

Ecology and Conservation of Threatened Birds in and around Navegaon National Park, Maharashtra

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Abstract

Birds, the warm-blooded bipeds with amazing adaptations evolved millions of years ago from reptiles. These colorful, delicate-looking, highly evolved animals are the only creatures with feathered wings that make them capable of true and perfect flight. This ecologically valuable group of vertebrates is the subject of the present study which deals with ecology and conservation status of threatened birds in and around Navegaon National Park, Maharashtra state. Navegaon National park, commonly known as Navegaon Bandh, is located in Gondia district. It lies between 20^o 45' to 21^o 2' North Latitude and 80^o 5' to 80^o 15' East Longitude. It is popular in the eastern Vidarbha region of Maharashtra for diversity of vegetation ranging from dry mixed forest to rain forest. This southern tropical dry forest is enriched with varied wildlife, and is an important conservation unit in central India. birds visit this beautiful lake every winter.

The most important habitat in the park is the Navegaon Lake, home to many bird species. Flocks of migratory A total of 312 bird species from 57 different families under 14 orders have been recorded (Paliwal G.T., 2013). Among these 252 were local residents, 53 winter visitors, 05 passage migrants and 02 breeding migrants. Out of total 312 avian species recorded, 12 are listed under different threatened categories (Birdlife International 2013). Ecology and conservation of these threatened species is discussed in the present study.

Keywords: Ecology | Conservation | Threatened | Navegaon Bandh

Introduction

Unique bio geographical features of Maharashtra have put the Maharashtra state in the list of hotspots of biodiversity. This diversity is also reflected in the avifauna of the state. About 568 different species of birds occur in Maharashtra. Recent studies indicate that habitat loss, fragmentation, over-exploitation of our natural resources, pollution,

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industrialization, urbanization etc. are posing great threats to the birdlife. In many parts of urban areas it has been observed that sighting of House Sparrow has become rare in recent years. It is alarming to note that in India about 30 species are categorized as Endangered, 52 species are Vulnerable and about 66 species are Near Threatened which needs adequate conservation planning.

The 20th Century is witness to three phenomena of great ecological consequences. Unprecedented population growth, large scale Industrialization & Intensive agriculture based on large scale inputs of synthetic fertilizers & insecticides. All three had an immensely adverse impact on the all resources of biodiversity. Terrestrial & associated aquatic habitats maintain ecological balance of flora & fauna interrelationship, regulate surrounding climate & recharge ground water.

Aquatic invertebrates are important as a source of food for birds, mammals, amphibians, reptiles & other invertebrates. Changes in terrestrial & aquatic habitat lead to changes in invertebrate assemblages which in turn increase, decrease or change food supplies for other mammals. Navegaon National park is rich in bird fauna associated with it that includes some migratory species & ecologically an important landmark. Flocks of migratory birds visit this beautiful lake every winter. About 60 species of migratory birds visit this lake which indicates that the park and the lake is rich enough to attract these birds and induce them to spend the winter here. The National park has all the mammals that can be expected in any good protected forest of

central India. In our preliminary studies 312 species of birds, 60 species of mammals & 46 species of herpets were recorded from this National park (Paliwal G.T. 2013).

Adequate information on this aspect of birdlife in Maharashtra is not available and immediate attention is the need of the hour. In this context it becomes necessary to identify such species & draw up a conservation plan for their sustainable existence.

Material Methods

Birds were observed by binocular (07x50). They were identified following Grimmet *et al.*, (2001), Ali (2002) and their status following Ali and Ripley (2001). Observations were made every Sunday throughout the year during 2010-2012 from morning 5.00 to evening 6.00 pm. The bird watching was done from following study sites.

Study Area

Navegaon National Park

Navegaon National park, commonly known as Navegaon Bandh, is located in Gondia district. It lies between 20⁰ 45' to 21⁰ 2' North Latitude and 80⁰ 5' to 80⁰ 15' East Longitude. It is popular in the eastern Vidarbha region of Maharashtra for diversity of vegetation ranging from dry mixed forest to rain forest. This southern tropical dry forest is enriched with varied wildlife, and is an important conservation unit in central India.

Navegaonbandh Lake

This site is situated in Navegaon National Park located at 20⁰ 45' to 21⁰ 2' North Latitude and 80⁰ 5' to 80⁰ 15' East Longitude, representing the lentic systems affected by fishing and other activities.

Observation and Result

A total of 312 species from 57 different families under 14 orders have been recorded. Among these 252 were local residents, 60 migrants. Out of 312 avian species recorded 12

are listed under different categories (Birdlife International 2013). List of the threatened birds reported with their status is given in the Table: 1.

