in the south to over 3000 m in the north. It has a wide distribution and its range includes savannah grasslands, sub-tropical and temperate forests. It feeds on a variety of prey species ranging in size from the barking deer Muntiacus muntjak to the gaur Bos gaurus. Attacks on domestic yak are not uncommon and are the cause of conflict with herdsmen, who treat the tiger as vermin and eliminate it using poison. There are estimated to be between 150 and 250 tigers in Bhutan. In prime habitats, as in the Royal Manas National Park, the tiger can exist at a density of 4.5 100 km⁻². As with other large predators, the basis for conservation must be a separation of human settlements and wildlife reserves. Given this background, the emphasis must be to maintain forest cover over large areas where remoteness, difficulty of terrain and density of cover provide natural protection. Not all small populations are necessarily doomed. The overall prospects for the tiger appear good in Bhutan provided deforestation is carefully controlled. In order to succeed, protection of conservation areas should be accompanied by measures to improve the living standards of the people.

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INTRODUCTION

The tiger *Panthera tigris* is the largest carnivore in Bhutan. The wide geographical distribution (Fig. 1) even within Bhutan underlines its versatility and ability to adapt to a variety of environmental conditions. Its only requirements for survival appear to be some form of vegetative cover, water supply and adequate prey (Schaller, 1967). In Bhutan, it is largely nocturnal and elusive. While these characters are of survival value and therefore to be welcomed by the conservationist, they also make it difficult to study scientifically. There has so far been no attempt at serious research on the species in Bhutan, where much of what is known of its ecology has been derived from incidental observations by naturalists and herdsmen living near tiger habitats. The present account is an attempt to collate the information which is available, given the need to know its current distribution if measures aimed at its conservation in Bhutan are to be appropriate and effective.

STUDY AREA

The Kingdom of Bhutan lies in the Eastern Himalayas between longitudes 88° 45' and 92° 10' E and latitudes 26° 40' and 28° 15' N. With an area of 46 600 km², Bhutan is comparable to Switzerland both in size and topography. Given its altitudinal range of 200–7500 m from south to north, it has an ecological diversity paralleled in few other countries. The unusual richness and diversity of its fauna and flora are due to the fact that Bhutan lies in an area where two of the world's major zoogeographical realms, the Palaearctic and the Oriental, meet (Blower, 1986). Several rivers such as the Torsa, Mo (Sankosh), Pho and Manas originate in the Himalayas and flow southward to disgorge eventually into the Brahmaputra river in India. The climate is variable, being hot and humid in the south and alpine in the north. The western part of Bhutan receives the highest mean annual rainfall of 3954 mm (Sargent, 1985). The human population was estimated to be 1.2 million in 1982, giving an average overall density of 25 km⁻². However, the productive land covers only about 19 000 km², and the 'true' population density there may be as high as 50–60 km⁻² (Fisher, 1976).

METHODS

Much of the information on the numbers and distribution of the tiger was collected in surveys carried out in Bhutan in 1988. Two kinds of survey were

