

Study of Diversity of Wader Birds in Soor Sarovar Bird Sanctuary, Agra

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Abstract

Wetlands are important ecosystems as they play a critical role in maintaining various natural cycles and support a wide range of biodiversity. Wader birds are a significant group of wetland-dependent birds that help in the proper functioning of wetlands. This study presents the diversity of the wader birds in the Soor Sarovar Bird Sanctuary in Agra district. Different spots were located around Keetham Lake and monitored on random 10 – 15 days a month mostly twice a day i.e., early morning and evening hours as per the study required. The study has been conducted for 1 year (January 2021-December 2021). Bird counting was done with the help of binoculars (Celestron 10x50) and the Point Count method and line transect method were applied during the survey. A total of 42 species of large and small waders were recorded and identified representing 4 orders and 9 families. 14 out of 42 species were winter migrants and 7 Near threatened species are recorded which signifies this bird sanctuary is an important bird area and needs to be maintained well to sustain and improve its biodiversity.

Keywords- *Wader, Wetlands, Migrants, Keetham Lake, Near Threatened, point count*

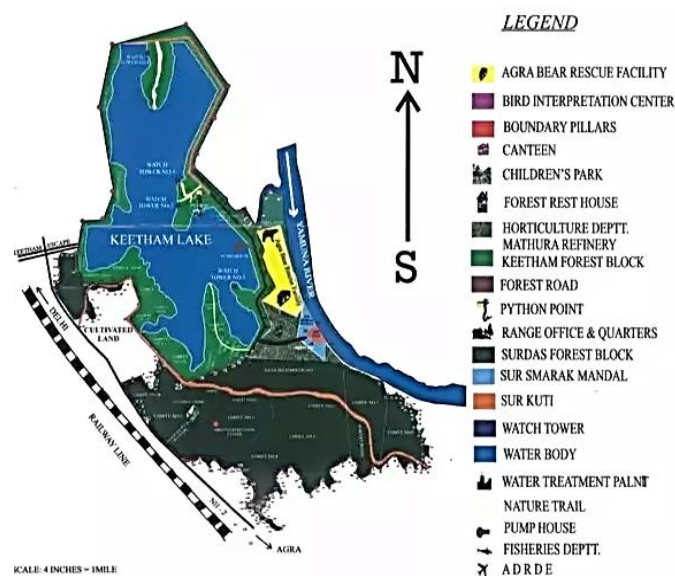
I. INTRODUCTION

Wader birds are those avian species that majorly depend on wetlands. They are the most visible fauna of wetlands and are found in all types of wetlands, whether they are natural or man-made (Hafner, 1997). Wading birds prefer mudflats with low emergent plants where they easily find their feed from the mud, shallow water or vegetation around the water body (Wang *et al.*, 2016). Waders belong to the families such as Ardeidea (egrets, herons and bitterns), Charadriidae (stilts and avocets), Scolopacidae (godwits, shanks, sandpipers, stints and snipes), Threskiornithidae (ibises and spoonbills), Gruidae (cranes) and Phoenicopteridae (flamingos). These birds possess special characteristics that are suitable for foraging in mud and shallow water. All waders have long legs and long agile toes which help them to walk and maintain balance in mud or wet areas where water current flows. Their beaks are long enough to dig into mud and shallow water and are specialised according to their feed. Their distinct colours and patterns of feathers provide immense beauty to the wetlands. Apart from aesthetics, waders play an important role in maintaining the wetland as they are the key indicators of any change that occurs in the environment along with keeping the ecological balance in check.

Extensive studies have been done on waders so far concerning their diversity, habitats, distribution pattern, foraging behaviour, breeding biology and significance of waders as indicators of pollution (Goss *et al.*, 1977; Klein, 1993; Kazantzidis and Gounter, 1996; Hafner, 1997; Maheshwaran, 1998; Kumar and Gupta, 2009; Gopi and Pandav, B. 2011; Gokulkrishnan *et al.*, 201; Kumar and Kanaujia, 2016).

II. STUDY AREA

Soor Sarovar Bird Sanctuary, Agra is situated at Mathura-Delhi National Highway no. 2 having geographical coordinates 27° 15'N and 77° 50'. The sanctuary has approximately 240 ha area of water body named Keetham Lake and about 400 ha of forest cover surrounded by river Yamuna on one side and agricultural land on the other side. The temperature here varies between 5°C to 48°C and the range of rainfall is 517 mm to 750 mm. The lake is situated in the middle of the sanctuary with numerous man-made islands. The shore and the island provide a good habitat for wader birds for foraging and breeding.



