

STATUS OF WETLAND BIRDS IN CHITWAN NATIONAL PARK, NEPAL

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ABSTRACT

The study on status of wetland birds in Chitwan National Park was carried out from February 5, 2014 to February 20, 2014. The study aimed to determine status and distribution pattern of wetland birds in Chitwan National Park. Study area was divided into four sectors viz; Sunachari to Sauraha, Sauraha to Kasara, Kasara to Rapti/Narayani confluence, and Rapti/Narayani confluence to Tribeni. The total number of wetland birds recorded in the study area was 36 species. Out of them, 15 were winter migratory birds belonging to 5 families, and 21 were residents belonging to 9 families. Among them, Ruddy Shelduck (*Tadorna ferruginea*) was the most abundant species. Mainly fish-eating bird species were observed at river confluences and shaded forest areas. It was noted that wetland birds are decreasing in number due to high anthropogenic disturbances such as massive sand mining, habitat loss, over fishing, livestock grazing, use of poisoning in wetlands, water pollution, mass tourist pressure in the park and proliferation of alien invasive species.

Key words: Chitwan National Park, Ruddy Shelduck (*Tadorna ferruginea*), wetland, abundant.

INTRODUCTION AND OBJECTIVE

Nepal has separated 23.23 percent of total area for national parks, conservation areas, wildlife reserves and hunting reserve as protected land for valuable flora and fauna, which is around 34,185.62 Sq.Km. (DNPWC, 2012). There are 12 National Parks, 1 Wildlife Reserve, 1 Hunting Reserve, 6 Conservation Areas and 12 Buffer Zones in and around the national parks and wildlife reserves (DNPWC, 2017). About 5 percent of Nepal's total area (743,756 ha) is covered with wetlands (Anon, 2008) and half of this is said to comprise the wet paddy fields. Rivers, lakes, ponds, marshes and seasonal water bodies characterize Nepal's wetlands (Bhandari, 1998, p. 329). Generally lakes in the higher mountains, above 3000 m tend to be

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oligotrophic, and those situated in the midhills are mesotrophic and almost invariably eutrophic if they are in the lowlands. There are four major river systems in Nepal that are snow-fed and run down south through the whole breadth of Nepal until they touch India. These are Koshi river in the east, Narayani river in the central, Karnali in the west and Mahakali in the far west.

Water birds are the key indicator species of wetland conditions hence their regular monitoring is highly important for wetland biodiversity conservation. Birds help to distribute nutrients through their droppings that increase primary production of aquatic vegetation, fish population and also maintain the wetland ecosystem. Nepal is renowned internationally for its high diversity of bird species. The high total of 878 species has been recorded, over 8 percent of the world's known birds (BCN and DNPWC, 2016). A total of 625 species of birds belonging to 64 families (BES and DNPWC, 2013) has been recorded from the Chitwan National Park and its surroundings of which 120 species are wetland dependent.

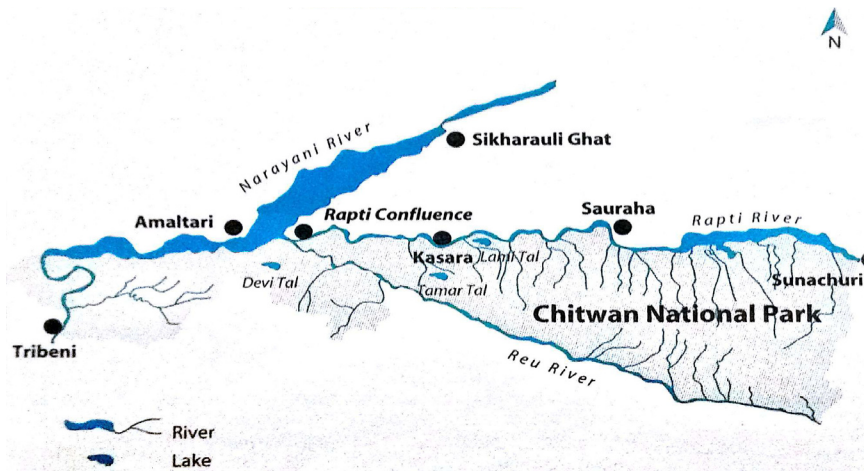
This study looks in more detail at the status and distribution pattern of wetland birds in CNP as well as analysis of residential and migratory bird colonies. Information from the research work contributes to the identification and monitoring of wetlands of international and national importance. Knowledge about the population size, status and trends of water birds, habitat preference and ecological requirements is of utmost importance for developing effective conservation and management strategies. Hence, assisting decision-makers to develop conservation plans and future management strategies for protecting wetlands and birds.