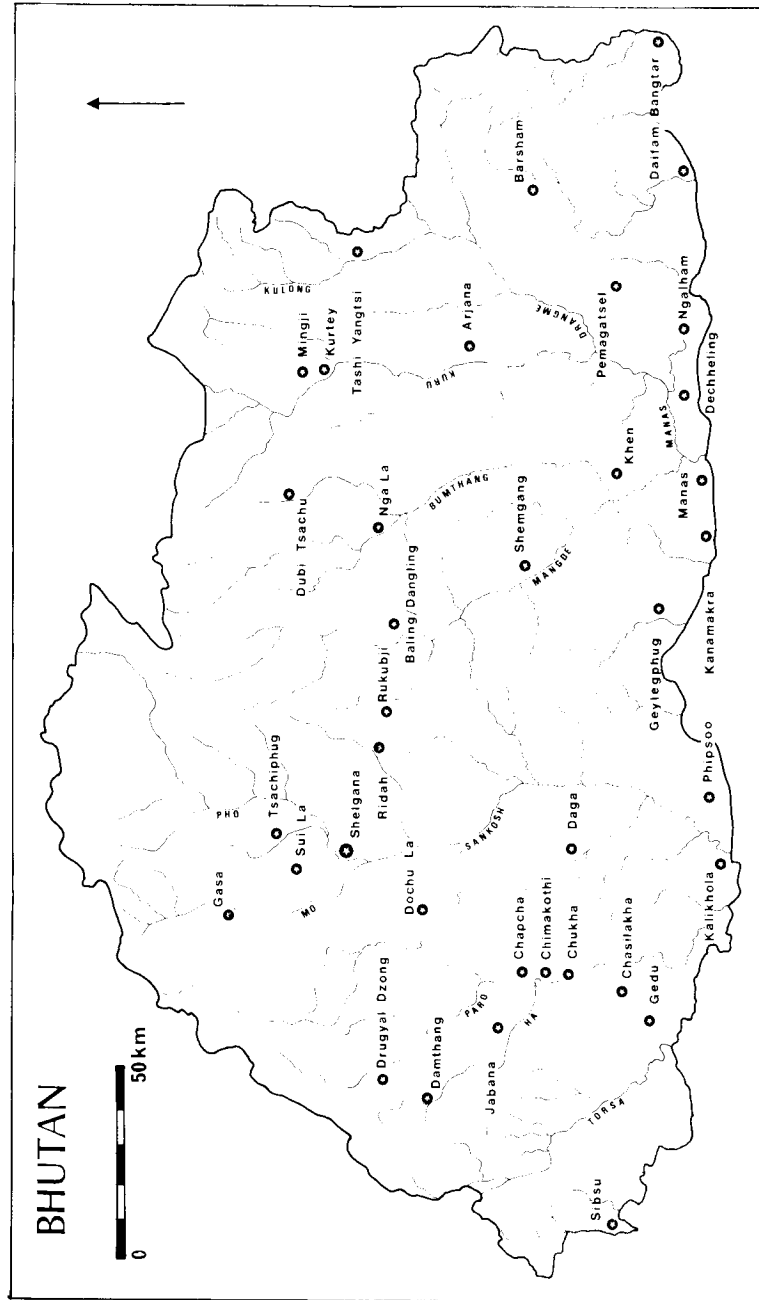


Fig. 1. Map of the Royal Kingdom of Bhutan showing the distribution of the tiger *Panthera tigris* based on the survey carried out in 1988.

conducted: on a country-wide scale, by visiting the areas and interviewing local people in June 1988, and more intensively in the Royal Manas National Park in March 1988 by studying the spoor along transects. Food habits of the tiger were determined from the observation of carcasses and scats found in the study area (Manas) and from interviewing trackers, game guards and livestock herdsman. Prey remains were identified from the hair and hoof fragments.

RESULTS AND DISCUSSION

Distribution

Tigers occur from altitudes of over 3000 m in the north to 200 m in the Himalayan foothills in the south along the border with India (Fig. 1). Of the 18 Dzongkhags (Districts) in Bhutan, it is known from all but the Chirang Dzongkhag. According to some herdsman and trackers, there appear to be some altitudinal differences in the tigers: those in the higher elevations have a larger head, shorter body and longer tail compared to those that occur in the lowlands. This might be an indication of local adaptation to meet the demands of a harsher terrain in the high altitude habitats. In the central belt, which ranges in altitude between 2000 and 3500 m, the tiger has been reliably reported in the gallery forests bordering the rivers Torsa, Ha, Paro, Mo, Mangde, Kuru, Bumthang and Manas. In the south, the tiger is reported from a number of protected areas such as the Royal Manas National Park (which includes the Namgyal Wangchuk Wildlife Sanctuary), Phipsoo Reserved Forest and Neoli Wildlife Sanctuary (Blower, 1986). It also occurs in the Khaling Reserved Forest in the extreme south-east of the country. Its stronghold appears to be the central belt between Mo river in the west and Kulong river in the east. Given the considerable extent of areas where the tiger may in fact be present but not yet searched for, it could be maintained that its conservation status is not threatened.

