



## International Journal of Biological Innovations

Available online: <http://ijbi.org.in> | <http://www.gesa.org.in/journals.php>

DOI: <https://doi.org/10.46505/IJBI.2020.2225>



Research article

E-ISSN: 2582-1032

# STUDY OF WADERS DIVERSITY IN THE CATCHMENT AREA OF UJANI RESERVOIR, SOLAPUR DISTRICT (MS), INDIA

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Received: 20.09.2020

Accepted: 15.10.2020

Published: 25.10.2020

**Abstract:** The present study was an attempt to access and evaluate the status and distribution of waders associated to wetlands of Ujani Reservoir with special reference to north - west region. Waders are the birds generally observed along shorelines and mudflats that wade in order to forage for food in mud or sand. Ujani wetlands provide feeding and roosting grounds for resident and migratory waders. This study was conducted from December 2015 to November 2017 including seasonal visits to five wetland sites *i.e.* Kumbhargaoon, Diksal, Kondhar-Chincholii, Rajegaon (Bhigwan) and Khanota. During study, about 38 species of waders were identified belonging to 14 families *viz.* Ardeidae, Charadriidae, Ciconiidae, Jacanidae, Laridae, Rallidae, Motacillidae, Phalacrocoracidae, Phoenicopteridae, Recurvirostridae, Rostratulidae, Scolopacidae, Threskiornithidae and Glariolidae.

**Keywords:** Biodiversity, Ramsar Convention, Ujani Reservoir, Waders, Wetlands.

## INTRODUCTION

Birds (Aves) also referred to as masters of air, are homeothermic or warm-blooded egg-laying vertebrates characterized by the presence of feathers and modification of forelimbs as wings for flight. Jaw bones are prolonged into a toothless beak to serve like hands and mouth concurrently (Verma and Prakash, 2020). Natural ecosystems have been overexploited and even destroyed by the rapidly increasing activities and industries. When consequent environmental changes exceed the tolerance limit, species habitat change also becomes ultimate cause for long term changes in the bird distribution (Puri and Virani, 2016). Abundance of birds represents healthy ecosystem. Aquatic biodiversity and healthy

ecosystem both are dependent on hydrologic regime and geological conditions. The maintenance of healthy aquatic ecosystem is required for ecological balance, agriculture, widespread biodiversity and human survival (Verma, 2017, 2018a, 2018b). The goal of this irreplaceable biodiversity is to minimize its loss through sustainable management, conservation practices and environmental ethics (Kumar and Verma, 2017; Prasad *et al.*, 2002; Verma, 2019).

As per the Ramsar Convention signed in 1971 by 169 parties, wetlands have great importance to conserve vast number of biota includes flora and fauna. Wetlands vary according to their origin, geographical location, water regime, chemistry,

dominant plants and soil or sediment characteristics (Verma *et al.*, 2001). Wetlands are often described as 'Kidneys of landscape' (Prakash, 2020) that support vast biodiversity of flora and fauna including sarus crane (Verma and Prakash, 2017; Verma, 2018c, 2018d; Prakash and Verma, 2019). It also provides food and shelter to organisms that thrive in (Roy *et al.*, 2016). They occur where the water table is at or near the surface of the land, or where the land is covered by water. Wetlands are among the world's most productive environments (Ranjan and Kushwaha, 2020) that are extremely suitable ecosystems to assess the effect of climate change. The climate change has a huge impact on biodiversity (Prakash and Srivastava, 2019).

