

**STUDIES OF POPULATION STATUS OF MIGRATORY WATER
BIRDS OF WETLANDS OF UPPER PUNJAB
(Jan. 2017)**



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INTRODUCTION

Midwinter waterfowl census have been conducted globally since 1970's in coordination with international waterfowl and Asian wetlands bureau, results of which are being published since 1987. Presently the coordination center is wetlands International (Wetlands International 2007). In Pakistan these surveys have been carried out since 1972 and Zoological Survey of Pakistan (ZSP) is an integral part of these surveys. Pakistan is also signatory of Convention on the Conservation of Migratory Species (CMS) of Wild Animals (especially water birds) over whole range of their migratory route. This convention requires the regular monitoring of migratory pattern, analyzing population trends, status and distribution of waterfowl species, assessing wetland values and identification of important sites for protection of threatened species for better management and conservation of waterfowl.

The current survey is conducted to estimate the waterfowl population on following important wetlands of upper Punjab:- Kalar Kahar, Uchali Lake, Jhallar Lake, Khabbeki Lake, Nammal Lakes, Chashma and Jinnah Barrages.

STUDY AREAS

1. **Khalar Kahar Lake**

The Lake is situated at 32° 46'N, 72° 42'E, about 25 km southwest of Chakwal is adjacent to Kalar Kahar town having an area of 220 hacters. This small brackish Lake of salt range has dense marginal vegetation having *Typha angustifolia*, *Saccharum spp* and *pharagmites karka*. The Lake has also light submerged vegetation and fruit orchards at southern banks of the Lake.



Fig.1 kalar kahar Lake, showing ducks and Coots.

2. Uchali Lake

Uchali Lake is situated at 13 km west of Nowshehra town and 42 km north west of District Khushab at 32° 33'N 72° 01'E. It is a saline Lake with a little marsh vegetation and almost completely surrounded by agriculture land. It is fed by a small spring from adjacent agriculture lands. It has been one of the largest Lakes of the Punjab province but its area shrank in the past years becoming a small marshy area.

Marsh vegetation is confined to a few small patches along the Lake shore, but there is a very rich growth of plankton in the Lake. The dominant aquatic plants are *Carex fedia*, *Hydrilla verticillata*, *Juncus sp*, *Phraagmites karka*, *Potamogeton crispus*, *Saccharum spontaneum*, *Typha angustata*, *Vallisneria spiralis* and *Zannichellia palustris*. The natural vegetation of the region is

a mixture of subtropical semi-evergreen forest and tropical thorn forest with species such as *Acacia modesta*, *Adhatoda vasica*, *Dodonea viscosa*, *Gymnosporia royleana*, *Olea ferruginea*, *Reptonia buxifolia*, *Tamarix aphylla*, *Withania coagulans* and *Zizyphus spp.* The natural vegetation around the Lake has been cleared for agricultural land.



Fig.2 Flocks of common coots at Uchali Lake.

3. Khabbaki Lake

Khabbaki Lake is situated at 32° 37'N 72° 14'E, 10 km north of Nowshehra and 38 km north west of district Khushab. The Lake has an area of 283 hacters. Water level of the Lake increased excessively in the 1985-1987 but after wards it became completely dry in past few years and lost its aquatic vegetation. Since 2007 Lake has regained some water and now it is full of water. Natural vegetation in the surroundings is like that of Uchali Lake.



Fig.3 Lake with scanty birds, showing boats of commercial fishermen.

4. Jhallar Lake

Jhallar Lake is situated at 32° 29'N 72° 07'E, approximately 10 km south east of Uchali Lake and 10 km south west of Nowshehra, District Khushab. It has an area of 100 hacters. It is a small brackish Lake with little vegetation similar in general character to nearby Uchali and Khabbaki Lakes. The Lake is fed by seasonal streams from surrounding hills.



Fig.4 Ducks at Jhallar Lake.

5. Nammal Lake

Nammal Lake is situated at 32° 41'N, 71° 49'E 29 km north east of District Mianwali, Punjab Province. It has an area of 486 hacters. It is a shallow Lake partly impounded by a dam at one corner and fed by a spring and several intermittent streams arising in the hills of salt range. Depth of the Lake varies up to 6 meters with average of 4.6 meters. Water is slightly saline. The water level fluctuates widely and is particularly confronted by the removal of water for irrigation.

