



EVALUATION OF STATUS, DIVERSITY AND CONSERVATION THREATS OF WETLAND BIRDS OF KONDAJJI LAKE, KONDAJJI VILLAGE, HARIHAR TALUK, DAVANAGERE DISTRICT, KARNATAKA


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ABSTRACT: The study revealed a total of 46 wetland bird species belonging to 16 families and 8 orders. Among them the order Charadriiformes was found to dominate the list by 5 families with 14 species followed by Ciconiiformes by 3 families with 13 species and least was Podicipediformes, by 1 family with 1 species. Among the families, Ardeidae dominated the list by the representation of 9 species, followed by the Scolopacidae with 7 species etc., and least by Podicipididae, Anhingidae, Recurvirostridae and Laridae with one species each. The study also revealed that the lake is a vulnerable wetland harboring plenty of resident as well as few migratory birds. Of the total wetland birds recorded, 91% were least concerned (LC) and 9% were near threatened (NT) species, which includes, Black-headed Ibis (*Threskiornis melanocephalus*), Darter (*Anhinga melanogaster*), Black-tailed Godwit (*Limosa limosa*) and River Tern (*Sterna aurantia*) have a protected status under the schedule IV of Indian Wildlife Protection Act, 1972.

Key words: Conservation threats, Wetland birds, Wetlands, Diversity, Kondajji Lake, Migratory birds

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INTRODUCTION

Birds are among the best monitors of environmental changes and have been used to assess the environment throughout the history as “biomonitors” and the changes in their population, behavioral patterns and reproductive ability have most often been used to examine the long term affects of habitat fragmentation. Hence they are the good indicators of ecological status of any given ecosystem [1].

The birds which inhabit and dependant on wetland directly or indirectly for feeding, breeding, nesting or roosting are generally known as water or wetland birds [2, 3]. Selection of these wetlands by water birds is greatly influenced by complex characteristics including water chemistry, aquatic vegetation, invertebrate fauna and physical features [3, 4]. The wetlands of South Asia are facing tremendous anthropogenic pressure, which can greatly influence the structure of the bird community [5]. The loss of water bird habitats through direct and indirect human interferences has led to a decline in several water bird populations [3]. Monitoring of wetland birds provides valuable information on the ecological health and status of wetlands and can be an essential tool for developing awareness regarding the conservation value of the wetlands. The importance of local landscapes for conservation of avifauna can only be understood by knowing the structure of the bird community of that region [3, 6].

The present study was conducted to analyze the diversity and richness of wetland birds and to identify the consequences of direct and indirect human interferences. This might be helpful to improve the habitat, pave the way for future research and formulation of an effective strategy for conservation of this important wetland birds.

MATERIALS AND METHODS

Study area:

The Kondajji Lake situated in Kondajji village of Harihar Taluk, Davanagere District, Karnataka. The lake is located in the mid of the Kondajji forest surrounded by a minor hilly tropical scrub jungle. The lake is approximately about 145.27 acres and is located between 14°34'11" N latitude and 75°53'10" E longitude. A major scout and guide training center in South India is located on South direction of the lake. This wetland provides water for drinking and irrigation to surrounding agricultural lands and also for aquaculture practices. The lake is situated 13 Km from Harihar and 8.2 Km from Davanagere District. The lake has recreational value, which attracts many tourists for water sports activities like boating etc., also free from sewage and agricultural drainage [3].

Sampling methods

The checklist is prepared based primarily on the field work conducted during November 2014 to October 2015 across Kondajji Lake by foot i, e along road side count. In the heronry, total counts were carried out by direct and point counting methods for the birds [7, 8]. A total of 12 visits (1 visit per month) were spent in the field observing status and diversity of birds. Birds were observed from 6 A.M to 11 A.M and identified using Olympus binoculars (10x50) and field guides [9], also given standardized common and scientific names [10]. The status of birds was determined and categorized into three groups such as; LM- Local migratory, WM- winter migratory and R- Resident on the basis of their movement and seasonality of occurrence (Table 1).

RESULTS AND DISCUSSION

The present study revealed a total of 46 wetland bird species belonging to 16 families and 8 orders recorded from the study area. Details such as common, scientific names, frequency and conservation status of the wetland birds are presented in Table 1. During the study it was revealed that the order Charadriiformes was found to dominated the list by 5 families with 14 species followed by Ciconiiformes by 3 families with 13 species, Pelecaniformes by 2 families with 3 species, Gruiformes by 1 family with 5 species, Anseriformes by 1 family with 4 species, both Passeriformes and Coraciiformes by 1 family with 3 species each, and least was Podicipediformes, by 1 family with 1 species (Table 1).

