# 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 200 4 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 rehabitation (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

				Months																
				2003						20	004	_				005				
5.N.	Common Name	Scientific Name	Family	D	J	F	М	Α	М	J	J	Α	s	0	Ν	D	J	F	т	SS
1	Little Grebe	Podiceps ruficolis	Prodicppedidae	6	-	-	-	8	•	-	-	-	-	2	-	-	-	-	16	W
2	Large Cormorant	Phalacrocorax carbo	Phalacrocoracidae	4	6	8	4	5	-	-	-	-	-	-	-	-	-	-	27	W
3	Little Cormorant	Phalacrocorax niger	,,	7	3	4	20	2	4		-	-	2	7	5	3	2	2	61	М
4	Darter	Anhinga rufa	Phalacrocoracidae	-	-	2	-	-		-	-	-	-		-	-	-	-	2	W
5	Gray Heron	Ardea cinerea	Ardeidae	4	2	2	4	4		1	-	•	-	4	5	4	-	1	31	М
6	Purple Heron	Ardea purpurea	,,	3	4	1	2	6		-	-	-	-		2	1	-	-	19	W
7	Pond Heron	Ardeola grayii	,,	15	9	12	10	5	3	-	-	-	13	10	12	15	10	9	123	R
8	Night Heron	Nycticorax nycticorax	.,	5	2		-	3	4	1	-	-	2	-	-	-	-	-	17	М
9	Cattle Egret	Bubulcus ibis	.,	23	2	6	36	6	3		7	2	2	18	7	16	6	4	138	R
10	Large Egret	Egretta alba	17	9	1	9	2	4	1	4	-	-	4	-	4	3	3	4	48	R
11	Intermediate Egret	Egretta intermedia	,,	4	2	4	3	3	15	1	1		5	3	6	12	2	-	61	R
12	Little Egret	Egretta garzetta		6	5	1	7	2	1	6	-	2	8	3	-	9	3	2	55	R
13	Chestnut Bittern	Irobrychus cinnamoneus		-	1		-		1			-						-	2	М
14	Lesser Adjuctant Stork	Leptoptlos javanicus	Ciconiidae		2														2	М
15	Open Billed Stork	Anastomus oscitans		10	6	5	2	8	7	6	1		3	13	6	6	6	3	82	R
16	While necked stork	Ciconia episcopus		15	8	4	1.			-			2		2		2	1	34	W
17	White Ibis	Threskiornis melanocephala	". Threskiornithidae	-	-	3		1					3		-	6	-		13	w
18	Black Ibis	Pseudibis papillosa		16	5	3	1	1	2	4	<u> </u>	4	2	10		-		1	49	R
			· ·	10					-		<u> </u>	1	-		-			⊢'		W
19 20	Glossy Ibis	Plegadis falcinellus	,, Anatidae	- 80	-	14	2	- 120	- 10	- 4	<u> </u>	<u> </u>	-	- 35	-	-	-	<u> </u>	2 263	W
	Lesser Whistling Teal	Dendrocygna Javanica	Anatidae	-	-	14	•	120	10	4	•	•		35	•	-	-	•	263	
21	Ruddy Shelduck	Tadorna ferruginea	,,	2	-	•	•			•	-	-			•	-	-	•		W
22	Pintail	Anas acuta	,,	•	-	2	15	-	-	•	-	•	-	-		-	-	-	17	W
23	Garganey	Anas querquedula	,,		-	3	14	•	•	•	•	•	-	•	4	-	-	-	21	W
24	Common Teal	Anas crecca	**	13	•	11	20	9	-	•	•	-	11	-	8	-	•	-	72	М
25	Mallard	Anas pltyrhynchos	,,	-	5		•	•		•	-	•	•	•	-	-	-	-	5	W
26	Spot Bill	Anas poecilorhyncha	,,	-	-	-	16	-	-	-	-		-	-	-	-	-	-	16	W
