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First sighting of a sloth bear in a decade in Shuklaphanta National Park, Nepal

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Abstract: Sloth bears (*Melursus ursinus*) are listed as Vulnerable on the International Union for Conservation of Nature (IUCN) Red List of threatened species with a global population estimate of <17,000 individuals. In southwestern Nepal, Shuklaphanta National Park includes the largest uninterrupted expanse of grassland in the region and provides suitable habitat for sloth bears. No records of sloth bears from Shuklaphanta National Park, however, have been reported since 2013. We present the first photographic evidence of a sloth bear in Shuklaphanta National Park in a decade. In addition, we observed a Bengal tiger (*Panthera tigris tigris*) at the same location as the sloth bear 5 days later. These observations highlight the need for further research into the occurrence and movements of sloth bears in this region as well as the extent of co-occupancy and types of interactions between sloth bears and tigers.

Key words: Bengal tiger, camera traps, coexistence, *Melursus ursinus*, Nepal, *Panthera tigris tigris*,

Among 8 species of bear found globally, the sloth bear (*Melursus ursinus*) is endemic to the Indian subcontinent (Servheen 1990). Sloth bears inhabit a variety of vegetation communities including dry and moist forests, savannahs, scrublands, and grasslands (Dharaiya et al. 2020). Historically, sloth bears occurred across large regions of India, Bangladesh, and Sri Lanka, as well as the southern lowlands of Nepal and possibly Bhutan. Currently, the species is considered extirpated from Bangladesh (Islam et al. 2013) and Bhutan (Dharaiya et al. 2020). The primary causes of sloth bear declines are habitat loss and degradation, human–bear conflict, and poaching for gall bladders. Sloth bears are now listed as Vulnerable on the International Union for Conservation of Nature (IUCN) Red List of threatened species across their global range (Dharaiya et al. 2020).

Globally, the estimated population size of sloth bears is <17,000 (Jnawali et al. 2011). In Nepal, there are estimated to be <1,000 individuals and possibly as few as 250–500 adults (Jnawali et al. 2011). Until the 1950s, sloth bears occurred across the Terai and Siwalik Hill regions of southern Nepal (Garshelis et al. 1999). Since the mid-1980s, sloth bears have been considered extirpated from Shuklaphanta National Park (ShNP; Yadav et al. 2016), which is the largest uninterrupted grassland in Nepal (Dhimi et al. 2023). An image of a sloth bear, however, was taken in ShNP during the National Tiger survey in 2013 (Yadav et al. 2016). Despite continued and extensive research efforts focused on monitoring tigers and their prey over the past decade, no additional sightings of sloth bears have been reported in the park. In this paper, we present the first photographic evidence of a sloth bear in ShNP after a decade, which occurred during a research project focused on hog deer (*Axis porcinus*) in March of 2023.

Study area

The study was carried out in Shuklaphanta National Park (Latitude 28°45'47"–29°02'52"N and Longitude 80°05'45"–80°21'43"E), located in the southern part of Kanchanpur district, Nepal (Fig. 1). The Park spans 305 km² and was originally established in 1976 as

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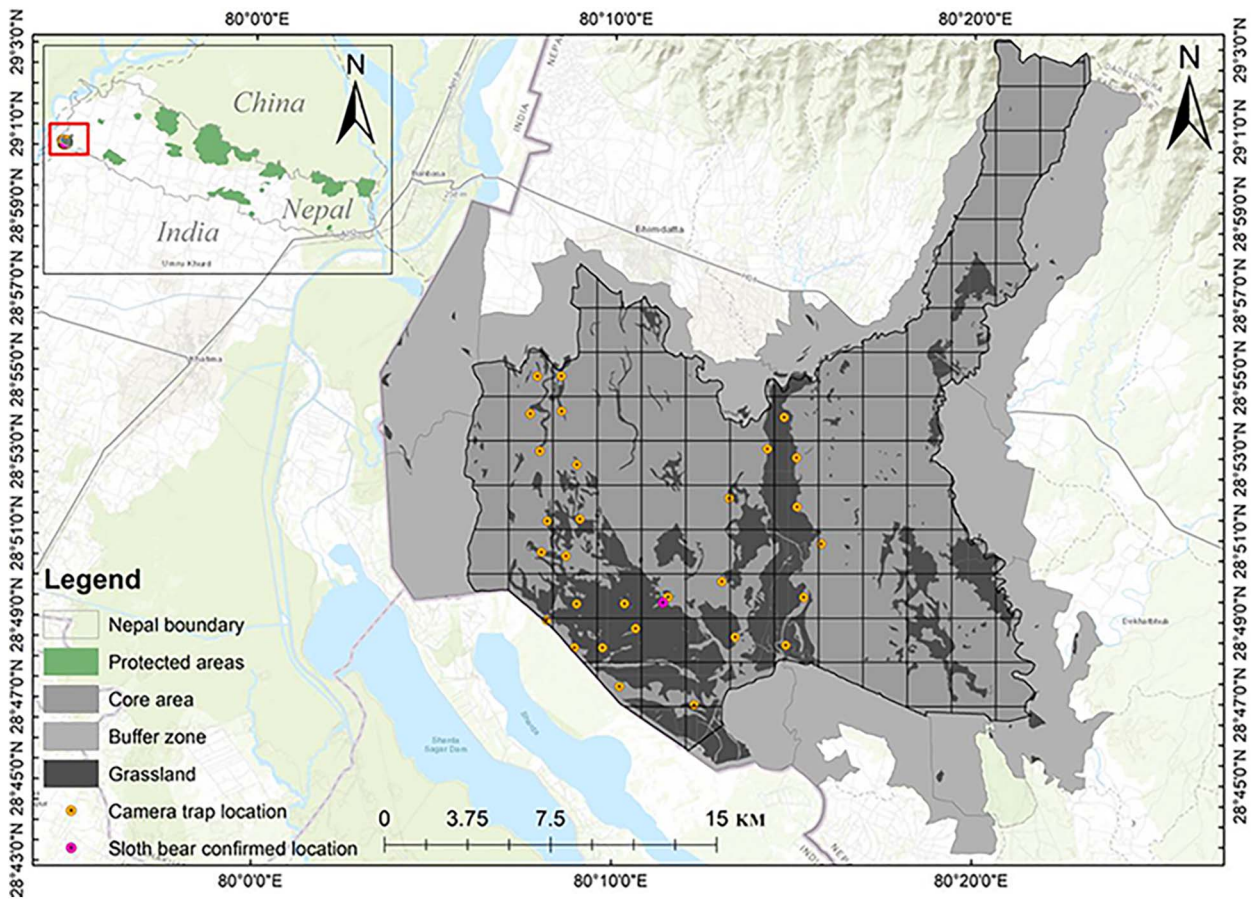


