RECENT RECORDS OF GLOBALLY ENDANGERED WHITE HEADED DUCK *OXYURA LEUCOCEPHALA* IN PAKISTAN

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ABSTRACT

The records show that the number of White-headed Duck is reduced from over 1000 to only ten in the course of past 35 years. It indicates that their number may reach zero at any coming year, if the present alarming rate of decline was to continue. It is believed that the South Asian migratory flock of White-headed Duck winters only at Uchalli Wetlands Complex in Punjab, Pakistan. There are however, indications that these birds may go to other areas in Punjab or elsewhere due to recent drought and shrinkage in habitat at Uchalli Wetlands Complex. Historically recorded sites since 1883 therefore, have more potential to survey for search of White-headed Duck than any other sites. To investigate their true status on alternate winter grounds, an extensive survey was undertaken from 28th January to 21st February 2003. The survey encompassed areas were Rawal Lake, Kallar Kahar Lake, Shahpur (Jehlum Bridge), Jahlar Lake, Khabbaki Lake, Uchalli Lake, Nammal Lake, Rangpur Lake, Mianwali (Chashma Barrage), Kharal Lake, Khangarh Lake, Bahawalnagar (Sulmanki Headworks), Chalianwala, Hafizabad (Qadirabad Headworks), Sialkot (Marala Headworks), and Jassar (River Ravi). These wetlands are extensive enough to lure White-headed Duck. A total of 33 White-headed Ducks were recorded at four different sites viz.: 22 at Uchalli, two at Jahlar, two at Nammal and seven at Rawal lake. Khabbaki, Kharrar and Chalianwala sites faced a severe drought following scanty rainfall in the catchment area. The sex ratio (male/female) of past seventeen years was found to be 46:54. The results depict that the reason for decline is other than natural calamities and may be hunting at non wintering sites due to distinction in male plumage.

Key words: White-headed Duck, Survey, Shannon-Weiner Biodiversity Index, Conservation.

INTRODUCTION

The White-headed Duck *Oxyura leucocephala* a globally endangered (A1a, c, d, e) duck, is only stifftail (*Oxyurini*) native to Europe, Asia and North Africa. It is listed both in the IUCN Red List and on appendix 1 of the CMS (IUCN 2000). It is one of nine specialised diving duck, which are weak fliers and rarely come to land. White-headed Duck prefer shallow, productive brackish "endorreic" wetlands having a closed basin hydrology. During this century, many White-headed Duck population has disappeared from Italy, Greece, Hungary, Albania, Morocco, Egypt and Israel. The global population, which was around 100,000 at the start of twentieth century, has decreased to 8,000-13,000 birds in 2002. Its range and population is declining further mainly due to shrinkage in its traditional wintering and breeding grounds in Central Asia. Asian flocks mainly breed in Russia and Kazakhstan and move towards Turkey, Azerbaijan, Iran, and Pakistan in winter (Li and Mundkur 2003).

The ducks like small lakes and reluctant to fly, so they make easy targets for shooters. Hunting probably wiped out the last birds in several sites and it still goes on across most of the range. At present time, White-headed Duck are known to winter in Pakistan only at Uchalli, Khabbaki and Jahlar. These lakes collectively known as Uchalli Wetlands Complex and a Ramsar site since 1996. It seems that Uchalli Wetlands Complex has been the sole Pakistan location for this species since late 1980's (Anonymous 2003). It is not clear, however, whether the dearth of sightings since late 1980;s is an indication of complete extirpation of these birds from other wetlands or merely the failure of ornithologists to survey the area adequately. Government departments admitted that the wetlands of the Punjab inadequately surveyed for migrant waterfowl, and severely over populated region of Pakistan was unlikely to provide the required undisturbed habitat for this conspicuous bird (Khan and Chaudhary, 1993).

The future of the species in Pakistan, however, cannot be completely secure until the wintering population is adequately assessed and protected on all potential sites. Recent drought period is a threat for lakes, which have no permanent source of water except rain, like Salt Range lakes.

