



Population Trends, Species Variations and Habitat use by Egrets, Herons and Storks at Kolleru Wetland, Andhra Pradesh, India

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Abstract

The present study was aimed to study the population trends, species variation and habitat utilization pattern of egrets, herons and storks at Kolleru wetland, Andhra Pradesh. The Kolleru wetland is a large perennial water body and provides food, shelter, nesting and breeding for many winter and local birds. The population and habitat utilization of these species showed difference in relation to various habitats during the study period. A total of 13 species were recorded belonging to the family Ardeidae, among which 5 species of herons, 4 species of egrets and 4 species of bitterns. While in the family Ciconiidae three species of storks were recorded among which Openbill stork was recorded in high numbers and the other two species (Painted stork and Adjutant stork) are rarely observed. The percent habitat utilization pattern of different water birds showed significant variations in relation to availability of various habitat types in the study area.

Keywords: Population, fluctuation, habitat utilization, ardeidae, ciconiidae.

Introduction

Wetlands are unique habitats for many water bird communities and home for large number of migratory and resident species of birds as these have a wide variety of resources in terms of production and productivity¹⁻³. In India a total of, 273 species of birds considered as waterfowls and utilizes these wetlands for day to day activities⁴. These birds utilise wetland habitats either throughout or during certain part of their life⁵. These ecosystems were maintained over hundreds of years for a variety of purposes and are a lasting tribute to the enlightened attitudes to wildlife enshrined within the Hindu Philosophical traditions. Countless marshes and lakes in India have until recently been famous for their rich bird size, but the most recent information available suggests that these bird populations are beginning to seriously decline⁶. Many of these areas are severely subjected to human population pressure resulting millions of acres of wetlands been destroyed by drainage, expansion of agriculture and local demand for fuel and fodder, but the quality of other millions of acres has deteriorated from siltation or other forms of pollution⁶⁻¹⁰.

Several works have carried out studies on the feeding and breeding behaviour of Ardeidae and Ciconiidae¹¹⁻²⁸, Several authors gave an account of general ecology of herons and egrets at Bharathpur^{29,30}. Rao *et al* made studies on population trends of Ardeidae at selected water bodies of nalgonda district³¹. Ali and Ripley have given brief the description and ecology of Ardeidae and Ciconiidae in general⁴. No detailed abbreviation is available on the population trends and habitat use by the egrets, herons and storks in India excepting brief reports on observations in this aspect at different locations³²⁻³⁵. Hence, the

present paper deals with our observations on population fluctuation, species variation of herons, egrets and storks, and habitat use at Kolleru wetland in Andhra Pradesh.

Material and Methods

Study area: Kolleru lake falls between 80° - 5' E to 81° - 20' E and 16° - 32' N to 16° - 57' N with total catchment area 4763 sq km figure-1. This lake is fed by two major rivers, 15 irrigation channels and 15 drains from Krishna and Godavari irrigation system. Thus, the lake swells up during S-W monsoon period from August to December. There are 50 islands and 89 bordering habitations, the fore shore area is presently under accelerated conversion into fish ponds for culture fisheries. The lake is presently facing ecological crisis being situated in the deltaic region between Krishna and Godavari regions central to highly agriculturally and industrially developed area. The industrial pollutants are mainly of organic nature and the agricultural runoff containing nutrients and pesticide residues enters the lake.

The population of aquatic avifauna visiting this lake was regularly monitored from November to March every winter during the study period for five years from 2007 to 2012. The total count method outlined by Gaston and Steward and Kantrud³⁶ and³⁷ was employed for estimation of bird species in the lake. Regular observations and all the counts were made during the early hours of the day that is, between 6.00 to 11 am, the bird species encountered with the help of 8 X 40 spotting binoculars and counted with a 20 X 40 spotting scope. Identification was done with help of Grimmet *et al.*³⁸. Habitat preference of egrets, herons and storks at the lake in relation to the frequency of sightings were calculated using fallowing formulae:

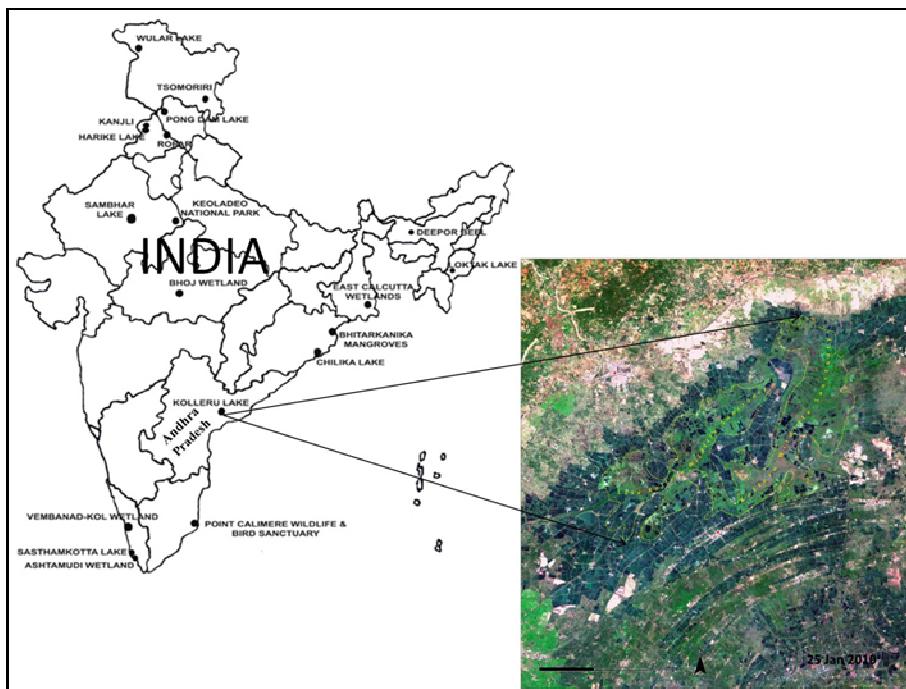


Figure-1

Geographical location of Kolleru Lake (Source: Crop aqua culture overwhelms Lake Kolleru A.P. India UNEP)

$$\frac{\text{Total number of sightings of individual species in one habitat}}{\text{Total number of sightings of all species in the same habitat}} \times 100$$

Results and Discussion

A total of 13 species were recorded out of 20 species in the family Ardeidae⁴, among which 5 species of herons, 4 species of egrets and 4 species of bitterns are widely distributed in various habitats of the Kolleru Lake. The maximum mean ranges from 64.00 ± 78.80 in Little Egret and the minimum mean ranges from 0.08 ± 0.27 in Night Heron table-1. The other species such as Pond heron (11.08 ± 3.98 to 0.58 ± 3.12) and Purple Heron (5.75 ± 3.49 to 3.5 ± 1.44) populations are fairly constant in all the census years. Whereas Grey heron, Reef Heron and Night Heron are local migrants distributed in small parties with its flock size varies from 2-8, 1-6, and 1-2. These species migrate along with other waders and congregate in small groups in fish tanks after the harvest. Similarly, all the species of egrets in the present study showed different flock size, Little Egret (2-418), Intermediate Egret (1-200) and Cattle Egret (1-65) gather in the shallow waters of lake or fish ponds indicates the distribution of egrets; herons and bitterns at various percentages, the maximum percentage of birds were recorded in egret species figure-2. The population of egrets is seen fluctuating in different months depending upon water level and availability of food. Egrets consume more amounts of fish and insects³⁹⁻⁴¹, but the egrets prey upon tadpoles, insects, fish etc. Drier periods produce extensive litter that provides structure and nutrients for micro invertebrate populations⁴². More abundance of herons and egrets occurs when the water level is less than 1 feet and dried

reed mats get exposed and as the water dries up these species disperse to other areas. Similar observations were made by Fredrickson and Taylor⁴³ in Missouri marsh habitat. The studies suggested that the general patterns of egrets and herons based on the use of vegetative structure and water depth. The other species Large egret (5.75 ± 3.49 to 3.33 ± 2.28) is a solitary feeder with the maximum flock size 2-14. This species occasionally mixed with other egret but prefer slightly deeper portions than the other egret species. Whereas the bitterns distribution was sparse, recorded in the reed beds and on the thick floating vegetation of the lake. Phragmites, Cypress and Kylinga reed species provide a congenial habitat conditions for these bitterns. The dominant species is Chestnut Bittern (Maximum mean 2.41 ± 2.06) with the flock range of 1-6 birds and the Little Bittern (0.16 ± 0.55) was recorded very less times with its flock range 0-2. All these bittern species are seen in the months of March to September in all the census years, except Black Bittern which is a resident species recorded throughout the year.

