

Distribution, Status of Migratory and Resident Waterfowls of Drigh Lake (Sindh) Wildlife Sanctuary

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Abstract: Drigh Lake has emerged as an important wintering area offer a wide variety of waterfowl 37 species of waterfowl belonging to 6 orders and 9 families have been recorded from the area during the period 1998-2003, which includes some rare and threatened species. The status of each bird species has also been recorded. During mid/winter counts of waterfowl the highest population of 12618 waterfowl was counted in 2000. Drigh lake wildlife sanctuary listed as a wetland of international importance under the Ramsar convention in July 1976.

Key words: Waterfowl counts, wetland, threatened species, ecology, status

INTRODUCTION

Province of Sindh is located between 65.5° to 71.5° latitude in the North and 22.5° to 27.5° longitude in the East. The approximate area is about 140, 903, 59 km. The entire region is a peculiar habitat with dry and humid zonation. The peculiarity has allowed the intermixing of the fauna and flora of varied zoogeographical regions of the old world.

The lakes, dhands, ponds and other wetland areas along with the forests are very interesting seats for birds, especially the aquatic birds. Most of the lakes and dhands are mesotrophic/eutrophic with abundant food supply and nesting places wetlands have played a crucial role in human history wetland occupy the transitional zone between permanently wet and generally dry environment.

Drigh Lake gazetted as a wildlife sanctuary in 1972. A small, slightly brackish lake with extensive marshes on the food plain of the Indus river (27°34'N, 68°02'E) 18 km west of Larkana, Larkana District, Sindh province.

In 1977, the clay and silt soils of the region were heavily impregnated with salts following heavy flooding. The lake is fed by monsoon rains, several small streams entering along the eastern side and water from a small canal to the north. There is no outlet channel. During the dry-pre-monsoon period in early summer, some parts of the lake dry out.

The lake has decreased in size in recent years as a result of the diversion of floodwater for irrigation purposes and is now almost completely over growth with emergent vegetation, mainly *Tamaris* and *Typha*.

The eastern boundary of the wildlife sanctuary is defined by an earthen bund constructed to help retain water. The main road from Larkana and Quamper crosses the northern end of the marshes and defines the northern boundary.

The lake is situated in a region of cultivated plains, generally divided into small fields for rice cultivation. The limestone and sand stone hills of the Kalat Range lie some 80 km to the west. Dry subtropical monsoonal climate with very hot summer and cool winter. The average annual rainfall is about 175 mm. Temperature of ten exceeds 49° during the summer, Scott^[1] and Conder^[2].

The natural vegetation is surrounding areas are dense growth of aquatic vegetation including *Cyprus alternifolius*, *Hydrilla verticillata*, *Najas minor*, *Scirpus littoralis*, *Lpomoea aquatica*, *Juncos articulatus*, *J. maritimus*, *Nymphaea lotus*, *potamogeton pectinatus*, *Typha angustata* and *Tamarix dioica*.

Surrounding areas are mostly under cultivation for rice. The lake was declared a wildlife sanctuary (182 ha) in October 1972, under section 14 of the Sindh wildlife protection ordinance 1972. The sanctuary was listed as a wetland of international importance under the Ramsar convention in July 1976.

The management plan prepared by Conder^[2] contains a number of recommendations for improved management include the construction of an embankment around the sanctuary with sluices to facilitate the control of water level and provision of observation towards and other facilities for visitors.

A variety of resident and migrating birds regularly exploit temporary and/or permanent water bodies of Pakistan and constitute a plant of its ecosystem.

The available information on population of the birds. Breckenridge^[3], Hickey^[4], Kenjeigh^[5], Lack^[6], Ali and Ripley^[7], Khan^[8], Scott^[1,9] and Gabol^[10].

The main objectives of the study was the water flow of Drigh Lake, because migratory birds have very important role for Pakistan and other countries.

The lake supports a commercial fishery and provides excellent opportunities for scientific research. Fishing activities and boating cause of considerable amount of disturbance to the waterfowl population.

Drigh Lake an important wintering area for wide variety of migratory water birds, which includes white spoonbill, shoveler, common teal, coot, ducks waders, gulls and terns.

Drigh Lake full fills the Ramsar convention criteria for wetland for international important 1b, 3b, 2b and 2c.

The present study in restigated the status of waterfowls in selected area compared with previous records. In this present research help how many migratory birds population decline in last four year due to different factors.