There are 25 sites in Pakistan since 1883 where historic records for wintering of White-headed Duck are present. Sixteen sites have historic records of White-headed Duck in Punjab. A record of more than 1000 White-headed Ducks is available in the freshwaters of Pakistan. This population was stable until 1980's, but wintering population declined afterwards. The mid-winter

counts since 1987 showed a steady but significant decline in their numbers. At present the depleted Pakistan population of White-headed Duck is struggling to survive at only two sites (Jahlar and Uchalli) out of the 16 historically recorded sites in Punjab. There were some speculations that White-headed Duck might have visit other alternate wetlands. Moreover it was important to find out status of habitats of historically recorded sites. Only ten birds in winter 2001-2002, a sharp decline after 1987, has prompted WWF-Pakistan to launch a survey to determine the present status of the wintering population of White-headed Duck in Punjab. And to gather information for undertaking conservation measures for the protection of the migratory population of White-headed Duck and its habitat in Pakistan (Birdslife International 2006).

MATERIALS AND METHODS

A diagnostic survey was conducted. Experienced ornithologists, who were familiar with the area and local languages, were consulted for the survey. All the concerned Districts staff from Wildlife and Parks Department of Punjab (WPDP), Ornithological Society of Pakistan (OSP) and WWF-Pakistan were involved in the Survey. The area visited during the survey include Rawal Lake (Islamabad), Kallar Kahar Lake (Chakwal), Shahpur (Jehlum Bridge, Khushab), Jahlar Lake (Khushab), Khabbaki Lake (Khushab),, Uchalli Lake (Khushab), Nammal Lake (Mianwali), Rangpur Lake (Khushab), Chashma Barrage (Mianwali), Kharal Lake, (Okara) Khangarh Lake (Muzafargarh), Sulmanki Headworks (Bahawalnagar), Chalianwala (Gujrat), Qadirabad Headworks (Hafizabad), Marala Headworks (Sialkot), and Jassar (River Ravi, Narowal)

Birds census was made by point counts method (Haldin and Ulfvens 1987). The total water area estimated was 46,746 hectares. The census period was lasted from 28th January to 21st February 2003.

On the basis of size of lake sufficient number of points (1-5 per lake) were selected from which the whole area could be observed with the aid of a telescope. With the help of a GPS coordinates and elevation above sea level was recorded. When several census points in a single lake, were determined the limit of sub areas, in order to avoid double counts, and moved to the next point as rapidly as possible without disturbing the birds.

Species diversity was measured with the Shannon Function (H') (Hutchinson, 1970). Similar other analyses were carried out like the birds density (Census Index) based on the area searched, relative abundance based on the actual abundance and dominant and sub-dominant birds again based on the abundance and distribution.

RESULTS AND DISCUSSION

White-headed Duck Counts: There were only four sites where White-headed Duck is recorded. These wetlands were extensive enough to lure White-headed Duck. Thirty-three White-headed Ducks were counted viz.: 22 at Uchalli, 2 at Jahlar, 2 at Nammal and 7 at Rawal lake.

Other bird species abundance and distribution: A total of 118784 birds were counted belonging to 149 bird species typical of wetlands at these 16 sites with a census index value of 254/Km². Total water surface area visited was 46746 Hectares. The most abundant species were Eurasian Coots and common Pochard. The wetlands like Rangpur Kallar Kahar, Marala, Jassar, Nammal, and Sulmanki provide an ideal habitat for the avi-fauna of the study area having the maximum density of birds. Khabbaki, Kharal and Chalianwala sites faced a severe drought following scanty rainfall in the catchment area.

Correspondence Analyses: Different analyses were carried out based on the data collected from the field. Shannon-Weiner Biodiversity index was calculated in order to know the species diversity in different habitats. It was calculated based on the abundance of the species by the following formula $H = -[\sum PilnPi]$, where H represents the symbol for the amount of diversity in an ecosystem, Pi represents the relative abundance to the total and the lnPi represents the natural logarithm of it (Hutchinson, 1970). Similar other analyses were carried out like the density of the birds based on the area searched; dominant and sub-dominant birds based on the abundance and distribution.

Shannon-Weiner Biodiversity index value for encountered birds were estimated to be 4.05. Shahpur, Kallar Kahar, Uchalli, Jassar and Sulmanki were found to be the most diverse, because it has a higher index 5.11, 4.56, 4.86, 4.13 and 4.61 respectively than the others (Table I), indicating better environment and rich diversity of avi-fauna. Despite the fact that other habitats have higher species diversity, the even distribution and abundance of the species found in these habitats makes them more diverse.