27	Eurasian Wigeon	Anas penelope	,,	-	-		•	-		-	-	•	-		-	-	-	-	0	W
28	Red Crested Pochard	Netta rufina	,,	-	-	-	•	-	4	-	•	•	-	•	-	-	-	-	4	М
29	Shoveler	Anas clypeata		-	3		-	-	-		-	-	-	-	-	-	-	-	3	М
30	Common Pochard	Aythya ferina		3	-	4	-	•	3	-	-	-	•	-	-	-	-	-	10	W
31	Cotton Teal	Nettapus coromandelianus		50	-	10	20	11	-	-	-	-	40	50	20	-	-	-	201	W
32	Sparrow Hawk	Accipiter nisus	Accipitridae	3	-		4	-	-	-	-	-	-	-	-	-	4	1	12	W
33	Dark Kite	Nilvus migrans	,,	1		1	-	1	-	-	-	-	-		1	2	2	1	9	М
34	Marsh Harrier	Cilrcus aeruginorus	,,	1	1	2	2	1		-	-	-	-		-		-	-	7	W
35	Pied Harrier	Cirus melanoleucos	,,	-	-		-	-			-		-	2	1		-	-	3	W
36	Besra Sparrow Hawk	Accipiter virgatus	,,	-	-		2	-			-		-		-		-	-	2	М
37	Indian Gallinule	Gallinula chloropus	Rallidae	3	-		3	-	2		-	-	-	-	-	5	-	-	13	Μ
38	Coot	Fulica atra	,,	-	1	-	-	-		-	-	-	-		-	-	-	-	1	М
39	Pheasant tailed Jacana	Hydrophasianus chirurgus	Jacanidae	-	-	-	-	-	4	6	-	-	-		-	-	-	-	10	S
40	Bronze Winged Jacana	Metopidius indicus	22	-	-				3	2	-					-	-	-	5	S
41	Yellow Wattled Lapwing	Vanellus malaboricus	Charadriidae	-	-				2	1	-		1			-	-	-	4	S
42	Eurasian Lapwing	Vanellus vanellus	,,	-	-						-				-	1	-	-	1	W
43	Little Stint	Calidris minutus	,,	-	-	-	-	-	-	-	-		-	1	1	3	-	-	5	W
44	Red- Wattled Lapwing	Vanellus indicus		-	-	3	2	2	2	11	-	5	3	1	2	-			31	м
45	Golden Plover	Pluvialis dominica		8	12		-				-	-	-	-	-	-	-	25	45	W
46	Curlew	Numenius arguata		1														-	1	W
47	Common Sand Piper	Tringa hypoleucos			13		7	2						6	6			50	84	w
18	Green Shank	Tringa nebularia				2	t.	-						-	-			-	2	M
49	Painted Snipe	Rostratula benghalesnsis	,, Rostratulidae			<u>.</u>	1	<u> </u>					<u> </u>				-	t.	2	M
+9 50	Black - Bellied Tern	Sterna acuticauda	Laridae				-	3											3	M
					-	-	-	_			<u> </u>	<u> </u>	-		•	-	-		3	
51	Indian River Tern	Sterna aurantia	Laridae			_	-	1	-		· ·	•		•	-	-	-	<u> </u>		M
52	Red Turtle Dove	Streptopelia tranquebarica	Columbidae	-	-	1	1	-	-	•	· ·	•	-	-	-	-	-		2	м
53	Indian Ring Dove	S. decaocto	,,	-	-	2	2	-	-	-	·		2	4	4	2	-	<u> </u>	16	M
54	Spotted Dove	S. Chinensis	,,	2	1	1	2	2	1	2	3	2	4	3	1	1	2	2	29	R
55	Rose - Ringed Parakeet	Psittachula krameri	Psittacidae	-	-	-	2	1	•	-	•	-	-	•	1	-	-	Ŀ	4	М
56	Pied Crested Cuckoo	Clamator jacobinus	Cuculidae		-		L		-	2	4	-		-	1		-	-	7	IS M