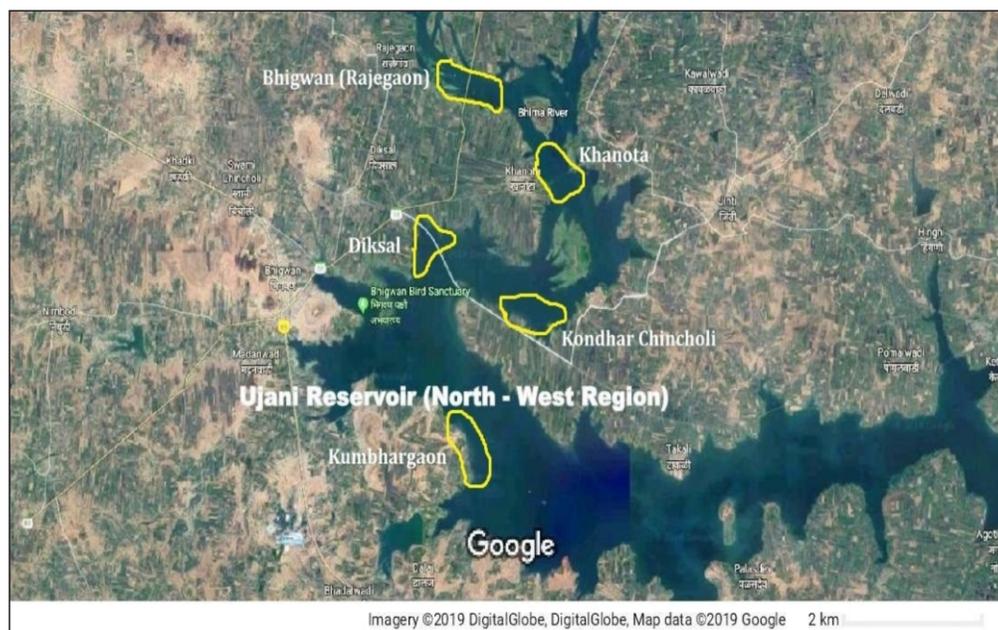
Wading birds are found all over the world in every continent except Antarctica. They can be found in fresh, brackish and saltwater areas, though most of the species tend to prefer freshwater habitats. Open water, shallow water, marshes, mudflats, water banks, ponds and flooded areas are all popular habitats for wading birds, and they can even be found in urban and suburban areas such as along the permanent ponds, retention ponds or seasonal swamps. While most species of waders prefer wet habitats, some, especially cranes, are found in areas with widely varying water levels.

Wading birds share several physical characteristics as well as certain ethological

features which distinguish them from other group of birds. The legs are long and thin that not only help them to keep the balance in wet areas, muddy grounds and but also help to forage in deeper areas. Many wading birds have long bills having sharp pointed tips or distinct curves or spatulate shapes according to types of food they consume. Neck is long which helps them to change the shape of their neck. Powerful neck muscles help them to hunt effectively. These characters assist them for foraging, vocalization, flight and social behaviour. As far as behaviour is concerned; wading birds share a variety of behavioural traits that help in identifying the bird family. To identify wading birds, unique feature is the first step toward proper classification of all the world's beautiful and unusual waders.

## MATERIALS AND METHODS

The study area Ujani Reservoir (map) is located in Solapur district of MS state of India. Authors selected 5 wetland sites of Ujani Reservoir with special reference to north-west region including Kumbhargaon (N- 18° 16' 29.4", E- 74° 48' 55.4", Alt.494 m.), Diksal (N- 18° 17' 56.2", E- 74° 48' 05.7", Alt.488 m.), Kondhar-Chincholi (N- 18° 17' 40.6", E- 74° 49' 18.6", Alt.497 m.), Rajegaon (Bhigwan) (N- 18° 17' 56.2", E- 74° 48' 27.3", Alt.528 m.) and Khanota (N- 18° 19' 14.3", E- 74° 49' 56.9", Alt.489 m.)



Map showing study area: North- West region of Ujani Reservoir.

The study was conducted from December 2015 to November 2017 that included regular field trips, 1-2 days a week during all months of year to prepare check list. Photography and observation was done by using Canon 700D, 100-400 mm lens and Olympus 10x50 binocular. The time selected for survey was early morning (06:30 to 09:30 am) and evening (04:00 to 06:00 pm). Mostly visual encounter survey method was used for direct observation and counting of birds by walking along the bank of reservoir (Crump and Scott, 1994; Joshi, 2014). Presence of waders species in a particular microhabitat like open water, shallow water, marshy, mudflat and dry bank was observed and recorded (Karikar *et al.*, 2017). The status of the recorded bird species was established on the basis of frequency of sightings (Kumar and Gupta, 2009).

Bird species was identified with the help of field guides (Ali and Ripley, 1987; Grimmett *et al.*, 1999) and only those species were recorded which were confirmed and identified. The common names, zoological names and families of the birds recorded were ascertain as per the BirdLife International (2013) and Grimmett *et al.*(1999).

