

# Diversity of Waterbirds in Lucknow District, Uttar Pradesh, India

Amita Kanaujia<sup>1</sup>, Adesh Kumar<sup>2</sup>, Sonika Kushwaha<sup>3</sup>, Akhilesh Kumar<sup>4</sup>

Biodiversity & Wildlife Conservation Lab, Department of Zoology, University of Lucknow, Lucknow- 226007  
Uttar Pradesh, India

**Abstract:** For over a century, pioneering naturalists have determined the way in which waterbird conservation has evolved around the world and have been involved in the establishment of international organizations such as IUCN. The term, waterbird or aquatic bird is used to refer the birds that live on or around water bodies; they may be fresh water or marine. The enrichment of organic constituents accountable for the growth of aquatic weeds, phytoplankton and zooplankton therefore the wetlands are good habitat for availability of food stuff to various waterbirds in moderate proportion. This study presents diversity of water bird in Lucknow and adjacent areas where surveys have been conducted for two years (October 2012- September 2014) in different unprotected wetlands of Lucknow having N 26.8470° and E 80.9470° geographical coordinates. Total 71 Species of water bird representing 9 orders and 21 families were recorded from five different localities. Out of these 70 species, 25 species were residential, 14 species were residential/local migratory, 2 species were local migratory, 27 species were migratory while 2 species were residential/migratory. The study reveals that in Lucknow there are maximum populations of Migratory water birds followed by residential, residential/local migratory and residential/migratory species. The present study of wetlands helps to maintain a record of water bird to restore and maintain the present condition of wetland. The attempt of study is to provide the information about biodiversity of water birds to recognize these sites as globally important habitat for the conservation of water bird population because baseline information is a condition for planning and monitoring management actions for waterbirds and their habitats.

**Keywords:** Waterbirds, Wetlands, Lucknow, Residential and Migratory

## 1. Introduction

For over a century, pioneering naturalists have determined the way in which waterbird conservation has evolved around the world and have been involved in the establishment of international organizations such as IUCN. The term, water bird or aquatic bird is used to refer the birds that live on or around water bodies; they may be fresh water or marine. But some water birds are more terrestrial than others, and their adaptations vary depending on their environment. The enrichment of organic constituents accountable for the growth of aquatic weeds, phytoplankton and zooplankton, the wetlands are good habitat for availability of food stuff to various waterbirds in moderate proportion. Waterbirds are known for their provisioning services like natural indicator for vertebrates and invertebrates as well as important component of wetland ecosystem. There are about 9000 species of birds in the World out of which approximately 23% (310 of 1340) of the bird species found in India (R. Manakadan and A. Pittie, 2001) are known to be dependent on wetlands (A. Kumar, J.P. Sati, P.C. Tak, and J.R.B. Alfred, 2005). The birds' population is dwindling continuously from last few decades and more than hundred species of birds are either endemic or endangered (U.N. Shukla, and A.A. Lone, 2010).

The present study of wetlands helps to maintain a record of water bird to restore and maintain the present condition of wetland. Wetlands play a crucial role in maintaining ecosystem and support various life forms. Man depends upon wetlands for various livelihood services but this interaction with wetlands is rapidly unlinked due to intensified industrial development and pollution by domestic and industrial sewage. Some incidences were noticed in 2014 by Kanaujia

