

## Avifauna diversity along the coastline of Banbhore (Gharo creek), district Thatta, Sindh, Pakistan

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### ABSTRACT

**Introduction:** Banbhore situated at bank of Charo creek and 65km from the Karachi in the district Thatta, Sindh, Pakistan. The main objectives of research were to observe the avian diversity of coastline of Banbhore, Sindh, Pakistan.

**Materials and Methods:** During the research two transects lines were selected; each transects line consists of 1 km long selected. Linear count method was used while direct and indirect methods were applied. For the statistical analysis PAST software was used to find out the diversity indices.

**Results:** A total of 51 avian species and 960 individuals were noted from coastline of Banbhore (Gharo creek), district Thatta, Sindh, Pakistan. Dominance Index (0.03134), Evenness Index (0.7575), Margalef Index (7.268), Simpson diversity Index (0.9687) and Shannon-wiener diversity Index (3.654) were recorded from the study area.

**Conclusion:** 51 avian species were documented from the Banbhore (district Thatta) during the research and documented that Banbhore (Gharo creek) having rich avian diversity.

**Key words:** Common teal, Brown Headed-gull, Garganey, Transects.

## INTRODUCTION

Pakistan consists of different ecological zones having small area (IUCN, 1989; Roberts, 1991). It is converted into zones on the basis of plants and mammals species. Unites are not continuous ecological zones, it is smaller ecological units. Major part of Pakistan has changed into agriculture, urban and industrial landscape (Roberts, 1991; Altaf, 2016). Pakistan consists of the following eighteen major ecological zones; which is consists of snowfields, deserts, sand dunes, fresh water, marine water, estuaries and hills (Roberts, 1997). Pakistan consists of 225 wetlands and also having largest canal system of world. Pakistan consists of 0.78 million hectares wetland area; while out of these, seventy four percent consists of freshwater and twenty six percent of coastal areas and having nineteen International important wetlands or Ramsar sites (Altaf *et al.*, 2014).

993 species of birds are recorded from the whole world and 2700 from Asia and 668 from Pakistan. In Pakistan, out of total, 30% avian species are long distance migrant, 43% species are Oriental or Palearctic and come for breeding and 27% are winter visitors (Roberts, 1991). Total 7 fly zones present in world; while only one present in Pakistan and this is known as Indus fly zone (Ali, 2005). Cranes, ducks, Falcons, flamingos, geese swans and waders are vital migratory avian species in Pakistan (Ali, 2005). This area is not studied before, therefore this study was planned to assess the avifauna diversity along the coastline of Banbhore, district Thatta, Sindh, Pakistan.