Map of Soor Sarovar Bird Sanctuary, Agra

III. MATERIAL AND METHOD

The study was carried out from January 2021 to December 2021. The survey was conducted at regular intervals of days in a month. Birds were observed mostly twice a day according to the season from 6 am to 9 am and 3.30 pm to 5.30 pm. Birds were counted by applying the Point Count and Line Transect method by using binoculars (Celestron 10x50). For photography, Nikon DSLR was used. Identification of waders was done with the help of standard books (Ali and Ripely, 1995; Ali, S. 2002; Grimmet and Inskipp, 2011).

All the identified waders were categorized into two groups – Small waders and Large waders (Ajitha and Jose, 2015), according to their body size. Birds were monitored and their data was collected as per

different seasons. The whole study period was divided into different seasons viz., Winter (November, December and January), Spring (February to March), Summer (April to June), Monsoon (July to August) and Autumn (September to October).

IV. RESULTS AND DISCUSSION

The study was conducted to assess the diversity of wader birds in Soor Sarovar Bird Sanctuary, Agra. A total of 42 species belonging to 4 orders and 9 families are found in a particular study period. Families Charadriidae, Burhinidae, Jacanidae, Recurvirostridae and Scolopacidae are consisting small waders and the large waders belong to families Ardeidae, Ciconiidae, Threskiornithidae and Phoenicopteridae as they possess longer legs and beaks, with a longer neck and overall larger size of their bodies.

Out of 42 species, 14 (33%) are winter migratory and reach the sanctuary in the later half of October month and last here till March or a few days of April. These winter migratory waders are Pied Avocet, Kentish Plover and all the waders found here from the family Scolopacidae. Whereas Openbill Stork, Greater Flamingo, Glossy Ibis, Little-ringed Plover, and White-tailed Lapwing are local migratory waders along with Pheasant-tailed Jacana and Bronze-winged Jacana resident migratory which constitute 12% and 5% of the total waders species respectively. 7 out of 42 species i.e., River lapwing, Great thick Knee, Black-necked stork, Painted stork, Woolly-necked stork, Black-tailed godwit and Black-headed ibis found here are listed in Near Threatened category of IUCN Red List (IUCN,2021). This represents the ecological importance of this bird sanctuary. The greatest number of species was recorded from the family Scolopacidae (29%) followed by Ardeidae (23%) and the least was from the family Phoenicopteridae (2%). The maximum diversity of waders was recorded during the migration period from late October to March and the minimum was in the summer season i.e., from April to June.

Table 1. List of wader birds, their residential and IUCN status in Soor Sarovar Bird Sanctuary, Agra

ORDER	FAMILY	COMMON NAME	SCIENTIFIC NAME	IUCN Status	RESIDENT Status
Pelecaniformes	Ardeidae	Cattle Egret	<i>Bubulcus ibis</i>	LC	R
Pelecaniformes	Ardeidae	Great Egret	<i>Ardea alba</i>	LC	R
Pelecaniformes	Ardeidae	Pond Heron	<i>Ardeola grayii</i>	LC	R
Pelecaniformes	Ardeidae	Grey Heron	<i>Ardea cinerea</i>	LC	R
Pelecaniformes	Ardeidae	Little Egret	<i>Egretta garzetta</i>	LC	R
Pelecaniformes	Ardeidae	Intermidate Egret	<i>Ardea intermedia</i>	LC	R
Pelecaniformes	Ardeidae	Night Heron	<i>Nycticorax nycticorax</i>	LC	R
Pelecaniformes	Ardeidae	Purple Heron	<i>Ardea purpurea</i>	LC	R
Pelecaniformes	Ardeidae	Yellow Bittern	<i>Ixobrychus sinensis</i>	LC	R
Pelecaniformes	Ardeidae	Striated Heron	<i>Butorides striata</i>	LC	R