#### RESULTS AND DISCUSSION

During present study, a sum of 38 species of waders were identified (table 1) belonging to 14 different families *viz.* Ardeidae, Charadriidae, Ciconiidae, Jacanidae, Laridae, Rallidae, Motacillidae, Phalacrocoracidae, Phoenicopteridae, Recurvirostridae, Rostratulidae, Scolopacidae, Threskiornithidae and Glariolidae.

**Table 1: Check-list of waders species reported in the catchment area of Ujani Reservoir.**

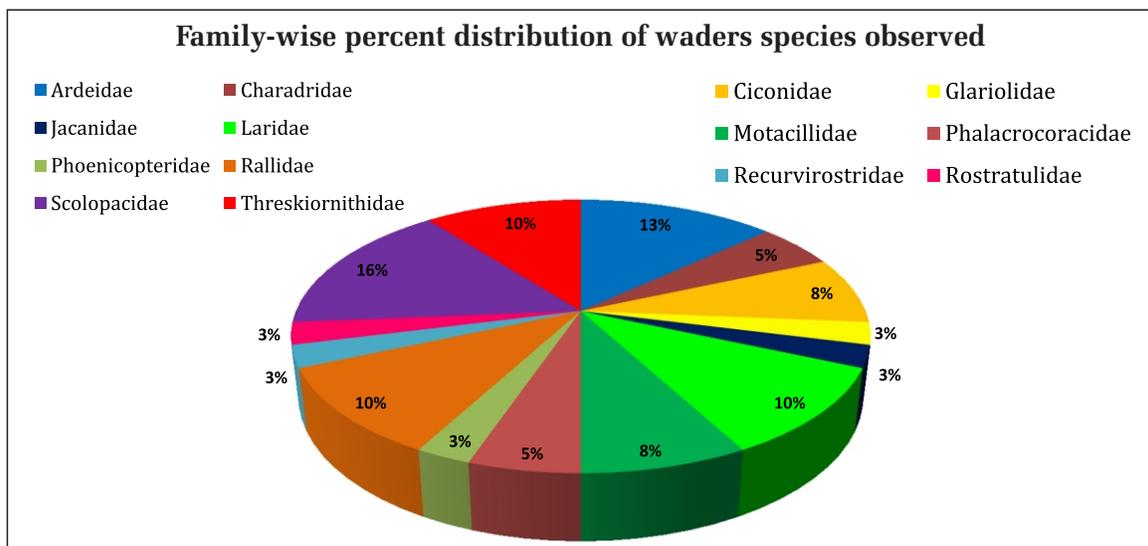
Sr. No.	Common Name	Zoological Name	Family
1	Grey Heron	<i>Ardea cinerea</i>	Ardeidae
2	Indian Pond Heron	<i>Ardeola grayii</i>	
3	Cattle Egret	<i>Bubulcus ibis</i>	
4	Little Egret	<i>Egretta garzetta</i>	
5	Purple Heron	<i>Ardea purpurea</i>	
6	Red Wattled Lapwing	<i>Vanellus indicus</i>	Charadriidae
7	Little Ringed Plover	<i>Charadrius dubius</i>	Ciconiidae
8	Asian Openbill	<i>Anastomus oscitans</i>	
9	Painted Stork	<i>Mycteria leucocephala</i>	
10	Asian Woolly Neck	<i>Ciconia episcopus</i>	Gleriolidae
11	Small Pranticole	<i>Glariola lactea</i>	
12	Pheasant Tailed Jacana	<i>Hydrophasianus chirurgus</i>	Jacanidae
13	Black headed Gull	<i>Larus ridibundus</i>	Laridae
14	Brown headed Gull	<i>Larus brunnicephalus</i>	
15	Gull billed Tern	<i>Gelochelidon nilotica</i>	
16	River Tern	<i>Sterna aurantia</i>	
17	White browed Wagtail	<i>Motacilla maderaspatensis</i>	Motacillidae
18	Grey Wagtail	<i>Motacilla cinera</i>	
19	Yellow Wagtail	<i>Motacilla flava</i>	