The family Ardeidae dominated the list by the representation of 9 species, which contributed 20%, followed by the Scolopacidae with 7 species, contributed 15%; Rallidae with 5 species, contributed 11% each; Anatidae with 4 species, contributed 9%; Motacillidae, Alcedinidae and Charadriidae, with 3 species each, contributed 7% each; Ciconiidae, Threskiornithidae, Phalacrocoracidae and Jacanidae with 2 species each, contributed 4% each and least by Podicipididae, Anhingidae, Recurvirostridae and Laridae with one species each, contributed 2% each of total family wise frequency of occurrence of water birds of the study area (Fig. 1).

Based on the residential status of wetland birds, resident birds (R) were found as the most of predominant with 19 species, which contributed 41%, followed by the winter migratory (WM) with 15 species, contributed 33%, local migratory (LM) with 9 species, contributed 20% and as least by resident migratory (RM) with 2 species, contributed 4% and summer migratory (SM) with 1 species, contributed 2% of the total wetland birds specie recorded from the study area (Fig. 2).

On the basis of frequency of occurrence or sighting of wetland birds, the common birds (C) were found to be the most of predominant with 17 species, contributed 37%, followed by the uncommon (Uc) with 14 species, contributed 30%, fairly common (FC) with 11 species, contributed 24% and as least by rare birds (Rr) with 4 species, contributed 9% of the total wetland birds specie recorded from the study area (Fig. 4).

This similar pattern of study was reported on wetland birds in Chhilchhila Wildlife Sanctuary of Haryana [2]; Bathi Lake of Davanagere District [3]; Anekere wetland of Karkala, Udupi District [11]; Pallikaranai Wetlands of Chennai [12] and Kundavada Lake of Davanagere District [13]. These studies also recorded the seasonal change in density and diversity of migratory avifauna of which some are globally threatened and near threatened species.

The study also revealed that, of the total wetland birds recorded, 91% (n=42) were least concerned (LC) and 9% (n=4) were near threatened (NT) species (Fig. 3), which includes, Black-headed Ibis (*Threskiornis melanocephalus*), Darter (*Anhinga melanogaster*), Black-tailed Godwit (*Limosa limosa*) and River Tern (*Sterna aurantia*) have a protected status under the schedule IV of Indian Wildlife Protection Act, 1972 [14].

From the study it has been found that the lake is a vulnerable wetland harboring plenty of resident as well as few winter migratory birds such as Purple Heron, Grey Heron, Common Moorhen, Common Coot, Garganey, Common Teal, Little Ringed Plover, Black-tailed Godwit, Marsh Sandpiper, Common Greenshank, Green Sandpiper, Common Sandpiper, Little Stint and Yellow Wagtail. Most of the migratory species recorded were winter visitors except Yellow-wattled Lapwing which is a summer visitor and the resident birds were observed throughout the year. These winter migratory avifauna exhibit a distinct species specific pattern for arrival at and departure from the wetland. The basic requirements of the migratory water birds at their wintering sites are adequate food supply and safety [15].