Three species of storks (Painted stork, Openbill Stork and Lesser Adjutant Stork) were recorded at Kolleru lake. This wetland supports more suitable feeding habitat for the distribution of Openbill Storks, the other two species are recorded rarely and observed in small parties in the winter season. Figure-3 shows the general distribution of Openbill Storks in different months in five years census counts. More number of storks was recorded during the months of October to May, and the population gradually decreased in the subsequent months as the water recedes from the lake. The populations of

these storks species depend on the abundance of the fresh water snail (*Pila virullence*)⁴⁴. This wetland provides an ideal habitat for the growth of snail population. The present investigation showed an increase bird number in the recent years (2010-11 and 2011-12) in the study area is the result of disturbance as well as depletion of their diet in the actual foraging grounds present outside the study area in the lake. In previous, years very large congregation of Openbill Storks were recorded in the central parts of the lake, those storks are now widely dispersed in various habitats which also includes in the study area. The

habitat change resulted in the depletion of snail population as the large quantities of these snails exploited for duck feed and prawn feed factories and habitat alterations and increased disturbance also responsible for the decreasing the stork numbers in the feeding habitats of the lake. Breeding of the stork species was not recorded neither in lake bed nor in belt villages. The painted stork population was predominantly seen in large numbers (2-350) during fish harvesting period at different parts of the lake.

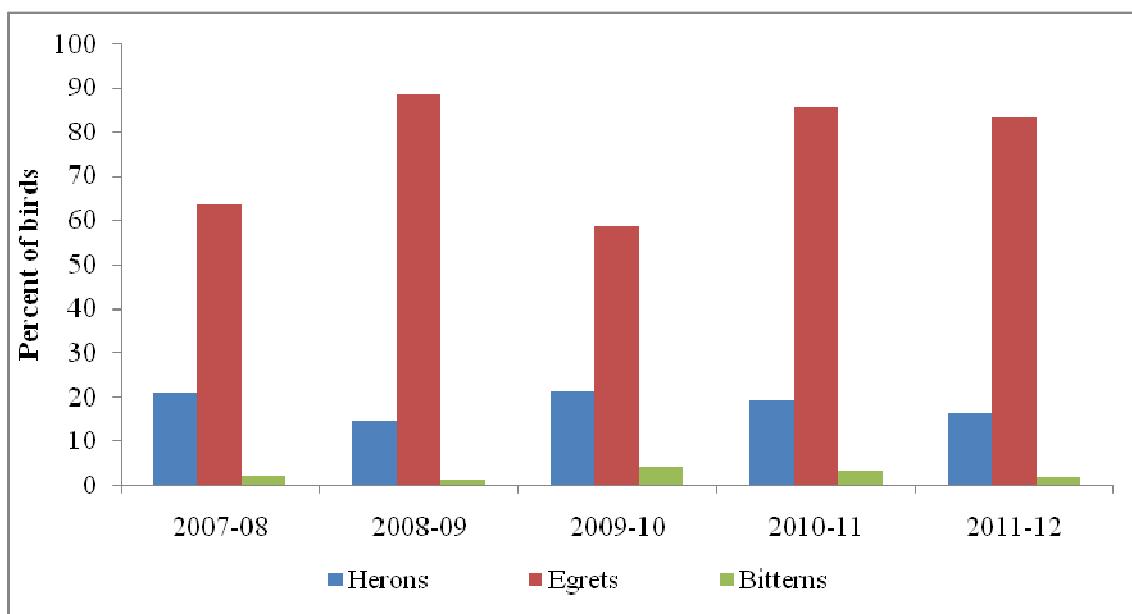


Figure-2
Year wise percent composition of herons, egrets and bitterns during the study period