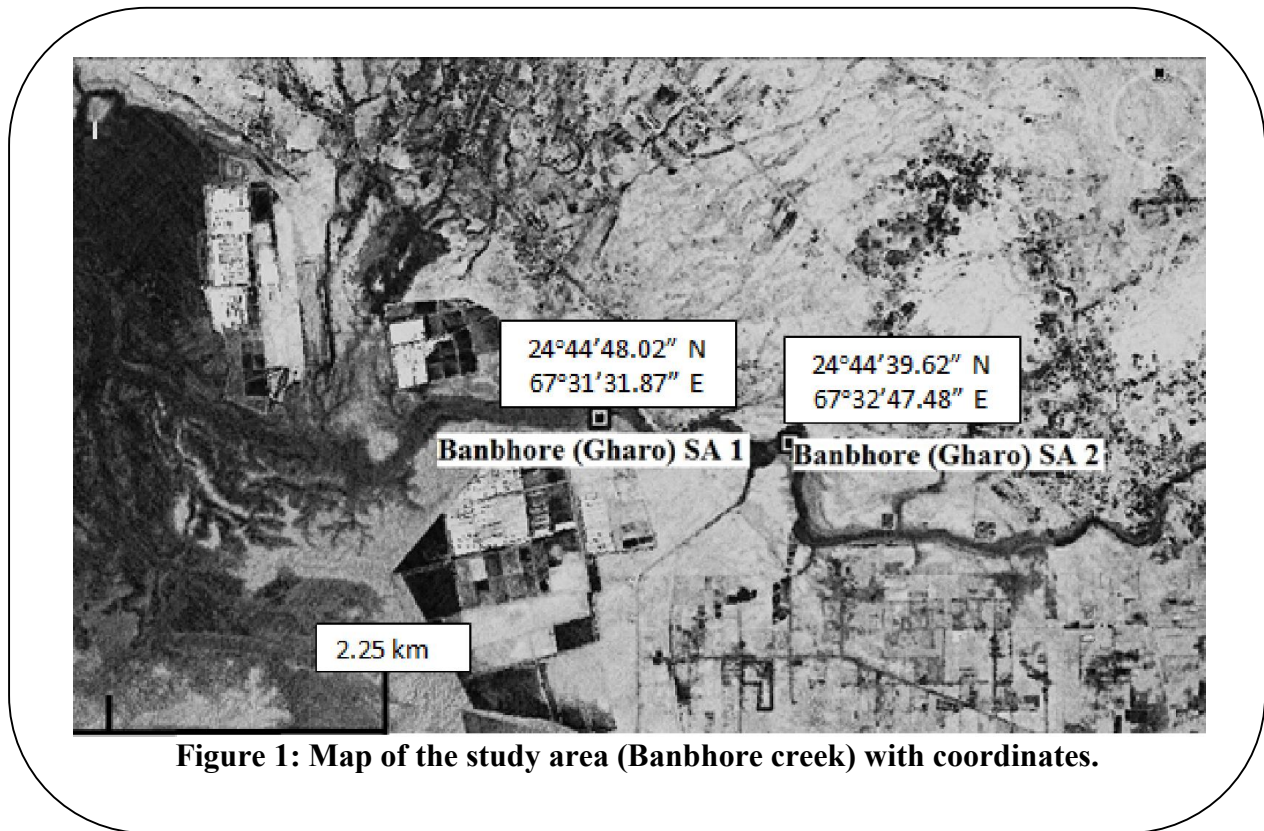
## MATERIALS AND METHODS

This survey was started from March 2015 to April 2016 to assessment of diversity of study area. The data were collected on monthly basis at dawn and dusk.

**Methodology:** Linear count method was used; which having 2 transect lines, while each transects line consists of 1 km long selected; and used both direct (i.e. physical count) and indirect

methods (i.e. nests and body parts). Guide books (Mirza and Wasiq, 2007; Grimmett *et al.*, 2008) were used for identification and reorganization of avian species.

**Study area:** Banbhore situated at bank of Gharo creek and 65km from the Karachi in the district Thatta, Sindh, Pakistan (UNESCO, 2012) as shown in Figure 1.



**Figure 1: Map of the study area (Banbhore creek) with coordinates.**

**Statistical Analysis:** For the data analysis PAST (2.17C) was used to find out the Dominance Index (D), Evenness Index (E), Margalef Index (R), Shannon diversity Index ( $H'$ ) and Simpson diversity Index (S) (Hammert *et al.*, 2001).

## RESULTS AND DISCUSSION

A total of 51 species of avifauna and 960 numbers were noted from coastline of Banbhore (Gharo creek), district Thatta, Sindh, Pakistan as shown in table 1. Dominance Index (D), Evenness Index (E), Margalef Index (R), Simpson diversity Index (S) and Shannon-wiener

diversity Index (H') were recorded from the study area as; 0.03134, 0.7575, 7.268, 3.654 and 0.9687 respectively as shown in table 2. While Ali *et al.* (2016) recorded total 4280 population of birds from the Keti Bunder, District Thatta.

Simpson Index (0.94), Shannon-wiener diversity Index (3.23), Margalef Index (5.74), Evenness Index (0.52) and Dominance Index (were noted as; 0.06). Altaf *et al.* (2015) total of 51 species of birds and 2531 numbers were recorded from head Marala. Simpson Index (0.86), Shannon-wiener diversity index (2.62), Margalef Index (6.38), Evenness (0.27) and Dominance Index (0.138) were documented.

