

HABITAT LOSS OF CRITICALLY ENDANGERED VULTURES IN NAMERI NATIONAL PARK-ASSAM¹

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Abstract. Assam, comprising the eastern Himalayas, is one of the Mega bio-diversity hotspots of the world. It forms part of two bird areas, viz. eastern Himalaya and Assam plains, with many endemic species. Nameri National Park is a part of the North Bank Landscape (NBL) of Brahmaputra River bordering Assam and Arunachal Pradesh as established by the World Wildlife Fund; it also is a part of the Eastern Himalayan Bio-diversity Hotspot and habitat of resident and migratory bird. There are 374 avian species (resident and migratory) recorded in Nameri National Park. This includes, as reported in the International Union for Conservation of Nature (IUCN) Red List, four Critically Endangered vultures: White-rumped Vulture (*Gyps bengalensis*), Slender-billed Vulture (*Gyps tenuirostris*), Red-headed Vulture (*Sarcogyps calvus*) and Long-billed Vulture (*Gyps indicus*). The paper highlighted the present status of birds of prey in Nameri National Park and the adjoining areas.

Key words: Critically endangered vultures, diclofenac, Himalayas

PERDIDA DE HABITAT DE BUITRES CRITICAMENTE AMENAZADOS EN EL PARQUE NACIONAL NAMERI, ASSAM, INDIA

Resumen. Assam, junto los Himalayas orientales, es uno de los mega hotspots de biodiversidad del mundo. Forma parte de dos áreas avifaunísticas, el Himalaya oriental y las llanuras de Assam, con numerosas especies endémicas. El Parque Nacional Nameri forma parte del Paisaje de la Rivera Norte (North Bank Landscape, NBL) del río Brahmaputra que bordea Assam y Arunachal Pradesh tal y como determinó el World Wildlife Fund. También forma parte del Hotspot de Biodiversidad del Himalaya Oriental y contiene hábitats para aves residentes y migratorias. Hay 374 especies de aves (residentes y migratorias) registradas en el Parque Nacional Nameri. La lista incluye, tal y como se reporta en la Lista Roja de la UICN, cuatro especies de buitre críticamente amenazadas: buitre dorsiblanco bengalí (*Gyps bengalensis*), buitre picofino (*Gyps tenuirostris*), buitre cabecirrojo (*Sarcogyps calvus*), y buitre piquilargo (*Gyps indicus*). El artículo presenta el estado actual de las aves de presa en el Parque Nacional Nameri y áreas aledañas.

Palabras clave: India, buitres en peligro crítico, diclofenaco, Himalayas

INTRODUCTION

Nameri National Park (Latitude 26°50' / to 27°03' / N and Longitude 92°39' to 92°59' E) covers an area of 200 km² in the foothills of the eastern Himalayas in Assam. It is contiguous

with Pakhui Wildlife Sanctuary in Arunachal Pradesh to the north, and together they exceed 1,000 km² with elevations ranging from 79 to over 1,500 meters. The park is bounded by the Bor-Dikorai River and Sijussa Camp in the east.

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Its western border aligns with the Jia-Bhoreli River and is adjacent to Balipara Reserve Forest, while its northern border is contiguous with Pakhui Wildlife Sanctuary of Arunachal Pradesh. The southern border is marked by the confluence of Jia-Bhoreli and Bor-Dikorai rivers. The park is criss-crossed by the tributaries of Jia-Bhoreli river including Diji, Dinai, Doigurung, Nameri, Dikorai, Khari.

