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Cover: Mixed media with fine liners, colour pencils, and watercolour background of an Indian funnel web spider. © Elakshi Mahika Molur.

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COMMUNICATION

Indian Leopard predation on the sub-adult Himalayan Griffon Vulture (Accipitridae: Accipitriformes)

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Abstract: This study documents instances of predation on Himalayan Griffon Vulture *Gyps himalayensis* by Indian Leopards *Panthera pardus fusca* Meyer, 1794 near the pre-release aviary of the Buxa Vulture Conservation Breeding Centre within the Buxa Tiger Reserve. Camera trap monitoring revealed leopard predation on sub-adult vultures, highlighting a previously unreported threat to vulture populations. The adaptability of leopards to diverse ecosystems, coupled with their varied diet, underscores the need for further research to understand the implications of leopard predation on vulture conservation efforts. This documentation provides insights into the prey-predator interactions and emphasizes the importance of continued monitoring and conservation measures to safeguard vulnerable vulture populations.

Keywords: Buxa Tiger Reserve, camera trap, *Gyps himalayensis,* leopard food, *Panthera pardus fusca,* post-release monitoring, vultures, vulture predation, wildlife conservation, wintering grounds.

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Author contributions: SSC—conceptualization, methodology, investigation, writing- original draft. DR—project administration, writing – review and editing. AS—project administration, writing - review and editing. PJH—project administration, writing – review and editing. NKJ—writing, literature review and editing. RG—investigation and data collection.

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INTRODUCTION

Vultures are nature's most efficient scavengers. They occupy a crucial ecological niche that helps in maintaining a healthy and natural environment. They play useful role in the ecosystem by efficiently disposing of carcasses. Once very common, vultures are on the verge of extinction in Indian subcontinent. Populations of three species of vultures, viz., the Oriental White-rumped, the Long-billed, and the Slender-billed, have declined drastically between the mid 1990s and the mid-2000s (Prakash et al. 2003, 2007; Pain et al. 2008).

The Vulture Conservation Breeding Centre at Rajabhatkhawa is an initiative of the West Bengal Forest Department, with the goal of saving three *Gyps* species of vultures, namely the Oriental White-rumped Vulture *Gyps bengalensis*, Long-billed Vulture *Gyps indicus*, and the Slender-billed Vulture *Gyps tenuirostris*, from looming extinction. This centre also works as a rescue and rehabilitation centre for vultures for the entire West Bengal state. Since the establishment of the centre, a total of 95 Himalayan Griffon Vultures have been rescued, 80 individuals successfully rehabilitated and subsequently released back into their natural habitat. The present documentation of leopard predation on Himalayan Griffon is the byproduct of intense monitoring of the habitat and behaviour of wild vultures in the study area by the centre. The Himalayan Griffon Vulture *Gyps himalayensis* is considered a resident of the mountains of central Asia, the Himalaya, southern and eastern Tibet, and China. Post breeding, the adults remain, for most of the year, in the breeding grounds while juveniles migrate to the plains of south and southeast Asia in winter (Naoroji 2006; Rasmussen & Anderton 2012). These migrating Himalayan Griffons frequently visit the pre-release aviary site of the Buxa Vulture Conservation Breeding Centre where captive bred vultures from the conservation breeding centre are kept for acclimatization before release into the wild. Visit of Himalayan Griffon at the site and close interaction with the captive-bred vultures indicate the social behaviour of the vulture and success of the conservation breeding and reintroduction programme.

Study area

The observed predation on vulture by leopard has been documented near pre-release aviary, on the bank of the Bala River near 22nd Mile anti-poaching camp, (26.6178N & 89.5612E) of the Buxa Vulture Conservation Breeding Centre located within the Buxa Tiger Reserve. The Tiger Reserve is located in the northeastern corner of West Bengal and covers an area of 760.87 km^2. The northern boundary of the reserve borders Bhutan while the eastern side borders Assam. The western and southern boundaries are bordered by tea gardens and agricultural fields (Figure 1). Biogeographically, the tiger reserve lies in two major zones: the central Himalaya and Gangetic Plains. The elevation of the reserve ranges 60–1,750 m. The forest type is primarily tropical moist deciduous dominated by Sal *Shorea robusta*. The temperature ranges 10–32 °C; and the average annual rainfall is about 4,100 mm.