Most abundant species of this research were recorded as; Common teal (75), Black Headed gull (49), Brown Headed-gull (43), Common shelduck (42), Garganey (42), Pallas,s gull (39), Caspian gull (38), Northern Paintail (37) and Northern shovler (35) as mention in Table 3 and Figure 2. Altaf *et al.* (2015) documented that most abundant species of river Chenab were recorded as Purple heron, night heron, little egret, large egret, intermediate egret, Indian river tern, Indian pond heron, grey heron, cattle egret and black-winged stilt. While Ali *et al.* (2016) noted that most abundant species of the Keti Bunder were recorded as; pallas's gull, little grebe, little egret, greater flamingo, greater egret, common shelduck, common coot, cattle egret and black headed gull.

**Table 1: Avifauna of Banbhore (Gharo creek), district Thatta, Sindh, Pakistan.**

Sr. No.	Common Name	Scientific Name	No.	Distribution	Status
1	Barn swallow	<i>Hirundo rustica</i>	7	Winter Visitor	LC
2	Black headed gull	<i>Larus ridibundus</i>	49	Resident	LC
3	Black kite	<i>Milvus migrans</i>	8	Resident	LC
4	Black shoulder kite	<i>Elanus caeruleus</i>	2	Resident	LC
5	Black winged stilt	<i>Himantopus himantopus</i>	27	Resident	LC
6	Blue-cheeked bee-eater	<i>Merops persicus</i>	21	Winter Visitor	LC
7	Brahminy kite	<i>Haliastur indus</i>	26	Resident	LC
8	Brown-headed gull	<i>Larus brunnicephalus</i>	43	Resident	LC
9	Caspian gull	<i>Larus cachinnans</i>	38	Resident	LC
10	Cattle egret	<i>Bubulcus ibis</i>	16	Resident	LC

11	Common greenshank	<i>Tringa nebularia</i>	6	Resident	LC
12	Common Pochard	<i>Aythya ferina</i>	29	Resident	VU
13	Common ringed plover	<i>Charadrius hiaticula</i>	11	Resident	LC
14	Common sandpiper	<i>Actitis hypoleucos</i>	4	Resident	LC
15	Common shelduck	<i>Tadorna tadorna</i>	42	Resident	LC
16	Common snipe	<i>Gallinago gallinago</i>	19	Resident	LC
17	Common teal	<i>Anas crecca</i>	75	Resident	LC
18	Common tern	<i>Sterna hirundo</i>	15	Resident	LC
19	Dalmatian pelican	<i>Pelecanus crispus</i>	18	Resident	NT
20	Dunlin	<i>Calidris alpina</i>	25	Resident	LC
21	Dusky crag martin	<i>Hirundo concolor</i>	3	Resident	LC
22	Eurasian crag martin	<i>Hirundo rupestris</i>	7	Summer Breeder	LC
23	Eurasian curlew	<i>Numenius arquata</i>	6	Resident	NT
24	Eurasian spoonbill	<i>Platalea leucorodia</i>	16	Resident	LC
25	Eurasian wigeon	<i>Anas penelope</i>	16	Resident	LC
26	Gadwall	<i>Anas strepera</i>	14	Resident	LC
27	Garganey	<i>Anas querquedula</i>	42	Resident	LC
28	Great white pelican	<i>Pelecanus oncorotalus</i>	12	Resident	LC
29	Greater flamingo	<i>Phoenicopterus ruber</i>	24	Winter Visitor	LC
30	Greater Sand plover	<i>Charadrius leschenaultii</i>	8	Winter Visitor	LC
31	Grey heron	<i>Ardea cinerea</i>	2	Resident	LC
32	Indian reef heron	<i>Egretta gularis</i>	3	Resident	LC
33	Large egret	<i>Egretta alba</i>	17	Resident	LC
34	Lesser flamingo	<i>Phoenicopterus minor</i>	17	Resident	NT
35	Little bittern heron	<i>Ixobrychus minutus</i>	3	Resident	LC
36	Little cormorant	<i>Phalacrocorax niger</i>	18	Resident	LC
37	Little egret	<i>Egretta garzetta</i>	19	Resident	LC
38	Little ring plover	<i>Charadrius dubius</i>	18	Resident	LC
39	Little tern	<i>Sterna albifrons</i>	24	Resident	LC
40	Mallard	<i>Anas platyrhynchos</i>	14	Resident	LC
41	Marsh sandpiper	<i>Tringa stagnatilis</i>	18	Resident	LC
42	Night heron	<i>Nycticorax nycticorax</i>	4	Resident	LC
43	Northern pintail	<i>Anas acuta</i>	37	Resident	LC
44	Northern shovler	<i>Anas clypeata</i>	35	Resident	LC
45	Pallas,s gull	<i>Larus ichthyaetus</i>	39	Resident	LC
46	Pond heron	<i>Ardea grayii</i>	10	Resident	NE
47	Red-wattled lapwing	<i>Vanellus indicus</i>	12	Resident	LC
48	Sand martin	<i>Riparia riparia</i>	12	Resident	LC
49	Sindh green bee-eater	<i>Merops orientalis</i>	34	Resident	LC
50	Whimbrel	<i>Numenius phaeopus</i>	4	Resident	LC
51	Wire-tailed swallow	<i>Hirundo smithii</i>	3	Resident	LC