Habitat

The habitat of the tiger ranges from the sub-tropical forests and savannah grasslands in the south along the border with India to temperate forests at 3000 m and above. There is abundant food at all levels and in a variety of habitats. The animal thrives in several stages of vegetational succession which can support a higher ungulate biomass than climax vegetation. In Eastern Bhutan, large areas of forest have been destroyed by slash and burn agriculture (Sargent, 1985), which are utilized in the long periods of fallow by a variety of wildlife including the tiger. Lowland forests with their rich ungulate prey are the optimal habitat of the tiger in Bhutan.

Food habits

Tigers range over large areas and need medium-sized or large herbivores as prey (Ashby & Santiapillai, 1987). It is catholic in its diet, feeding on a variety of prey species in Bhutan, for example, barking deer *Muntiacus muntjak*, wild pig *Sus scrofa*, hog deer *Axis porcinus*, sambar *Cervus unicolor*, and even gaur *Bos gaurus* and buffalo *Bubalus bubalis* at lower altitudes. One carcass of an adult bull gaur killed by a tiger was found in Manas near a dry river bed. The tiger fed on the hind quarters and left the rest of the carcass intact.

At higher altitudes, the tiger preys on animals such as the serow *Capricornis sumatraensis*, the takin *Budorcas taxicolor* and other mountain ungulates. Takin usually inhabit the dense bamboo forests at altitudes of 1500 to 3000 m (Prater, 1965) and ascend to even higher altitudes in summer. The tiger is known to follow the movement of the takin herds. At higher altitudes, it also sometimes preys on the domestic yak, which is one of the causes of conflict with the herdsmen.

Tiger numbers and density

Estimating tiger numbers in the dense and tangled vegetation of the tropical rainforest habitats is difficult. The results of the interviews indicate the presence of about 150 tigers in Bhutan (Table 1). However, given the fact that the tiger can inhabit an area without betraying its presence, this is a minimum estimate. In Nepal, which is very much similar to Bhutan in topography, climate and vegetation, adult tiger densities can reach 6–7 individuals 100 km^{-2} in prime habitats, and 1–2 100 km^{-2} in less optimum areas (McDougal, 1977; Smith, 1978; Sunquist, 1981). In the 658 km^2 Royal Manas National Park in Bhutan, about 30 tigers are known to be present (Tobgey Dukpa, pers. comm.), giving a density of $4.5 \text{ } 100 \text{ km}^{-2}$. This value compares favourably with the estimated tiger density of $4.3 \text{ } 100 \text{ km}^{-2}$ (Karanth, 1987) in the adjoining Manas Tiger Reserve in India. However, not all the areas in Bhutan are prime tiger habitat—the total area given conservation status is 9505 km^2 (Blower, 1986). The existing conservation areas in Bhutan, assuming their stability remains assured, would protect no more than about 250 tigers at an average density of one tiger 40 km^{-2} .

CONSERVATION AIMS AND PROSPECTS

Given the need for large home range and abundant prey species, the tiger cannot be maintained at high density even in the most favourable habitat (Santiapillai & Widodo, 1985). Many of the protected areas in Bhutan can only support about 20–30 tigers. Such small populations are more

TABLE 1
Number of Tigers *Panthera tigris* in Bhutan (based on the tiger count carried out in 1988 by Dasho Paljor Dorji)