The aquatic vegetation consists of *Carex fedia*, *Hydrilla verticillata* *Juncus sp*, *Phragmites karka*, *Potamogeton crispus*, *Saccharum spontaneum*. *Typha angusta* and *Zannichellia palustris*. The natural vegetation of the region is a mixture of subtropical semi-evergreen scrub and tropical thorn scrub with species such as *Acacia modesta*, *Acacea nilotica*,

Adhatoda vasica, *Dodonea viscosa*, *Gymnosporia royleana*, *Olea ferruginea*, *Prosopis cineraria*, *Reptonia buxifolia*, *Salvadora oleoides*, *Tamarix aphylla*, *T. dioica*, *Zizyphus mauritiana*, *Z. nummularia*, *Chrysopogon aucheri*, *Lasiurus hirsutus*, *Heteropogon contortus* and *Panicum antidotale*. *Prosopis glandulosa* has been introduced in the area. Most of the land adjacent to the Lake has been cleared for agriculture. The wetland was first designated wildlife sanctuary with an area of 486 hacters in 1970 and has been re-notified many times.

6. Chashma Barrage

Chashma Barrage is located at 32° 25'N 75° 22'E 25 km southwest of Mianwali on the Mianwali to Dera Ismail Khan Road in Punjab Province. The wetland comprises of a large Barrage on the Indus River with a series of embankments or flood bunds, which divide the wetland in to five Lakes each of up to 250 hacters in area. Depth of the five Lakes varies from 0.2 meter in the dry season to 8 meters at the height of the flood season. Depth of the main river varies from 4.6 meters to 8.8 meters.

The aquatic vegetation consists of *Hydrilla verticillata*, *Nelumbium speciosum*, *Nymphaea lotus*, *Typha angustata*, *Pragmites karka*, *Potamogeton pectinus*, *Saccharum spontaneum*, *Vallisneria spiralis* and *Zannichellia palustris*. The natural vegetation of the region is a mixture of subtropical semi-evergreen scrub and tropical thorn forest with species such as *Olea ferruginea*, *Acacia modesta*, *A. nilotica*, *Adhatoda vasica*, *Dodonea viscosa*, *Tamarix aphylla*, *T. dioica*, *Zizyphus mauritiana*, *Z. nummularia*, *Chrysopogon aucheri*, *Lasiurus hirsutus*, *Heteropogon contortus* and *Panicum antidotale*.

Considering importance of the wetland it was declared as wildlife sanctuary with an area of 33,082 hacters in 1974 and has been re-notified many times. The wetland has also been declared as Ramsar Site.



Fig.5 Ruddy Shelduck at Chashma barrage.

7. Jinnah Barrage

Jinnah Barrage is situated ($32^{\circ} 55'N$, $71^{\circ} 31'E$) about 50 Km northwest of Mianwali city. It has a voluminous watershed in the main downstream (river Indus). Few small ponds are also located at the adjacent peripheries. The wetland has light submerged vegetation. The Barrage is unique in having good concentration of anatids both at upstream and downstream of the Barrage and also supports a variety of water birds.



Fig.6 Downstream of Jinnah Barrage.

MATERIALS AND METHODS

The wetlands were surveyed during the month of January for mid-winter waterfowl census 2017. Each wetland was visited at least three times during the survey period and counts were made at different selected points. The birds were directly observed, identified and counted with the help of binoculars (Olympus 8-16 X 40, DPS I) and spotting scopes (Nikon w/ 15-45 X). The GPS receiver (Magellan SporTrack) was also used to record the coordinates of each wetland. For the identification of water birds, Sonobe and Usui (1993) were referred. We paid great attention to the identification of each species of migratory water birds. Identifying as many species in each flock as possible, and then applying the observed ratios to unidentified members of the flocks to estimate total numbers of each species. The total number of the birds was

determined by direct counts by selecting plots at each site of the wetlands and counting the number of species and birds in each plot and then multiplying each plot with total area of the wetland to determine the number of birds present at the total area of wetland. The data collected and then computed to find out the total population estimates of migratory water birds at each wetland.