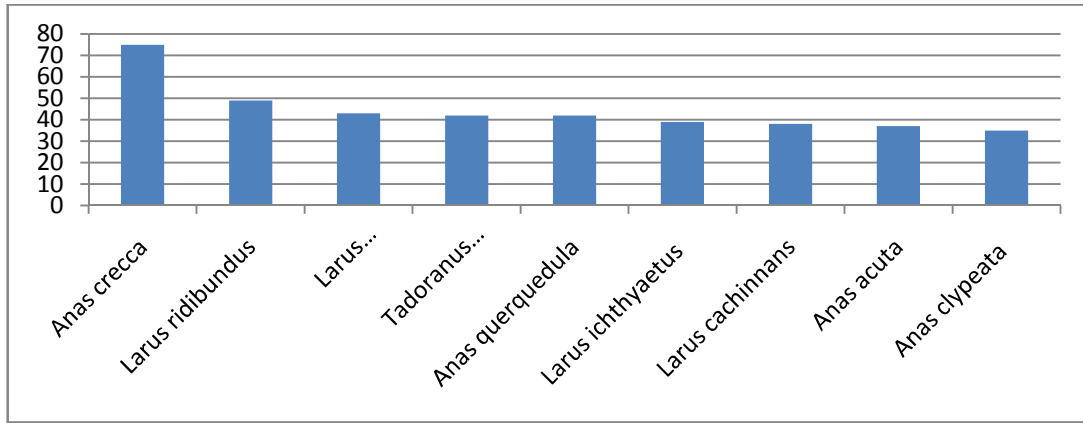
**Table 2: Diversity indices of birds of the Banbhore (district Thatta).**

Diversity Indices	Values
Dominance (D)	0.03134
Evenness (E)	0.7575
Richness (R)	7.268
Shannon (H')	3.654
Simpson (S)	0.9687
Species	51
Population	960