Fig. 1. Map of Shuklaphanta National Park, Nepal, showing the locations of 30 camera traps (orange dots) within 2×2 -km grid cells monitored between March and April 2023. The location of the sloth bear (*Melursus ursinus*) detection is illustrated by the pink dot. The inset shows the location of Shuklaphanta National Park in southwestern Nepal.

Shuklaphanta Wildlife Reserve with the goal of conserving Nepal's largest herd of swamp deer (*Rucervus duvaucelii*). In 2004, a buffer zone was delineated around the park, adding an area of 243.5 km² to the existing protected area. The Park gained national park status in 2017. Shuklaphanta National Park has an altitude ranging from 175 to 1,300 m above sea level and a tropical monsoon climate with 3 seasons. The major vegetation community types within the park include forest, grassland, wetland, and cultivated lands. Approximately 60% of the park area is covered by Sal forest (*Shorea robusta*; Rawat et al. 2020, Sadadev et al. 2021). Wildlife that inhabit the park include diverse ungulate species, such as swamp deer, spotted deer (*A. axis*), barking deer (*Muntiacus muntjak*), sambar deer (*Rusa unicolor*), and apex predators including

Bengal tigers (*Panthera tigris tigris*) and leopards (*P. pardus*).

Methods

We set up 30 motion-triggered camera traps (Browning Trail Cameras, Birmingham, Alabama, USA) in grid cells of 2×2 km at a height of 45 cm from the ground to target detections of hog deer. The cameras were deployed for 30 days from 12 March to 13 April 2023. We monitored each camera every 10 days to check the batteries and remove images. Research ethics approval was not required to accomplish the objectives of this study because data were collected using remote, passive camera traps.