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50	E	0		-	_		-				_										
58	Eurasian Cuckoo	Cuculus canorus	,,	-	-	-	•	2	•	•	-	-	-	-	-	-	-	-	2	M	SC
59	Indian Cuckoo	Cuculus micropterus	,,	-	-	1	2	-	-	2	-	-	-	-	-	-	-	-	5	S	SC
60	Koel Cuckoo	Eudynamyus scolopocea	,,	-	-	3	2	2	•	-		-	-	-	-	-	3	7	17	S	FC
61	Large Coucal	Centropus sincnsis	,,	1	1	3	1	-	-	-	1	2	4	-	2	2	-	1	18	R	FC
62	Small Pied King fisher	Ceryle rudis	Alcedinidae	4	1	4	4	1	2	3	1	1	2	1	1	2	2	1	30	R	FC
63	Blue Eared King Fisher	Alcedo meninting	,,	1	1	-	2	-	-	-	-	-	1	-	-	-	-	-	5	М	SC
64	Eurasian King fisher	Alcedo atthis	,,	1	2	-	-	-	-	-	-	-	3	-	1	-	2	1	10	М	FC
65	White breasted Kingfisher	Halcyon smyrnensis		2	1	-	-	-	2	-	-	1	-	2	2	-	3	2	15	М	FC
66	Blue tailed Bee eater	Merops philippinus	Meropideae	-		2	-	-				-	-	-	-				2	М	0
67	Green Bea - Eater	Merops orientalis		-	-	-	1	-		1	-	÷	-			-	-	-	2	М	SC
68	Crimson breasted Barbet	Megalaima haemacephala	Capitonidae	-			2	-		-	2		-					-	4	Μ	SC
69	Blue throated Barbet	Megalaima asicatica	Capitondiae	-		3	-	-	-	2			-	-	-			-	5	М	0
70	Ashy crowned finch lark	Eremopterix grisea	Alaudidae	3	3	2	4	4	3	4		-	-	2	2	3	8	2	40	RM	С
71	Short toed Lark	Calandrella cinerea	**	7	5	3	3	4	3	2				-	3	5			35	RM	С
72	Crested Lark	Galerida cristata	**						1					-			20	2	23	RM	0
73	Bush Lark	Mirafra assamica		2	1	7	-	-	3	3				-		10	3	2	31	R,M	FC
74	Sand Martin	Riparia paludicola	Hirundinidae	-	13		6	20		-	2			-			2		43	S	FC
75	Barn Swallow	Hirundo rustica			15		-	-						-		3			18	М	SC
76	Straited Swallow	Hirundo daurica														6			6	м	SC
77	Brown Shrike	Lanius cristatus	,, Laniidae											2	2				4	M	SC
78	Black Naped Oriole	Oriolus chinensis	Oriolidae	-	2	2	3	2	2					~	-				11	S	0
79	Black Headed Oriole	Oriolus xanthornus	Onondae	-	2	1	1	-	-		-	-	-						4	s	0
80	Golden Oriole	Oriolus valuiorius Oriolus orilous	**			3	1	1											5	s	0
81			" Dicruridae	10		-	3	2	6			2	- 49	10	- 12	6		12	112	R	c
	Ashy Drongo	Dicrurus lucophaeus	Diciulidae		<u> </u>	_		<u> </u>	_						_	_		_	<u> </u>	-	
82	Black Drongo	Dicrurus adsimilis	" 21	19	7	14	76	26	17	38	20	22	16	25	18	4	17	10	329	R	C
83	Gray headed Myna	Sturnus melabaricus	Sturnidae	3	•	-	2	•	•	-	•	•	•	-	-	•	•	•	5	M	0
84	Pied Myna	Sturnus contra	,,	12	9	11	7	3	7	13	9	8	5	25	11	2	16	12	150	R	С
85	Common Myna	Acridotheres tristis	,,	23	16	33	14	22	12	16	18	12	14	30	12	4	25	21	272	R	С
86	Bank Myna	Acridotheres giginianus	,,	4	4	3	6	9	9	7	3	2	7	12	8	-	-	3	77	R	С
87	Jungle Myna	Acndotheres fuscus	Sturnidae	-			-	-	1	-		-	-	4	-			•	5	М	0
88	Indian Tree Pie	Dendrocitta vagabunda	Corvidae	-		2	2	-	•	-		1	1	2	2	2	-	1	13	R	FC
89	House Crow	Corvus splendens	,,	6	9	4	11	7	6	8	5	9	7	16	10	7	14	11	130	R	С