Charadriiformes	Charadriidae	Kentish Plover	<i>Charadrius alexandrines</i>	LC	WM
Charadriiformes	Charadriidae	Little Ringed Plover	<i>Charadrius dubius</i>	LC	LM
Charadriiformes	Charadriidae	River Lapwing	<i>Vanellus duvaucelii</i>	NT	R
Charadriiformes	Charadriidae	White Tailed Lapwing	<i>Vanellus leucurus</i>	LC	R
Charadriiformes	Burhinidae	Great Thick Knee	<i>Esacus recurvirostris</i>	NT	R
Charadriiformes	Burhinidae	Indian Thick Knee	<i>Burhinus indicus</i>	LC	R
Ciconiiformes	Ciconiidae	Black Necked Stork	<i>Ephippiorhynchus asiaticus</i>	NT	R
Ciconiiformes	Ciconiidae	Painted Stork	<i>Mycteria leucocephala</i>	NT	R
Ciconiiformes	Ciconiidae	Woolly Necked Stork	<i>Ciconia episcopus</i>	NT	R
Ciconiiformes	Ciconiidae	Open Bill Stork	<i>Anastomus oscitans</i>	LC	LM
Charadriiformes	Jacanidae	Bronze Winged Jacana	<i>Metopidius indicus</i>	LC	LM
Charadriiformes	Jacanidae	Pheasant Tailed Jacana	<i>Hydrophasianus chirurgus</i>	LC	LM
Charadriiformes	Recurvirostridae	Black Winged stilt	<i>Himantopus himantopus</i>	LC	R
Charadriiformes	Recurvirostridae	Pied Avocet	<i>Recurvirostra avosetta</i>	LC	WM
Charadriiformes	Scolopacidae	BlackTailed Godwit	<i>Limosa limosa</i>	NT	WM
Charadriiformes	Scolopacidae	Common Greenshank	<i>Tringa nebularia</i>	LC	WM
Charadriiformes	Scolopacidae	Common Redshank	<i>Tringa tetanus</i>	LC	WM
Charadriiformes	Scolopacidae	Spotted Redshank	<i>Tringa erythropus</i>	LC	WM
Charadriiformes	Scolopacidae	Ruff	<i>Calidris pugnax</i>	LC	WM
Charadriiformes	Scolopacidae	Temminck's Stint	<i>Calidris temminckii</i>	LC	WM
Charadriiformes	Scolopacidae	Green Sandpiper	<i>Tringa ochropus</i>	LC	WM
Charadriiformes	Scolopacidae	Wood Sandpiper	<i>Tringa glareola</i>	LC	WM
Charadriiformes	Scolopacidae	Common Sandpiper	<i>Actitis hypoleucos</i>	LC	WM

Charadriiformes	Scolopacidae	Marsh Sandpiper	<i>Tringa stagnatilis</i>	LC	WM
Charadriiformes	Scolopacidae	Little Stint	<i>Calidris minuta</i>	LC	WM
Charadriiformes	Scolopacidae	Common Snipe	<i>Gallinago gallinago</i>	LC	WM
Pelecaniformes	Threskiornithidae	Eurasian Spoonbill	<i>Platalea leucorodia</i>	LC	R
Pelecaniformes	Threskiornithidae	Glossy Ibis	<i>Plegadis falcinellus</i>	LC	LM
Pelecaniformes	Threskiornithidae	Red Naped Ibis	<i>Pseudibis papillosa</i>	LC	R
Pelecaniformes	Threskiornithidae	Black Headed Ibis	<i>Threskiornis melanocephalus</i>	NT	R
Phoenicopteriformes	Phoenicopteridae	Greater Flamingos	<i>Phoenicopus roseus</i>	LC	LM

Table 2. Overview of Taxonomic, number of species and distribution of Wader birds in Soor Sarovar Bird Sanctuary, Agra

ORDER	FAMILY	NO. OF SPECIES	% OF OCCURRENCE	LC	NT	R	WM	LM
Pelecaniformes	Ardeidae	10	23%	10	0	10	0	0
	Threskiornithidae	4	10%	3	1	4	0	0
Charadriiformes	Charadriidae	5	12%	4	1	3	2	0
	Burhinidae	2	5%	1	1	2	0	0
	Jacaniidae	2	5%	2	0	2	0	0
	Recurvirostridae	2	5%	2	0	1	1	0
	Scolopacidae	12	29%	11	1	0	12	0
Ciconiiformes	Ciconiidae	4	10%	1	3	4	0	0
Phoenicopteriformes	Phoenicopteridae	1	2%	1	0	0	0	1
	Total	42	100%	35 (83%)	7 (17%)	26 (62%)	15 (28%)	1 (2%)

keys: IUCN Status: LC- Least Concerned, NT- Near Threatened, R- Residential, WM- Winter Migratory, LM- Local Migratory

