

Avian diversity during rehabilitation stage of Chimdi Lake, Sunsari, Nepal

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Abstract

Avian diversity of Chimdi Lake during rehabilitation stage was studied. 109 species of birds belonging to 34 families were recorded. Maximum 64 species were recorded in March 2004 and 20 species recorded in July 2004. Out of total; bird species 33.94% were migratory, 25.68% were resident, 24.77% were winter visitors and 15.96% were summer visitors. On the basis of abundance, 41.28% were scarce, 22.9% were occasional, 21.1% were fairly common and 14.6% were common. The Lake area was found to be rich in avian diversity although the Lake was not fully rehabilitated.

Key words: Avian diversity, Chimdi Lake, , seasonal status

Introduction

The information regarding the avian diversity during rehabilitation stage in any lake area is very few. The present study has attempted to know both present and past condition of the lake in order to have an idea about the restoration of the lake again. If the lake is restored again it can provide habitat for many important species of bird. Nepal being rich in avian diversity, the study will help to add a new spot for bird sighting. Heinen (1987) studied the birds of Koshi Tappu wildlife reserve and Koshi Barage in Eastern Nepal. Subba (1994, 1995 and 1997) made checklist of bird of Dharan, Biratnagar and Gajurmukhi VDC, Ilam respectively. Gori *et al.*, (2003) studied the re-colonization of water bird following the wetland and rehabilitation (Hortobagy National Park, Hungary). Singh and Roy (1990) studied the systematics of birds colonizing Kawar Lake (Begusarai, Bihar). The lake has attracted the

attention of conservationists, so the present study explored the status of the lake and made specific suggestions to be included in planning of the lake for its restoration.

Study area

Chimdi Lake, locally known as 'Birju Tal' is the study area located at Chimdi village development committee (VDC), ward no. 3 and 4, Sunsari district, Nepal. It is about 12 km west from Nepal's main industrial city Biratnagar. Its geographical coordinates are 87°10'51.3" E longitude and 26° 29'23.5" N latitude. It is situated at an elevation of 70m above mean sea level. The total area of the lake is approximately 101.6 hectare.

Materials and methods

Study of Avifauna of Chimdi Lake area was carried out from December 2003 to February 2005. Monthly census of bird was

done in order to know their population and status. The population of birds was estimated from 6 am to 9 am by direct counting method. Birds were observed within transect of 200m. Binocular, digital camera, and field books were used during bird observation. The field books of Ali and Ripley (1986), Fleming *et al.* (2000) and Shrestha (2000) were used in the field for bird identification.

Results

On the basis of field observation 109 species of birds belonging to 34 families were recorded (Table1). Out of total species , 28 species were resident , 27 species were winter visitor arriving the lake area during winter (September to November) and leaving the area by summer (late April), 17 species were summer visitor arriving the lake area during summer (March to June) and departing on the commencement of winter (September, November). 37 species were migratory birds passing through lake area on their way to and from nesting grounds (Table 1). On the basis of census made at the lake area and its surrounding, abundance of the bird species was given (Table 1). 16 species were common, 23 species were fairly common, 25 species were occasional and 45 species were scarce.

Total numbers of individuals counted during the study period were 3675 (Table 1). Variation of bird species and total number of individuals of birds species on monthly basis have been shown in (Figure 1 and 2) respectively. Seasonal status and abundance of bird on percentage basis have been depicted in Figure 3 and 4 respectively.

Discussion

The biodiversity of the Nepalese fauna is revealed by birds for of the total bird species

found throughout the entire area of South Asia, half are found along the foot hills of the Nepal Himalayas (Shrestha, 2000).The change in vegetation composition in relation to the stage of successional development is often determining factor on the types and abundance of bird inhabiting the area (Bhattarai, 1988).

Butterworth *et al.*, (2003) studied water bird and water chemistry relations in shallow wetland basins in the Western Boreal Forest (WBF) which is the second most important waterfowl habitat in North America and concluded that understanding the relation between water birds and productivity is a crucial component of conservation planning. Chimdi Lake also supported thousands of water fowls but dramatic changes resulted due to anthropogenic influences. The lake is now at restorative phase.