STUDY AREA

Chitwan National Park is the first and oldest National Park of Nepal. Chitwan National Park (27° 30'N, 84° 20'E) covers an area of 952.63 km² and is located in south-central Nepal (Fig.1).

United Nations Educational Scientific and Cultural Organization (UNESCO) declared the park a World Heritage Site in 1984 and is also identified as an important bird area (IBA) by the Bird Life International. CNP has been classified into three main vegetation types. Sal (*Shorea robusta*) forest occupies the 70 percent of the park. The riverine forest occupies an area of about 7 percent along the Rapti, Narayani and Reu rivers and their island. It is mainly dominated by Simal (*Bombax ceiba*) and

Figure 1: Chitwan National Park Lakes & Rivers



grassland. Grassland occurs in alluvial flood plains cover 20 percent of the park area that support luxuriant growth of grasses interspersed with patches of riverine forest (Dinerstein, 2003). The park has many rivers and lakes. Rivers include three major rivers: the Narayani, Rapti and Reu. Major lakes are Bishazari Tal, Tamor Tal, Lami Tal, Garud Tal and Devi Tal. Chitwan National Park is the third best destination of tourists who visit Nepal.

MATERIALS AND METHOD

The survey was carried out for 16 days from February 5, 2014 to February 20, 2014 in four sectors viz; Sunachuri - Sauraha, Sauraha - Kasara, Kasara - Rapti/Narayani confluence, Rapti/Narayani confluence - Tribeni areas of Chitwan National Park (Table1).

Table 1: Itinerary for Wetland Bird Survey

Date	Station	Section-wise Location	Weather	Time	
				Start	End
February 5-8, 2014	A	Sunachuri-Sauraha	Sunny	09h00	17h00
February 9-12, 2014	B	Sauraha-Kasara	Sunny	10h00	16h00
February 13-16, 2014	C	Kasara - Rapti / Narayani Confluence	Sunny	10h30	15h30
February 17-20, 2014	D	Rapti / Narayani Confluence-Tribeni	Sunny	09h30	17h00

Source: Field survey, 2014.

Surveys were conducted using a wooden dugout canoe, and counts were started at 9:00 a.m. and ended at 17:00 p.m. Due to foggy weather, counting was done in the late morning. 10×50 Olympus DPSR binoculars were used for bird identification. Photographs were taken and videos were recorded using a Canon powershot 5×40 HS. Services of bird watchers were also hired for observation and conformation. Survey was done in Narayani and Rapti rivers including major lakes e.g. Garud Tal, Tamor Tal, Lami Tal and marshy land of Temple Tiger Lodge. The survey started from Sunachuri, the eastern border of park to Tribeni, the western border of park.

RESULT AND DISCUSSION

A total of 36 water bird species belonging to 3 orders and 10 families were recorded in Chitwan National Park of which 15 species of birds were winter visitors and 21 were residents. Altogether 10 duck species were observed in which 9 were migratory. However, Khadka (2013) recorded 12 species of ducks of which 11 were migratory. The mostly observed species was Ruddy Shelduck (*Tadorna ferruginea*) with a total of 378 individuals because they feed on algae which was widely available in shingle banks of Rapti and Narayani rivers where water flow was slow. They also remained in pair within the flocks (Khadka, 2012 & 2013). The same species also recorded highest in 2012 with a total count 5,549 in Narayani and Rapti rivers (Khadka, 2013 pp. 3-7). The study carried out by Khadka in 2012 covered 90 percent of the total wetland area of Chitwan National Park and its surrounding resulted in the abundant number of Ruddy Shelducks (*Tadorna ferruginea*). However, as the study area was limited in the recent research, so was the number of Ruddy Shelducks (*Tadorna ferruginea*) was found low.

Figure 2 : Ruddy Shelduck (*Tadorna ferruginea*)



Mainly fish eating bird species were sighted at river confluences and shaded forest areas. The higher concentration of fishes at confluences

between the main river streams and various tributaries and creeks, might be a factor influencing the distribution of waterbirds in such areas. During the hot season, the water of shaded forest areas was cooler and during winter the water was warmer than that of the main rivers. Such areas might assist with thermoregulation for Gharial (*Gavialis gangeticus*) and Marsh Mucker (*Crocodylus palustris*) as well as fish at different times of the year. Fish were also abundant so that fish eating birds were more concentrated in these areas.