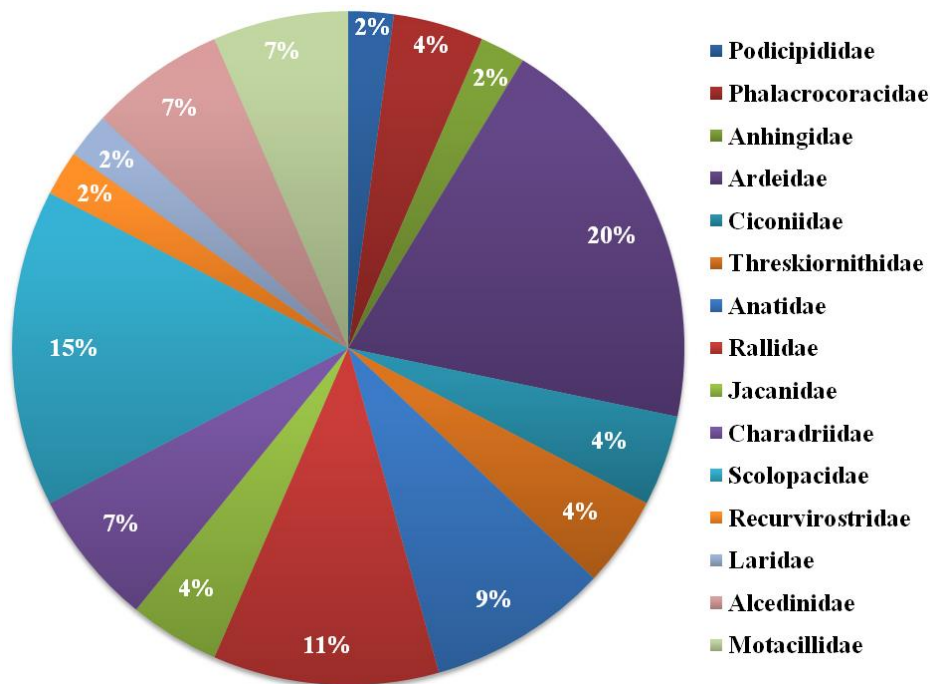


Figure 1: Family wise species distribution and diversity of wetland birds in Kondajji Lake

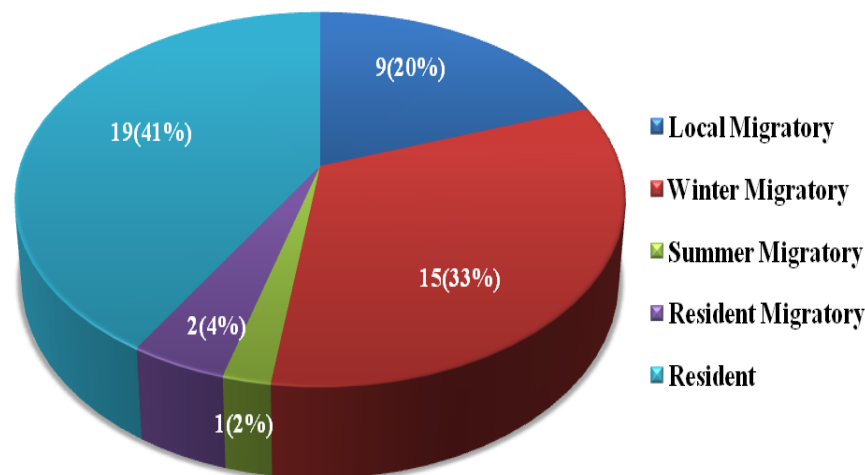


Figure 2: Residential status of wetland birds of Kondajji Lake

Table-1: Systematic list of Wetland birds with their conservation status in Kondajji Lake, Davanagere district, Karnataka.

S.No	Common Name ¹	Scientific Name ²	S ³	F ⁴	CS ⁵	
					IUCN 2014.3	WPA 1972
Order: Podicipediformes						
Family: Podicipididae						
1	Little Grebe	<i>Tachybaptus ruficollis</i>	LM	C	LC	IV
Order: Pelecaniformes						
Family: Phalacrocoracidae						
2	Little Cormorant	<i>Phalacrocorax niger</i>	RM	C	LC	IV
3	Indian Shag	<i>Phalacrocorax fuscicollis</i>	RM	Uc	LC	IV
Family: Anhingidae						
4	Darter	<i>Anhinga melanogaster</i>	LM	C	NT	IV
Order: Ciconiiformes						
Family: Ardeidae						
5	Little Egret	<i>Egretta garzetta</i>	R	FC	LC	IV
6	Cattle Egret	<i>Bubulcus ibis</i>	R	FC	LC	IV
7	Large Egret	<i>Casmerodius albus</i>	R	C	LC	IV
8	Median Egret	<i>Mesophoyx intermedia</i>	R	FC	LC	IV
9	Grey Heron	<i>Ardea cinerea</i>	WM	Uc	LC	IV
10	Purple Heron	<i>Ardea purpurea</i>	WM	Uc	LC	IV
11	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	LM	C	LC	IV
12	Chestnut Bittern	<i>Ixobrychus cinnamomeus</i>	LM	C	LC	IV
13	Indian Pond Heron	<i>Ardeola grayii</i>	R	FC	LC	IV
Family: Ciconiidae						
14	White-necked Stork	<i>Ciconia episcopus</i>	LM	Uc	LC	IV
15	Asian Openbill Stork	<i>Anastomus oscitanus</i>	LM	Uc	LC	IV
Family: Threskiornithidae						
16	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	R	C	NT	IV
17	Black Ibis	<i>Pseudibis papillosa</i>	R	C	LC	IV
Order: Anseriformes						
Family: Anatidae						
18	Lesser-whistling Duck	<i>Dendrocygna javanica</i>	LM	FC	LC	IV
19	Spot Billed Duck	<i>Anas poecilorhyncha</i>	R	FC	LC	IV
20	Cotton Teal	<i>Nettapus coromandelianus</i>	R	Uc	LC	IV
21	Garganey**	<i>Anas querquedula</i>	WM	Rr	LC	IV
Order: Gruiformes						
Family: Rallidae						
22	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	R	FC	LC	IV
23	Brown Crake	<i>Amaurornis akool</i>	R	C	LC	IV
24	Common Moorhen	<i>Gallinule chloropus</i>	WM	Uc	LC	IV
25	Purple Moorhen	<i>Porphyrio porphyrio</i>	R	FC	LC	IV
26	Common Coot**	<i>Fulica atra</i>	WM	FC	LC	IV
Order: Charadriiformes						
Family: Jacanidae						
27	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	R	C	LC	IV
28	Bronze-winged Jacana	<i>Metopidius indicus</i>	R	FC	LC	IV
Family: Charadriidae						
29	Little Ringed Plover**	<i>Charadrius dubius</i>	WM	C	LC	IV
30	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	SM	Uc	LC	IV
31	Red-wattled Lapwing	<i>Vanellus indicus</i>	R	C	LC	IV