Sr. No.	Scientific Name	Common Name	Status
01	<i>Anhinga melanogaster</i>	Oriental Darter	NT
02	<i>Threskiornismelano cephalus</i>	Black headed Ibis	NT
03	<i>Mycteria leucocephala</i>	Painted Stork	NT
04	<i>Ephippiorhynchus asiaticus</i>	Black necked stork	NT
05	<i>Leptoptilos javanicus</i>	Lesser Adjutant Stork	VL
06	<i>Ichthyophaga ichthyatus</i>	Grey headed Fish eagle	NT
07	<i>Gyps indicus</i>	Long billed Vulture	CR
08	<i>Neophron percnopterus</i>	Egyptian Vulture	EN
09	<i>Grus antigone</i>	Sarus Crane	VL
10	<i>Limosa limosa</i>	Black- tailed Godwit	NT
11	<i>Sterna aurantia</i>	River Tern	NT
12	<i>Anthracoceros coronatus</i>	Malabar-Pied Hornbill	NT
NT: Near Threatened, VL: Vulnerable, CR: Critically Endangered, EN: Endangered			

Table: 1. List of the Threatened birds reported from Navegaon National Park & its surrounding

Discussion's

Oriental Darter *Anhinga melanogaster* (Pennat 1769): This species is classified as Near Threatened (NT) because of its population is declining moderately rapidly owing to pollution, drainage, hunting and collection of gees & nestlings (Birdlife International 2013). A sleek water bird, mainly black in adult stage, like the cormorants but with longer more slender snake-like neck, narrow head & long straight pointed bill. The Oriental Darter is widespread in India from coastal wetlands to c.300 m in the Himalaya. In Maharashtra, it is widespread in small numbers & can be found in any large wetlands, natural or man- made. The fish eating bird

inhabits shallow inland wetlands including lakes, swamps & reservoirs, where it hunts fish & frogs. It is an expert diver & feeds almost exclusively on fish caught by its stiletto-shaped bill. It nests colonially with egrets, storks & herons. It makes a platform nest, sometimes very close to other nests & lay 3-6 eggs.

Threats & Conservation measures

The main threat to this & all piscivorous species is from excessive fishing all over its range. Hunting & disturbance at nesting colonies are also the threat to this species. In India it is listed in schedule IV of the wildlife (Protection) Act, 1972 & its hunting & disturbance are prohibited.

Black-headed Ibis *Threskiornis melanocephalus* (Latham 1790)

Black-headed Ibis is undergoing a population reduction which is suspected to be moderately rapid. It faces the entire gamut of threats; from hunting & disturbance at breeding colonies to drainage & conversion of foraging habitat to agriculture. Consequently it qualifies as Near threatened (Birdlife International 2013). A common resident, showing seasonal local movements, it is a large hen-sized bird with black neck, naked black head & long stout down curved black bill, as well as black legs. Black-headed ibis is recorded from all over Maharashtra, ranging from Mula-mutha, Kawadi & Wurwund areas of Pune district (Bradbeer 1987); Jaikwadi dam, Paithan of Aurangabad district (Vyawahare & Kulkarni 1986; Dhule district (Davidson 1882, Vyawahare 1992); Solapur district (Mahabal 1989; Deccan plateau (Davidson & Wenden 1878). Breeding of Black-headed Ibis was recorded from March to June. D'Abreu (1923) has mentioned it as a breeding resident in Vidarbha where it is found in all districts at some wetlands in small numbers. The Black-headed Ibis is found in all types of wetlands such as paddy fields, freshwater marshes, lakes, rivers, flooded grasslands, tidal creeks, mudflats, salt marshes & coastal lagoons. It feeds almost entirely on animal matter such as frogs, fish, aquatic insects, crustaceans & worms. It nests colonially with other heronry species such as painted storks.

Threats & Conservation measures

Drainage, disturbance, pollution, agricultural conversions, hunting and collection of eggs &

nestlings from colonies are the probable causes of decline in some parts of Maharashtra. Heavy predation of eggs & chicks by House Crow & Fledglings by eagles has been noticed. It is also observed to be caught by traps by professional village bird trappers. It is protected under Indian Wildlife (protection) Act 1972. In many villages people protect colonies as a tradition.