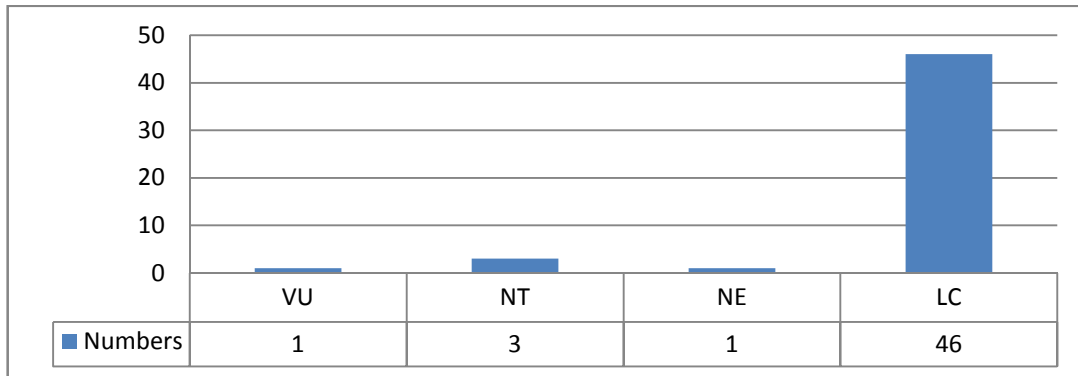
**Table 3: Most abundant birds of the Banbhore (district Thatta).**

Common Name	Scientific Name	Numbers
Common teal	<i>Anas crecca</i>	75
Black headed gull	<i>Larus ridibundus</i>	49
Brown headed-gull	<i>Larus brunnicephalus</i>	43
Common shelduck	<i>Tadoranus tadoranus</i>	42
Garganey	<i>Anas querquedula</i>	42
Pallas,s gull	<i>Larus ichthyaetus</i>	39
Caspian gull	<i>Larus cachinnans</i>	38
Northern paintail	<i>Anas acuta</i>	37
Northern shovler	<i>Anas clypeata</i>	35

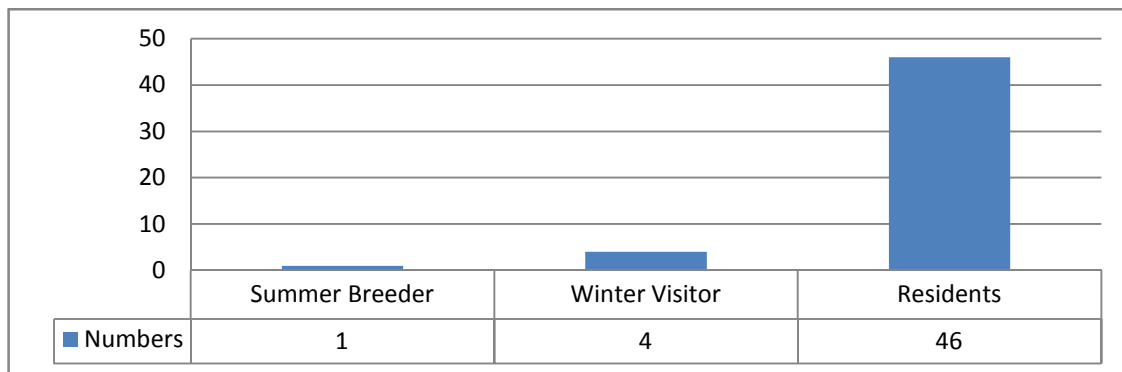
During the research noted that status of the species is as; one species is Vulnerable (VU), 3 species are Near Threatened (NT), 46 are Least Concern (LC) and one species is Not Evaluated (NE) till now as shown in Figure 3. During the survey recorded that only one species is summer breeder, 4 species are winter visitor, 46 are resident as shown in Figure 4.



**Figure 2: Most abundant avian species of the Banbhore (district Thatta).**



**Figure 3: Status of birds of the Banbhore (district Thatta).**



**Figure 4: Status of birds of the Banbhore (district Thatta).**

**Conclusion:** 51 water species of birds were documented from the Banbhore (district Thatta) during the survey and is noted that the study area having rich avifauna diversity.

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**Availability of data:** We have included all data in the manuscript that were collected during the field survey.

**Authors' contributions:** Ali design study and also conducted the research; Altaf helped in data analysis and write up; Ashraf, Khan, Khan and Chattha critically read this article and approved as final manuscript.

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