

Distribution and Status of Oriental White-backed Vulture *Gyps bengalensis* in Nagar Parkar, Sindh, Pakistan

(Breeding season 2010-11)



A pair of *G. bengalensis* on the nest



Maan Jee ka Vaandia village near Nagar Parkar



A group of *G. bengalensis* sitting on trees



A dead decomposed adult *G. bengalensis*

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Summary

This report is an outcome of the field study carried out from November 2010 to March 2011 at *G. bengalensis* breeding colony Nagar Parkar, Sindh province, Pakistan to identify the location and number of remaining individuals and monitor the remaining population and assess the mortality of *G. bengalensis* in the surroundings of Nagar Parkar Town. *G. bengalensis* once the most common raptor in south Asia is declined due to the non-steroidal anti-inflammatory drug Diclofenac and is declared extinct in the wild in Punjab province of Pakistan. During breeding Season 2009-10, a colony of 36 breeding pairs was located and a total of 35 nestlings were assumed to be fledged near Nagar Parkar Town. During November 2010 surveys, a total of 36 nests were observed of which 33 were occupied and 03 were empty. A total of 63 adult *G. bengalensis* were observed during census surveys and two decomposed dead adults were observed during mortality surveys. Similarly in January 2011, a total of 36 nests were observed of which 33 were occupied and 03 were empty. A total of 73 *G. bengalensis* were observed of which 51 were adults and 22 were nestlings during census surveys and no dead vultures were found during mortality surveys. During March 2011, of total 36 nests, 22 were occupied and 14 were empty. A total of 22 chicks assume to be fledged during breeding season 2010-11. A total of 67 *G. bengalensis* were observed of which 45 were adults and 22 were nestlings during census surveys and 03 decomposed dead adults were found during mortality surveys. Recommendations have also been suggested for the conservation of this species in Pakistan.

Introduction

The principal driver of the global biodiversity decline is the habitat loss and fragmentation resulted from the anthropogenic compressions on our natural ecosystems (Vitousek et al. 1997; Lugo 2002; Miller & Hobbs 2002). In 1980s, vultures were so abundant around human settlements that they were considered as severe risk to airliners (Grubh et al., 1990). Within South Asian region, in mid 1980s, *Gyps* vultures were supposed to be amongst the common huge raptors in the whole world (Houston, 1985) but in 2000, three major species Long-billed Vulture *G. indicus*, Oriental White-backed Vulture *G. bengalensis*, and Slender-billed Vulture *G. tenuirostris*, due to rapid population declines, were classified Critically Endangered species (BirdLife International, 2001; IUCN, 2006) due to the widespread use of the non-steroidal anti-inflammatory drug, diclofenac (Green et al. 2004, Oaks et al. 2004, Shultz et al. 2004). *G. bengalensis* was found abundantly in the region of South-East Asia, and the in expanse of Indian subcontinent (Pain et al., 2003).

G. bengalensis is resident of Pakistan and was extensively dispersed all through the provinces of Sindh, Punjab and the wide-ranging valleys and basins of the Khyber Pakhtunkhwa domain. This species inhabits areas with a high human population, cultivated zones with dispersed trees and where the slaughterhouses offer maximum chances for finding food (Roberts, 1991). It has been reported from Bhalwal and Head Rasool, Taunsa and Chashma barrages (Showler and Davidson, 1999), eastern Nara canal (Barnes, 1888-1891; Oates, 1902) and Salt Range area (Waite, 1848). It was reported to be common on the plains around Thrill (Rattray, 1899), fairly common around Murree, Rawalpindi (Whistler, 1930), very common in Lahore (Currie, 1916a), common in Karachi (Ticehurst, 1926-1927) and common in Gujranwala districts (Whistler, 1916c). Further, it was regarded as widely distributed in the plains and adjacent desert areas in Sindh province (Holmes and Wright, 1968-1969; Ali and Ripley, 1968-1998 and Grubh, 1983). It was regularly reported in Dera Ismail Khan District of Khyber Pakhtunkhwa province (Kylanpaa, 2000).