The observation the area from 1998 to 2003, including the mid winter water fowl census conducted by the authors.

MATERIALS AND METHODS

The area was regularly visited in all seasons during the period from 1998 to 2003 and bird's fauna was recorded.

The species was observed and identified by using spotting scopes and binoculars. The waterfowls were identified by the book A field guide to the water birds of Asia Asian wetland Bureau, Sonbe and Usui^[11].

RESULTS AND DISCUSSION

As a result of this study a total number of 37 species of birds belonging 6 orders and 9 families have so far been recorded from the area, out of them are migratory, resident, 1 passage migrant, 2 are straggler (Table 1). The results of the mid winter counts of waterfowls as given in Table 2 show its importance with regard to water bird population. The total population during the years 1998-2003 ranged between 4029-12618, but the number declined in 2001, 2003, due to diversion of water for irrigation purposes has resulted in lower water levels in the sanctuary. The area of open water has decreased in recent years and much of the wetland is now over group with dense stands of *Typha* and *Tamarise*. There is reported to heavy grazing pressure in the sanctuary. By 1988, much of the wetland has become overgrown with

Table 1: Waterfowls of Drigh lake

Order:	Podicipediformes		
Family:	Podicipedidae		
Little Grebe	<i>Tachybaptus ruficoilits</i>		R α B
Order:	Pelecaniformes		
Family:	Phalacrocoracidae		
Great cormorant	<i>Phalacrocorax carbo</i>		R
Little cormorant	<i>Phalacrocorax niger</i>		R
Indian shang	<i>Phalacrocorax fasciolis</i>		R
Order:	Ciconiiformes		
Family:	Ardeidae		
Indian pond Heron	<i>Ardeola grahamii</i>		R
Little Egret	<i>Egretta garzetta</i>		R
Large Egret	<i>Egretta alba</i>		WV/R
Intermediate Egret	<i>Egretta intermedia</i>		
Black-crowned Night heron	<i>Nycticorax nycticorax</i>		
Grey heron	<i>Ardea cineria</i>		WV/R
Family:	Threskiornithidae		
Glossy ibis	<i>Plegadis falcinellus</i>		Str.
White spoon bill	<i>Plegadis leucorodica</i>		N(B)
Order:	Anseriformes		
Family:	Anatidae		
Eurasian wigeon	<i>Anas penelope</i>		WV
Common teal	<i>Anas crecca</i>		WV
Mallard	<i>Anas platyrhynchos</i>		WV
Northern pintail	<i>Anas acuta</i>		WV
Northern shoveler	<i>Anas chrypeata</i>		WV
Marbled teal	<i>Marmaronetta anquirostris</i>		WV
Common pochard	<i>Aythya ferina</i>		WV
Fernginous duck	<i>Aythya nyroca</i>		WV
Gadwall	<i>Anas strepera</i>		WV
Garganey	<i>Anas querquedula</i>		WV
Red-creasled pochard	<i>Netta rufina</i>		WV
Tufted duck	<i>Aythya fuligula</i>		WV
Order:	Gruiformes		
Family:	Rallidae		
Moor hen	<i>Gallinula chloropus</i>		R
Common coot	<i>Fulica atra</i>		WV
Purple moor hen	<i>Porphyrio porphyrio</i>		R
White-breasted water hen	<i>Anaeronis phoenicurus</i>		R
Order:	Charadriiformes		
Family:	Recurvirostridae		
White-tailed plover	<i>Vanellus leucurus</i>		WV/CS
Red-wattled lapwing	<i>Vanellus indicus</i>		WV/CS
Family:	Scolopacidae		
Black-tailed godwit	<i>Limosa limosa</i>		WV
Common sandpiper	<i>Actitis hypoleucos</i>		WV
Green sandpiper	<i>Tringa ochropus</i>		WV
Common snipe	<i>Gallinago gallinago</i>		WV
Family:	Laridae		
Black head gull	<i>Larus ichthyæetus</i>		WV
Herring gull	<i>Larus argentatus</i>		WV
Wiskered tern	<i>Chlidonias hybrida</i>		PM

WV = Winter visitor Str = Straggler PM = Passage migrant
OS = Over summer R = Resident B = Breeding N(B) = Non-breeder

dense stands of *Typha* and *Tamarix*. This change in the ecology of the site had been reflected in a fall in the number of wintering waterfowl, particularly ducks and coots, from over 30,000 in the early 1970s to less than 20,000 in the late 1985s. It was that many of the wintering birds had moved to nearby Pugri Lake, a privately owned wetland managed very effectively as a duck hunting reserve. Heavy grazing in the marsh by domestic livestock, particularly cattle and water buffalo, was also

Table 2. Result of mid-winter waterfowls.