East part from Amrite to Sunachuri at Rapti river, there was low presence of park security as a result massive sand mining, grazing, fish poisoning, fishing through electric shock and other illegal activities had been increased so that very low number of wetland birds were sighted in that areas. These practices results in the reduction of number of fishes which in turn had been decreased the number of wetland birds that depend on fish as food. From Amrite to Rapti/Narayani Confluence where there was low disturbance, the highest number of Ruddy Shelduck (*Tadorna ferruginea*) and several other aquatic birds including ducks, geese, egrets and storks were observed. Due to low disturbances in other parts of Rapti and Narayani rivers, there were highest number of Ruddy Shelduck (*Tadorna ferruginea*) and several other aquatic birds were also in good numbers (Table 2).

Table 2: Wetland Bird Survey in Chitwan National Park

Species			Counting Location				Total
Order/Family	Scientific name	Common name	A	B	C	D	
ANSERIFORMES							
Dendrocygnidae	<i>Dendrocygna javanica</i>	Lesser Whistling Duck	2	4	12	8	26
Anatidae	<i>Anser indicus</i>	Bar-headed Goose	36	46	51	68	201
Anatidae	<i>Anser anser</i>	Greylag Goose	0	0	2	2	4
Anatidae	<i>Tadorna ferruginea</i>	Ruddy Shelduck	60	96	118	104	378
Anatidae	<i>Tadorna tadorna</i>	Common Shelduck	0	0	2	0	2

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Anatidae	<i>Anas strepera</i>	Gadwall	37	42	55	67	201
Anatidae	<i>Anas platyrhynchos</i>	Mallard	42	0	29	18	89
Anatidae	<i>Anas poecilorhyncha</i>	Spot-billed Duck	2	8	8	0	18
Anatidae	<i>Anas acuta</i>	Northern Pintail	0	0	17	4	21
Anatidae	<i>Anas penelope</i>	Eurasian Wigeon	4	5	7	8	24
GRUIFORMES							
Rallidae	<i>Amaurornis akool</i>	Brown Crake	0	4	0	0	4
Rallidae	<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	1	2	0	1	4
Rallidae	<i>Porzana fusca</i>	Ruddy-breasted Crake	0	0	2	0	2
Rallidae	<i>Porphyrio porphyrio</i>	Purple Swamphen	1	0	0	0	1
Rallidae	<i>Gallinula chloropus</i>	Common Moorhen	88	22	0	28	138
Rallidae	<i>Fulica atra</i>	Common Coot	19	4	0	0	23
Scolopacidae	<i>Tringa nebularia</i>	Common Greenshank	19	7	21	18	65
Scolopacidae	<i>Calidris temminckii</i>	Temminck's Stint	26	37	28	29	120
Accipitridae	<i>Pandion haliaetus</i>	Osprey	2	2	1	3	8
Accipitridae	<i>Ichthyophaga ichthyaetus</i>	Grey-headed Fish Eagle	0	5	0	2	7
Podicipedidae	<i>Podiceps cristatus</i>	Great Crested Grebe	1	0	0	0	1
Anhingidae	<i>Anhinga melanogaster</i>	Oriental Darter	0	3	2	2	9
Ardeidae	<i>Egretta garzetta</i>	Little Egret	8	9	10	3	30

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Ardeidae	<i>Ardea Cinerea</i>	Grey Heron	4	0	5	7	16
Ardeidae	<i>Ardea purpurea</i>	Purple Heron	0	0	1	0	1
Ardeidae	<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	0	0	6	15	21
Ardeidae	<i>Ardeola grayii</i>	Indian Pond Heron	3	2	3	3	11
Ardeidae	<i>Casmerodius albus</i>	Great Egret	4	0	0	3	7
Ardeidae	<i>Mesophoyx intermedia</i>	Intermediate Egret	3	5	3	3	14
Ardeidae	<i>Bubulcus ibis</i>	Cattle Egret	1	6	0	1	8
Ardeidae	<i>Butorides striatus</i>	Little Heron	0	3	4	0	7
Threskiornithidae	<i>Pseudibis papillosa</i>	Black Ibis	6	8	7	7	28
Ciconiidae	<i>Anastomus oscitans</i>	Asian Openbill	1	0	2	2	5
Ciconiidae	<i>Ciconia nigra</i>	Black Stork	6	14	10	5	35
Ciconiidae	<i>Ciconia episcopus</i>	Wolly-necked Stork	6	4	0	0	10
Ciconiidae	<i>Leptoptilos javanicus</i>	Lesser Adjutant	4	3	2	0	9

There were a lot of mudflats, shingle banks, smaller stony feeder streams and sand banks for resting, roosting and feeding sites as well as suitable microhabitat of birds. Important site as Itcharni Tappu, Dudaura, near Sauraha and Sukhisar, Telawighat, near Bhimle areas were places with best bird habitat and good sightings of birds at Rapti river. In the eastern channel of Narayani there was less presence of waterbirds due to high water current, lack of appropriate feeder stream compared to western channel. In the western channel of Narayani there was high frequency of birds and mainly Nandapur, Amaltari and Lamichaur areas were found to be the best habitats.