The population declines affecting Asian *Gyps* vultures are among the most rapid and geographically widespread recorded for any species (Gilbert et al., 2006). Catastrophic decline in the population of three species of *Gyps* i.e. *G. bengalensis*, *G. indicus* and *G. tenuirostris* reported across the subcontinent, was first noticed in the mid-1990s and the first numerical evidence was recorded in India (Prakash, 1999; Cunningham et al., 2003; Arshad et al., 2009). Decline has been estimated in excess of almost 97% within a period of 12 year i.e. during 1980-1990s in India, whereas 92% in a 3 year period in Pakistan (Virani, 2004).

In 2000, regular systematic examinations were made to calculate the number of dead *G. bengalensis* in and near the breeding colonies and roosting areas in Punjab province, Pakistan (Gilbert et al., 2002). Mortality succeeding counts of breeding pairs of *G. bengalensis* in nesting colonies in Punjab province, Pakistan, showed a population decline at a rate of 50% per year between 2000 and 2003 (Gilbert et al., 2004, 2006; Green et al., 2004). This decline has caused the disappearance of large herds of *G. bengalensis* in the Punjab province (Gilbert et al., 2006).

G. bengalensis has been reported breeding in the Thar Parkar, Umer kot and Sanghar districts of Sindh Province and a few scattered active nests of *G. bengalensis* were present in the

surroundings of Nagar Parkar Town during 2000-04 breeding seasons; however, all were vanished by the end of 2003-04 breeding season. A colony of 36 breeding pairs was located at Mann Jee ka Vaandia (N. 24°. 23'. 29.6". E. 070°. 41'. 50.1") which was nesting on *Kandi Prosopis cinerea* trees in agricultural fields near Nagar Parkar Town in November 2009. This colony was not present in this area in the past, however, is assumed to be shifted from surrounding areas or the neighboring country. During breeding season 2009-10, a total of 35 nestlings of *G. bengalensis* were assumed to be fledged. The discovery of breeding colony of *G. bengalensis* in Nagar Parkar has given a hope of their survival in future. This is the sole breeding colony of *G. bengalensis* that exist in Pakistan and is of great significance.

The aims of this study were, to identify the distribution, location of nests, their status, breeding success, census and mortality of *G. bengalensis* in the surroundings of Nagar Parkar Town. This research work addresses major conservation actions proposed for this species by BirdLife International. They are to identify the location and number of remaining individuals of *G. bengalensis* to monitor remaining populations and to Support captive breeding efforts. This research will provide complete information about the distribution and status of *G. bengalensis* in Nagar Parkar and will further help WWF-Pakistan to capture nestlings for its vulture restoration and captive breeding programme. These findings will provide a baseline database for long-term monitoring and will further help to take measures for the conservation of this species.

Material and Methods

During the surveys, a 4x4 vehicle was hired for transportation and status and GPS locations of all the nests were noted in fixed protocol data sheets. Each and every nest was given its specific identity number and their status was observed from the ground with the help of spotting field scope and binoculars. Nests where eggs were laid were defined as being active, indicated by direct observation of an egg or nestling, or when an adult was observed in a posture consistent with incubation or brooding (Postupalsky, 1974). However, the term occupied was used for the nests where all kinds of activities were observed during the study. Nesting attempts were considered successful when fledging was observed or more commonly when activity at the nest ceased on or after the first observation of a fledging in the colony. A census of all vultures sitting in and out of nests and flying in the sky was carried out during the surveys. The age classes of all vultures encountered were assessed using plumage characters as juvenile (less than one year), sub adult (greater than one year but not adult) or adult. Dead vultures of all age groups were located opportunistically during the surveys. The ages of dead vultures were assessed and time since death was estimated as 0-1 days, 2-7 days, 8-30 days and >31 days on the basis of decomposition

Study Area

The study was carried out at the *G. bengalensis* breeding colony at Mann Jee ka Vaandia village (N. 24°. 23'. 29.6". E. 070°. 41'. 50.1") about 5 km from Nagar Parkar Town. Nagar Parkar, the chief town in the taluka of the same name in district Thar Parkar is situated at 69 meters at sea level to the east of a range of low hills on the tip of south eastern Pakistan, surrounded by India on three sides Nagar Parkar is attached to Pakistan from north only.