In the present study 109 species of birds belonging to 34 families were recorded. On December 2003, 48 species birds were seen which declined to 39 species in December 2004, within a period of one year a fall in number of species was recorded and this may be attributed to unsustainable use of lake thus destroying the birds' habitat. Maximum number of species recorded during study period of 15 months was 64 in the month of March 2004. This may be due to late departure of winter visitors and early arrival of summer visitors. Least number of birds' species (20) was recorded in July 2004 and this may be due to local migration of resident bird departure of winter visitors and commencement of monsoon season. However decreasing trend in species number was observed and this may be due to destruction of bird's habitat.

On the basis of abundance 41.28% birds were scarce and seen rarely, 22.9% were occasional, 21.1% were fairly common and 14.6% were common birds of Chimdi Lake

Table 1. Avian Diversity of Chimdi Lake area and its surroundings

S.N.	Common Name	Scientific Name	Family	Months												SS	AB					
				2003																		
				D	J	F	M	A	M	J	J	A	S	O	N							
				2004																		
				D <th>J</th> <th>F</th> <th>M</th> <th>A</th> <th>M</th> <th>J</th> <th>J</th> <th>A</th> <th>S</th> <th>O</th> <th>N</th> <td colspan="2">2005</td> <td>J<th>F</th><th>T</th> </td>	J	F	M	A	M	J	J	A	S	O	N	2005		J <th>F</th> <th>T</th>	F	T		
1	Little Grebe	<i>Podiceps ruficollis</i>	Podicipedidae	6	-	-	-	8	-	-	-	-	-	2	-	-	-	-	16	W	SC	
2	Large Cormorant	<i>Phalacrocorax carbo</i>	Phalacrocoracidae	4	6	8	4	5	-	-	-	-	-	-	-	-	-	-	27	W	FC	
3	Little Cormorant	<i>Phalacrocorax niger</i>	..	7	3	4	20	2	4	-	-	-	2	7	5	3	2	2	61	M	FC	
4	Darter	<i>Anhinga rufa</i>	Phalacrocoracidae	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	W	SC	
5	Gray Heron	<i>Ardea cinerea</i>	Ardeidae	4	2	2	4	4	1	4	-	1	-	4	5	4	-	1	31	M	FC	
6	Purple Heron	<i>Ardea purpurea</i>	..	3	4	1	2	6	-	-	-	-	-	2	1	-	-	-	19	W	O	
7	Pond Heron	<i>Ardeola grayii</i>	..	15	9	12	10	5	3	-	-	-	13	10	12	15	10	9	123	R	C	
8	Night Heron	<i>Nycticorax nycticorax</i>	..	5	2	-	-	3	4	1	-	-	2	-	-	-	-	-	17	M	O	
9	Cattle Egret	<i>Bubulcus ibis</i>	..	23	2	6	36	6	3	-	7	2	2	18	7	16	6	4	138	R	C	
10	Large Egret	<i>Egretta alba</i>	..	9	1	9	2	4	1	4	-	4	-	4	3	3	4	48	R	FC		
11	Intermediate Egret	<i>Egretta intermedia</i>	..	4	2	4	3	3	15	1	1	-	5	3	6	12	2	-	61	R	FC	
12	Little Egret	<i>Egretta garzetta</i>	..	6	5	1	7	2	1	6	-	2	8	3	-	9	3	2	55	R	FC	
13	Chestnut Bittern	<i>Irobychus chinamoneus</i>	..	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	2	M	SC	
14	Lesser Adjutant Stork	<i>Leptoptilos javanicus</i>	Ciconiidae	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	M	SC	
15	Open Billed Stork	<i>Anastomus oscitans</i>	..	10	6	5	2	8	7	6	1	-	3	13	6	6	3	82	R	C		
16	White necked stork	<i>Ciconia episcopus</i>	..	15	8	4	-	-	-	-	-	-	2	-	2	1	34	W	O			
17	White Ibis	<i>Threskiornis melanocephala</i>	Threskiornithidae	-	-	3	-	1	-	-	-	-	3	-	-	6	-	-	13	W	SC	
18	Black Ibis	<i>Pseudibis papillosa</i>	..	16	5	3	1	1	2	4	-	4	2	10	-	-	-	1	49	R	O	
19	Glossy Ibis	<i>Plegadis falcinellus</i>	..	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	W	SC	
20	Lesser Whistling Teal	<i>Dendrocygna Javanica</i>	Anatidae	80	-	14	-	120	10	4	-	-	-	35	-	-	-	-	263	W	O	
21	Ruddy Shelduck	<i>Tadorna ferruginea</i>	..	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	W	SC	