Family: Scolopacidae						
32	Black-tailed Godwit	<i>Limosa limosa</i>	WM	Uc	NT	IV
33	Spotted Redshank**	<i>Tringa erythropus</i>	WM	Rr	LC	IV
34	Common Redshank**	<i>Tringa totanus</i>	WM	Rr	LC	IV
35	Marsh Sandpiper**	<i>Tringa stagnatilis</i>	WM	Uc	LC	IV
36	Common Greenshank**	<i>Tringa nebularia</i>	WM	Rr	LC	IV
37	Common Sandpiper**	<i>Tringa hypoleucos</i>	WM	Uc	LC	IV
38	Little Stint**	<i>Calidris minuta</i>	WM	Uc	LC	IV
Family: Recurvirostridae						
39	Black-winged Stilt	<i>Himantopus himantopus</i>	LM	C	LC	IV
Family: Larodae						
40	River Tern	<i>Sterna aurantia</i>	LM	C	NT	IV
Order: Coraciiformes						
Family: Alcedinidae						
41	Small Blue Kingfisher	<i>Alcedo atthis</i>	R	C	LC	IV
42	Lesser Pied Kingfisher	<i>Ceryle rudis</i>	R	C	LC	IV
43	White-breasted Kingfisher	<i>Halcyon smyrnensis</i>	R	FC	LC	IV
Order: Passeriformes						
Family: Motacillidae						
44	Yellow Wagtail**	<i>Motacilla flava</i>	WM	Uc	LC	IV
45	Grey Wagtail	<i>Motacilla cinerea</i>	WM	Uc	LC	IV
46	Large Pied Wagtail	<i>Motacilla maderaspatensis</i>	R	C	LC	IV

¹Common names after Manakadan *et al.*, 1998.

²Scientific names after Inskipp *et al.*, 1996.

³S³-Status of the birds observed as Resident (R), Winter Migratory (WM), Local Migratory (LM), Resident Migratory (RM) and Summer Migratory (SM)

⁴F⁴- Frequency Based on the occurrence of the birds, C-Common, Uc- Uncommon, FC- Fairly Common, and Rr- Rare

⁵CS⁵- Conservation status: GT-Globally threatened; LC-least concerned; NT- Near threatened; WPA, 1972- Wildlife Protection Act 1972; Schedule IV