Painted Stork *Mycteria leucocephala* (Pennant 1769)

Painted stork is one of the most abundant of the Asian storks. It is classified as Near Threatened (Birdlife International 2013) because it is thought to be undergoing a moderately rapid population decline. Painted Stork is a long-legged, long necked, lanky bird, less than a meter in height, found in all types of wetlands. It has a long heavy yellow bill & unfeathered waxy yellow face. Head, neck, breast & back white with closely barred belly band & white wing coverts. It is a common resident bird. The Painted Stork frequents freshwater marshes, lakes & reservoirs, flooded fields, rivers or lakes & in the rainy season can be seen in crop fields. It nests colonially in trees, often along with other water birds. The bird arrives before winter in traditional areas & usually nests on selected trees using sticks & leaves. Though it is a Near Threatened species painted stork is found in almost the whole of the Maharashtra. The breeding season is from February to June (Barnes 1891). Recently breeding colonies of painted stork were reported in Maharashtra from Pingali in Man tehsil 7 Kurawali tank in Phaltan, Satara district; at Bhadalwadi in Ujjani backwaters of Indapur tehsil & Terna

Lake in Osmanabad district (Narwade *et al.*, 2012a). D'Abreu (1923) has mentioned it as a breeding resident in Vidarbha, found an all districts at selected wetlands in small numbers. Malkhed reservoir (Kasambe & Wadatkar 2003). It is recorded as "Occasional" in Nagpur district (Kasambe & Sani 2009). A flock of about 25 birds was seen at Sonegaon lake of Arjuni/Morgaon taluka (Paliwal & Bhandarkar pers. Obs. 2012).

Threats & conservation measures: The increasing impact of habitat loss, disturbance, pollution, drainage, hunting of adults & collection of eggs, nestlings from colonies & pesticide poisoning are causes for concern. Nest predation by mammalian species & human interference also major threats. Trees used by the birds during the breeding season were found to be destroyed some times. The number of breeding pairs of painted storks declined could be because more than 50% nesting trees in the lake area were cut down. Lack of food for heronry birds after overfishing and overuse of water for irrigation in summer resulted in a scarcity of water during the breeding season (Narwade *et al.*, 2012a). Disturbance by dogs to juveniles of storks in shallow areas of the lake. Hunting juvenile birds for food was observed as a common practice.

Black-necked stork *Ephippiorhynchus asiaticus* (Latham 1790)

Birdlife International (2013) justifies the inclusion of Black-necked stork in the Near Threatened category as it has undergone a moderately rapid overall population reduction. A characteristically large bird between 130 &

150 cm tall with bright red legs, white body, extensive black on the wings & tail, & notably a glossy iridescent black head & neck with large black bill. Genus *Ephippiorhynchus* is unique among storks in exhibiting sexual dimorphism in coloration: iris dark brown male & yellow in female. Like most storks, the Black-necked stork flies with its neck outstretched, not retracted like a heron. The wingspan is up to 230 cm. The Black-necked stork is found all over the Indian plains, common nowhere but widespread. It is thinly but widely distributed in suitable wetlands. D'Abreu (1935) mentioned it as resident in erstwhile central provinces (now Vidarbha & Madhya Pradesh). The Black-necked stork prefers large marshes & Jheels and margins of large rivers & brackish lagoons, where it feeds on fish, frogs, snakes, small turtles. In summer, when jheels & ponds dry up & food is reduced, it becomes more aggressively territorial & frequently fights over food & space (Maheswaran & Rahmani 2004). It has the characteristic stork habit of soaring & circling aloft in heat of the day. The nest is built on large trees, mostly near water. If undisturbed the same tree is used year after year. The female lays two to four eggs & both parents incubate & raise the chicks. Nests were found even in densely populated areas, frequently close to roads & human habitation.

Threats & Conservation measures

The main threat to Black-necked stork is destruction & degradation of its habitat & overfishing. It is listed in schedule I of Indian Wildlife (protection) Act 1972, & also

included CITES Appendix I. In India it occurs in number of PAs/IBAs.

Lesser Adjutant Stork *Leptoptilos javanicus* (Horsfield 1821)

Because of small declining population lesser Adjutant stock is listed as vulnerable. It is the smallest member of genus *Leptoptilos* but still a large bird of 122-129 cm height, weight about 5 kg & has a 210 cm wing span. It is dark grey-black above, white below, with naked head & neck, & a dirty yellowish massive wedge-shaped bill. Breeding males show coppery spots on median coverts, narrow whitish edges to lower scapulars, tertials & inner greater coverts & redder sides to the head, juvenile is duller & less glossy above. Lesser Adjutant has an extensive range across South & Southeast Asia. It is found all over India, particularly in well-watered tracts. D'Abreu (1923) has mentioned that it is most probably resident in the erstwhile central provinces. It breeds in eastern Maharashtra in small numbers in T.A.T.R. (M.S.R. Shad pers. comm. 2013); (Paliwal et.al, 2013); (Chinchkhede & Kedar 2013) and found in Nagzira wildlife sanctuary (Kiran Purandare Pers. Comm. 2013). Lesser Adjutant is an adaptive species found in forest pools, shallow open jheels, man-made wetlands, edges of reservoirs. It feeds on fish, frogs, crabs, snakes, small birds, any small prey. It nests on tall trees preferably in forests. Nesting is either in loose scattered colonies, sometimes up to eight nests found in a tree or solitarily. Breeding season varies from area to area.