MATERIALS AND METHODS

The first captive-bred vulture was released into wild as part of reintroduction in the year 2020. Since then, 31 captive-bred White-rumped Vultures along with 45 rescued Himalayan Griffons have been released using the soft release methodology. In this method, the birds earmarked for release are kept in pre-release aviary for acclimatization and socialization followed by opening the gate of pre-release aviary in presence of wild vultures. This method was initially developed and applied in France in 1980s (Terrasse & Choisy 2007). It was found in earlier studies that soft release protocols tend to have a positive outcome and are 40% more successful than hard release protocol in conservation translocation (Resende et al. 2021). In addition, animals remain at or near the release site during initial period in wild which increase the chance of conservation translocation success by 77%.

Following the methodology described by Terrasse et al. (2004), food was frequently provided at feeding sites located just outside the pre-release aviary. Besides, carcass of wild animals that died naturally inside the tiger reserve were also provided after necessary medical checks for disease. This attracted wild vultures near the pre-release aviary and also supported released vultures during initial days. The site is closely monitored through trap-camera. Trap-camera photographs are downloaded twice a week and analysed to document various activities and behaviour of the released and wild vultures. Professional color model 1347 of Cuddeback Digital motion sensor cameras were used to collect photographs. A research team remain stationed day and night at a nearby camp to observe and understand behaviour of vultures including feeding time and pattern, preference of body parts and interaction with wild birds. The intense monitoring also included other scavengers feeding on the carcass.