Table: Detail of Water birds at the Wetlands of upper Punjab Jan. 2017

Sr. No.	Scientific Name	Common Name	Kalar Kahar Lake	Chashma Barrage	Jhallar Lake	Khabbeki Lake	Uchali Lake	Nammal Lake	Jinnah Barrage	Total
1	<i>Tachybaptus</i>	Little Grebe	32	1261	27	80	372	5	13	1790
2	<i>PedicepsCristatus</i>	Great Crested Grebe	0	23	3	10	25	0	0	61
3	<i>Phalacrocoraxcarbo</i>	Large Cormorant	234	1732	0	0	12	0	0	1978
4	<i>Phalacrocorax Niger</i>	Little Cormorant	13	1025	6	0	25	7	280	1356
5	<i>Phoenicopterusruber</i>	Greater Flamingo	0	0	0	0	215	0	0	215
6	<i>ArdeolaGrayii</i>	Indian Pond Heron	41	77	5	6	17	5	4	155
7	<i>Ixobrychusminutus</i>	Little Bittern	2	3	0	0	0	0	0	5
8	<i>Nycticoraxnycticorax</i>	Night Heron	2	12	0	0	0	0	0	14
9	<i>Bubulcus ibis</i>	Cattle Egret	15	62	0	0	27	12	0	116
10	<i>Egrettaagarzetta</i>	Little Egret	63	728	3	15	32	21	27	889
11	<i>EgrettaIntermedia</i>	Intermediate Egret	7	17	0	0	0	0	0	24
12	<i>Egretta Alba</i>	Large Egret	7	38	0	2	5	0	2	54
13	<i>Ardeacineria</i>	Gray Heron	42	139	3	22	42	15	28	291
14	<i>Ardeapupurea</i>	Purple Heron	125	4	0	0	0	0	0	6
15	<i>Platalealeucorodia</i>	White Spoon bill	0	0	0	0	0	8	0	8
16	<i>Tadornaferruginea</i>	Ruddy Shelduck	0	216	0	0	0	0	65	281
17	<i>Tadornatadorna</i>	Common Shelduck	0	0	0	0	6	0	0	6
18	<i>Anus Penelope</i>	EurasianWigeon	0	1829	0	0	119	0	126	2074
19	<i>Anus streptera</i>	Gadwall	7	3672	126	0	437	0	513	4655
20	<i>Anascrecca</i>	Common Teal	215	4610	116	27	6321	70	418	11677
21	<i>Anasplatyrhynchos</i>	Mallard	32	1820	3	25	1392	130	592	3994
22	<i>Anasacuta</i>	Northern Pintail	31	1322	0	0	645	16	163	2177

23	<i>Anaschpeata</i>	Shovler	28	5727	223	0	1230	0	25	7033
24	<i>Nettarufina</i>	Red-crested Pochard	0	173	2	0	0	0	0	175
25	<i>Aythyaferina</i>	Common Pochard	52	2179	1509	5	7311	8	13	10877
26	<i>Aythanyroca</i>	White-eyed Pochard	15	89	4	0	25	0	0	133
27	<i>Aythyafuligula</i>	Tufted Duck	0	1237	0	2	0	0	0	1239
28	<i>Oxyurealeucocephala</i>	White-headed Duck	0	0	0	0	2	0	0	2
29	<i>Amauornispheonicurus</i>	White-Breasted Water Hen	0	10	0	0	0	0	0	10
30	<i>Galinulachloropus</i>	Indian Moorhen	73	124	3	0	39	2	12	253
31	<i>Porphyrioporphyrus</i>	Purple Moorhen	112	209	0	0	0	0	7	328
32	<i>Fulicaatra</i>	Common Coot	186	14710	9	63	16337	12	132	31449
33	<i>Hydrophasianuschirurgus</i>	Pheasant-tailed Jacana	0	39	0	0	0	0	0	39
34	<i>Himantopus himantopus</i>	Black Winged Stilt	32	61	9	18	83	25	13	241
35	<i>Recurvirostraavosetta</i>	Pied Avocet	0	0	0	23	0	0	0	23
36	<i>Vanellusvanellus</i>	Northern Lapwing	0	5	0	0	0	4	0	9
37	<i>Charadriusalexandrinus</i>	Kentish Plover	12	28	0	0	10	13	4	67
38	<i>Vanellusleucurus</i>	White-Tailed Plover	0	4	0	0	0	2	0	6
39	<i>Charadriushiatricula</i>	Ringed Plover	0	12	0	24	0	0	0	24
40	<i>Charadriusdubius</i>	Little ringed Plover	0	25	0	0	0	0	0	25
41	<i>Holopterusindicus</i>	Red-wattled Lapwing	5	17	6	5	12	12	7	64
42	<i>Ca;odros ,omita</i>	Little Stint	12	72	0	0	0	25	0	109
43	<i>Gallinagogallinago</i>	Common Snipe	7	21	0	0	5	17	0	50
44	<i>Tringaerythropus</i>	Spotted Redshank	0	25	0	0	0	0	0	25
45	<i>Tringatotanus</i>	Redshank	0	39	0	0	21	4	0	64
46	<i>Tringanebularia</i>	Greenshank	4	12	0	0	4	0	0	20
47	<i>Tringaochronus</i>	Green Sandpiper	9	10	0	0	2	26	4	51
48	<i>Actitishypoleucos</i>	Common Sandpiper	13	13	5	3	7	2	13	56
49	<i>Calidristeminckii</i>	Temincks stint	4	4	2	2	3	0	0	11
50	<i>Tringaglareola</i>	Wood Sandpiper	2	9	0	0	5	0	0	16
51	<i>Limosalimosa</i>	Black-tailed Godwit	0	149	0	0	0	0	0	149
52	<i>Larusargentatus</i>	Herring Gull	0	26	0	0	0	0	5	31
53	<i>Larusichthyaetus</i>	Great black-headed Gull	4	40	0	0	7	0	2	53