Threats & conservation Measures

Habitat destruction in general & hunting by tribals in Central areas are the major threats to Lesser Adjutant stork. Intensive fishing using small mesh sized nets which do not leave even fish fry is a major threat to fish eating birds like Lesser Adjutant & also use of pesticides in paddy fields are the threats to this species. In India Lesser Adjutant is protected under Indian Wildlife (Protection) Act 1972. It is listed in Schedule IV of the Act.

Grey headed fish-eagle *Ichthyophaga ichthyaetus* (Horsfield 1821)

A medium-sized raptor, 69 to 74 cm, with grey head, neck, nape and breast, merging with the paler brown of the mid-belly. Abdomen flanks, and tail are white. Upper parts brown, darker on the wings, turning to blackish on quill tips. Terminal tail band dark brown, particularly visible in flight. Sexes are alike. Juvenile streaked overall, except on belly and vent, with white under wings and lightly barred flight feathers and tail. It has been reported from Navegaon National Park (Islam & Rahmani 2004); (Paliwal et.al, 2013). Although widely distributed, the species is local and declining in most parts of its range through loss of forested wetlands. It is found near slow-moving rivers and streams, lakes, reservoirs, and tidal lagoons. Can be seen sitting for hours on a tree bough, overlooking a sluggish stream or a pool, waiting for an opportunity to snatch fish. If undisturbed, can be seen in the same favourite spot for many months. It feeds exclusively on fish, sometimes very large ones, but during the breeding season it pursues birds and small mammals also. It is very territorial and makes a large nest with sticks on a tall

tree. Sometimes the same nest is used year after year, and thus becomes bulky due to yearly addition of twigs and sticks. The bird becomes noisy during the breeding season. It breeds during winter from November to January. Two to four eggs are laid and both parents share incubation duties (female more). Incubation period to be 28-30 days and nestling period is about 80 days.

Threats & conservation measures: The serious threats are the loss of undisturbed wetlands, overfishing, siltation, pollution and persecution. Contamination by agricultural pesticides and eggshell thinning are major problem, even in well protected national parks like Carbett (Naoroji 1997). Like all birds of prey, the Grey-headed fish-eagle is listed in schedule I of the Indian wildlife (Protection) Act, 1972.

Long-billed Vulture *Gyps indicus* (Scopoli 1786)

The Long-billed Vulture *Gyps indicus* is classified as Critically Endangered (CR) by Birdlife International and IUCN because it has suffered an extremely rapid population decline as a result of feeding on carcasses of animals treated with the drug diclofenac. A large vigorous vulture of about 92 cm, with a conspicuous white neck-ruff and a long black neck, with pale down feathers. It is mainly found south of the Gangetic plain in Delhi, Uttar Pradesh, Haryana, Rajasthan, Gujarat, M.P., Bihar, Jharkhand, Chhattisgarh, Maharashtra, Karnataka, Andhra Pradesh. It is a semi-endemic species in India and also has a small population found breeding in southeast Pakistan, in the Sind province. Like other

Gyps vultures in India, the long-billed was abundant until very recently, but since the mid-1990s, it has suffered disastrous decline throughout its range, mainly due to veterinary use of the non-steroid anti-inflammatory drug diclofenac (Oaks *et al.*, 2004b, Green *et al.*, 2004, Shultz *et al.*, 2004). The Long-billed vulture is still found widely but in extremely low numbers in many parts of the Maharashtra state. Prasad (2003a) has given historical records from western Maharashtra as follows: Satara district (Davidson & Wenden 1878); Junnar, Pune district (Betham 1902); Dhule district (Barnes 1888, Davidson 1882), Mumbai (Ali & Abdulali 1938a). It was common in Vidarbha (D'Abreu 1923). The species used to breed in hundreds on the Gidhad Pahad Hills in Navegaon National Park before 2000. Now it is scarce. Like the White-backed, the long-billed vulture inhabits open countryside, and is found in villages, near cultivated areas. It is a scavenger and feeds almost entirely on carrion, often with the White-backed vulture. It nests almost exclusively in small colonies on cliffs and ruins, sometimes on trees where cliffs are absent. It is mainly a resident bird with a large home and returns to same cliffs for roosting at night. Nesting colonies are traditional and used year after year, and are clearly visible due to the white fecal markings below the nests.