20	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Phalacrocoracidae
21	Little Cormorant	<i>Microcarbi niger</i>	
22	Greater Flamingo	<i>Phoenicopterus roseus</i>	Phoenicopteridae
23	Eurasian Coot	<i>Fulica atra</i>	Rallidae
24	Common Moorhen	<i>Gallinula chloropus</i>	
25	Purple Swamp Hen	<i>Porphyrio porphyrio</i>	
26	White Breasted Water Hen	<i>Amaurornis phoenicurus</i>	
27	Black Winged Stilt	<i>Himantopus himantopus</i>	Recurvirostridae
28	Greater Painted Snipe	<i>Rostratula benghalensis</i>	Rostratulidae
29	Eurasian Curlew	<i>Numenius arquata</i>	Scolopacidae
30	Black Tailed Godwit	<i>Limosa limosa</i>	
31	Common Sandpiper	<i>Actitis hypoleucos</i>	
32	Green Sandpiper	<i>Tringa ochropus</i>	
33	Marsh Sandpiper	<i>Tringa stagnatilis</i>	
34	Wood Sandpiper	<i>Tringa glareola</i>	
35	Black Headed Ibis	<i>Threskiornis melanocephalus</i>	Threskiornithidae
36	Glossy Ibis	<i>Plegadis falcinellus</i>	
37	Red naped Ibis	<i>Pseudibis papillosa</i>	
38	Eurasian Spoonbill	<i>Platelea leucorodia</i>	

**Table 2: Habitat-wise distribution of waders species observed in the catchment area of Ujani Reservoir.**

Sr. No.	Common Name	Habitats preferred				
		Open water	Shallow water	Marshy	Mudflat	Mudflat
1.	Grey Heron	-	-	+	+	-
2.	Indian Pond Heron	-	-	+	+	-
3.	Cattle Egret	+	-	-	+	+
4.	Little Egret	-	-	-	+	-
5.	Purple Heron	-	-	+	+	-
6.	Red Wattled Lapwing	-	-	-	+	+
7.	Little Ringed Plover	-	-	+	-	+
8.	Asian Openbill	-	+	-	+	-
9.	Painted Stork	-	-	+	+	-
10.	Asian Wooly Neck	-	-	+	+	-
11.	Small Pranticole	-	-	+	-	+
12.	Pheasant Tailed Jacana	-	-	+	-	-
13.	Black headed Gull	+	-	-	-	+