Name of species	1998	1999	2000	2001	2002	2003
Little grebe	-	-	240	260	115	110
Great cormorant	-	50	-	45	-	40
Indian shag	-	8	-	-	-	-
Little cormorant	30	980	-	-	-	-
Little egret -	90	205	140	60	80	-
Intermediate egret	-	-	85	-	-	-
Great egret -	-	38	16	70	85	-
Indian pond heron	-	-	90	68	-	-
Black-crowned night heron	-	15	180	98	100	90
Grey heron	-	30	-	-	22	08
Glossy ibis	-	-	-	-	-	-
White spoon bin	-	-	-	-	304	140
Eurasian widgeon	510	20	3400	800	1536	1000
Common teal	315	3260	3500	800	2259	2000
Mallard	530	20	80	609	309	150
Northern pintail	-	3000	90	409	559	400
Northern shoveler	390	2830	3600	1300	2300	1580
Marbled teal	2	380	-	-	24	-
Common pochard	650	10	126	360	1600	1221
Ferruginous duck	-	-	-	-	18	07
Gadwall	700	-	90	200	-	-
Garganey	-	2	15	4	-	-
Red-crested pochard	-	-	-	10	-	-
Marbled teal	2	289	-	-	-	-
Tufted duck	-	4	-	-	-	-
Unidentified duck	-	-	-	-	-	-
White-breasted water hen	-	-	8	24	10	20
Moor hen	-	195	39	46	40	38
Common coot	900	140	760	1120	1356	1400
Purple moor hen	-	3	-	-	-	-
Water cock	-	40	-	-	-	-
White-tailed plover	-	2	-	-	40	18
White-tailed lapwing	-	-	8	-	22	17
Black-tailed godwit	-	35	-	-	80	60
Green sand piper	-	-	18	20	10	04
Common sand piper	-	-	24	32	16	02
Common snipe	-	-	-	-	10	08
Black headed gull	-	20	-	-	-	-
Herring gull	-	-	8	4	-	7
Whiskered tern	-	-	14	22	8	-
Unidentified tern	-	-	-	-	-	-
	4029	11423	12618	6387	10842	8485

Table 3: Statistical analysis of birds population data Drigh lake

Year	Mean	SD±	SE±	Range at 95% CL
1998	403.7000	313.8542	99.24910	179.18220-0628.2178
1999	496.6522	1027.467	214.2416	52.34222-940.9621
2000	573.5455	1201.2080	256.09840	40.95972-1106.0131
2001	290.3182	389.5260	83.04722	117.61200-0463.0243
2002	452.8333	745.2432	152.1221	138.1447-767.5219
2003	353.5417	596.7764	121.81650	101.54510-0605.5382

thought to be a problem. There is some fishing in the lake, using traditional fishing techniques, but this is not thought to be causing any adverse at the present time. Although Drigh Lake is reported to be state ownership and some parts of the Sanctuary remain in private ownership and this has hampered management activities. In 1991 the Sindh wildlife management board counted the highest population is 60286, 17500 Northern Pintail, 6000 Northern Shoveler 9100 common pochard, 5500 Black-crowned Night heron, 5500 common coot, 7200

Gadwall, 59 Marbled Teal and 4 Great crested Grebe^[11]. In 1992, 6500 Night heron, 5550 common Teal, 10000 Northern Pintail, 8080 Northern Shoveler and 7430 common Pochard^[11].

In 1994 census of SWMB the population of Night heron declined and noted only 23, only 08 Ferruginous duck record on 1994. In 1973 over 32,000 ducks and coots were present, but numbers than declined rapidly as the area of open water decreased in size, less than 7,000 ducks and coots were present in 1975 and 1976 and only 820 were recorded in January 1987.

Drigh Lake is a very interesting semi natural wetland supporting rich and diverse aquatic vegetation consisting of at least 19 aquatic/marshy habitats. It constitutes a particularly good example of a type of wetland characteristic of this region and thus qualifies as a site of international importance under Ramsar Criterion 1b. it is an important breeding and wintering area for a wide variety of waterfowl, in 1988 the lake supported 2750, 1999 5000 night herons, the lake may also qualify under Ramsar Criteria 2b and 2c.