The terrain is undulating, with lower areas at elevation between 80–100 m along the Jia-Bhoreli and its tributaries, and with higher areas at 200–225 m in the central and northern parts of the park. Soils are characterized by sandy or sandy loam alluvial deposits. Numerous small rivers and perennial streams originating in Arunachal Pradesh run through the park and feed into the Jia-Bhoreli River. Many rivers shift their course during the rainy season and form dry riverbeds during the winter. Forest and woodland cover the majority of the park (94%, 188 km²). Grasslands are found along the banks of the Jia-Bhoreli River and its tributaries and cover an area of 10 km² (5%). The remaining 2 km² (1%) is formed by various river beds. Nameri is covered by Tropical Evergreen, Semi-Evergreen, Moist Deciduous forests with cane and bamboo brakes and narrow strips of open grassland along rivers. Grasslands comprise <10% of the total area of the park, while the Semi-Evergreen and Moist Deciduous species dominate the area. The vegetation of the park is a mosaic of four major forest types (Champion and Seth 1968): (1) Eastern Alluvial Secondary Semi-Evergreen Forest (2) Low Alluvial Savannah Woodland (3) Eastern Dillenia Swamp Forest and (4) Wet Bamboo Forest (usually found along streams or on badly drained hollows), with areas of cane brakes formed by *Calamus tenuis*. The subtropical monsoon climate of the region is characterised by heavy rainfall, averaging of 3,500 mm per annum. The predominance of the southwest monsoon causes precipitation to be highly seasonal (Barthakur 1986). Most of the rain falls between May and September, i.e. the summer (hot) season. Winters (October to April) are usually cool and dry, although rains are not uncommon. The average temperature in the area varies from a low of 5°C in winter to a high of 37°C in summer. The relative humidity varies between 65 and 90% or more. Parts of the area were declared as Naduar

Reserve Forest (Present East Buffer) in 1876 and Nameri Wildlife Sanctuary in 1985. The Nameri National Park was formed in 1998.

Pollution, drainage, habitat destruction, hunting and collection of eggs and nestlings are some of the causes that threaten the birds with extinction in the park and vicinity (Datta et al. 1998). Another major cause is poisoning by diclofenac, which is a non-steroidal anti-inflammatory veterinary drug (NSAID) that causes kidney failure in birds upon eating the carcasses of treated cattle. In India, 99% of vulture species population decreases is thought to be due to poisoning by diclofenac. These factors also play an important role in decreasing the number of the park's avian species, which were abundant in earlier decades.

There are 374 species of resident and migratory birds that so far have been identified in Nameri National Park (Das 2010).

Many of the species are resident, non-migratory owing to its cover by primary forest having multi-season fruit bearing trees (Dymond 1998). Included are four critically endangered vultures as described below (see also Table 1 and Figure 1).

WHITE-RUMPED VULTURE (*GYPSS BENGALENSIS*)

It is an Old World vulture closely related to the Eurasian Griffon Vulture (*Gyps fulvus*). At one time it was believed to be closer to the White-backed Vulture of Africa and was known as the Oriental White-backed Vulture.

The White-rumped Vulture is a typical, medium-sized vulture, with an unfeathered head and neck, very broad wings, and short tail feathers. It is much smaller than the Eurasian Griffon. It has a white neck ruff. The adult's whitish back, rump, and underwing coverts contrast with the otherwise dark plumage. The body is black and the secondaries are silvery grey. The head is tinged in pink and bill is silvery with dark ceres. The nostril openings are slit-like. In flight, the adults show a dark leading edge of the wing and has a white wing-lining on the underside. The undertail coverts are black. This is the smallest of the *Gyps* vultures, but is still a very large bird. It weighs 3.5-7.5 kg (7.7-16.5 lbs), measures 75–93 cm (30–37 in) in length, and has a wingspan of 1.92–2.6 m (6.3–8.5 ft).

White-rumped Vultures always nest on large

TABLE 1. Summary of information about vultures in Nameri National Park.