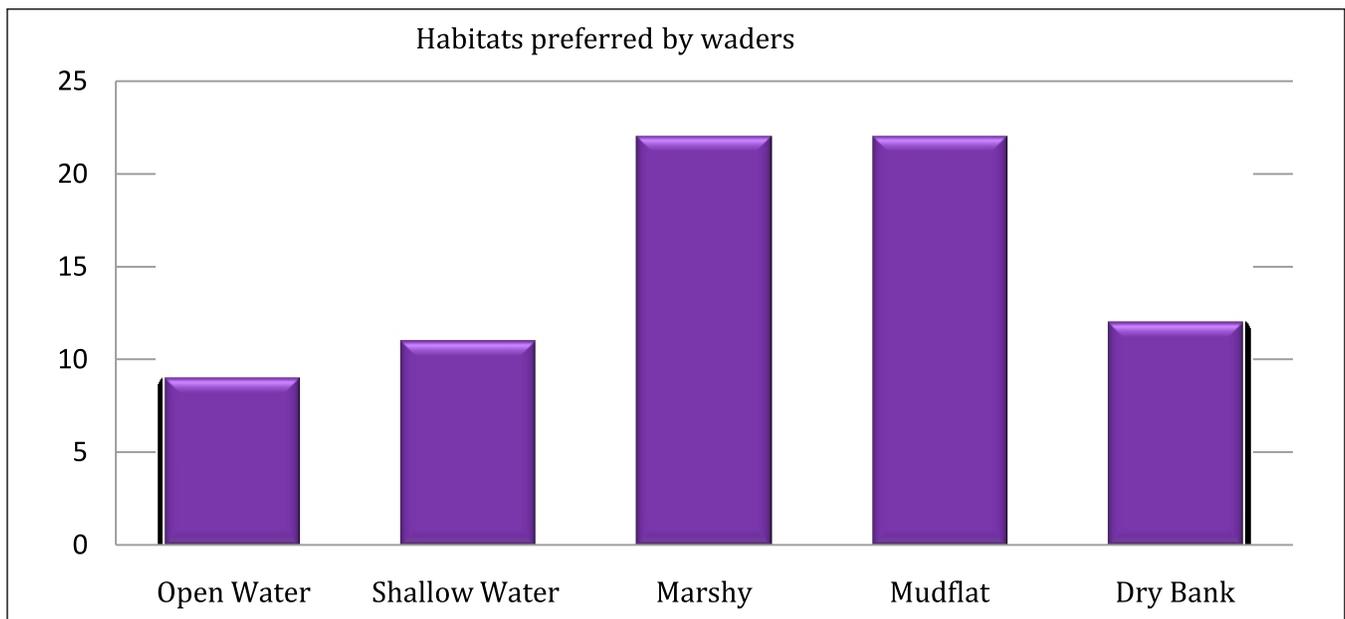
14.	Brown headed Gull	+	-	-	-	+
15.	Gull billed Tern	+	-	-	-	+
16.	River Tern	+	-	-	-	+
17.	White browed Wagtail	-	-	-	-	+
18.	Grey Wagtail	-	-	-	+	-
19.	Yellow Wagtail	-	-	-	+	+
20.	Indian Cormorant	+	+	-	-	-
21.	Little Cormorant	+	+	-	-	-
22.	Greater Flamingo	-	+	-	+	-
23.	Eurasian Coot	+	-	-	-	-
24.	Common Moorhen	-	+	+	-	-
25.	Purple Swamp Hen	-	+	+	-	-
26.	White Breasted Water Hen	-	+	+	-	-
27.	Black Winged Stilt	-	+	+	-	-
28.	Greater Painted Snipe	-	-	+	+	-
29.	Eurasian Curlew	-	+	-	-	+
30.	Black Tailed Godwit	+	+	-	-	-
31.	Common Sandpiper	-	-	+	+	-
32.	Green Sandpiper	-	-	+	+	-
33.	Marsh Sandpiper	-	-	+	+	-
34.	Wood Sandpiper	-	-	+	+	-
35.	Black Headed Ibis	-	+	+	+	-
36.	Glossy Ibis	-	-	+	+	-
37.	Red naped Ibis	-	-	+	+	-
38.	Eurasian Spoonbill	-	-	+	+	-



**Graph 1: Family-wise percent distribution of waders species observed.**

Among 38 bird species recorded, family Scolopacidae was found dominant with six species, followed by family Ardeidae having five species and families Laridae, Rallidae and Threskiornithidae having four species each. Families Ciconidae and Motacillidae included three species each. Families Charadriidae and Phalacrocoracidae having two species each, while least observed families were Jacanidae, Phoenicopteridae, Recurvirostridae, Rostratulidae and Glariolidae with one species each (Graph 1).

Though the sites studied are temporary wetlands but they fulfil all the basic needs of wetland birds like shelter and suitable foraging grounds due to irrigated agricultural fields as well as scattered trees along the bank of reservoir. These habitats are richly supplied with variety of food sources like fishes, crustaceans, other invertebrates, phytoplankton, zooplanktons etc. As far as the habitats are concerned, most of the species preferred marshy and mudflat areas, some preferred shallow water and dry banks and very few were observed at open water habitat (Table 2; Graph 2).



**Graph 2: Various habitats preferred by waders.**

Thus, it can be concluded that wetlands are the kidneys of landscape; it provides all the basic requirements for wetland birds having large number of waders. The waders are also considered as the bio indicators as they are very specific towards their microhabitat, so they directly reflect the health of an ecosystem. Due to some anthropogenic activities like sand mining, improper irrigation practices, unplanned tourism, weed infestation, agricultural expansion, fishing, poaching and pollution, these wetlands are on the verge of extinction (Kumbhar and Mhaske, 2017). Because of utmost significance, wetlands must

be conserved (Wetlands International, 2012). Intensive use of chemical fertilizers, weedicides, insecticides and other pesticides by farmers along the lentic water body and bank of reservoir to get best quality of crops are adversely affecting the biodiversity (Joshi and Krishna, 2014). The IUCN (International Union of Conservation of Nature) proved itself as a powerful agency to create awareness and suggest measures for biodiversity conservation and policy implementation. It also provides information about range, population size, habitat and ecology and threats to biodiversity (IUCN, 2016).

**CONFLICT OF INTEREST**

The authors declare that there is no conflict of interest.

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