(<http://www.sindh.iucnp.org>). Nagar Parkar has on its north Chachro taluka and on west Mithi taluka of Thar Parkar district, while on east of it Jodhpur, Rajasthan (India) and on its south Rann of Kutch. Climatically the small rocks and sandy area of Nagar Parkar both become extreme cold in winter and hot in summer (www.tharparkar.sdnpk.org/bfact.htm). The population of taluka Nagar Parkar is 153,106 individuals. Total population of livestock is 843,093 out of which 95,352 are cattle, 7,381 are buffaloes, 199,086 are sheep, 486,945 are goats, 23,687 are camels, 2,561 are horses, 265 are mules and 27,816 are asses. In taluka Nagar Parkar there is 01 dispensary, no mobile unit, 10 veterinary centers, 01 veterinary office and 09 Livestock assistants (TRDP, 2002).

Annual precipitation in a good year ranges between 200-250 millimeters and happens mostly in the monsoon that starts from 2nd week of June and continues to the end of September. If rains do not fall during this period, a situation like drought emerges resulting in acute shortage food and fodder. Vegetation consist mostly stunted scrub and bush although trees such as the hardy Kandi *propolis cineraria* do occasionally dot the landscape. The main natural ground cover is provided by grasses which are nutritive and a palatable fodder for the livestock (TRDP, 2002).

Wildlife has a significant correlation with greenery, verdure and forage. In congruence to the desert nature of the area, this area is blessed with beautiful species of birds and animals. Sometimes back Wild Ass; only of its kind in Pakistan was found roaming in Rann of Kutch area. However, the massive social changes in the district have not affected only the culture of the people but also the physical environment of the area. This change, in resultant has diminished and/or vanished many species of the wildlife. Even today a number of animals found in the district which includes Chinkara (*Gazella benetti*), Desert Fox (*Vulpes vulpes griffithi*), Jackal (*Canis aureus*) and Hyaena (*hyaena striata*). Among birds the most famous is Indian Peacock (*Pavo cristatus*). The other birds found in the area are Indian Grey Partridge (*Francolinus pondicerianus*), Barn Owl (*Tyto alba*), Indian or Collard Scops Owl (*Otus bakkamoena*), Sindh Night Jar (*Caprimulgus maharattensis*), Indian Night Jar (*Caprimulgus asiaticus*), Laughing Dove (*Streptopelia senegalensis*), Large Hawk Cuckoo (*Hierococcyx sparveroides*), and Spotted Sandgrouse (*Pterocles senegallus*) (<http://en.wikipedia.org/wiki/Tharparkar>).

Results

Breeding Season 2010-11

Nest status surveys

During nest location surveys from November 16th to 17th, 2010, a total of 36 nests were observed of which 33 were occupied and 03 were empty. Of total occupied nests, in 06 nests single adults were observed in sitting posture, in 27 nests pairs were observed (in 24 nests pairs in sitting posture and in 03 nests pairs were observed in standing posture). Similarly during surveys from January 13th to 14th, 2011, a total of 36 nests were observed of which 33 were occupied and 03 were empty. Of total occupied nests, in 10 nests single adults were observed in sitting posture, in 01 nest pair was observed in sitting posture and in 22 nests chick and single adults were observed in sitting posture. During surveys from March 19th to 20th, 2011, a total of 36 nests were observed of which 22 were occupied and 14 were empty. Of total

occupied nests, in 05 nests single chicks were observed in sitting posture, in 14 nests single chicks and single adult were observed in sitting posture and in 03 nests single chick and pairs were observed in sitting posture. A total of 22 chicks assume to be fledged during breeding season 2010-11.