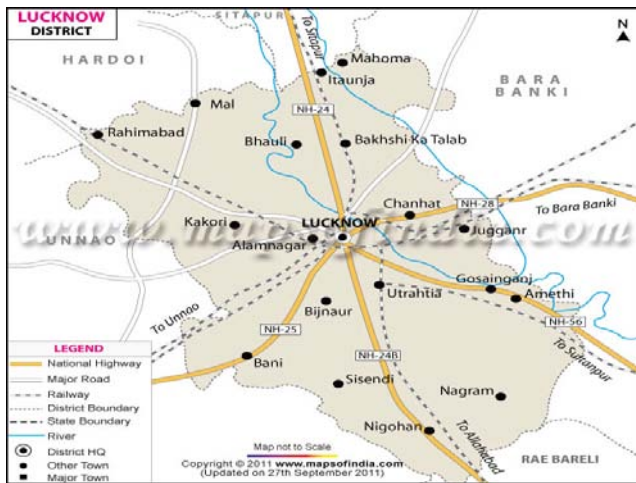
and Kumar regarding human interference, especially excessive fish cultivation, excessive cultivation of water chestnut, overgrazing near wetland area, excessive use of pesticides nearby agricultural fields, soil-digging, draining off or levelling of wetlands for agricultural purposes, levelling for construction work, use of wetland water for irrigation purpose, overgrazing near wetland area, draining off for fish culture, wetlands fire, poaching of water birds that effects the roosting and breeding of waterbirds, which directly prejudiced population of waterbirds (Amita Kanaujia and Adesh Kumar, 2014).

## 2. Materials and Methods

The Geographic coordinates of Lucknow is 26.8470° N and 80.9470° E. During study, wetlands of Lucknow and its associated areas (Itaunza, Gosaiganj, Amethi, Mahona and

Bakshi ka Taalab) were covered. Wetlands have been the important waterfowl habitats of Lucknow city. The study area involves Lucknow and its associated areas (up to 50 km). The capital of Uttar Pradesh is situated 123 meter above sea level. In summer temperature ranges from 25-45°C while in winter from 2-20°C, the average annual rainfall is about 896.2 mm (35.28 inch). Lucknow covers an area of 2528 sq.km. The principal river Gomti originates near the Maldo Tada town of Pilibhit. The river extends to about 900 km. Some of the tributaries of this river are Kukrail, Loni, Beta etc. Sai river flows from the south of the city and in the east it enters the district Raebareli. It is surrounded on the eastern side by District Barabanki, on the western side by district Unnao, on the southern side by Raebareli and on the northern side by Sitapur and Hardoi districts. Population of Lucknow as per census 2001 is 36, 81,416 lacs.

Wetlands in and around Lucknow are still very rich in biodiversity but due to local pressure such as increasing population and anthropogenic activities the wetland needs rehabilitation strategy.



**Figure 1:** Map of Study Area (from Google)

This study presents waterbird diversity of Lucknow and adjacent areas where surveys have been conducted for two years (October 2012- September 2014) in different unprotected wetlands of Lucknow. Observations were carried twice in a day in the morning and evening hours using open ended line transect method with the aid of an Olympus 10x50 binoculars and data was supported with photography using Canon EOS 1000 D SLR camera. The birds were identified using standard field guide books (Ali and Ripley, 1995, Grimmett *et al.*, 2011 and Salim Ali, 2002).

### 3. Results and Discussion

The birds generally migrate in the winter months of October-November-December. During the study period in October and November month, the migratory birds observed were Black-headed Ibis, White-necked stork, Black-necked stork, Black ibis, Bar headed goose, Comb duck, Cotton teal, Northern pintail, Garganey, Common teal, Red crested pochard, Common pochard, Gadwall, Eurasian wigeon, Greyleg goose, Ruddy shelduck, Ferruginous pochard, Little ringed plover, Ringed plover, Wood sandpiper, Green sandpiper, Common sandpiper, Common sedshank, Common greenshank, Wire-tailed swallow, Yellow wagtail, Grey wagtail etc.

Residential waterbirds recorded are Little grebe, Little cormorant, Indian cormorant, Little egret, Large egret, Median egret, Cattle egret, Indian pond heron, Chestnut bittern, Black-crowned night heron, Lesser whistling duck, White-breasted water hen, Purple moorhen, Common moorhen, Sarus crane, Red-wattled lapwing, Pheasant-tailed jacana, Bronzed-winged jacana, Small blue kingfisher, White breasted kingfisher, Small bee-eater, Large pied wagtail, Common woodshrike, Ashy prinia and Plain prinia. (Fig.2).



