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Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

NOTE

IMPACT OF CYCLONE FANI ON THE BREEDING SUCCESS OF SANDBAR-NESTING BIRDS ALONG THE MAHANADI RIVER IN ODISHA, INDIA

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26 November 2019 | Vol. 11 | No. 14 | Pages: 14895–14898

DOI: 10.11609/jott.5480.11.14.14895-14898



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IMPACT OF CYCLONE FANI ON THE BREEDING SUCCESS OF SANDBAR-NESTING BIRDS ALONG THE MAHANADI RIVER IN ODISHA, INDIA

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Extreme weather events can have severe negative effects on animal populations (Hennicke & Flachsbarth 2009). Events such as cyclonic storms, synonymously known as typhoons, cyclones, or hurricanes are common worldwide and their occurrence can have both direct and indirect effects on bird population. Wiley & Wunderle (1993) made an extensive review on the consequences of such effects on birds. Birds those inhabit in open and exposed areas are especially susceptible to severe cyclonic effect (Cely 1991). The direct effects include decline in population due to mortality and physical injury (Nagarajan & Thiyagesan 1995; Wolfaardt et al. 2012), geographic displacement (Legrand 1985; DeBenedictis 1986), destruction of breeding sites (Reville et al. 1990; Shepherd et al. 1991), and loss of eggs and chicks (Reville et al. 1990; Hennicke & Flachsbarth 2009; Wolfaardt et al. 2012). Aftermath of cyclonic storms, the surviving population also experiences indirect effects. Due to lack of foraging site and food resource availability, the parent birds fail to provide provisioning services to their chicks leading to infant mortality from starvation (Feare 1976; Langham 1986). Information on the effect of

such cyclonic storms on the birds those inhabit and breed in riverine habitats, however, is very scarce and is anecdotal. In this note I report the impact of Fani, an extremely severe cyclonic storm, on different waterbird species that breed on the sandy islands along Mahanadi River in Odisha, eastern India.

The Mahanadi River is the largest river in Odisha and different stretches of it have been identified as important waterbird congregation sites (Nair et al. 2014; Kar & Debata 2018). During summer season, a number of sandy islands in this river are also used as regular breeding sites for several waterbirds including some of the globally threatened species (Rahmani & Nair 2012; Kar & Debata 2018; Kar et al. 2018; Debata et al. 2019). I observed breeding activities of Black-bellied Tern *Sterna acuticauda* J.E. Gray, 1831, River Tern *Sterna aurantia* J.E. Gray, 1831, Little Tern *Sternula albifrons* (Pallas, 1764), Indian Skimmer *Rynchops albicollis* Swainson, 1838, River Lapwing *Vanellus duvaucelii* Lesson, 1826, Great Thick-knee *Esacus recurvirostris* Cuvier, 1829, Small Pratincole *Glareola lactea* Temminck, 1820, and Black-winged Stilt *Himantopus himantopus* (Linnaeus, 1758) from seven different islands along the Mahanadi River during January–July 2019 (Figure 1). Among all the species, breeding activity of Black-bellied Tern was completed much earlier in April while for the other species it continued beyond April. Every day I visited every nesting site during 05.30–08.30 h to monitor the existing nests and chicks, and record new nests. I also counted the individuals of each species. As on 02 May 2019, there



ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

PLATINUM
OPEN ACCESS



DOI: <https://doi.org/10.11609/jott.5480.11.14.14895-14898>

Editor: Anonymity requested.

Date of publication: 26 November 2019 (online & print)

Manuscript details: #5480 | Received 20 October 2019 | Final received 23 October 2019 | Finally accepted 05 November 2019

Citation: Debata, S. (2019). Impact of cyclone Fani on the breeding success of sandbar-nesting birds along the Mahanadi River in Odisha, India. *Journal of Threatened Taxa* 11(14): 14895–14898. <https://doi.org/10.11609/jott.5480.11.14.14895-14898>

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Funding: Compensatory Afforestation Fund Management and Planning Authority, India.

Competing interests: The author declares no competing interests.

Acknowledgements: The present study is an outcome of the ongoing breeding activity monitoring work of Indian Skimmer along the Mahanadi River by the Odisha Forest Department and it is being financially supported by the Compensatory Afforestation Fund Management and Planning Authority, India. I would like to thank K. Swain, divisional forest officer, Chandaka Wildlife Division for his support during the study. Thanks to S.K. Dalai for his assistance in identifying nesting sites and T. Kar for preparing the map.



