Short Communication

A first description of a breeding colony of white-rumped vultures *Gyps bengalensis* on the Cambodia/Laos border

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Paper submitted 15 May 2023, revised manuscript accepted 11 August 2023.

In 1985, white-rumped vultures *Gyps bengalensis* were described as "possibly the most abundant large bird of prey in the world", with a global population almost certainly numbering several million individuals at that time (Houston, 1985; BirdLife International, 2021). In South Asia, populations of the species then underwent a catastrophic crash due mostly to veterinary use of diclofenac, a non-steroidal anti-inflammatory drug (NSAID) with lethal consequences for vultures (Oaks *et al*., 2004). The toxicity of diclofenac when ingested by vultures is such that it has reduced the global population of white-rumped vultures by over 99% in the past 30 years (Prakash *et al*., 2007). The global population of the species is currently estimated to be ca. 6,000–9,000 individuals, equating to 4,000–6,000 mature individuals (BirdLife International, 2021, 2023), most of which are in India and Nepal (DNPWC, 2015; Prakash *et al*., 2019). An isolated and disjunct population remains in Cambodia (Fig. 1), centred on the northern plains landscape, though vagrant individuals may cover a larger range (Gilbert *et al*., 2007; Botha *et al*., 2017).

In Cambodia, the status of populations of this Critically Endangered species remain precarious. Following a rapid decline in 2010–2016 from 201 to 109 individuals, which was associated with secondary poisoning (i.e. by carbamates) and a reduction in carrion availability (Clements *et al*., 2013; Loveridge *et al*., 2018), the national population has continued to decline at a slower rate and may now have stabilized around 70 individuals according to a national census (Broadis *et al*., 2021).

Thus far, the Cambodian population has avoided the NSAID poisoning epidemic because the drug has not been widely used in the country. Following discovery of diclofenac use in domestic veterinary practices in 2018, this was banned in Cambodia in July 2019. However, vulture populations in the country are threatened by exposure to pesticides and other chemicals (Loveridge *et al*., 2018), habitat degradation and limited food availability due to the collapse of wild ungulate populations it feeds on (Clements *et al*., 2013), which are listed as critical threats for vultures in the region (Botha *et al*., 2017).

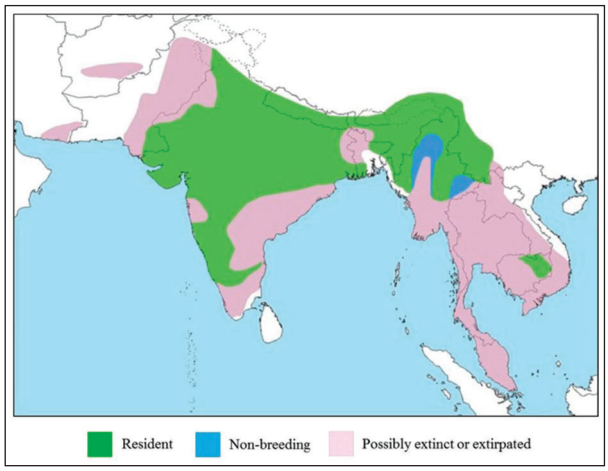

Fig. 1 Global distribution of white-rumped vultures *Gyps bengalensis,* including the range of the isolated population in Cambodia and Laos. Adapted from Botha *et al*. (2017).

CITATION: Legrand, R., Eang S., Botha, A. & Eames, J.C. (2024) A first description of a breeding colony of white-rumped vultures *Gyps bengalensis* on the Cambodia/Laos border. *Cambodian Journal of Natural History*, **2024**, 12–16.

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White-rumped vultures (WRVs) are a social species, dozens of individuals can be observed at roost sites and feeding on the same carrion. The species breeds in colonies in trees of varying height (Thakur, 2015; Sehgal & Kumar, 2022) and in northern India, WRVs also seem to favour nesting sites relatively close to feeding stations (Sehgal & Kumar, 2022). According to Naoroji (2006), nests are usually located at a height of 10–18 m throughout their range, and up to 30 m on tall trees, and sometimes as low as 4 to 5 m in protected areas or when larges trees are unavailable.

Because WRVs first breed at an age of 5.1 years and have a generation length (the average age of parents of the current cohort) of 11.2 years (Bird *et al*., 2020), reversing the ongoing population decline in Cambodia will require long-term efforts. Protection of breeding sites is of paramount importance. Well aware of the importance of feeding stations for the conservation management of the species (Gilbert *et al*., 2007), a vulture feeding station has been in existence at Siem Pang Wildlife Sanctuary (SPWS), since July 2004 (Birdlife International *et al*., 2005). Since August 2020, one cow or buffalo has been provided on a weekly basis at the station to ensure a reliable and regular supply of food for vultures.