Species	IUCN Status	Habitat	Notes
White-rumped Vulture	Critically Endangered (CR)	S, G, D, A	This species was recorded seven times, usually involving 2–3 birds, mostly seen soaring. When 10 wild elephants (<i>Elephas maximus</i>) died in the area due to poisoning during July–August 2001, no vultures were seen on the carcasses.
Long-billed Vulture	Critically Endangered (CR)	S, G, D, A	Between 2001 to 2002, this species was recorded five times, usually involving 2–3 birds, mostly seen soaring over Dharikati village.
Slender-billed Vulture	Critically Endangered (CR)	S, G, D, A	It was not observed during 1996, but small flocks of up to six birds were seen 4–5 times a year during 1997–2001, mainly between November and March. None has been seen since 2001.
Red-headed Vulture	Critically Endangered (CR)	S, G, D, A	Singles were seen soaring at Potasali on 16 April 2002 and feeding on a carcass along the Khari River on 10th July in the same year.

S = Secondary forest (with an open canopy regenerating naturally after human and /or natural disturbance)
 G = Grasslands (various serial stages of riverine vegetation including short grass on sandy islets through to areas being colonised by trees)
 D = Disturbed areas (cultivation, settlements etc. in the fringe areas of the park)
 A = Aerial



FIGURE 1. The four critically endangered vultures in Nameri National Park.

trees near habitations even when there are seemingly appropriate cliffs in the vicinity. The preferred nesting trees are Bhelu (*Tetrameles nudiflora*), Satiana (*Alstonia scholaris*), Bon jalakia (*Cryptocarya amygdalina*), Urium (*Bischofia javanica*), Bola (*Morus laevigata*), Madar (*Erythrina suberosa*) (Hendriks, 1998). The main nesting period is November to March with eggs being laid mainly in January. Nests are usually in clusters and isolated nests tend to be those of younger birds. Solitary nests are never used regularly and are sometimes taken over by the Red-headed Vulture (*Sarcogyps calvus*) and large owls such as *Bubo coromandus*. Nests are nearly 1 m in diameter and 0.3 m in thickness. Prior to laying an egg, the nest is lined with green leaves. The single egg is white with a tinge of bluish-green. Females are reported to destroy the nest on loss of an egg. They are usually silent but make hissing and roaring sounds at the nest or when jostling for food

This species was very common when surveys were conducted during 1995-2000, especially in the Gangetic plains of India and was often seen nesting on the avenue trees within large cities in the region. This species, as well as the Indian Vulture (*Gyps indicus*) and Slender-billed Vulture (*Gyps tenuirostris*) have suffered a 99% population decrease in India and nearby countries since the early 1990s. The decline has been widely attributed to poisoning by diclofenac, as discussed above

The Indian White-rumped Vulture is mostly resident. Like other vultures it is a scavenger, feeding mostly on carcasses of dead animals (Penhallurick 2001). In Nameri National Park between 1996 and 1998, this species was recorded seven times, usually involving 2-3 birds. When ten wild elephants died in the area due to poisoning during July-August 2001, no vultures were seen on the carcasses (Baruah, 2004). Their absence is noteworthy and presumably related to the catastrophic decline of *Gyps* vultures in the Indian subcontinent.

LONG-BILLED VULTURE (*GYP S INDICUS*)

It is an Old World vulture, closely related to the Griffon Vulture. It breeds mainly on hilly crags in central and peninsular India. The birds in the northern part of its range once considered a subspecies are now considered to be distinct, the Slender-billed Vulture. These were lumped

together under the name Long-billed Vulture. Two races remain: *Gyps indicus indicus* found in northern India and further east, and *Gyps indicus tenuirostris* found in the plains of the Indus and Ganges rivers. Two individuals of the nominal race were seen during 2007 in the Bogjili area of the park near high forest (Singh 1991).

This species breeds mainly on cliffs, but is known to use trees in Rajasthan. Like other vultures it is a scavenger, feeding mostly from carcasses of dead animals, which it finds by soaring over savannah and around human habitation. They often move in flocks.

The Long-billed Vulture is a typical vulture, with a bald head, very broad wings and short tail feathers. It has suffered a 99% population decrease in Pakistan and India; between 2000-2007 annual decline rates of this species and the Slender-billed Vulture averaged >16%. The cause of this has been identified as poisoning by the veterinary drug diclofenac.