From Baguban to Tribeni area in Narayani river, water volume was high and water current was low due to closed barrage gate and water

diverted into irrigation channel. Due to this reason, low diversity of birds were found because since there was no feeding and basking site for birds. Mostly seen birds were a flock of Common Moorhen (*Gallinula chloropus*), few pairs of Ruddy Shelduck (*Tadorna ferruginea*) and Bar-headed Goose (*Anser indicus*), a pair of Little Egret (*Egretta garzetta*), two pairs of Black-crowned Night Heron (*Nycticorax nycticorax*) and 18 individuals of Mallard (*Anas platyrhynchos*).

Lami Tal and Tamor Tal were near the park head quarter at Kasara. Tamor Tal was in the southern part of Kasara in the Sal-forest and Lami Tal was in the riverine belt of Rapti which was in the eastern part of Kasara, near Ghatgain. Lami Tal had good marshy lakes than Tamor Tal. Lesser Whistling Duck (*Dendrocygna javanica*), Common Moorhen (*Gallinula chloropus*), Temminck's Stint (*Calidris temminckii*) were commonly found at Lami Tal.

Every year, sand mining and stone quarrying activities had been stopped during the month of January to February by Chitwan National Park to minimize disturbance for migratory water birds, Crocodiles as well as other aquatic animals. But during other season sand and stone collection was opened for local people and massive stone and sand collection took place so that algae feeder Ruddy Shelduck (*Tadorna ferruginea*), and other fish eating and aquatic-invertebrates feeding species were affected due to loss of food and roosting sites and also few sightings of these species in the Sunachuri to Janakpur Ghat, near Sauraha. The spread of Water Hyacinth (*Eichornia crassipes*) and Pond Weed (*Potamogeton nodosus*) on sand banks, mudflats and shingle banks on the Rapti River, from below Sauraha to the Rapti/Narayani confluence had reduced the feeding areas for ducks and other wetland birds.

CONCLUSION

In Chitwan National Park, among wetland birds; resident birds were found more in number than the migratory birds. Common wetland birds were Ruddy Shelduck (*Tadorna ferruginea*), Bar-headed Goose (*Anser indicus*) and Gadwall (*Anas strepera*). Commonly Ruddy Shelduck (*Tadorna ferruginea*) was the most abundant species. The species of Purple Swamphen (*Porphyrio porphyrio*), Great Crested Grebe (*Podiceps cristatus*) and Purple Heron (*Ardea purpurea*) were few in number. Stone, gravel and sand mining in Rapti river was the main reason for the decreasing

number of water birds in comparison to Narayani river. The population of wetland birds was decreasing due to use of chemicals in water, food shortage due to over-fishing, proliferation of invasive alien species, hunting and trapping, eutrophication, massive sand mining, fish poisoning, fishing through electric shock and other anthropogenic activities. Current conservation measures and monitoring were inadequate for aquatic birds. Active conservation measures in the form of monitoring and stringent protection of riverine habitats including floodplain lakes, marshes, swamps and developing aquatic bird species management protocols were urgently needed for effective conservation of wetland birds.

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REFERENCES

- Anonymous (2008). Conservation and sustainable use of wetlands in Nepal (CSUWN – NEP/05/G01). *Banako Jankari* Special Issue 40-42.
- BCN and DNPWC (2016). *Birds of Nepal: An official checklist*. Kathmandu: Bird Conservation Nepal and Department of National Parks and Wildlife Conservation.
- BES and DNPWC (2013). *Chitwan bird checklist 2013*. Chitwan: Bird Education Society and Department of National Parks & Wildlife Conservation.
- Bhandari, B. (1998). An inventory of Nepal's Terai wetlands. *Final Report*. Kathmandu, IUCN Nepal, 329 .
- Dinerstein, E. (2003). *The return of the unicorns: The natural history and conservation of the greater one-horned rhinoceros*. New York: Columbia Press. 316.
- DNPWC (2012). *Biodiversity conservation in Nepal: A success story*. Kathmandu: Department of National Parks and Wildlife Conservation.
- (2017). *Biodiversity conservation in Nepal: A success story*. Kathmandu: Department of National Parks and Wildlife Conservation.

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Khadka, B.B. (2012). Midwinter waterbird count in 2011 at chitwan national park. *Danphe*, 21 (1); 1-5.

Khadka, B.B. (2013). Midwinter waterbird count in 2012 at chitwan national park. *Danphe*, 22 (2/3); 3-7.