Three species of vultures regularly visit the feeding station and nests of slender-billed vultures *G. tenuirostris* and red-headed vultures *Sarcogyps calvus* are recorded annually in SPWS. In 2022 for example, nine slender-billed vulture nests and two red-headed vulture nests were found in the wildlife sanctuary (Rising Phoenix, 2022). With only one nest found in 2015 and two in 2016, white-rumped vultures rarely nest in SPWS yet are the most commonly recorded vulture species at the SPWS feeding station, with an average monthly count of 48 birds in 2022 (Rising Phoenix, 2022). In addition, no WRV nests were recorded in Cambodia in 2020 and 2021 and only one (which failed) was recorded in 2022, a surprising and concerning outcome considering it is by far the most numerous vulture species in the country (Broadis *et al*., 2021). This situation contrasts markedly with records of up to 32 nests in 2005 (of which 22 were in Mondulkiri Province and 9 in Lomphat Wildlife Sanctuary) and 28 nests in 2006 (Goes, 2013). Neither of these areas have active WRV nests at present and only foraging individuals have been observed, in line with notion that individuals may cover large areas in search of food.

To resolve the mystery of their breeding locality and preferred nesting habitats, we captured an adult and an immature WRV at SPWS between 4 and 7 March 2020. Both birds were fitted with GPS trackers (OrniTrack-50 - solar powered GPS-GSM tracker) from Ornitela (Vilnius, Lithuania). These devices weigh 50 g, representing around 1.3% of the bird's bodyweight, which is less than the 3% usually deemed acceptable for tracking (Kenward, 2001; Barron *et al*., 2010). The GPS acquisition interval was set to every hour and GSM transmission attempt was set to every two hours during the day. The tracker quickly revealed that both individuals were returning to a single location on the Phou Kiou ridge on the southern boundary of Xe Pian National Park in Laos, just 2 km from the western boundary of SPWS (Fig. 2).

Located in Champasak Province of Laos, the Phou Kiou hills (14°05′08.0″N, 106°07′25.7″E) encompass a forested ridge that rises steeply from the surrounding plains (which are 90 m above mean sea level, AMSL) to an altitude of 220 to 290 m AMSL. The ridge extends approximately 30 km on a northwest to southeast axis, with slopes being steeper on the southern side. The hills are covered with dense semi-evergreen forest that is relatively untouched, although we observed selective logging of timber trees on the ridgetop.

During a first partial survey of the site on 14 April 2020, two nests and three chicks (including one coming from a third nest) were found. On 12 April 2022, a second survey successfully located six nests, including four with chicks and two nests which were not in use.

On returning to the site on 27 April 2023, we recorded 15 nests along a 4 km transect on the ridge line (Fig. 2). Twelve of these were active and nine chicks were counted in the nests. Two nests per tree were observed on six occasions (Fig. 3). Though we explored the ridge, it is possible that we may have missed some nests and likely that undiscovered nests exist to the west of where we searched on the ridge.

The Phou Kiou white-rumped vulture colony is a new and important discovery. To the best of our knowledge, it is the first report of a breeding site for WRV in Laos in peer-reviewed literature (Timmins & Vongkhamheng, 1996; Thewlis *et al*., 1998; Evans *et al*., 2000; Duckworth & Tizard, 2003; Pain *et al*., 2003; Duckworth & Timmins, 2015). As such, Laos should be added to the list of breeding range states for WRV in the next edition of the multi-species action plan to conserve African-Eurasian vultures.

Birds that breed on Phou Kiou ridge feed at the feeding station in SPWS which is located 25 km to the east. It is not known whether the establishment of this colony predates carcass provisioning at SPWS. The nests were found in *Anisoptera costata* with a height of at least 20 m, which is within the known range for WRV (Naoroji, 2006). Tall trees with strong forks to support nests have been identified as preferred nesting sites for the species elsewhere (Gilbert *et al*., 2002; Baral *et al*., 2005; Thakur &