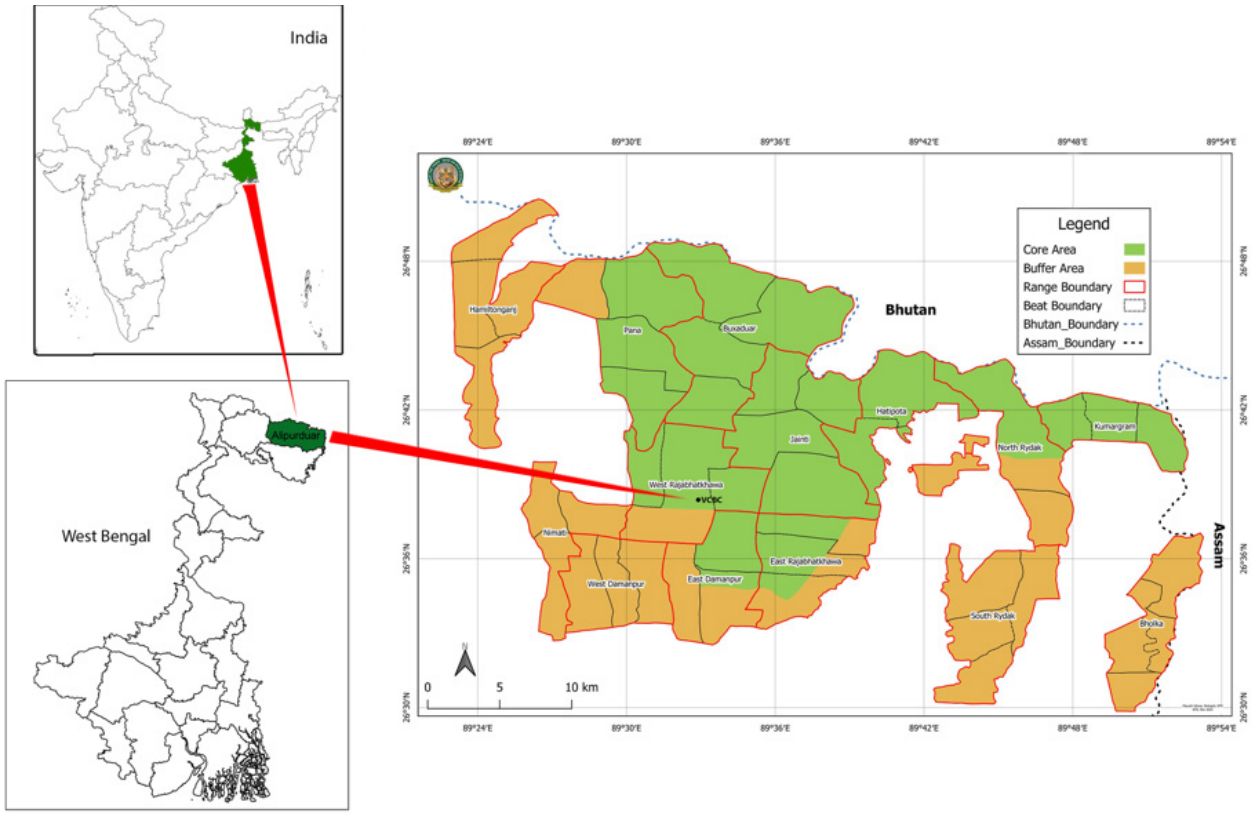

Figure 1. Location of Buxa Vulture Conservation Breeding Centre, Rajabhatkhawa.

RESULTS AND DISCUSSION

In February 2020, when screening and analysing trap camera images from the supplementary feeding site near 22nd Mile pre-release aviary, an unusual event of an Indian Leopard *Panthera pardus fusca* (Meyer, 1794) preying a sub-adult Himalayan Griffon Vulture was recorded on 10 February 2020. The leopard approached the griffon feeding on a Sambar Deer *Rusa unicolor* carcass and despite aggression shown by the vulture the leopard killed the vulture and dragged it out of the frame of the trap camera. Later, the almost consumed carcass of the griffon was observed in a nearby bush.

Later on, in March 2024, two more carcasses of Himalayan Griffon vultures were found in the Bala riverbed near the supplementary feeding site. Both carcasses were almost fully consumed, and only some bones and feathers were left. Presumably, these vultures were also predated by leopards.

Vultures which are thought to have very few predators at their adulthood are evidently not that safe in its natural habitat.

The Indian Leopard has a wide range of distribution in India, except above the treeline in the Himalaya and desert areas (Daniel 1996). In addition to their natural habitats, the elusiveness and behavioural flexibility of the leopard allow them to survive near villages and human settlements (Daniel 1996; Nowell & Jackson 1996). Studies on the food habits of leopard suggest that they have a more diverse diet, ranging from small rodents and birds to medium-sized wild ungulates weighing less than 50 kg (Eisenberg & Lockhart 1972; Bothma & Le Riche 1986; Santiapillai et al. 1982; Johnsingh 1983; Rabinowitz 1989; Seidensticker et al. 1990; Karanth & Sunquist 1995, 2000; Sankar & Johnsingh 2002; Henschel et al. 2005; Andheria et al. 2007).

Leopards in and around Buxa Tiger Reserve (BTR) are highly adaptable as they inhabit a diverse range of ecosystems that includes dense forests of central BTR, hilly terrain along Indo-Bhutan border, and tea garden areas adjoining the forest land. As per the latest report published by National Tiger Conservation Authority of India, there are 61 leopards inhabiting the territory of BTR while 74 are utilizing the Reserve (Qureshi et al. 2024). Carnivore sign survey data of Buxa Tiger Reserve from the year 2022 reveals 16 individuals/100 km^2 (Annual Report 2022). Diversity of terrain has provided diverse prey base for leopard in the region from small