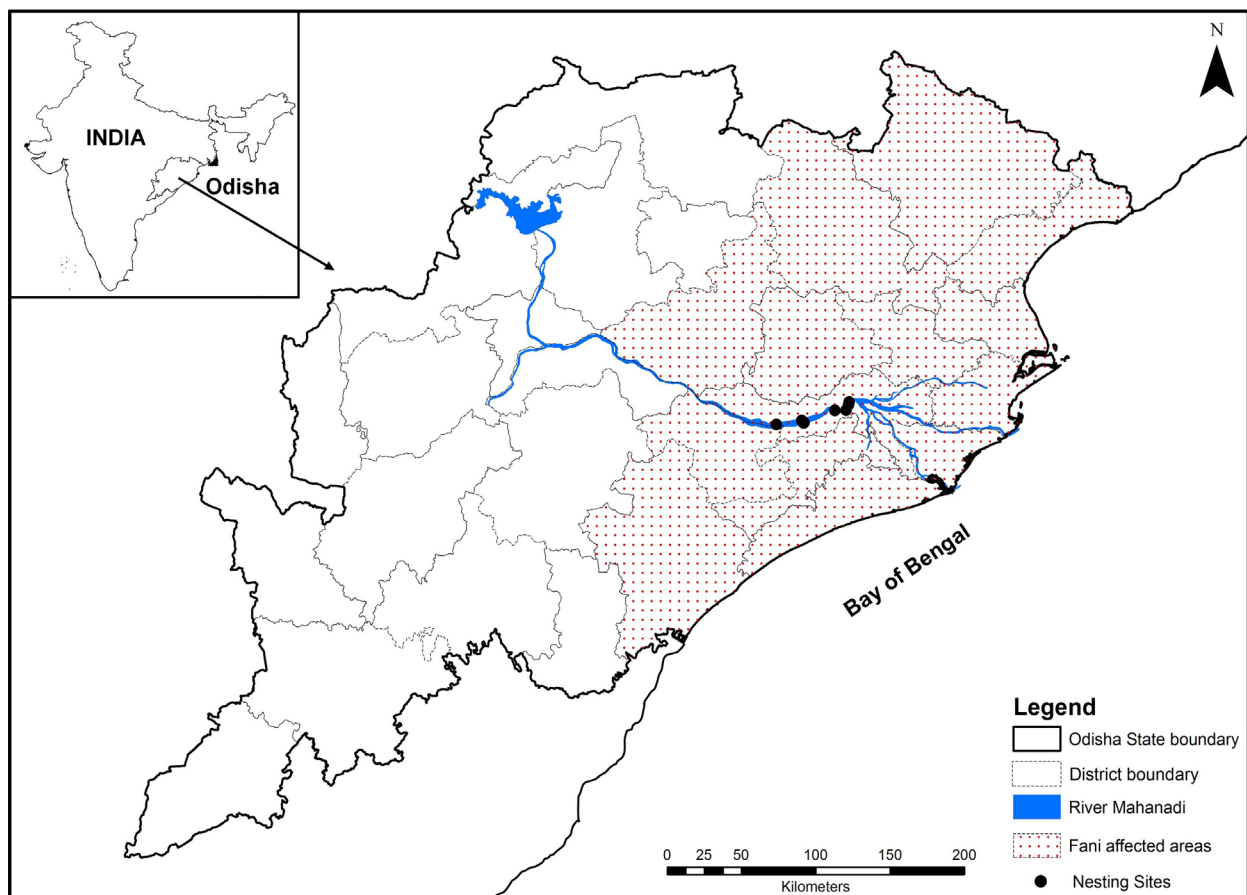


Figure 1. Map showing the cyclone Fani affected areas and location of the nesting sites of different sandbar-nesting birds along the Mahanadi River in Odisha, eastern India during the year 2019.

were a total of 269 active nests and 154 chicks. The population count, number of active nests, and chicks of each species is given in Table 1.