Census (Density) Index: The area covered during the survey for each locality was calculated using GIS techniques to calculate avi-fauna density (Haldin and Ulfvens 1987). Table II shows that the Rangpur, Sulmanki and Kallar Kahar host the densest populations of birds with a density of 740, 566 and 506 birds/ Km² respectively followed by Maralla and Jassar with a density of 497and 408 receptively birds/ Km².

Dominant and Sub-dominant Index: Dominant and sub-dominant index described in Table III revealed that few species in each lake were abundantly found. The most dominant species was common Coots and Common

Pochard with a dominant index value of 0.559 and 0.336 respectively.

Table: I Shannon-Weiner Biodiversity Index for avi-fauna.

Location	Birds total Population	Shannon-Weiner Diversity Index (H')
Rawal Lake	3089	2.85
Kallar Kahar Lake	1246	4.56
Shahpur (Jehlum Bridge)	1248	5.11
Jahlar Lake	370	2.96
Khabbaki Lake	342	2.64
Uchalli Lake	1591	4.86
Nammal Lake	1726	5.45
Rangpur Lake	9256	4.63
Mianwali (Chashma Barrage)	71008	2.37
Kharal Lake	382	0.045
Khangarh Lake	257	3.05
Bahawalnagar (Sulmanki Headworks)	5821	4.61
Chalianwala	90	3.46
Hafizabad (Qadirabad Headworks)	9711	3.14
Sialkot (Marala Headworks)	8059	2.30
Jassar (River Ravi)	4588	4.13
Total	118784	4.05

Table: II Census Index of Avi-fauna at different sites in Punjab, Pakistan.

Location	Birds total Population	Total Area (Hectares)	Census Index/Km²
Rawal Lake	3,089	1,902	162
Kallar Kahar Lake	1,246	220	566
Shahpur (Jehlum Bridge)	1,248	1,350	93
Jahlar Lake	370	100	370
Khabbaki Lake	342	283	121
Uchalli Lake	1591	943	169
Nammal Lake	1726	486	355
Rangpur Lake	9,256	1,250	740
Mianwali (Chashma Barrage)	71,008	33,109	214
Kharal Lake	382	235	163
Khangarh Lake	257	100	257
Bahawalnagar (Sulmanki Headworks)	5,821	1,150	506
Chalianwala	90	23	391
Hafizabad (Qadirabad Headworks)	9,711	2,850	341
Sialkot (Marala Headworks)	8,059	1,650	497
Jassar (River Ravi)	4,588	1,125	408
Total	**118,784**	**46,746**	**254**

The least populated habitat was Shahpur, Khabbaki and Kharal with a value of 93, 121 and 163 birds/ Km² respectively. It was also observed that ducks and other waterfowls were less in numbers due to scarcity of water in these areas.

Table: III Dominant and Sub-dominant Index of Avi-fauna at different sites in Punjab, Pakistan.

Location	Dominant		Sub-dominant	
	Species	Index Value	Species	Index Value
Rawal Lake	Common Pochard	0.263	Eurasian Coot	0.236
Kallar Kahar Lake	Common Swallow	0.681	House Crow	0.681
Shahpur (Jehlum Bridge)	House Sparrow	0.166	Red-Wattled Lapwing	0.092
Jahlar Lake	House Sparrow	0.430	House Crow	0.250
Khabbaki Lake	Common Myna	0.159	House Sparrow	0.155
Uchalli Lake	House Crow	0.270	Eurasian Coot	0.159
Nammal Lake	Eurasian Coot	0.432	Greater Flamigoes	0.362
Rangpur Lake	Common Pochard	0.784	Eurasian Coot	0.720
Mianwali (Chashma Barrage)	Eurasian Coot	0.573	Common Pochard	0.332
Kharal Lake	Black-winged Stilt	0.531	Northern Lapwing	0.191
Khangarh Lake	House Sparrow	0.430	Plain Martin	0.250
Bahawalnagar (Sulmanki Headworks)	Little Grebe	0.652	Common Teal	0.400
Chalianwala	White-backed Vulture	0.521	Black-winged Stilt	0.521
Hafizabad (Qadirabad Headworks)	Eurasian Coot	0.701	Little Grebe	0.526
Sialkot (Marala Headworks)	Eurasian Coot	1.543	Common Pochard	0.586
Jassar (River Ravi)	Common Pochard	0.533	Eurasian Coot	0.533
Total	Eurasian Coot	0.559	Common Pochard	0.336

Sex Ratio: The sex ratio of past seventeen years was found to be 53.97 percent female and 46.03 percent male (Table IV). The results depicts that the reason for decline is other than natural calamities and may be hunting at non wintering sites due to distinction in male plumage.