**Figure 2:** Migratory and Residential birds observed during study

Total 70 Species of waterbird representing 9 orders and 21 families were recorded from five different localities (Itanunja,

Gosaiganj, Amethi, Mahona and Bakshi ka Taalab). Out of these 70 species, 27 species were migratory (Table.1), 25 species were residential (Table.2), 14 species were residential/local migratory (Table.3), 2 species were local migratory while 2 species were residential/migratory (Table.4). Hence the study reveals that in Lucknow there are maximum populations of Migratory water birds followed by residential, residential/local migratory and residential/migratory species. Study of Kumar and Srivastava reveals that the Industrial developments hinder the migration of birds and shrink the migratory bird population at Sandi Bird Sanctuary in 2013. The avifauna of Barna wetland of Narmada Basin was studied by Balapure *et al.*, in 2012. They reported 63 species of residential and migratory birds belonging to 7 order and 12 families (Balapure *et al.*, 2012).

**Table 1:** List of Migratory Waterbirds

S.N.	Scientific Name	Common Name	Feeding Habit	IUCN Status
1.	<i>Threskiornis melanocephalus</i>	Black-headed Ibis	P	LC
2.	<i>Ciconia episcopus</i>	White-necked Stork	P	LC
3.	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	P	NT
4.	<i>Pseudibis papillosa</i>	Black Ibis	P	NT
5.	<i>Anser indicus</i>	Bar-headed goose	V	LC
6.	<i>Sarkidiornis melanotos</i>	Comb duck	V / I	LC
7.	<i>Nettapus coromandelianus</i>	Cotton teal	V / I	LC
8.	<i>Anas acuta</i>	Northern pintail	V	LC
9.	<i>Anas querquedula</i>	Garganey	V	LC
10.	<i>Anas crecca</i>	Common Teal	V	LC
11.	<i>Rhodonessa rufina</i>	Red-crested Pochard	V	LC
12.	<i>Aythya ferina</i>	Common Pochard	V	LC
13.	<i>Anas strepera</i>	Gadwall	V	LC
14.	<i>Anas penelope</i>	Eurasian Wigeon	V / I	LC
15.	<i>Anser anser</i>	Greylag Goose	V	LC
16.	<i>Tadorna ferruginea</i>	Ruddy Shelduck	O	LC
17.	<i>Aythya nyroca</i>	Ferruginous Pochard	O	LC
18.	<i>Charadrius dubius</i>	Little Ringed Plover	I	LC
19.	<i>Charadrius hiaticula</i>	Ringed Plover	I	LC
20.	<i>Tringa glareola</i>	Wood Sandpiper	I	LC
21.	<i>Tringa ochropus</i>	Green Sandpiper	I	LC
22.	<i>Actitis hypoleucos</i>	Common Sandpiper	I	LC
23.	<i>Tringa totanus</i>	Common Redshank	I	LC
24.	<i>Tringa nebularia</i>	Common Greenshank	I	LC
25.	<i>Hirundo smithii</i>	Wire-tailed Swallow	I	LC
26.	<i>Motacilla flava</i>	Yellow Wagtail	I	LC
27.	<i>Motacilla cinerea</i>	Grey Wagtail	I	LC

**Table 2:** List of Residential Waterbirds

S.N.	Scientific Name	Common Name	Feeding Habit	IUCN Status
1.	<i>Tachybaptus ruficollis</i>	Little Grebe	P	LC
2.	<i>Phalacrocorax niger</i>	Little Cormorant	P	LC
3.	<i>Phalacrocorax fuscicollis</i>	Indian Cormorant	P	LC
4.	<i>Egretta garzetta</i>	Little Egret	I	LC
5.	<i>Casmerodius albus</i>	Large Egret	P	LC
6.	<i>Mesophoyx intermedia</i>	Median Egret	P	LC
7.	<i>Bubulcus ibis</i>	Cattle Egret	I	LC