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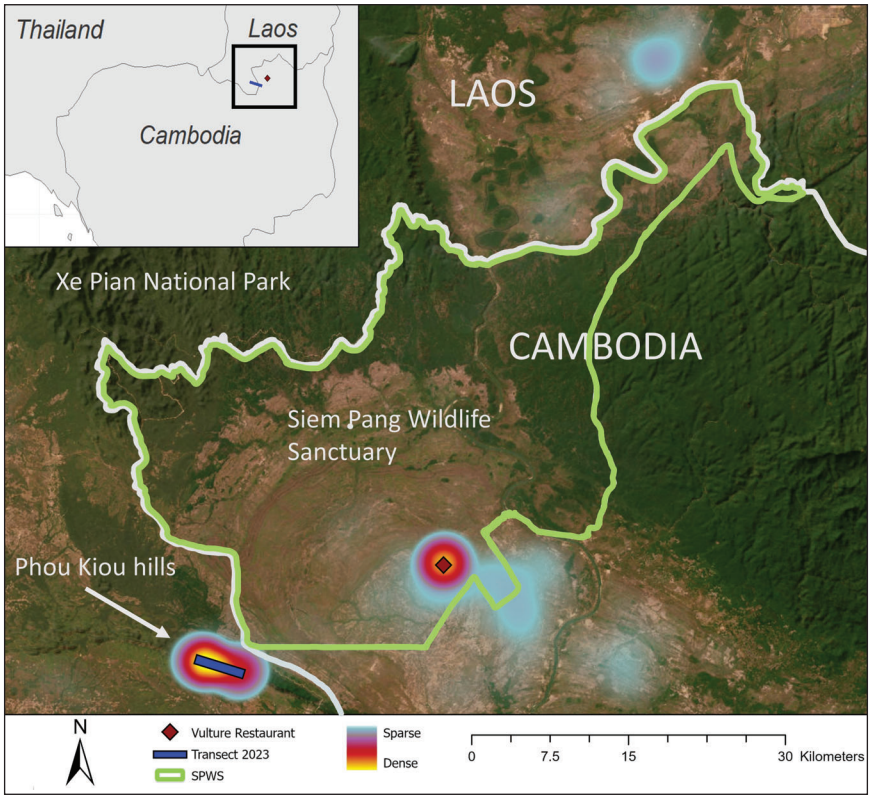

Fig. 2 Heatmap of recorded locations of one white-rumped vulture tagged in 2020. Two hotspots were observed, one centred on the vulture restaurant in Siem Pang Wildlife Sanctuary and one in the Phou Kiou hills in Champasak Province, Laos.

Fig. 3 Nests (yellow circles) of white-rumped vultures photographed in April 2023. One young is resting in the lower nest while the other is perching in the far left of the image.

Narang, 2012; Sehgal & Kumar, 2022). A study by Murn *et al*. (2015) indicates that the spatial pattern of nests relies on both the distribution of trees and their ability to support more than one nest. These results highlight that the preservation of larger nest trees and the sustainable management of timber resources are essential components for conservation management (Botha *et al*., 2017).

We recommend that annual surveys be undertaken of the colony and that use of drones (Junda *et al*., 2015; Santangeli *et al*., 2020; Zink *et al*., 2023) or examination of high-resolution satellite images (Hughes *et al*., 2011; Fretwell *et al*., 2017) be considered. We also recommend satellite tagging of additional WRVs to determine the location of additional nests or colonies. To this end, we captured and tagged two further adult WRV on 24–25 April 2023 and also recaptured an immature WRV tagged in 2020, which allowed us to ensure that device was still functioning and fitting properly.

During our short surveys, we observed logging of timber trees in semi-evergreen forests in the immediate vicinity of the colony on top of the ridge, and the widespread destruction of deciduous dipterocarp forests at the foot of the ridge. We also observed people clearing and burning forest to plant cassava within Xe Pian National Park.

Although diclofenac has been banned in Cambodia for veterinary use since 2019, it is unknown whether it is used in Laos. The same is true of the presence and use of other vulture-toxic drugs such as ketoprofen, flunixin and aceclofenac in both countries. Potential risks posed by these drugs to vultures should be assessed, along with other possible threats such as electrocution from power lines or reduced food availability.

Acknowledgements

This study was undertaken by Rising Phoenix within the framework of an agreement between Siem Pang Conservation (a Cambodian non-profit enterprise) and the Ministry of Environment. We would like to thank Vilakhan Xayaphet from the faculty of Environmental Sciences of the National University of Laos for his assistance in the surveys. We would also like to thank our Rising Phoenix colleague Luon Bunpeang who participated in two surveys.

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