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Research Article

An Assessment of Water bird species and associated water bird composition in the Haiderpur Wetland of Hastinapur Wildlife sanctuary Uttar Pradesh, India

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ABSTRACT

Bird species are natural indicators of healthy ecosystem. Indian sub-continent contributes about 13% of the world avian species. A study was carried out between year 2017 and 2019, at Haiderpur wetland (Hastinapur wildlife sanctuary) along the Ganga River in Utter Pradesh. Total 66 water bird species belonging to 15 families were encountered. Among the water bird species 04 Vulnerable (Common Pochard, Black headed ibis, Sarus crane, Indian skimmer), 06 near threaten (River Lapwing, Northern lapwing, River tern, Painted stork, Woolly-necked Stork, Black-tailed Godwit) and 01 Endangered (Black-bellied Tern) waterbird species (as per IUCN records) were reported in the Haiderpur wetland area. The contribution of water migratory bird is about 29% in the study area. This area is contributing as birding site thus more focus on conservation of this site.

Key words: Wetland, Migratory bird, Haiderpur Wetland, Hastinapur wildlife sanctuary, Uttar Pradesh

INTRODUCTION

Birds play an important role to monitor the health of natural ecosystems (Collar and Andrew, 1988; Pertti Koskimies, 1989; Gregory *et al*. 2003). About ten thousand avian species has been reported in the world and Indian sub-continent contributes about 1331 species of the world avian species (Grimmett *et al*., 2011). A tran-sitional zone between aquatic and terrestrial system pro-vides a wetland zone (Cowardin et. al., 1979; SACON 2013) and Wetlands are among the most productive and biologically rich ecosystems on earth (Richardson 1995). In India, about 5.16% of total geographical area is recognized as wetland (SAC, 2011). Now a day, these wetlands are degrading through various anthropogenic activities therefore a periodic survey on wetland avian species is required to understand the health of natural ecosystem. A survey was made to understand the status of water bird species in Haiderpur wetland of Hastinapur Wildlife Sanctuary, Uttar Pradesh.

In India, about 42 Ramsar wetlands sites are recognized out of these 8 wetlands sites are in Uttar Pradesh and about 31 important birding areas (IBA's) have been recognized in different district of Uttar Pradesh (Islam and Rahmani 2008; MoEF, 2020). However, a periodic monitoring on avian diversity and abundance is useful to understand the status of an ecosystem and res-toration planning for habitat. Although, few short-term studies (Riyaz 2000; Tanveer 2000) based on bird com-munity Checklist have been conducted in Hastinapur Wildlife Sanctuary. However, this area has been recog-nized as an important birding area (Islam & Rahmani 2004). In the last decade, few studies (Khan *et al*., 2013; Arya *et al*., 2020) have focused on avian status in Hastinapur and their adjoin area. In addition, some recent studies (Saini *et al*., 2017; Sinha *et al*., 2019; Ahmed *et al*., 2019; Arya *et al*., 2021; Joshi *et al*., 2021) also conducted to know the diversity status of water bird species on the Ganga River and the Bhagirathi stream of Uttarakhand.The present study is focusing on the status of water bird species in Haiderpur wetland of Hastinapur, Wildlife sanctuary, Uttar Pradesh.

MATERIAL AND METHOD

Study area:

The water bird avian survey was conducted in Haiderpur wetland (29°22'46.9"N; 77°59'37.1"E) of Hastinapur Wildlife Sanctuary, Uttar Pradesh. The boundary of Sanctuary is consisted with four districts (Muzaffar Nagar, Meerut, Ghaziabad and Bijnor) districts of Uttar Pradesh and covered about 2073 Km^2 area. This sanctuary is divided into microhabitats namely Khola, Khadar, River Ganga and Boodhi Ganga. The study site, Haiderpur wetland is situated in the western side of the Ganga River Barrage and covers about 12 km^2 areas (Figure 1). The tropical dry deciduous, tropi-cal secondary scrub and tropical grassland vegetation composition is present across the wetland.