90	Jungle Crow	Corvus macrorhynchos	,,	4	3	5	2	3	4	4	3	4	6	2	5	3	2	4	54	R	С
91	Dark Cuckoo Shrike	Coracina melaschistas	Campephagidae	-			2	-	-			-	-	-	-		-	1	3	М	0
92	Red Whiskered Bulbul	Pycnonotus jocosus	Pycnonotiadae	2	1	3	6	5	3	2	3	1	3	1	3	4	2	2	41	R	С
93	Red Vented Bulbul	Pycnonotus cafer	,,	3	6	2	5	3	7	-		3	-	-	9		6		44	R	С
94	Jungle Babbler	Turdoides striatus	Timaliidae	3	10	6	2	2	7	-			-	-	5		4	-	39	R	FC
95	Paradise Fly Catcher	Terpsiphone paradisi	Muscicapidae	-	-	-	-		1	-	-	-	-	-	-	-	-	-	1	S	SC
96	Gray headed flycatcher	Culicicapa ceylonensis	Muscicapidae	-	-	-	-		2	-	-	-	-	-	-	-	-	-	2	Μ	SC
97	Robin Dayal	Copsychus saularis	Turdidae		3	5				2	2	3	8	4	3	4			34	R	FC
98	Eurasian Black Bird	Turdus merula					1							-					1	S	SC
99	Black Red Start	Phoenicurus ochruros		-			3									2			5	s	SC
100	Collard Bush Chat	Saxicola torquata					3							1		2			6	S	SC
101	Pied Wagtail	Motacilla alba	Motacillidae	4			7						3	6	7	12		3	42	WM	FC
102	Yellow Headed Wagtail	Mitacilla citreda	Motacillidae	-	6	1	3								3	8			21	W	0
103	Gray Wagtail	Motacilla caspica		-		3	-							2		12		6	23	W	0
103	Paddy Field Pipit	Anthus nova eseelandiae			2	2	4		-		6	2		2	3	3		3	23	RM	FC
104	Spotted Munia	Lonchura punctulata	Ploceidae		<u> </u>	<u> </u>	+	<u> </u>	H	-	0 10	4	- 16	-	-	-	÷	-	27	S	0
105		Passer domesticus	Filleluae	17	20	7	13	10	6	- 14	9	12	21	23	- 14	12	- 18	17	213	R	c
	House Sparrow		" Emborizidoo	17	20	/	13	10	0	14	9	12	3	23	14	12	10	17		M	SC
107	Crested Bunting	Melophus lathami	Emberizidae	-	-		-	-	-	-		-	3	4	-	-	-		5		
108	Tailor Bird	Orthotomus sutorius	Sylviidae	6	-	-	4	-	-	-	-	-	-	-	-	-	-	-	10	S	SC
109	Yellow throated leaf warbler	Phylloscopus cantator	,,	-	-	•	6	1	-	-	-	-	•	7	-	•	-	-	14	S	SC
			Total	431	237	255	423	340	176	172	110	100	276	353	237	207	189	230			
			No. of Species	48	47	54	64	45	40	30	20	21	35	39	44	39	28	36	I		
	SS = Seasonal Status	AB = Abundance																			
	R = Resident	C = Common																			

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SS = Seasonal Status	AB = Abundance
R = Resident	C = Common
W = Winter Visitor	FC = Fairly Common
S = Summer Visitor	O = Occasional
M = Migrant	SC = Scarce



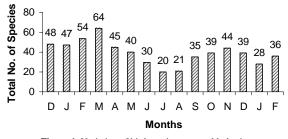


Figure 1. Variation of bird species on monthly basis.

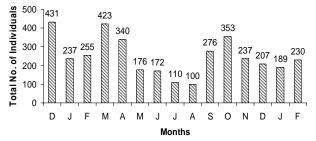


Figure 2. Variation of total number of individuals of bird species on monthly basis.

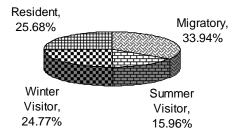


Figure 3. Seasonal Status of birds on percentage basis

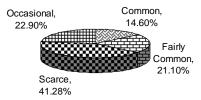


Figure 4. Abundance of birds on percentage basis

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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