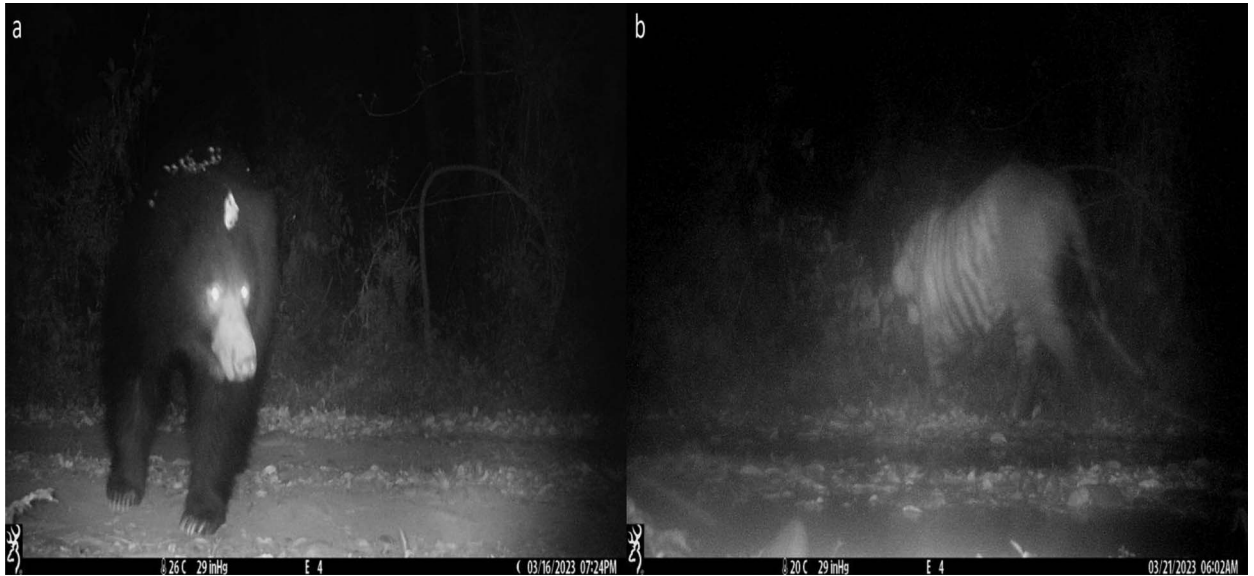


Fig. 2. (a) Sloth bear (*Melursus ursinus*) captured using a remote camera on 16 March 2023 at 1924 hours; and (b) a Bengal tiger (*Panthera tigris tigris*) captured on 21 March 2023 at 0602 hours at the same location in Shuklaphanta National Park, Nepal.

Results

We recorded 7 photos of a solitary sloth bear moving across the field of view at a single camera trap on 16 March 2023 at 1924 hours. The camera was located along a walking trail in the core area of the ShNP, about 6 km from the nearest human settlement and along a corridor connected to the Pilibhit Tiger Reserve in Uttar Pradesh, India, to the south. The animal was identified as a sloth bear based on the long snout and long, sloth-like claws (Fig. 2a). The camera trap was located at the entrance of Shuklaphanta Grassland along the east–west forest road to the Shuklaphanta Range Post (28°49′24.41″N, 80°11′23.83″E) at an altitude of 165 m above sea level. At the same location, we recorded 13 images of a Bengal tiger 5 days later, on 21 March 2023 at 0602 hours (Fig. 2b). These detections could indicate that the area provides a corridor for both species to enter the Shuklaphanta grassland from mixed forest habitat where *Syzygium cumini*, *Acacia catechu*, and *Mallotus philippensis* are the major tree species.

Discussion

Our detection of a sloth bear provides the first record of this species in over a decade in ShNP. The sloth bear is an elusive and vulnerable mammal, and this finding highlights the importance of further research into the

occurrence and movements of sloth bears in the region. Sloth bears disappeared from Shuklaphanta National Park during the 1980s, possibly as a result of poaching for gall bladders (Garshelis et al. 1999) combined with the expansion of human settlements and agriculture (Jnawali et al. 2011, Amin et al. 2018). On 8 March 2013, the observation of a single individual during spring provided hope that the bears might recolonize the Park; however, no observation of the species has been made since then (Yadav et al. 2016).

Our observation from 2023 may indicate the presence of sloth bears in ShNP, but at densities so low that they remain undetected. This possibility, however, is unlikely because of regular monitoring programs within ShNP for species including tiger, one horned rhinoceros (*Rhinoceros unicornis*), and swamp deer. An alternative explanation is that the sloth bear we detected in ShNP was passing through ShNP from the nearby Pilibhit Tiger Reserve in Uttar Pradesh, India, where a population of sloth bears exists (Sathyakumar et al. 2012). The minimum straight-line distance between the Tiger Reserve and ShNP is only 30 km. Food may have attracted the bear to ShNP; sloth bears are opportunistic feeders, and their diet can vary depending on the season and food availability (Joshi et al. 1997, Sukhadiya et al. 2013). In ShNP, flowering plants, fruit, and insects, which are a major part of the sloth bear's diet, are readily available in spring when the image

was captured (Joshi et al. 1997, Sukhadiya et al. 2013, Dharaiya et al. 2020). Further studies are needed to confirm whether sloth bears could be current residents of ShNP or whether the bear we observed was moving through the Park at the time of detection.

A survey of sloth bear presence in different seasons would initially be helpful in determining whether the bears inhabit ShNP year-round or whether the park provides a corridor for seasonal migration and/or dispersing individuals from Nepal's Siwalik hills region to India's counterpart reserve. Larger scale studies of sloth bear movement patterns in India and Nepal will also be instrumental to identify movement patterns and corridors among habitats. Further, the vegetation communities of ShNP (including Sal forest and grasslands) are similar to other protected areas in the Terai region where sloth bears still occur. The frequent detection of termite mounds in the park, which are a preferred food of sloth bears (Yadav et al. 2016), suggests that ShNP should be able to support a population of sloth bears. Therefore, translocation programs initiated by the Nepalese government and conservation partners could help with the establishment or augmentation of sloth bears within the park.

Management implications

The sloth bear we detected in ShNP might be a seasonal migrant or disperser from the nearby protected areas and national forests near the Indo–Nepal border. In these areas, sloth bears often occupy the same habitat as tigers, suggesting that the two species co-occur across at least part of their ranges. Further research is essential to characterize the extent of co-occupancy and types of interactions between these two species. In addition, conservation activities focused on sloth bears could simultaneously promote the conservation of tigers, and vice versa, if both species co-occur in ShNP.

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