Threats & conservation measures

Till the early 1990s, there was no major threat to the long-billed Vultures and healthy breeding colonies were found in many areas. By the mid-1990s, the populations of all Gyps vultures started declining due to the

introduction of diclofenac. Other likely contributory factors to the population crash are changes in human consumption and processing of dead livestock, and the use of poisons and pesticides, but these are probably of minor significance. This species have been included in Schedule I of Indian wildlife (Protection) Act, 1972. It is listed in CITES Appendix II and CMS Appendix II. Birdlife International and IUCN have listed this bird as Critically Endangered. In 2004, the IUCN passed a BNHS/RSPB/ Birdlife sponsored resolution at its world congress urging all the range states to ensure effective protection of Gyps vultures (BNHS 2004). An International South Asian Vulture Recovery Plan has been developed and is being implemented in India, Nepal and Pakistan. The plan suggests establishing a minimum of four captive breeding centers, each capable of holding 25 pairs.

Egyptian Vulture *Neophron percnopterus* (Linnaeus 1758)

The Egyptian Vulture *Neophron percnopterus* is perhaps the most widespread vulture of the old world, with isolated resident populations in Central Asia to India, and Nepal. In its wide range, it is declining rapidly; therefore Birdlife International (2013) has listed it as Endangered. It is a long-lived and slow-breeding bird with very few predators on adults. In India good populations used to be present 20 years ago, has also seen a sharp decline. Birdlife international (2013) estimates its total world population between 13000-41000 mature individuals. Most critically, the species has undergone a catastrophic decline (>35% per year) since 1999 in India, where numbers

detected on road transects declined by 68% between the years 2000 and 2003 (Cuthbert *et al.*, 2006). The Egyptian Vulture has a unique appearance and cannot be mistaken for any other vulture. It is small kite-like vulture with naked head and small all-feathered neck. Adult dirty white with black flight feathers; juvenile dark with pale vent and tail. The face is bare, yellow in adult and brown in juvenile. The Egyptian vulture has a very wide range in Africa, southern Europe, and the whole of Middle East, Iran, Afghanistan, Pakistan, India and Nepal. It is found all over India, sometimes very close to human habitation, but its numbers are decreasing. Prasad (2003a) has collected old records from Western Maharashtra. It was reported from Mumbai, Thane (Ali & Abdulali 1938b); Pune (Ingalhalikar 1988, Betham 1902); Solapur and Satara district in Deccan plateau (Davidson & Wenden 1878, Burgess 1854). It was a very common resident vulture species in Vidarbha (D'Abreu 1923). There are few recent records from eastern Vidarbha, Nagpur (through pers.comm. from Rohan Chakravarty in 2007; Tarique Soni in 2008; Sanjay Nafdey, Kumar Zilplwar, and Kuldeep Shukla in 2012; and Rajendra Pradhan in 2013. Two individuals were sighted near Navegaon National Park in 2011 (Paliwal G.T. 2013). The Egyptian Vulture can be seen walking around villages and traveler camps, looking for carrion, offal, garbage, and human excrement. It opportunistically picks up crickets, frogs and alates of emerging termites. It has a narrow long beak which helps it in tearing off small pieces of meat. The Egyptian Vulture is

usually solitary or found in pairs with juveniles. It roosts singly or in small groups, generally on tall trees, but electric towers are frequently used where tall trees are absent. It is mostly resident and seen around its usual haunts throughout the year sometimes undertake short to long distance migration as conditions become unsuitable during winter. It feeds on dead animals but can also kill stranded fish and turtles, and perhaps small prey. Prakash & Nanjappa(1988) observed Egyptian Vulture actively killing Checkered keelback water snake in Keoladeo NP, Bharatpur. It mainly nests on cliffs, rocky projections, brackets of occupied buildings, abandoned forts and ruins, but occasionally on tall trees. A single egg is laid and both parents share incubation and chick-rearing duties.

Threats & conservation measures

In some areas, loss of wild ungulate populations and hence reduced food supply is the main threat, while in some countries antibiotic residues in cattle carcasses could be the major threat. In India the annual rate of population decline was 35% during 2000-2003. In India, the main threat could be poisoning by feeding on cattle carcasses treated with diclofenac, as has been seen in Gyps species of vultures. Earlier when Gyps species of vultures were in abundance, they would not allow the Egyptian Vulture to feed on internal organs of a carcass such as lung and liver, but now with the near total disappearance of Gyps vultures from the Indian subcontinent, Egyptian Vulture has a great chance to feed on such internal organs that contain more diclofenac than the muscles on which they use to feed earlier. Thus

the risk increases. It is listed in Schedule IV of the Indian Wildlife (Protection) Act, 1972. In India, still occurs in numerous PAs. The veterinary use of diclofenac has been totally banned by the Indian Government since 2006.