RED-HEADED VULTURE (*SARCOGYP S CALVUS*)

Red-headed Vulture, also known as the Asian King Vulture, Indian Black Vulture or Pondicherry Vulture, is an old world vulture once found throughout South Asia. The range has become localized primarily to Nepal and northern, north-eastern India. The widespread use and subsequent poisoning by the drug diclofenac, along with carprofen, flunixin, ibuprofen and phenylbutazone, has caused its population to collapse. The population of this species has essentially halved every other year since the late 1990s. What once was a plentiful species numbering in the hundreds of thousands has come dangerously close to extinction in less than two decades. A few individuals exist within the park.

It is a medium-sized vulture, 76 - 86 cm (30 to 34 in) in length, weighing 3.5-6.3 kg (7.7-14 lb) and having a wingspan of 1.99-2.6 m (6.5-8.5 ft). The adult has a prominent deep red-to-orange naked head, which is paler among juveniles. It has a black body with pale grey band at the base of flight feathers.

SLENDER-BILLED VULTURE (*GYP S TENUIROSTRIS*)

The Slender-billed Vulture is a recently recognized species of old world vulture. It was

once included with its relative, the Indian Vulture, under the name of 'Long-billed Vulture'. However, these two species have non-overlapping distributions and can be immediately told apart by trained observers, even at considerable distances. The Indian Vulture is found only to the south of the Ganges and breeds on cliffs, while the Slender-billed Vulture is found along the Sub-Himalayan regions and into Southeast Asia. It nests in trees.

This vulture is mostly grey with a pale rump and grey under-tail coverts. The thighs have whitish down. It is rare, with most records being of soaring birds. Small flocks of up to six birds were seen 4–5 times a year during 1997–2001 near Potasali, 14th mile area of the park, mainly between November and March. None has been seen since 2001, again presumably linked to the general decline of *Gyps* vultures (Talukdar and Das 1997).

The population of this species and the Indian Vulture has declined by 97% and in India annual decline rates for both species averaged over 16% between 2000–2007. Wild populations remain in northern and eastern India through southern Nepal and Bangladesh, with a small population in Burma. The Royal Society for the Protection of Birds (RSPB) estimated the Slender-billed Vulture to number about 1,000 birds in 2009, and predicts total extinction in the wild within the next decade.

Its decline is largely due to the use of diclofenac in working farm animals, especially in India.

CONCLUSION

Veterinary use of the nonsteroidal anti-inflammatory drug diclofenac is a major cause of the catastrophic collapse of *Gyps* vulture populations in the Indian subcontinent. Three species of vultures endemic to South Asia, which together used to number in the tens of millions, are now at high risk of extinction and are listed as critically endangered. Populations of Oriental white-backed (*Gyps bengalensis*), long-billed (*Gyps indicus*) and slender-billed vultures (*Gyps tenuirostris*) have declined by

more than 95% since the early 1990s, and continue to decline at an annual rate of 22–48%.

Diclofenac is a widely available drug in the Indian subcontinent, where it is used for the symptomatic treatment and management of inflammation, fever, and/or pain associated with disease or injury in domestic livestock. Vultures are exposed to the drug when they consume carcasses of cattle that were treated with diclofenac shortly before death. Following experimental exposure to diclofenac or diclofenac-contaminated tissues, *Gyps* vultures die within days from kidney failure with clinical signs of extensive visceral gout (formation of uric acid crystals within tissue). These clinical signs and diclofenac residues in vulture tissues have been found in carcasses of wild *Gyps* vultures from across India, Pakistan, and Nepal, and the proportion of vulture carcasses with signs of diclofenac poisoning is consistent with this being the main, and possibly the only, cause of the vulture decline in Nameri National Park and adjoining areas of Assam.

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