Wetland bird survey:

The water bird survey was carried out from January 2019 to January 2021. Line transects and point count methods (Bibby *et al*, 2000) were applied to quantify the abundance and diversity of water bird. The survey was done between October to March, morning 07:00 am to 11:00 am and evening 04:30 pm to 06:30 pm and between April to September, morning 10:00 am to

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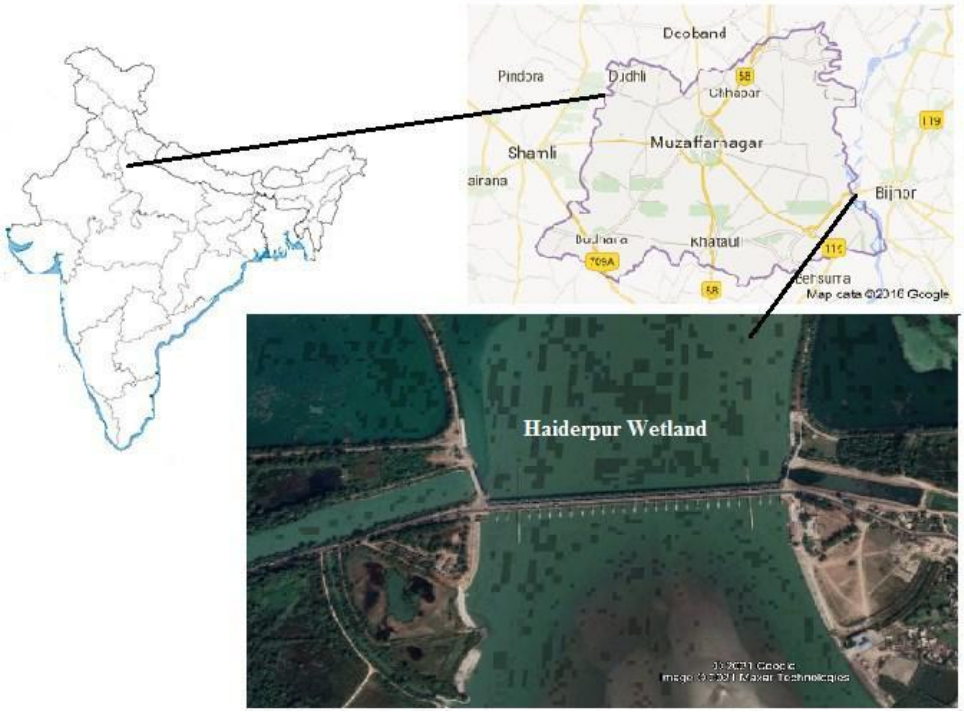

Figure 1. Study area Haidepur wetland, Muzaffarnagar, Uttar Pradesh, India

12:00 pm and 04:00 pm to 07:00 pm.; the same study points and transects were revisited in the following years. The encountered water bird species were taken photographs with camera (Model Canon SX60HS) and identified by the using field guidebook (Grimmett *et al*. 2011). We reported water bird species however some water dependant species namely wagtails and kingfishers were also present in the study area. The mean values of water avian species were used to determined species diversity and richness. Shannon diversity index (Shannon and Weaver, 1949) was used to calculate the avian diversity and abundance.

RESULTS AND DISCUSSION

Total of sixty-six waterbird species belonging to fifteen families were reported during the survey (Table 1). Of these, twelve avian species were contributed as water-dependent/associated bird species, and 19 winter migrant species recorded which breeds in Eurasia and visits Hastinapur wetland in winter (Annexure 1). Maximum water bird species namely Ducks, Pochard and Goose belonged to Anatidae (16) and followed by Darter, Heron, and Egret belong to Ardeidae (9) respectively. Out of sixty-six species, 04 Vulnerable (Common Pochard, Black headed ibis, Sarus crane, Indian skimmer), 06 near threaten (River Lapwing, Northern lapwing, River tern, Painted stork, Woolly-necked Stork, Black-tailed God-wit), (Figure 2a, 2b) and 01 Endangered (Black-bellied Tern) waterbird species (as per IUCN records) were rec-orded in the Haiderpur wetland site. However, some pre-vious studies (Khan, 2013) reported 117 avian species in Hastinapur wildlife sanctuary area, including 51 water bird species. Similarly, an avian survey (Arya *et al*., 2020) in Hastinapur wetland area (12km^2) reported 226 avian species including 56 waterbird species. In the pre-sent study, the waterbird species diversity was calculated H = 2.45 and the abundance (19) of water migratory birds in Haiderpur wetland also indicates availability of rich food sources and vegetation cover for shelters to the bird species. The variety of food availability and safe shelter sites influences the avian diversity in the habitat (Terborgh 1977; Wiens and Rotenberry 1981; Rajpar *et al*., 2011; Joshi *et al*., 2015).