Sarus Crane *Grus antigone* (Linnaeus 1758)

Bird Life International (2013) justifies including Sarus Crane in the vulnerable category as it has suffered a rapid population decline, which is projected to continue, due to widespread reduction in the extent and quality of its wetland habitats, poisoning and pollutants. The Sarus Crane, which stands between 152 and 156 cm, is the tallest flying bird in the world. It is grey overall, with whiter mid-neck mostly naked red head and upper neck, blackish primaries, mostly grey secondaries, and reddish legs that are bright during breeding and pale outside the breeding season. The female is supposed to be slightly smaller, but sometimes this difference is imperceptible. Juvenile has feathered buffish head and upper neck, and duller plumage with brownish feather fringes. The bare red skin of the adult head and neck is brighter during the breeding season. This skin is rough and covered by papillae and a narrow area around and behind the head is covered with black bristly feathers. The Sarus Crane has a wide distribution range in north and north-west India. Nearly 100 years ago, Sarus was reported from many parts of Maharashtra but it was never a common bird as in north and north-west India. D'Abreu (1923) mentioned it as a resident which breeds in July and August in the erstwhile Central Provinces (now Vidarbha and MadhyaPradesh). In the 1970s,

there were at least 37 pairs of Sarus Crane at Navegaon Bandh reservoir, Bhandara district, but now there are none (Dhurve *et al.*, 2010). Presently there is a small population of around 50-60 birds in the whole of eastern Maharashtra (Bhandara and Gondia districts) according to the survey done in the monsoon of 2010 by Gondia Nisarg Mandal on 15 sites (Dhurve *et al.*, 2010). Two birds were regularly sighted at Shrungar Bandh Lake, near Navegaon National Park, Maharashtra (Paliwal & Bhandarkar 2012), but were killed by poisoning. The population in Chandrapur district around Tadoba has drastically declined and only one or two birds are sighted here now (Sanjay Karkare & Nandkishor Dudhe pers. comm. 2013). The Sarus uses open wet and dry grasslands, agricultural fields, marshes, and jheels for foraging, roosting, and nesting (Sundar *et al.*, 2000; Sundar & Choudhury 2003, 2005). Wetlands, even very small ones close to roads and human habitation, are the preferred habitat for construction of nests (Sundar 2009). For foraging, Sarus usually uses crop fields to a lesser extent and prefers feeding in wetlands. It is omnivorous, feeding on a variety of roots and tubers as well as invertebrates and amphibians. It has a long breeding season, starting just at the onset of monsoon (July) and extending to October-November. Both parents select the nest sites and help in nest building. Clutch size is usually one or two eggs, but mostly one chick is successfully raised. The juvenile moves with the parents for almost a year, till the next breeding season. In areas with perennial water supply through wetlands and irrigation canals,

pairs maintain discrete territories throughout the year.

Threats & Conservation

In India, Sarus is considered a sacred bird so hunting is not the main problem; it is habitat destruction and habitat alteration which are taking their toll. Wetlands are under tremendous pressure from human use, drainage and conversion to agriculture, housing colonies and even construction of highways. In the tribal belt of Maharashtra, the bird and its eggs are stolen and eaten by poachers. Another danger is from the use of insecticides for poaching of water birds. The Sarus Crane feeds on the poison-treated grains and eventually dies of toxicity (Paliwal & Bhandarkar, 2013).

Conservation measures underway

The Sarus Crane is listed in Schedule IV of the Wildlife (Protection) Act, 1972, and in CITES Appendix II and CIVIS Appendix II. It is the State Bird of Uttar Pradesh where nearly 50% of India's Sarus population is present. The Uttar Pradesh government has established the Sarus Protection Society. This crane is also present in many PAs/IBAs, but the majority of the population is found in cultivated lands, where it is safe largely due to farmers who are tolerant of these sacred birds.

People's drive to protect Sarus Crane

Eight years ago, two to three pairs of Sarus Crane used to breed at the Shrungar Bandh Lake (bodi) near Bondgaon (Surban) village in Arjuni (Morgaon) tehsil of Gondia district. But then only one pair appeared for breeding, and the eggs were being stolen. A guard was appointed by the Department of Forests to secure the nest, still the eggs were stolen. At

last, the forest department took the help of local people, which brought about change. Every year, the pair was raising chicks successfully. The last pair was killed by poisoning in 2012. A Saras Swarakshan Samiti (Sarus Conservation Committee) was formed in Bondgaon. The people of Bondgaon organise a Saras-Gidhad Savrakshan Yatra (Sarus and Vulture Conservation Rally) during Wildlife Week every year, and they are giving protection to the existing pair of Sarus Crane in their village. The attempts of forest officers in Gothangaon to protect nesting Sarus Crane in their area is to be appreciated. The villages where Sarus Cranes breed have been declared as Sarus Gram (Sarus village) and sign ages to that effect are installed at prominent places by the Mandal. BNHS is helping the NGOs through the IBCN Small Grant Programme in this conservation initiative which has shown a positive outcome as the number of Sarus Crane is increasing (Anon. 2013).