Nest status data breeding season 2010-11

Date	Total Nests	Empty	Occupied					Total
			Single A Sit	Pair Sit	Single Chick	Chick & Adult	Chick & Pair	
16/11/10-17/11/10	36	03	06	27	-	-	-	33
13/1/11-14/1/11	36	03	10	01	-	22	-	33
19/03/11-20/03/11	36	14	-	-	05	14	03	22

Census surveys

During census survey from November 16th to 17th 2010, a total of 63 *G. bengalensis* were observed and all of them were adults. Similarly during survey from January 13th to 14th, 2011, a total of 73 *G. bengalensis* were observed of which 51 were adults and 22 were nestlings. During census survey from March 19th to 20th 2011, a total of 67 *G. bengalensis* were observed of which 45 were adults and 22 were nestlings. Birds of all age groups sitting in nests and flying in the sky were counted in the study area.

Census data breeding season 2010-11

Date	Total	Adults	Sub adults	Juveniles/Fledglings
16/11/10-17/11/10	63	63	-	-
13/1/11-14/1/11	73	51	-	22
19/03/11-20/03/11	67	45	-	22

Mortality surveys

During mortality surveys, one dead adult *G. bengalensis* was found near nest no. 26 and another dead adult was found near nest no. 27 (N. 24°. 23'. 47.7". E. 070°. 42'. 04.7") at Dharay Village on November 17th, 2010. The birds were decomposed and were died of more than one month ago. During January 2011 surveys, no dead vultures were found. However, during March 2011 surveys, one dead adult *G. bengalensis* was found near nest no. 6 (N. 24°. 23'. 48.8". E. 070°. 41'. 37.0") and another dead adult was found under nest no. 7 (N. 24°. 23'. 41.2". E. 070°.

41'. 36.4") at Mann Jee Ka Vaandia village on March 19th, 2011. Both the birds were decomposed and were died of more than one month ago. Another dead adult *G. bengalensis* was found dead near nest no 32 (N. 24°. 24'. 05.5". E. 070°. 42'. 12.3") at Dharay village on March 20th, 2011. This bird was partially decomposed and assumed to be died 15-20 days ago from observation day. All the dead birds were removed and dumped during each survey, so that they might not be recounted during next mortality surveys

Mortality data breeding season 2010-11

Date	Location	Age	Time since death	Nest #	Position	Removed Yes/No	Comments
17-11-2010	N.24° 23'.47.7" E.070° .42'.04.7"	Adult	>30 days	26	Ground	Yes	Decomposed
17-11-2010	N.24° 23'.47.7" E.070° .42'.04.7"	Adult	>30 days	27	Ground	Yes	Decomposed
19-03-2011	N.24° 23'.48.8" E.070° .41'.37.0"	Adult	>30 days	06	Ground	Yes	Decomposed
19-03-2011	N.24° 23'.41.2" E.070° .41'.36.4"	Adult	>30 days	07	Ground	Yes	Decomposed
20-03-2011	N.24° 24'.05.5" E.070° .42'.12.3"	Adult	8-30 days	32	Ground	Yes	Partially decomposed

Conclusions

Population of *G. bengalensis* still continues to decline and this loss is causing major impact on ecosystems they inhabit as well as the associated human correlation. Based on the known rates of declines of vulture population, the *G. bengalensis* is at considerable risk of extinction in the wild soon and is assumed functionally extinct as populations in Pakistan. There is an urgent need to bring together conservationists, policy makers and those who are in authority to take an immediate action for the long-term conservation of *G. bengalensis* in Nagar Parkar.

If this species is to have any future hope of survival, captive flocks must be established to allow for future restoration programmes. WWF-Pakistan has started vulture restoration programme in 2006 to conserve and breed *G. bengalensis* in Punjab province Pakistan. WWF-Pakistan has conducted surveys extensively in Punjab province to find and capture *G. bengalensis* but could not find vultures. It was assumed that there are less than 50 individuals of *G. bengalensis* in Pakistan. However, the discovery of active nests in Nagar Parkar has given a hope of its survival in future.