22	Pintail	<i>Anas acuta</i>	..	-	-	2	15	-	-	-	-	-	-	-	-	-	-	-	17	W	SC	
23	Garganey	<i>Anas querquedula</i>	..	-	-	3	14	-	-	-	-	-	-	4	-	-	-	-	21	W	O	
24	Common Teal	<i>Anas crecca</i>	..	13	-	11	20	9	-	-	-	-	11	-	8	-	-	-	72	M	FC	
25	Mallard	<i>Anas platyrhynchos</i>	..	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	5	W	SC	
26	Spot Bill	<i>Anas poecilorhyncha</i>	..	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	16	W	SC	
27	Eurasian Wigeon	<i>Anas penelope</i>	..	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	W	SC	
28	Red Crested Pochard	<i>Netta rufina</i>	..	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	4	M	SC	
29	Shoveler	<i>Anas clypeata</i>	..	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	3	M	SC	
30	Common Pochard	<i>Aythya ferina</i>	..	3	-	4	-	3	-	-	-	-	-	-	-	-	-	-	10	W	SC	
31	Cotton Teal	<i>Nettapus coromandelianus</i>	..	50	-	10	20	11	-	-	-	-	40	50	20	-	-	-	201	W	O	
32	Sparrow Hawk	<i>Accipiter nisus</i>	Accipitridae	3	-	-	4	-	-	-	-	-	-	-	-	-	4	1	12	W	O	
33	Dark Kite	<i>Nilvus migrans</i>	..	1	-	1	-	1	-	-	-	-	-	1	2	2	1	9	M	O		
34	Marsh Harrier	<i>Circus aeruginosus</i>	..	1	1	2	2	1	-	-	-	-	-	-	-	-	-	-	7	W	FC	
35	Pied Harrier	<i>Circus melanoleucos</i>	..	-	-	-	-	3	2	-	-	-	-	2	1	-	-	-	3	W	SC	
36	Besra Sparrow Hawk	<i>Accipiter virgatus</i>	..	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	M	SC	
37	Indian Gallinule	<i>Gallinula chloropus</i>	Rallidae	3	-	-	3	-	2	-	-	-	-	-	-	5	-	-	13	M	O	
38	Coot	<i>Fulica atra</i>	..	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	M	SC	
39	Pheasant tailed Jacana	<i>Hydrophasianus chirurgus</i>	Jacaniidae	-	-	-	-	4	6	-	-	-	-	-	-	-	-	-	10	S	SC	
40	Bronze Winged Jacana	<i>Metopidius indicus</i>	..	-	-	-	-	3	2	-	-	-	-	-	-	-	-	-	5	S	SC	
41	Yellow Wattled Lapwing	<i>Vanellus malabaricus</i>	Charadriidae	-	-	-	-	2	1	-	-	-	1	-	-	-	-	-	4	S	SC	
42	Eurasian Lapwing	<i>Vanellus vanellus</i>	..	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	W	SC	
43	Little Stint	<i>Calidris minutus</i>	..	-	-	-	-	-	-	-	-	-	-	1	1	3	-	-	5	W	SC	
44	Red- Wattled Lapwing	<i>Vanellus indicus</i>	..	-	-	3	2	2	2	11	-	5	3	1	2	-	-	-	31	M	O	
45	Golden Plover	<i>Pluvialis dominica</i>	..	8	12	-	-	-	-	-	-	-	-	-	-	-	-	-	25	45	W	O
46	Curlew	<i>Numenius arquata</i>	..	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	W	SC	
47	Common Sand Piper	<i>Tringa hypoleucos</i>	..	-	13	-	7	2	-	-	-	-	6	6	-	-	-	50	84	W	FC	
48	Green Shank	<i>Tringa nebularia</i>	..	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	M	SC	
49	Painted Snipe	<i>Rostratula benghalensis</i>	Rostratulidae	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	M	SC	
50	Black - Bellied Tern	<i>Sterna acuticauda</i>	Laridae	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	3	M	SC	
51	Indian River Tern	<i>Sterna aurantia</i>	Laridae	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	M	SC	
52	Red Turtle Dove	<i>Streptopelia tranquebarica</i>	Columbidae	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	2	M	SC	
53	Indian Ring Dove	<i>S. decaocto</i>	..	-	-	2	2	-	-	-	-	-	2	4	4	2	-	-	16	M	FC	
54	Spotted Dove	<i>S. chinensis</i>	..	2	1	1	2	2	1	2	3	2	4	3	1	1	2	2	29	R	C	
55	Rose - Ringed Parakeet	<i>Psittacula krameri</i>	Psittacidae	-	-	-	2	1	-	-	-	-	-	-	1	-	-	-	4	M	O	
56	Pied Crested Cuckoo	<i>Clamator jacobinus</i>	Cuculidae	-	-	-	-	-	2	4	-	-	-	-	1	-	-	-	7	S.M	FC	
57	Common Hawk Cuckoo	<i>Cuculus sparveroides</i>	..	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	3	M	SC	