Black-tailed Godwit *Limosa limosa* (Linnaeus 1758)

Although Black-tailed Godwit is widespread and has a large global population, its numbers have declined rapidly in parts of its range owing to changes in agricultural practices. In 2006, Bird Life International classified this species as Near Threatened due to an estimated decline in numbers of around 25% during the preceding 15 years. One of the large waders (40-44 cm) found in India, with a distinctive long bill on a relatively small head, long neck, and long legs. In winter, the colour of its fore body is a pale grey-brown, which becomes a dull pink- chestnut by March-end or April

when the birds migrate to their breeding areas. In flight it has a striking white wing bar and rump, and black tail. The female is c. 5% larger than the male. The Black-tailed Godwit is a fairly common winter migrant to the entire subcontinent. In Maharashtra, it is reported from many sites. D'Abreu (1934) had shot a bird at Sonegaon Lake in Nagpur which is now in the city because of urbanization. It was also observed in Amravati and Nagpur districts of Vidarbha (Kasambe & Wadatkar 2002, Kasambe & Sani 2009), usually in small numbers in all large wetland reservoirs in winter. Pune region: Mahabal & Lamba (1987) mentioned sightings from Katraj Ghat, Pashan, and Mula-Mutha near Pune, but treated it as 'rare'; they also recorded it from a few sites in Pune district. Nashik region: Decline in population of Black-tailed Godwit from 350-450 in 2001-2004 to 150-200 in 2005-2010 was observed by B. Raha (pers. comm. 2010). Raha also recorded a group of four godwits staying at Gangapur Dam from May 1 to August 31, 2006 and found it to be a regular visitor to Nandur-Madhmeshwar in Nashik district during a 10-year period (2001-2009). It was reported at Jaikwadi Dam, Paithan, Aurangabad district (Vyawahare & Kulkarni 1986). It was seen in Gondur and Shanimandal tanks, Dhule district (Vyawahare 1992). It is a winter migrant in India, with the first birds arriving by the last week of August or early September, and becoming well dispersed all over India by late November and December. Very social, sometimes seen in tens of thousands (e.g., in Chilika) foraging on soft mud and ooze for small invertebrates.

Sometimes seen solitarily or in small parties of 5- 10 individuals on roadside puddles or village ponds. It feeds on tiny molluscs, crustaceans, worms, and seeds of grass and marsh plants. It is very silent in winter. During the breeding season, it gives high-pitched, nasal, rather strident calls, most common of which is a weeka-weeka-weeka (BirdLife international 2013). According to BirdLife International (2013), it breeds from April to mid-June in loose, semi-colonial groups of up to three pairs per ha. It breeds in lowland wet grasslands, grassy marshland, raised bogs and moors, lake margins and damp grassy depressions in steppes. Secondary habitats such as wet meadow, pasture, damp areas around fish-ponds and sewage farms, and salt-water lagoons are also used.

Threats & Conservation measures

In the breeding areas, loss of nesting habitat owing to wetland drainage and agricultural intensification, hunting and poaching are the major threats (Bird Life International 2013). Trapping of waders, including Black-tailed Godwits a huge problem in certain parts of India. Drainage of wetlands, afforestation of shallow wetlands and mudflats, poaching and pollution are the major threats. Climate change is likely to play a major role in further decline of this species. The Black-tailed Godwit has been recorded in trade by Daniel *et al.*, (1999) and also during bird trade survey by Ahmed (2002). The volume of trade and impact of trapping remains completely undocumented as the trapped birds are sold the very same day. They are sold at a premium for meat, secretly to trusted customers and hence the trade

remains undocumented and hard to expose most of the time. Like all waders, it is protected under the Indian Wildlife (Protection) Act, 1972. It is listed in Schedule IV of the Act. It occurs in a large number of IBAs/PAs.

River Tern *Sterna aurantia* (Gray 1831)