8.	<i>Ardeola grayii</i>	Indian Pond Heron	I / P	LC
9.	<i>Ixobrychus cinnamomeus</i>	Chestnut Bittern	I / P	LC
10.	<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	P	LC
11.	<i>Dendrocygna javanica</i>	Lesser whistling duck	V	LC
12.	<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	I	LC
13.	<i>Porphyrio porphyrio</i>	Purple Moorhen	I / V	LC
14.	<i>Gallinule chloropus</i>	Common Moorhen	I	LC
15.	<i>Grus antigone</i>	Sarus Crane	P	VU
16.	<i>Vanellus indicus</i>	Red-wattled Lapwing	I	LC
17.	<i>Hydrophasianus chirurgus</i>	Pheasant-tailed Jacana	O	LC
18.	<i>Metopidius indicus</i>	Bronzed-winged Jacana	O	LC
19.	<i>Alcedo atthis</i>	Small Blue Kingfisher	P	LC
20.	<i>Halcyon smyrnensis</i>	White-breasted Kingfisher	P	LC
21.	<i>Merops orientalis</i>	Small Bee-eater	I	LC
22.	<i>Motacilla maderaspatensis</i>	Large Pied Wagtail	I	LC
23.	<i>Tephrodornis pondicerianus</i>	Common Woodshrike	I	LC
24.	<i>Prinia socialis</i>	Ashy Prinia	I	LC
25.	<i>Prinia inornata</i>	Plain Prinia	I	LC

**Table 3:** List of Residential/Local Migratory Waterbirds

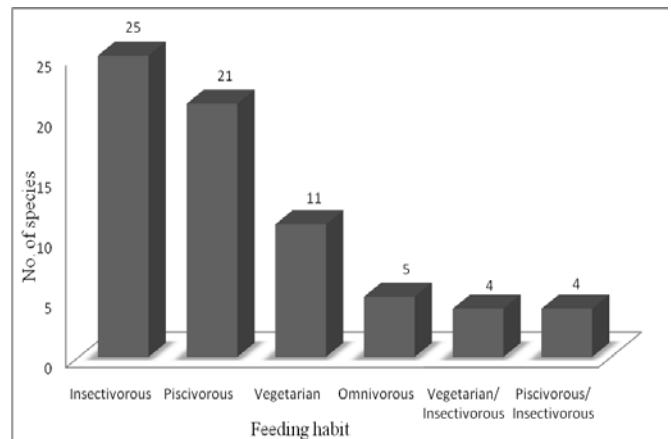
S.N.	Scientific Name	Common Name	Feeding Habit	IUCN Status
1.	<i>Phalacrocorax carbo</i>	Great Cormorant	P	LC
2.	<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	P	LC
3.	<i>Ixobrychus sinensis</i>	Yellow-bittern	I / P	LC
4.	<i>Anhinga melanogaster</i>	Darter	P	NT
5.	<i>Ardea cinerea</i>	Grey Heron	P	LC
6.	<i>Ardea purpurea</i>	Purple Heron	P	LC
7.	<i>Mycteria leucocephala</i>	Painted Stork	P	NT
8.	<i>Anastomus oscitans</i>	Asian Open-bill Stork	I	LC
9.	<i>Anas platyrhynchos</i>	Mallard	O	LC
10.	<i>Anas poecilorhyncha</i>	Spot-billed duck	V	LC
11.	<i>Fulica atra</i>	Common Coot	P	LC
12.	<i>Vanellus malabaricus</i>	Yellow-wattled Lapwing	I	LC
13.	<i>Ceryle rudis</i>	Lesser Pied Kingfisher	P	LC
14.	<i>Riparia paludicola</i>	Plain Martin	I	LC