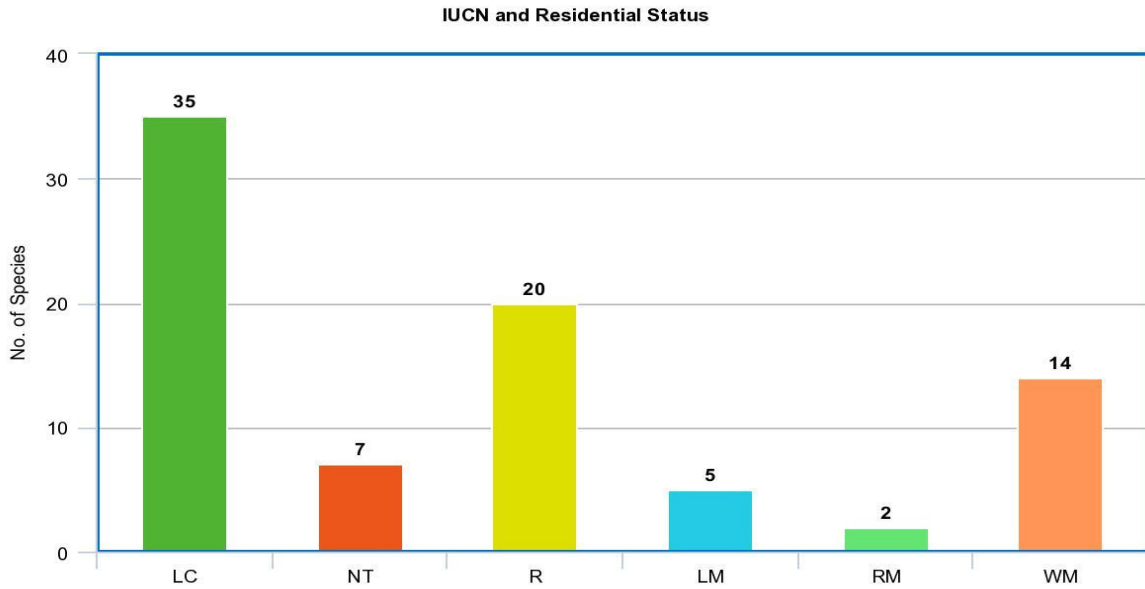


Figure1. Bar Graph showing IUCN Status of wading birds in Soor Sarovar Bird Sanctuary, Agra

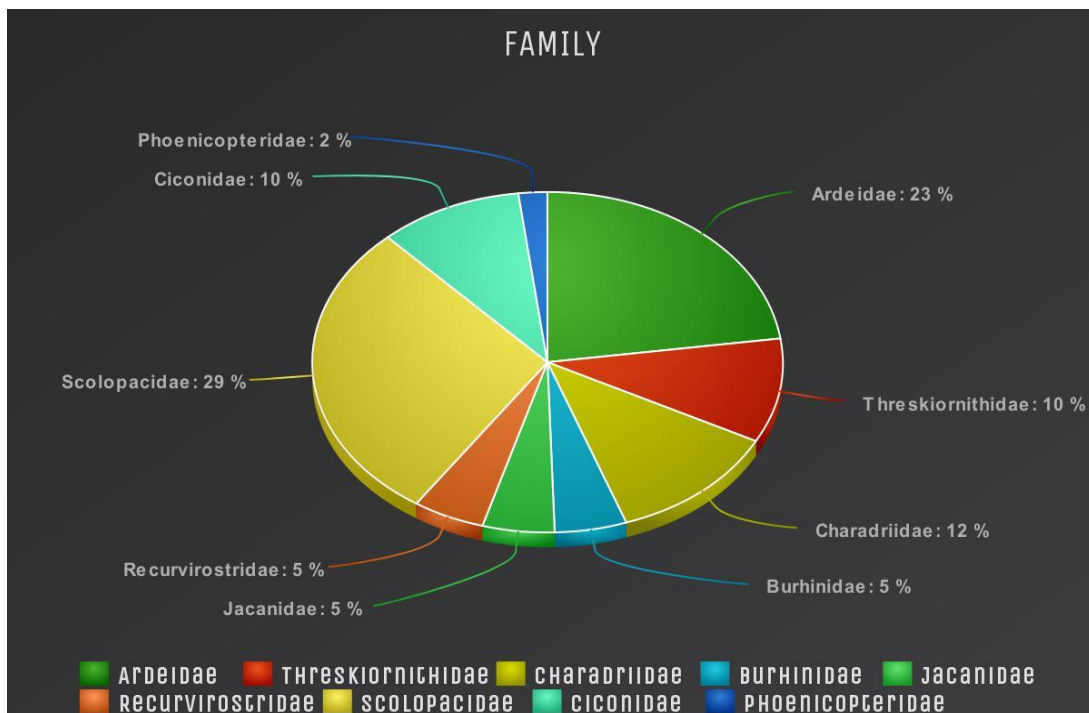


Figure.2 Percentage of Occurrence of different species under various families of waders

V. CONCLUSION

The purpose of this baseline study was to assess the diversity of waders in Soor Sarovar Bird Sanctuary, Agra. This study shows that the Soor Sarovar Bird Sanctuary is a prominent site for many wader species which includes various migratory birds that are near threatened.

The presence of such waders and a good amount of diversity signifies this sanctuary is an important bird area. The Soor Sarovar Bird Sanctuary, Agra was declared a Ramsar site in August 2020. The rich ecosystem provides habitat to many residents as well as migratory birds.

The diversity of wetland-dependent birds serves as an important ecological indicator to evaluate the status of wetlands and their different habitats (Kumar *et al.*, 2005) and such baseline studies are required for long-term monitoring of wader birds in Soor Sarovar Bird Sanctuary and their relationship between all the factors that influence their occurrence.

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