Figure 2. Near Threaten (IUCN) River lapwing (*Vanellus duvaucelii*) (2a) and Painted stork (*Mycteria leucocephala*) (2b) water bird species reported in Haiderpur wetland site.

Table 1. Waterbird species reported in Haiderpur wetland, Uttar Pradesh, India

Family	Common Name	Scientific Name	Distribution Status	IUCN Status	IWPC status
Anatidae	Lesser Whistling-Duck	*Dendrocygna javanica*	R/LM	LC	IV
	Graylag Goose	*Anser anser*	WM	LC	IV
	Bar Headed goose	*Anser indicus*	R/WM	LC	IV
	Common Shelduck	*Tadorna tadorna*	WM	LC	IV
	Ruddy Shelduck	*Tadorna ferruginea*	R/WM	LC	IV
	Northern Shoveler	*Spatula clypeata*	WM	LC	IV
	Eurasian wigeon	*Mareca penelope*	WM	LC	IV
	Tufted duck	*Aythya fuligula*	WM	LC	IV
	Gadwall	*Mareca strepera*	WM	LC	IV
	Indian Spot-billed Duck	*Anas poecilorhyncha*	R/LM	LC	IV
	Knob-billed duck	*Sarkidiornis melanotos*	R/LM	LC	IV
	Northern Pintail	*Anas acuta*	WM	LC	IV
	Green-winged Teal	*Anas crecca*	WM	LC	IV
	Common Pochard	*Aythya ferina*	WM	VU	IV
	Red-crested Pochard	*Netta rufina*	WM	LC	IV
	Ferruginous Duck	*Aythya nyroca*	R/WM	LC	IV
Anhingidae	Oriental Darter	*Anhinga melanogaster*	R/LM	LC	IV
Ardeidae	Night heron	*Nycticorax nycticorax*	R/LM	LC	IV
	Striated heron	*Butorides striata*	R	LC	IV
	Gray Heron	*Ardea cinerea*	R/WM	LC	IV
	Purple heron	*Ardea purpurea*	R/LM	LC	IV
	Great Egret	*Ardea alba*	R/LM	LC	IV
	Little Egret	*Egretta garzetta*	R/LM	LC	IV
	Cattle egret	*Bubulcus ibis*	R/AM	LC	IV
	Indian pond heron	*Ardeola grayii*	R/LM	LC	IV
Ciconiidae	Asian Open bill	*Anastomus oscitans*	R/LM	LC	IV
	Black stork	*Ciconia nigra*	WM	LC	IV
	Painted stork	*Mycteria leucocephala*	R/LM	NT	IV
	Woolly-necked Stork	*Ciconia episcopus*	R	NT	IV
Charadriidae	River Lapwing	*Vanellus duvaucelii*	R/LM	NT	IV
	Northern lapwing	*Vanellus vanellus*	WM	NT	IV
	Grey headed lapwing	*Vanellus cinereus*	WM	LC	IV
	Red-wattled Lapwing	*Vanellus indicus*	R/LM	LC	IV
	Little Ringed Plover	*Charadrius dubius*	R/WM	LC	IV
Gruidae	Common Crane	*Grus grus*	WM	LC	IV
	Sarus crane	*Antigone antigone*	R/LM	VU	IV
Jacanidae	Pheasant tailed jacana	*Hydrophasianus chirurgus*	R/LM	LC	IV
	Bronze-winged Jacana	*Metopidius indicus*	R	LC	IV
Laridae	Black headed gull	*Chroicocephalus ridibundus*	WM	LC	IV
	Caspian Gull	*Larus cachinnans*	WM	LC	IV
	Pallas's Gull	*Ichthyaetus ichthyaetus*	WM	LC	IV
	River tern	*Sterna aurantia*	R	NT	IV
	Whiskered Tern	*Chlidonias hybrida*	R/WM	LC	IV
	Black-bellied Tern	*Sterna acuticauda*	R	EN	IV
	Indian Skimmer	*Rynchops albicollis*	R/LM	VU	IV
Pandionidae	osprey	*Pandion haliaetus*	WM/R	LC	IV
Podicipedidae	Great creasted grebe	*Podicep scristatus*	R/WM	LC	IV
	Eared Grebe	*Podiceps nigricollis*	R/WM	LC	IV
	Little Grebe	*Tachybaptus ruficollis*	R/LM	LC	IV
Phalacrocoracidae	Little Cormorant	*Microcarbo niger*	R/LM	LC	IV
	Great Cormorant	*Phalacrocorax carbo*	R/WM	LC	IV
	Indian Cormorant	*Phalacrocorax fuscicollis*	R/LM	LC	IV
Rallidae	Eurasian Moorhen	*Gallinula chloropus*	R/WM	LC	IV
	Eurasian Coot	*Fulica atra*	R/WM	LC	IV
	Gray-headed Swamp hen	*Porphyrio poliocephalus*	R/LM	LC	IV
	White breasted water hen	*Amaurornis phoenicurus*	R	LC	IV
Recurvirostridae	Black-winged Stilt	*Himantopus himantopus*	R/LM	LC	IV
	Pied Avocet	*Recurvirostra avosetta*	R/WM	LC	IV