At the beginning of the twentieth century world's population of the White-headed Duck was over 100,000 but a massive decline was observed afterwards. An estimate shows that the existing global population of

the species is less than 10,000 birds. This situation appears worse in Pakistan where a record number of 1,039 birds was in 1968 (Li and Mundkur 2003), however only ten were reported in winter 2001 – 2002. The White-headed Duck was distributed throughout Pakistan and was widespread in Punjab as revealed by the historical records available since 1883.

Table: IV Sex ratio of White Headed Duck in Pakistan.

Winter (October to March)	Maximum Population of White-headed Duck in Punjab.	Sex Ratio	
		Female	Male
1987-1988	889	unknown	
1988-1989	286	unknown	
1989-1990	189	unknown	
1990-1991	76	35	41
1991-1992	40	20	20
1992-1993	146	82	64
1993-1994	120	65	55
1994-1995	162	91	71
1995-1996	37	19	18
1996-1997	32	19	13
1997-1998	54	28	26
1998-1999	57	33	24
1999-2000	26	10	16
2000-2001	23	11	12
2001-2002	10	6	4
2002-2003	33	19	14
2003-2004	27	14	13
2004-2005	22	17	5
2005-2006	7	5	2
2006-2007	21	8	13

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The results of this field survey demonstrated that except the Uchalli, Jahlar, Nammal and Rawal Lakes, no sighting from other historically recorded sites were observed. This indicates a distribution pattern that the White-headed Duck is only striving around the Salt Range Lakes. The sex ratio of past seventeen years 1991 to 2007 shows that the reason for decline in population of White-headed Duck may be hunting other than natural calamities due to distinction in male plumage.

The census of any species in a region provides reliable information about the population status within the country. A thorough census must also consider important factors such as distribution, regional and local variation, habitat preferences and their availability, conservation measures taken and species conservation status in context of national and international legislations. If habitat is degraded enough or reduced to such an extent that no primary needs for waterbird available there, then the extinction processes start in that region for many species.

Throughout this survey, a significant attempt has been made to study the morphometry reduced from maximum size of the lakes, which was available in the literature (IUCN 1990). Results indicate that most of the historically recorded sites were reduced, and a total reduction in water surface area is around 51 percent. The Khabbaki, Kharal, Chalianwala and Khangarh showed a significant change and the habitat was totally degraded. Loss of water from original habitat creates a major threat to the wildlife especially waterfowls that depend on them.

During the field survey a total of 149 species of birds were recorded and a maximum number of species were observed at the Chashma (126), Nammal (115), Rangpur (110), and Uchalli (103) Lakes. After generating relative abundance of recorded birds at sixteen sites following ten species typically of wetlands were more abundant: Eurasian Coot (22.01%), Common Pochard (13.23%), Northern Pintail (7.38%), Gadwal (5.10%), Little Grebe (4.75%), Mallard (4.51%), Shoveler (4.26 %), Water Rail (2.25%), Black-winged Stilt (1.61%), and Red-wattled Lapwing (1.54%).

It may be concluded that the Salt Range Lakes are primary and traditional habitat of the White-headed Duck and its occurrence at other sites is a secondary option. The cause of the current population decline is shrinking of habitats due to ground water explorations, development of barrages and construction of Canal Systems because the wetlands became easy targets for reclamation. The best evidence in support of above derivation is the present status of Khabbaki, Kharal, Chalianwala and Khangarh Lakes. Now White-headed Duck is almost eliminated from these sites.

In order to save this small migratory population government, nature conservation institutions and other similar agencies should work together and develop a collaborative project to reverse the situation and conserve the remaining population.

Recommendations: There is a need to further understand the effects of various threats on the migratory population of White-headed Duck 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, Future study of the wintering population of White-headed Duck should focus on all sites in Pakistan, where this species has been reported in the past, A revised checklist should be prepared of all the wetlands available in the Punjab and other areas in Pakistan, 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.

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