**Table 4:** List of Residential/Migratory and Local Migratory Waterbirds

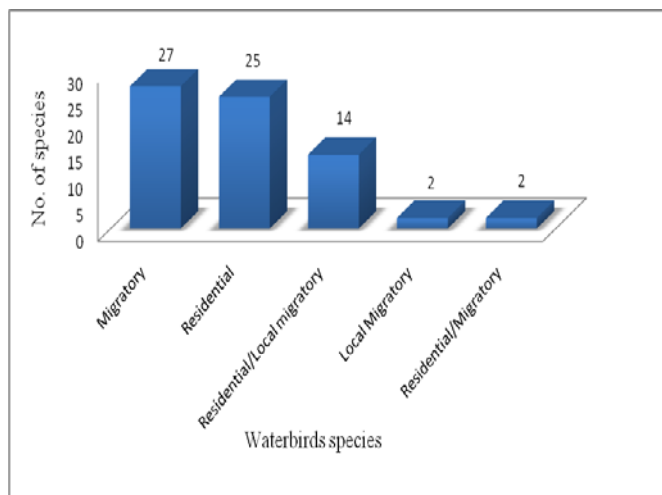
S.N.	Scientific Name	Common Name	Feeding Habit	IUCN Status
1.	<i>Himantopus himantopus</i>	Black-winged Stilt	I	LC
2.	<i>Hirundo rustica</i>	Common Swallow	I	LC
3.	<i>Ixobrychus flavicollis</i>	Black-bittern	I / P	LC
4.	<i>Nettapus coromandelianus</i>	Cotton Pygmy Goose	V	LC

(**Keys:** Feeding Habit: P- Piscivorous, I- Insectivorous, O-Omnivorous, V- Vegetarian. IUCN Status: VU- Vulnerable, NT- Near Threatened, LC- Least Concern. Based on the IUCN Red List 2011)

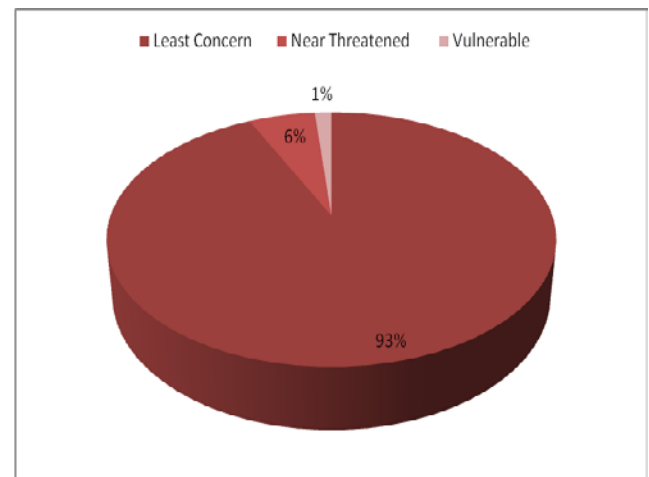
Species wise diversity of waterbirds shown in Fig.3. Species wise Percentage composition of waterbirds shown in Fig.4. Similar study was done by Joshi and Srivastava of Tawa Reservoir in 2012 and Husaain *et al.*, studied the status of waterbirds in Wular Lake and record 24 species in 2012. Out of 70 species of waterbirds maximum 25 were Insectivorous followed by 21, 11, 5, 4 and 4 were Piscivorous, Vegetarian, Omnivorous, Vegetarian/ Insectivorous and Piscivorous/ Insectivorous respectively. Species diversity of waterbirds according to their feeding habit has been shown in Fig. 5. In 2011 nearly same feeding habits of aquatic birds in Lake of Banglore were also observed by S. Rajashekara and M.G. Venkatesha. According to International Union for Conservation of Nature and Natural Resources (2008) out of 70 species reported 65 species of waterbirds have status of Least Concern, 4 species have status Near Threatened and only one species Sarus Crane is Vulnerable have been observed during the study and then percentage composition has been shown in Fig. 6.