Recommendations

- Vultures are generally unpopular in Asia, a factor that hinders conservation action, therefore awareness campaigns are required to improve understanding of their current plight, and of the crucial role that they play in the disposal of the carrion.
- To help vulture conservation efforts, there urgently need to identify the location of remaining breeding colonies of *G. bengalensis* in the Thar Parkar district of Sind province Pakistan.

This information will be used by conservation planners, non-governmental organizations, and individuals to help prevent their extinction.

- There is need to conduct surveys about the use and availability of Diclofenac in Nagar Parkar area and further create awareness among local farmers, chemists and veterinary practitioners not to use Diclofenac in livestock treatment.
- An immediate, phase out of diclofenac in veterinary use in all range area would be the simplest, most effective way to eliminate the drug from vulture's food and would quickly reduce the unsustainably high rates of mortality that occurred over the last 10 years.
- A complete removal of the drug may take several years to become effective due to pre-existing stockpiles in the market place. For this reason, consumer education should occur simultaneously to ensure that users are aware of the consequences of their actions.
- Education material on different aspects of vulture conservation should be prepared and circulated to pharmacists, veterinary hospitals and local veterinary practitioners.
- It is necessary to legislate that any animal treated with diclofenac (or any drug) within short period before death (e.g., one week) must be buried or burned so that contaminated carcasses are removed from the vulture's food source. A combination of complete phase out of diclofenac in veterinary market, plus legislation and enforcement of the proper disposal of drug treated carcasses, is likely to be most effective action.
- It is assumed that increased human interference in the breeding colony may reduce the breeding success of *G. bengalensis*, so there is need to create awareness among local farmers not to cut the Kandi trees *Prosopis cinerea* on which *G. bengalensis* make nests.
- Although most ecological aspects of *G. bengalensis* are well known, there is lack of scientific knowledge about ranging behaviour of vultures in Pakistan. GSM-GPS units telemetry tracking will provide information about food searching, territory exploration, home range of young and adult birds and the places they are dying. By knowing what their home range is, we can also mitigate potential threats within the home range. These units will allow us to follow the vultures and to answer a plethora of important ecological questions like: How far does a vulture travel in a day? How much time do they spend in the breeding colony? Are there any key areas out of this colony where vultures spend a large portion of their time? What habitat preference do vultures have? At what speed might it average while soaring above the landscape?
- There is need to declare the vulture safe zone around at least 100 km territory from the breeding colony of *G. bengalensis* near Nagar Parkar town, collect information about all the farmers, veterinary practitioners and chemists and create awareness among them about the fatal effects of Diclofenac in vultures and not to use in the treatment of livestock. Further, also suggest veterinary practitioners to use the alternate drug Meloxicam for the treatment of livestock that has no lethal effects on vultures.

- There is need to purchase all the Kandi trees *Prosopis cinerea* on which *G. bengalensis* nests are present in Mann Jee ka Vaandia village because these trees are personal property of local people and there are chances that local people may cut these trees for fuelwood and their other needs and hence destroy the *G. bengalensis* nests on these trees.
- Local staff should be trained to develop capacity for vulture conservation aiming to reduce vulture mortality in the wild through awareness among local people not to use Diclofenac and to provide expert guidance in captive breeding and release efforts to address these urgent conservation needs.
- Provisioning clean food to vultures in the wild may help reduce rates of mortality below levels that cause population decline. Vulture restaurants have been used to augment food supplies to vultures in South Africa and Europe with some success, but they have never been used to entirely substitute for an otherwise abundant source of food. There is need to establish a vulture restaurant near the breeding colony to provide Diclofenac free food to vultures.
- Although Diclofenac is banned, however is still used in the livestock treatment due to which the remaining population of *G. bengalensis* in the wild is at risk of poisoning. There is need to promote vulture restoration and captive breeding programme already established in 2006 by WWF-Pakistan.

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Photographs



Figure: 01. A nestling of *G. bengalensis* in the nest on Kandi tree *Prosopis cinerea*



Figure: 02. A group of *G. bengalensis* in the study area