The main population of Night heron is decline, 1998 and 1999 there is no record of Night heron, only 170 present in 2000, 90 present in 2001, 110 present in 2002 and 2003 only 90 record Night heron in Drigh Lake.

The white spoonbill duck is the non breeder in drigh lake, non breeder mean which is presumed not to breed but remains in a country for several month and breeds elsewhere

Due to remarkable attendance of waterfowls in winter, Drigh Lake was notified as an important Ramsar site in July 1976. The population of white-tailed plover, Red-wattled lapwing, Black-tailed Godwit, Green sand piper, common snipe, Herring Gull and whiskered Tern in also declined during 2003.

In total number of 128 species of birds belonging to 14 orders and 46 families have so far been recorded from the Hub Dam area^[13]. The total population of Hub Dam during the year 1986-1989 ranged between 46,000-53,000, but the numbers declined drastically in 1990 due to commercial fishing this year^[3]. In number of 49 species of birds belonging to 6 orders and 12 families have so far been recorded from Hadero lake (Sindh)^[10]. The total population of brackish lake Hadero during the year 1998-2001 ranged between 12518-16864, due to heavy hunting^[10]. Table 3 indicate that there is great change in the yearly population of birds in 1998 mean population was 404 whereas in 1999 it was 496 in 2000 mean was 574 while in year 2001 the population decline only 290 numbers was observed in year 2002 bird population again increased 452 birds were noted but in 2003 population of

birds decreased only 354 average number of birds were observed on the basis of date it could be concluded that there are some reasons which produced harmful effect on the birds population. Widespread use of pesticides on agriculture lands (rice field), loss of natural habitat, consequent decline in prey abundance, environment pollution, commercial exploitation, direct persecution, including illegal trapping and shooting. Unfortunately, the hunters, poachers and conservation personnel have violated this splendid waterfowls paradise drastically, for last few years. Drigh Lake has been an important wintering root for a wide variety of migratory waterfowls. Recommendations for improved management include the construction of an embankment around the Ramsar site with sluices to facilitate the control of water levels and provision of observation towers and other facilities for visitor. Primarily nature conservation, although there is some livestock grazing, cutting shrubs for fuel and illegal hunting within the sanctuary. Rice cultivation is the principal activity in surrounding areas. The lake has decreased in size in recent years of the diversion of floodwater for irrigation purposes, siltation and spread of emergent vegetation. Drigh Lake is situate less than 30 km by road from the large town of Larkana and thus provides an excellent opportunity for nature oriented outdoor recreation and conservation education for the general public. Furthermore, there is an excellent building on the edge of the march, which would be ideally suited for conversion to a visitor central and reserve headquarters. The existing system of bunds and trails within the sanctuary is idelly suited for development as a system of nature trails with interpretation facilities and observation hides.

REFERENCES

1. Scott, D.A., (Ed.) 1989. A Directory of Asian Wetlands IUCN Gland, Switzerland.
2. Conder, P.J., 1977. Drigh lake wildlife sanctuary management plan. Sindh Wildlife Management Board, Cyclostyled Report.
3. Breckenridge, W.J., 1935. A bird census method Wilson Bull., 47: 195-197.
4. Hickey, J.J., 1943. A Guide to Bird-Watching, Oxford University Press, New York.
5. Kendeigh, S.C., 1944. Measurement of bird populations. Ecol. Monogr., 14: 67-106.
6. Lack, D., 1966. Population Studies of Birds. Oxford University Press, London.
7. Ali and Ripley, 1968-70. Hand Book of the Birds of India and Pakistan. Oxford University Press, Bombay, India.
8. Khan, A.A., 1984. Water fowl of Pakistan WWF., Pakistan, Newsletter, 3.
9. Scott, D.A., A.L. Rao and A.R. Beg, 1990. The wetlands of Pakistan and the Ramsar convention. Ramsar Bureau and NCCW, Pakistan.
10. Gabol, K., 2004. Observation on the water flow of Hadero lake Sindh. J. Biol. Sci., 4: 5-8.
11. Sonobe, K. and S. Usui, 1993. A field guide to the water birds of Asia wild bird society of Japan. Tokyo, Japan.
12. Sindh Wildlife Management Board, 1990, 1991, 1994, 1998, 1999. A mid/winter Census Report.
13. Syed Ali, Ghalib and K. Najam, 2000. Observation on the Avi fauna Hub Dam. Pak. J. Zool., 32: 27-32.