54	<i>Larusridibundus</i>	Black headed gull	7	264	0	25	5	0	17	318
55	<i>Sterna aurantia</i>	Indian River Tern	5	172	0	0	6	0	39	222
		Total	1446	43910	2064	357	34806	441	2524	84946

RESULTS AND DISCUSSIONS

During the current waterfowl census (2017) a total of 55 species of water birds (both migratory and resident) were recorded at the important surveyed wetlands. The largest population (43910) of migratory water birds was observed at Chashma Barrage while smallest one at Khabbeki Lake with 357 individual birds. Like previous record, Common Coot (*Fulica atra*) was found most abundant species with highest population at almost all the wetlands i.e. 31449 individual birds. Whereas, in duck family Common Teal (*Anas crecca*) was found most abundant (11677) birds at the wetlands followed by Common Pochard (*Aythya ferina*) 10877 birds and Shovler (*Anas clypeata*) 7033 birds. But in previous years common Pochard was recorded as most abundant duck at wetlands of Punjab.

During the current survey a pair of White-headed Duck (*Oxyurea leucocphalia*) globally threatened (Endangered) duck species was observed at Uchali wetland. The White-headed Duck was previously observed from Jhalar Lake (also a part of Uchalli complex) in previous census of January 2014. The white-eyed Pochard (*Aythya nyroca*) also a globally threatened species was observed at different wetlands of Punjab in good numbers while previously these were rarely observed. Common Shelduck (*Tadorna tadorna*) was observed at Uchali Lake while, Ruddy Shelduck (*Tadorna ferruginea*) locally known as Surkhab was found common at both Jinnah and Chashma Barrages. Besides this some rare migratory water birds species like, Pied Avocet (*Recurvirostra avosetta*) was observed at Kalarkahar Lake while White Spoon-bill (*Platalea*

leucorodia) and Northern Lapwing (*Vanellus vanellus*) were also observed at Nammal Lake. A flock of Flamingos is resident to Uchali Lake and in previous years its population was 20 to 30 birds but currently about 215 birds were observed which indicates that these birds breed at the wetland in sustainable numbers.

If we compare current results with previous year's census, a significant change can be noticed at all the surveyed wetlands of Punjab. During the recent census only a few hundred birds were observed at Kabbeki Lake in comparison with previous years. The reason of decreasing birds population either increased commercial fishing activity or agricultural chemicals i.e. nitrogen, phosphorus and pesticides. The Uchali Lake holds comparatively higher number of birds than previous years. The common Coot was relatively less in numbers at Chashma Barrage. In 2015, Common Coot was counted 32860 birds while in current census only 14710 were observed which almost half in numbers.

RECOMMENDATIONS

- There is a dire need to further understand the effects of various threats on the migratory population of water birds in Pakistan, such studies should be continued to fill in the missing gaps of information and to develop a better conservation strategy for saving the species from extinction.
- A task force of bird lovers from government and non government sectors should be constituted to study the population dynamics of migratory water birds in these areas.
- Detailed hydrological observations should be recorded with specific regard to water inflow, water outflow, retention capacity, loss through evapotranspiration, manipulation of water level, load of silt and its impact on vegetation and afforestation programmes, etc.

- Pollution level should regularly be monitored with a special emphasis on phosphorus and nitrogen cycling, one of the principal factors responsible for degradation of water quality in wetlands. Water level should be managed to assume that wetlands are suitable for waterfowls.
- A pilot management scheme should be chalked out for some of these wetlands for consideration as closed areas. Some of them may be exclusively kept for waterfowl and other species with interference by local people and cattle prohibited.
- During the migratory season of water birds i.e. September to March, the Provincial Wildlife Departments may depute field staff at major wetlands to protect the migratory birds from illegal hunting and poaching.
- Detailed monitoring of migratory birds is required, so periodic surveys other than mid-winter may also be under taken. In addition studies on resident and migratory breeding water birds may also be undertake.
- The Kalar kahar Lake which is a tourist resort and also a breeding ground of different species of both migratory and local water bird species, due to scarcity of water the 50% of the Lake is almost dry so the government should take special measures for rehabilitation of Lake.
- . Uncontrolled reed harvesting at wetlands devoid water birds from their habitat, so it may be controlled.
- Disturbance caused by fishing and recreational activities may be minimized during migratory season which was observed at Khabbeki and Kalar kahar Lakes.

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