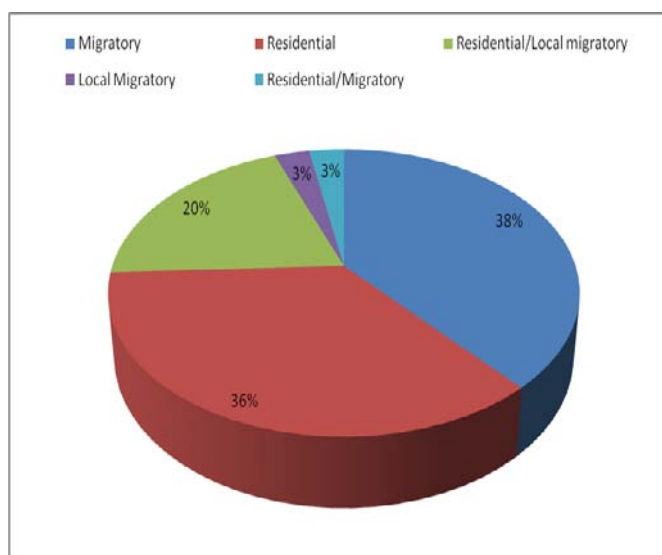
**Figure 5:** Species diversity of waterbirds according to their feeding habit



**Figure 3:** Species wise diversity of waterbirds



**Figure 6:** Percentage composition of waterbirds species according to IUCN Status



**Figure 4:** Species wise percentage composition of waterbirds

#### 4. Conclusion

The study on the waterbirds of Lucknow is lacking. This study provides the information about biodiversity of water birds to recognize these sites as globally important habitat for the conservation of water bird population because baseline information is a basic requirement for planning, monitoring and management actions for waterbirds and their habitats. Wetlands in Lucknow have high probability to support a good number of waterbirds species. This study exhibits the ecological value of wetlands in Lucknow as a feeding ground for the Migratory and residential species of birds. It is a preliminary study further supports the study of the breeding and behavioural aspects of migratory as well as residential species.

#### 5. Acknowledgement

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## Author Profile



**Amita Kanaujia:** received the M.Sc. and Ph.D. degrees in Zoology from University of Lucknow and Bundelkhand University in 1994 and 2007, respectively. She Joined Bipin Bihari College, Jhansi as an Assistant Professor and University of Lucknow as an Associate Professor in 2001 and 2007 respectively. She is working in the field of Biodiversity and Wildlife conservation. She is the Principal Investigator of various projects funded by UGC. U.P. State Biodiversity Board, World Bank and U.P. Boomi Sudhar Nigam.



**Adesh Kumar:** received the B.Sc. and M.Sc. degrees in Zoology and Animal Science from Rohilkhand University in 2004 and 2006, respectively. He qualified CSIR-NET LS in 2011 and 2012. currently

doing his research on Wetlands Biodiversity from University of Lucknow and a Project of “An annotated and colored checklist of butterflies of Uttar Pradesh, India.” funded by U.P. State Biodiversity Board, Lucknow.



**Sonika Kushwaha:** received the B.Sc. and M.Sc. degrees in Zoology from Bundelkhand University in 2003 and 2005, respectively. She awarded her Ph.D. on “Hematological and Histopathological Investigation on Vulture in Bundelkhand Region” conservation in 2014. Currently doing her research on a Project of “status, distribution and Demography of House Sparrow in Lucknow.” funded by U.P. State Biodiversity Board, Lucknow.



**Akhilesh Kumar:** received the B.Sc. and M.Sc. degrees in Zoology and Animal Science from Faizabad University and BBAU University in 2008 and 2010, respectively. Currently doing his research on House Sparrow demography from University of Lucknow and a Project of “status, distribution and Demography of House Sparrow in Lucknow.” funded by U.P. State Biodiversity Board, Lucknow.