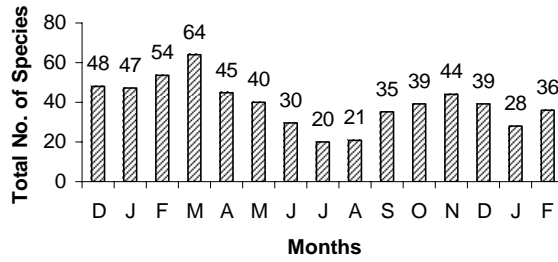


Figure 1. Variation of bird species on monthly basis.

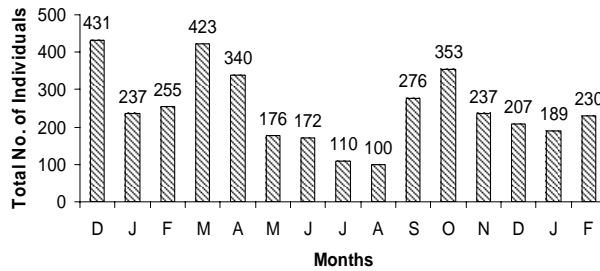


Figure 2. Variation of total number of individuals of bird species on monthly basis.

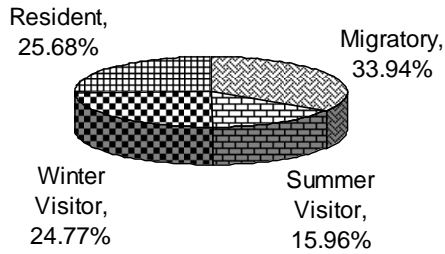


Figure 3. Seasonal Status of birds on percentage basis

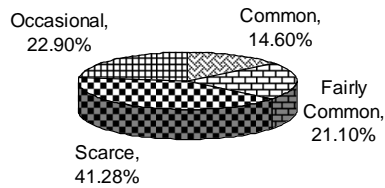


Figure 4. Abundance of birds on percentage basis

and its surrounding area. 25.68% of birds were resident, 33.94% were migrant 24.77% were winter visitors and 15.96% were summer visitors of the Chimdi Lake and its surrounding area.

In Koshi Tappu Wildlife Reserve 461 species of birds representing 58 families are recorded (Baral, 2000). At least 176 species breed in the reserve and 180 species are passage migrant or visitors (IUCN, 1998). The Chimdi Lake area accounts 23.64% and 58.62% of total birds of Koshi Tappu Wildlife Reserve in terms of number of species and family respectively. Similarly Chimdi Lake area represents 20.76% of total birds of Chitwan National Park in terms of number of species. Shrestha (2000) reported 525 species of birds in Chitwan National Park. Subba (1994) recorded 96 species of birds in Biratnagar whereas Chimdi Lake area and its surrounding show greater number of species than those recorded in Biratnagar.

Lake area shows rich diversity of avifauna. It can play important role in harbouring the birds that visit Koshi Tappu Wildlife Reserve and can be developed as a bird sanctuary parallel to Koshi Tappu Wildlife Reserve if restoration of the lake will be done in the time to come.

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