<i>Locality</i>	<i>District (Dzongkhag)</i>	<i>Minimum number</i>
Shelgana	Punakha	2
Tsachiphug		3 ^a
Sui La		1
Gasa		3
Ridah	Wangdiphodrang	2
Rukubji		1
Baling/Dangling	Tongsa	3
Nga La	Bumthang	2
Dubi Tsachu		3
Dochu La	Thimphu	1
Drugyal Dzong	Paro	1
Jabana		2
Chapcha	Chhukha	1
Chukha		1
Chimakothi		1
Chasilakha		1
Gedu		1
Damthang	Ha	2 ^a
Sibusu	Samchi	5 ^b
Phipsoo	Geylegphug	7
Manas		30 ^b
Kalikhola		2
Kana Makra		4
Gaylegphug		4 ^b
Daga	Daga	6
Pemagatsel	Pemagatsel	20
Barsham	Tashigang	3
Tashi Yangtshi		5 ^b
Shemgang	Shemgang	3
Khen		4
Arjana	Mongar	5
Kurtey	Lhuntshi	2
Mingji		3
Daifam/Bangtar	Samdrup Jongkhar	10 ^b
Ngalham		5
Dechheling		2
Total (minimum)		151

^a Presence of an adult female and cub.

^b These animals are shared with India.

vulnerable than larger ones to random changes (such as marked fluctuations in sex ratio), inbreeding depression and local catastrophic events (Bertram, 1986). These problems can to some extent be minimised if the protected areas can be linked to one another through the establishment of forest corridors in order to facilitate genetic exchange. If the objective is to maintain as many tigers as possible in as wide an area as is feasible, proper measures must be taken now to minimise tiger depredations on domestic yak and cattle. Some loss of livestock is inevitable if this stock grazes inside a big predator's range, and farmers almost without exception grossly exaggerate the economic effects that any such loss may cause.

Tiger attacks on domestic yak have brought the animal in direct conflict with the herdsmen, who are still known to poison marauding animals despite a decree by the Royal Government. This has banned villagers from using poison to kill tigers in Bhutan for the last 13 years. This is due largely to the fact that herdsmen have not been compensated for their losses—the main cause of resentment. In addition, any plan for conservation must take into account the high vulnerability of a large predator to poisoning and direct hunting. Hoogerwerf (1970) attributed the extinction of the Javan tiger *Panthera tigris sondaica* following the fragmentation of its habitat primarily to the use of poison.

Trade in tiger skins is highly profitable but poaching is not yet a major conservation problem in Bhutan. The Buddhist aversion to killing has meant that there is little direct pressure on wild animals (Sargent, 1985).

The conservation policy must maintain forest cover over large areas uninterrupted by human settlements and roads, where remoteness, difficulty of terrain and density of cover provide natural protection. Even quite small local populations are valuable and these should be protected wherever practicable and not abandoned simply for genetic reasons (Schaller, 1986; Ashby & Santiapillai, 1987). It would be a mistake to rely on the species being safe in perpetuity in one or two large reserves only—smaller reserves also have a vital role.

There is an urgent need for surveys to be done to determine the whereabouts of viable populations of tiger, particularly in the remaining unfragmented forests in the Black mountains. As Blower (1986) recommends, the tiger should be listed among the species to be designated as Royal Game 'which could only be hunted or captured with the permission of the King and illegal killing of which would incur especially severe penalties'.

The main threats to the tiger in the future would arise not merely from the demands of the growing human population for the resources of the land but also through the legitimate aspirations of the Bhutanese for an improved standard of living. As Myers (1975) points out, 'aspirations to the enhanced standards of living often cause greater pressure on undisturbed natural

environments than sheer growth of human numbers'. Already in the highlands large tracts of forest have been burnt and cleared to provide additional grazing for the yak herds (Sargent, 1985).

All the current efforts to conserve the tiger, whether in the wild or in captivity, are unlikely to succeed if they do not have the support of the local people. The herdsmen must believe that conservation measures are being taken in their long-term interests. Protection of conservation areas should be accompanied by measures that would improve the living standards of the people without further disrupting the environment (Schaller *et al.*, 1987). Land-use patterns in areas adjacent to the wildlife reserves inhabited by tiger must be designed in such a way as to make them compatible with tiger conservation and thus minimise the human-wildlife conflicts as much as possible.

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