Table 1 continued in next page

Scolopacidae	Common Sandpiper	*Actitis hypoleucos*	R/WM	LC	IV
	common greenshank	*Tringa nebularia*	WM	LC	IV
	Common redshank	*Tringa totanus*	R/WM	LC	IV
	Black-tailed Godwit	*Limosa limosa*	WM	NT	IV
Threskiornithidae	Glossary ibis	*Plegadis falcinellus*	R/WM	LC	IV
	Black headed ibis	*Threskiornis melanocephalus*	R/LM	VU	IV
	Red napped ibis	*Pseudibis papillosa*	R	LC	IV
	Eurasian Spoonbill	*Platalea leucorodia*	R	LC	IV

Where, R = Staying in one place all the year, non-migratory; **WM** = A winter migrant to India which breeds in Eurasia and visits India in winter.; **R/LM** = Denotes a species resident in India throughout the year which, however, undertakes local movements depending on water conditions; **R/WM** = Denotes a species which is also resident in India; however, influx of the migratory population from the Palaearctic takes place in winter**; R/AM** = Denotes a species resident in India throughout the year which, however, undertakes altitudinal migration from the plains of India to the Himalayas in different seasons. IWPA = Indian Wildlife Protection Act; **IUCN** = International Union for Conservation of Nature

The results indicate the migratory bird species in winter contribute about 28% of avian diversity of the total wet-land bird diversity in the Hastinapur (Figure 3). Thus, migratory bird species play an important role to enhance the avian diversity of local area. Some studies (Somveille *et al*., 2013) also indicate at a global level the migratory birds constitute the majority of the local avi-fauna.

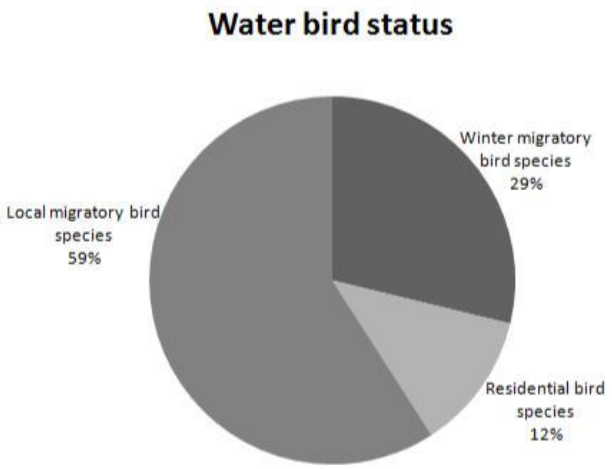

Figure 3. Status of waterbird species in the study area (Haiderpur wetland)

The presence of endangered, threatened species and rich water birds diversity in the study site indicates more attention is required on the conservation of wetland bird species. In addition, the enhancement of winter water migratory birds also indicates Haiderpur wetland is a suitable site for the water migratory bird species. How-ever, we have not reported any disturbance and anthro-pogenic activities near the wetland site although it is suggested that plantation across the wetland and conser-vation awareness programs must continue with the help of forest department. We can utilize the participation of citizen science in this area and a periodic interval water bird survey must be carried out in the Haiderpur wetland to understand the health of wetland ecosystem.

CONCLUSION

The current avian survey in wetland area is under the protected area (Hastinapur, wildlife sanctuary) and the rich avian diversity also attract to the researchers and avian biologists to understand the avian composition in the study site. In addition, the contribution of 28% winter migratory bird species increases the avian diversity of the Haiderpur wetland. The wetland habitat is appropriate for the winter migratory bird species and support to the abundance of avian specie. The occurrence of endan-gered and near threaten waterbird species also encourage to propose additional conservation efforts.

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