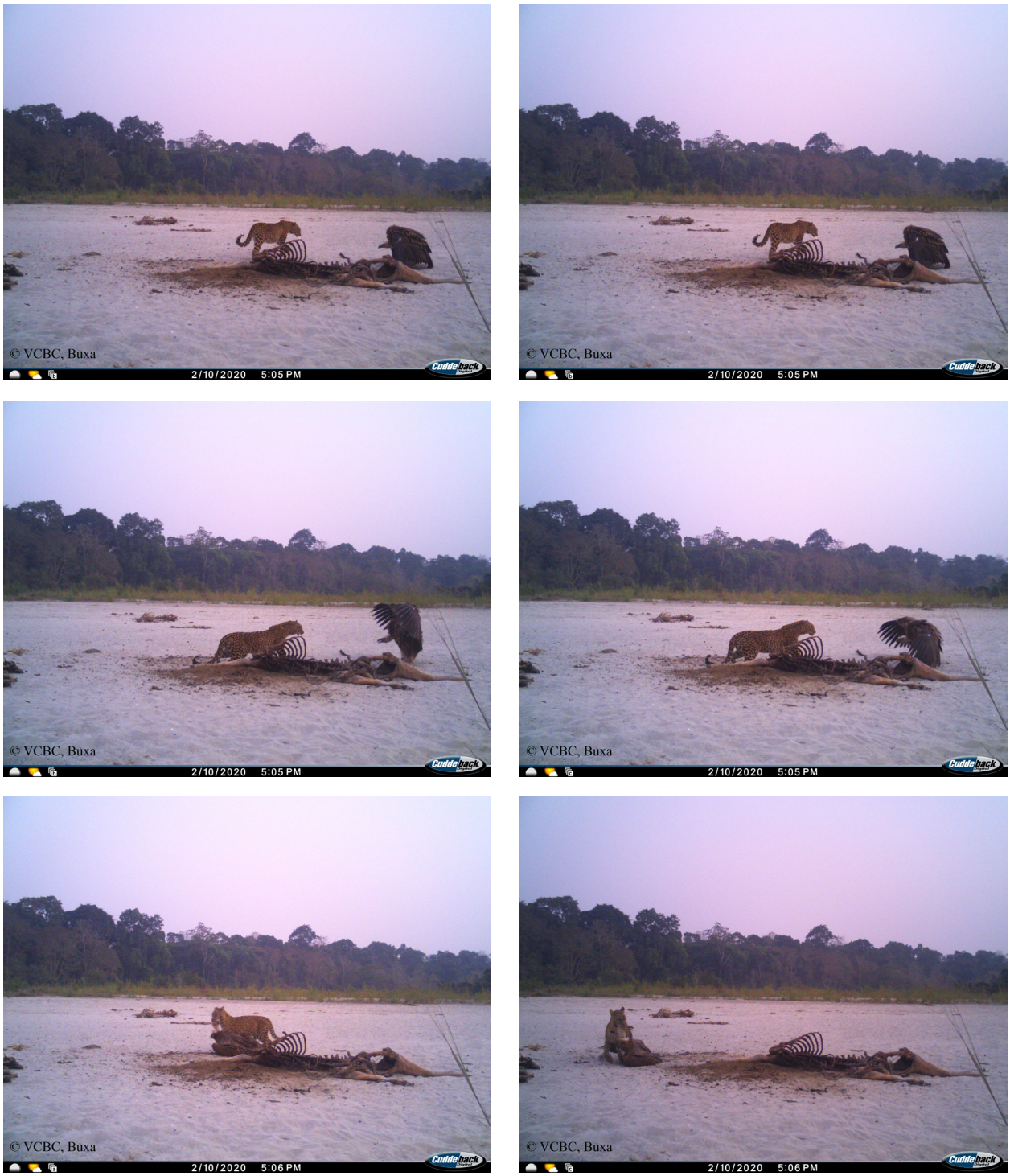

Image 1–6. The sequence of a sub-adult Himalayan Griffon Vulture being preyed by an Indian Leopard on 10 February 2020.

livestock in tea garden labour settlement to wild prey in the core area, making the reserve suitable for leopard habitation.

Indian leopards are known to hunt and feed on wild birds (Ahmed et al. 2008; Selvan et al. 2013) including peafowls (Mondal et al. 2011) on a regular basis in different protected areas of India. However, predating on Himalayan Griffon Vultures has seldom been reported. Thompson et al. (2020) reported killing of free-ranging vultures (Cape Vulture *Gyps coprotheres*) by two captive leopards when the birds landed inside the leopard-enclosure in South Africa's Limpopo Province. It appears

Image 7. Remains of Himalayan Griffon Vulture at Bala Riverbed captured on 21 March 2024.

Image 8. Remains of another Himalayan Griffon Vulture at Bala Riverbed captured on 21 March 2024.

that leopard predation on vulnures is either very rare or has gone unreported.

To the best of the knowledge of the authors, this is the first documentation of the predation and subsequent consumption of Himalayan Griffon Vulture by an Indian Leopard in a natural habitat. More research on the food habits of Indian Leopards particularly in the Himalayan Griffon's wintering grounds, may show that vultures are a more common prey than previously thought, or this account may represent an extremely unusual occurrence.

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