On 03 May 2019, at around 08.00h, cyclone Fani made a landfall in Odisha. During this period, the maximum wind speed reached up to 250km/h along with heavy rainfall, and about 13 districts were severely affected from it (Figure 1). As all the identified nesting sites in the study area are situated within the affected zone (Figure 1), they also experienced the consequences. My survey on 04 May 2019 found that Fani had major negative impacts on the population, nesting sites, nesting success, and chick survival (Image 1; Table 1). Overall, there was a relative decline of 81% in population of all the species. All the nesting sites were damaged and none of the active nests or chicks of any species survived (Table 1). Out of the 154 chicks of all species, I could only detect the carcass of 12 chicks of Indian Skimmer and seven chicks of River Tern. I could not detect any egg.

My discussion with the local people revealed that during the cyclone, there was an increase in water

level and high tide in the river, which resulted in the submergence and flooding of the islands. The heavy rain and rise in water level might have resulted in flooding of the nests. Due to high tide and water current, the eggs and chicks might have drowned in water. As the wind speed was very strong during the time, there is a possibility that some of the chicks and adults might have also been blown away. Such effects from extreme weather event have also been reported in different time periods across India. During the late 80s several species of birds died due hailstorms in Karera Bustard sanctuary, Madhya Pradesh (D'Cunha & Akhtar 1987), and Jaipur in Rajasthan (Rammanohar & Rajasekaran 1989). In Pichavaram Mangrove forest of Tamil Nadu, mortality of birds has been reported on several occasions due cyclones during 1993 (Nagarajan & Thiyagesan 1995; Thiyagesan & Nagarajan 1997). In 2013, cyclone Phailin had major impacts on mass mortality and destruction of nesting sites of several species of birds in Andhra Pradesh (Anonymous 2015) and Odisha (Senapati 2015). In 2014, the impact of hailstorms resulted in the death of

Table 1. Impact of cyclone 'Fani' (Landfall date 03 May 2019) on different sandbar-nesting birds along the Mahanadi River in Odisha, eastern India during the year 2019.

Species (Common name)	IUCN Red List status	Before Fani (02.v.2019)			After Fani (04.v.2019)			Relative decline (%)		
		Population	Active nests	Chicks	Population	Active nests	Chicks	Population	Active nests	Chicks
<i>Rynchops albicollis</i> (Indian Skimmer)	VU	172	40	88	65	0	0	62	100	100
<i>Sterna aurantia</i> (River Tern)	NT	63	27	29	18	0	0	71	100	100
<i>Sternula albifrons</i> (Little Tern)	LC	32	35	7	6	0	0	81	100	100
<i>Vanellus duvaucelii</i> (River Lapwing)	NT	26	13	6	11	0	0	57	100	100
<i>Esacus recurvirostris</i> (Great Thick-knee)	NT	8	1	2	2	0	0	75	100	100
<i>Glareola lactea</i> (Little Pratincole)	LC	>500	152	22	50	0	0	90	100	100
<i>Himantopus himantopus</i> (Black-winged Stilt)	LC	4	1	0	1	0	–	75	100	–

VU—Vulnerable | NT—Near Threatened | LC—Least Concern.



Image 1. Effect of Fani on breeding failure of sandbar-nesting birds along the Mahanadi River in the year 2019: A—damage of the nesting site protection fencing | B—flooding of nesting site | C—dead chick of Indian Skimmer | D—dead chick of River Tern. © Subrat Debata.

more than 50,000 birds in several areas of Maharashtra (Narwade et al. 2014). In 2018, two cyclones, Titli and Gaja also had similar impacts on mortality of several hundreds of birds in Andhra Pradesh (Babu 2018) and in Point Calimere in Tamil Nadu (Kolappan 2018).

It is predicted that changing pattern of global climate

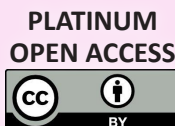
will increase the frequency and intensity of storms worldwide (IPCC 2007). So, possibilities of cyclonic effects on birds are also likely to increase. The impact can be detrimental and could even lead to local extirpation of the species that represent limited population and distribution range (Parmesan et al. 2000; Scheffer et al.

2001). Among all the eight species of birds those breed along the Mahanadi River, five are globally threatened. Apart from the ongoing threats, complete failure of breeding activity form the consequences of cyclones may lead to rapid population depletion and local extinction of these species in the long run.

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ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

November 2019 | Vol. 11 | No. 14 | Pages: 14787–14926

Date of Publication: 26 November 2019 (Online & Print)

DOI: 10.11609/jott.2019.11.14.14787-14926

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