River Tern *Sterna aurantia* has been up listed to Near Threatened category because increasing human disturbance and dam construction projects are expected to drive a moderately rapid population decline over the next three generations (BirdLife International 2013). A medium-sized tern, 38-43 cm long, with dark grey upper parts, white under parts, a forked tail with long flexible streamers, and long pointed wings. Bill yellowish with black tip, legs red, and black cap in breeding plumage. Sexes are similar, but juveniles have a brown head, brown-marked grey upper parts, grey sides to the breast, and white under parts. It inhabits rivers and freshwater lakes, also occurring rarely on estuaries, and it feeds predominantly on insects. Breeding records are known from early March to early May (Unnithan & Unnithan 2002, Bharucha *et al.*, 1988) and breeding occurs mainly in colonies in less accessible areas such as islands and sandbanks in rivers (delHoyo *et al.*, 1996). It nests in a scrape on the ground, often on bare rock or sand, and lays three greenish-grey to buff eggs, which are blotched and streaked with brown. Usually River Tern is seen in groups of 10-12 birds. River Tern is a common widespread resident of most of peninsular and northern India. In Maharashtra, it is a common resident found along all the

major rivers and wetlands. It breeds in summer on small islands formed in the backwaters of wetlands during the summer months. In Maharashtra, breeding colonies of River Tern were recorded from Ujjani (Bradbeer 1987, Bharucha & Gogte 1990. Bharucha *et al.*, 1988) and Lonavla in Pune district (Unnithan & Unnithan 2002). D'Abreu (1923) mentioned that it breeds gregariously in March, April, or May in the Central Provinces (now Vidarbha and Madhya Pradesh). Recently, a breeding colony of about 350 nests with eggs and chicks along with 30-40 fledglings was observed in Bhimariver near Indapur, Pune in May 2013 (Kamlakar Fartade pers. comm.). Breeding colonies of River Tern along with other ground nesting birds were found on small islands formed in the backwaters during summer in Nagpur district (Raju Kasambe pers. obs.); in Amravati district (Jayant Wadkar pers. comm. 2013); Chndrapur district (Latish Dekate pers. comm); and Jalgaon district (Anil Mahajan pers. com. 2013).

Threats & Conservation measures

Nesting areas are vulnerable to flooding, predation, and other disturbance (del Hoyo *et al.*, 1996). The multitude of dam construction projects completed, underway, or planned in Maharashtra may also threaten the species through changes in flow regime and flooding of nest sites. The eggs of River Tern are lifted by villagers and they are also trampled by livestock which are brought to the reservoirs to drink water in summer (Nandkishor Dudhe pers. comm. 2013). This bird listed as Near Threatened by Birdlife International (2013).

Malabar Pied Hornbill *Anthracoceros coronatus* (Boddaert, 1783)

According to BirdLife international (2013), Malabar Pied Hornbill is considered Near Threatened as it has a moderately small population, and is likely to decline as a result of continuing habitat loss. The Malabar Pied Hornbill is a medium-sized hornbill, c. 92 cm in length. It has mainly black plumage, apart from its white belly, throat patch, tail sides and trailing edge to the wings. The bill is yellow with a large, mainly black casque. Female has white orbital skin, which is black in the male. There is no black on cutting edge of bill in male. The female lacks black at the rear end of casque. Juveniles lack the casque. This species occurs from southwest West Bengal and Bihar to northern Andhra Pradesh, Western Ghats, mainly along the eastern edge, south of southern Maharashtra. In Maharashtra, it has been reported from nine IBAs, namely INS Shivaji and adjoining areas (Lonavla), Koyna Wildlife Sanctuary, Melghat Tiger Reserve, Nagzira Tiger Reserve, Navegaon National Park, Radhanagari Wildlife Sanctuary, Tadoba-Andhari Tiger Reserve, Sanjay Gandhi National Park and Tansa Wildlife Sanctuary, Mumbai (Rahmani *et al.*, 2013). Kasambe & Wadkar (2006) reported the presence of a small breeding population from Melghat Tiger Reserve in 2003. Pench Tiger Reserve (12 birds in four sightings), and Tadoba-Andhari Tiger Reserve (five birds in four sightings). It was sighted in Navegaon National Park on March 20, 2011 (Paliwal *et al.*, 2013). Aniket Deshkar (pers. com. 2013) sighted 6 birds in Umred-Karandla Tiger Reserve in May 2013.

It is locally common but declining in deciduous forests, edges of evergreen forests, plantations, groves, riparian areas, and even villages. It usually feeds and roosts in small to medium-sized groups. It is primarily arboreal and frugivorous (Rasmussen & Anderton 2012), but can be omnivorous, taking fruits, small mammals, birds, small reptiles, and insects. Wagh *et al.*, (2013) have recorded 11 fruit species, in the diet of this hornbill in Vidarbha. It breeds in single pairs during March to September.



Sarus Crane



Black-Headed Stork



Malabar Pied Hornbill



Lesser Adjutant



White rumped Vulture

Conservation

According to Mudappa & Raman (2009), Amboli-Goa-Dandeli is perhaps the most important region for the conservation of four species of hornbills, including Malabar Pied Hornbill, because of the relatively high encounter rates and density of the species. They also mention that a significant proportion of the population is found outside designated protected areas such as at Amboli in Maharashtra and adjacent corridor in Goa and Karnataka. They suggest that this region should be considered for designation as a protected area.

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