** Birds with migratory population.

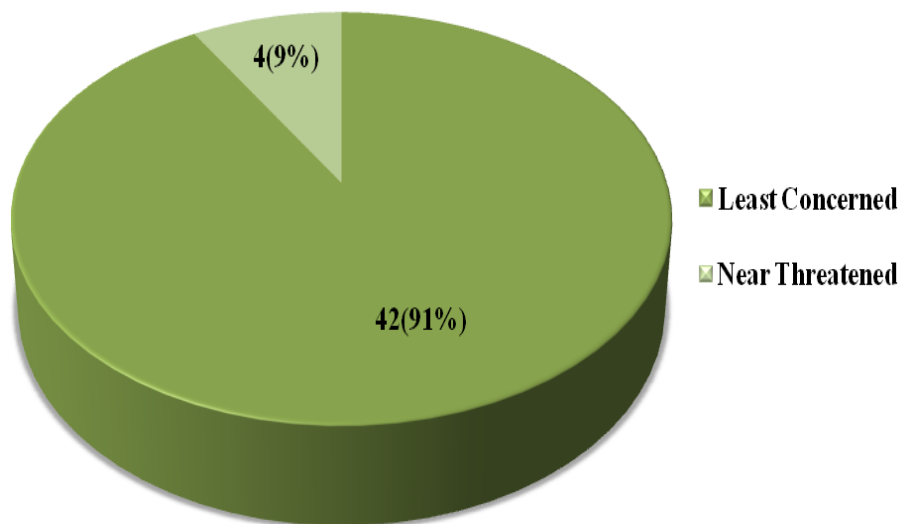


Figure 3: Conservation status of wetland birds of Kondajji Lake

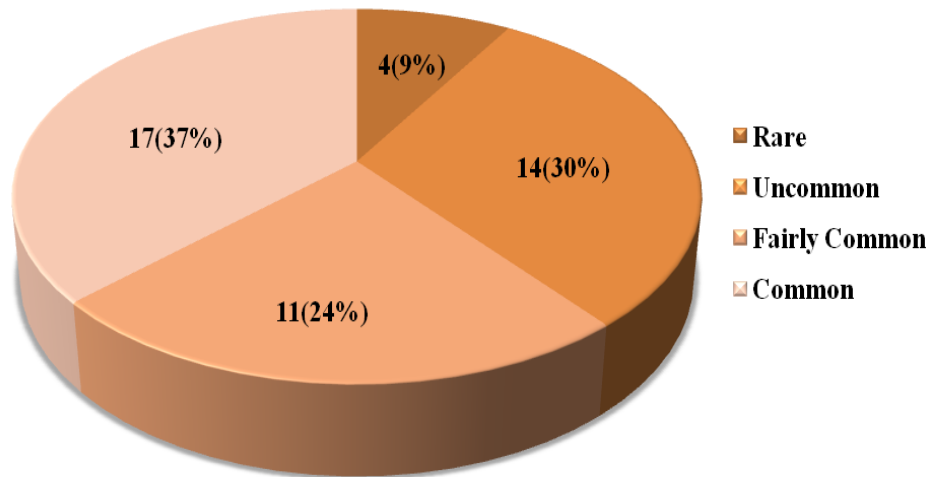


Figure 4: Frequency of occurrence of birds of Kondajji Lake

The wetland birds are in general being heterogeneous in their feeding habits [16]. In the present study, the habitat by supporting different aquatic fauna like fishes, crustaceans, invertebrates, water plants and planktons as the primary feed and also surrounding forest land and irrigated agricultural fields around the lake probably provided foraging grounds for the resident as well as few migratory wetland birds, which further adds to their diversity [17, 18].

From the present study it has been found that the diversity of wetland birds was gradually decreasing due to disturbances caused by the intensive fishing and modern agricultural practices. Other factors includes, habitat degradation due to, siltation, anthropogenic pressure, less availability of abundant food, throwing of domestic garbage by the tourists, and weed infestation are some major threats often disturbed the avifauna. Hence, being generally at or near the top of most wetland food chains they are highly susceptible to habitat disturbances and are therefore good indicators of the general condition of wetland habitats [3, 13, 19, 20, 21].

Furthermore, the lake is often infested by the growth of the hydrophytes like water hyacinth (*Eichhornia crassipes*), *Salvinia molesta*, *Cattail typha* and lesser Duckweed (*Lemna*), water Hyacinth (*Eichhornia crassipes*) has rapidly covered the water surface of lake and thereby reducing the feeding areas for water birds [17]. All these activities affected the aquatic bird's habitat and resulting in loss of avifaunal diversity of the lake ecosystem [3, 15, 17, 22]. The data recorded in the present study may give valuable information about status and conservation threats of wetland birds of Kondajji Lake as a baseline data for assessing the changes of environmental conditions in the area, thereby helping in formulating future conservation measures to preserve the wetland habitats and to maintain the ecosystem health [3].

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