Table-1
Species variation in the family Ardeidae during the study period

Sl. No	Species Name	2007-08	2008-09	2009-10	2010-11	2011-12	C.V	Range
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD		
1	Grey heron	1.75 ± 2.86	-	2.50 ± 4.55	2.00 ± 4.76	1.83 ± 4.12	1.5	2 – 8
2	Purple heron	5.75 ± 3.49	3.50 ± 1.44	3.66 ± 2.39	3.33 ± 2.28	4.41 ± 1.97	2.3	2 – 12
3	Large egret	1.66 ± 3.88	0.33 ± 0.74	1.33 ± 3.85	0.33 ± 0.74	2.0 ± 3.26	2.2	2 – 14
4	Pond heron	11.08 ± 3.98	7.91 ± 5.69	9.66 ± 3.94	0.58 ± 3.12	10.50 ± 2.37	2.22	2 – 23
5	Cattle egret	11.50 ± 8.37	10.10 ± 6.87	22.50 ± 23.30	8.58 ± 5.56	16.90 ± 8.85	8.85	1 – 65
6	Intermediate egret	4.25 ± 5.25	16.08 ± 34.25	4.08 ± 6.32	25.50 ± 54.40	43.08 ± 60.11	60.11	1 – 200
7	Little egret	59.08 ± 110.50	64.08 ± 78.80	38.33 ± 51.51	52.60 ± 113.60	47.40 ± 63.80	63.8	1 – 418
8	Reef heron	2.50 ± 1.65	-	-	-	-	-	0 – 6
9	Night heron	0.08 ± 0.27	-	-	-	-	-	0 – 1
10	Little bittern	0.16 ± 0.55	-	-	0.16 ± 0.55	0.33 ± 0.74	2.95	0 – 2
11	Chestnut bittern	1.33 ± 1.92	0.41 ± 0.49	1.08 ± 1.18	1.41 ± 2.06	0.66 ± 0.74	1.25	1 – 6
12	Yellow bittern	1.0 ± 1.68	0.08 ± 0.27	0.41 ± 0.75	0.91 ± 2.21	0.25 ± 0.43	2.19	1 – 8
13	Black bittern	0.50 ± 0.76	0.75 ± 1.23	1.41 ± 2.32	1.64 ± 0.41	1.82 ± 0.25	1.61	1 – 8

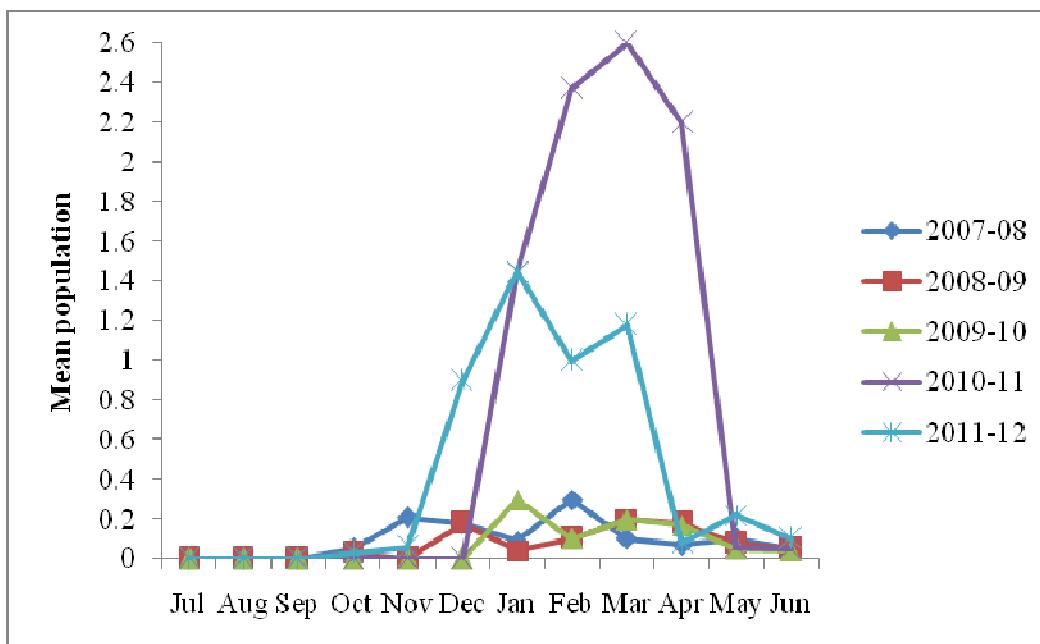


Figure-3
Mean monthly population fluctuations of Openbill Stork during the study period

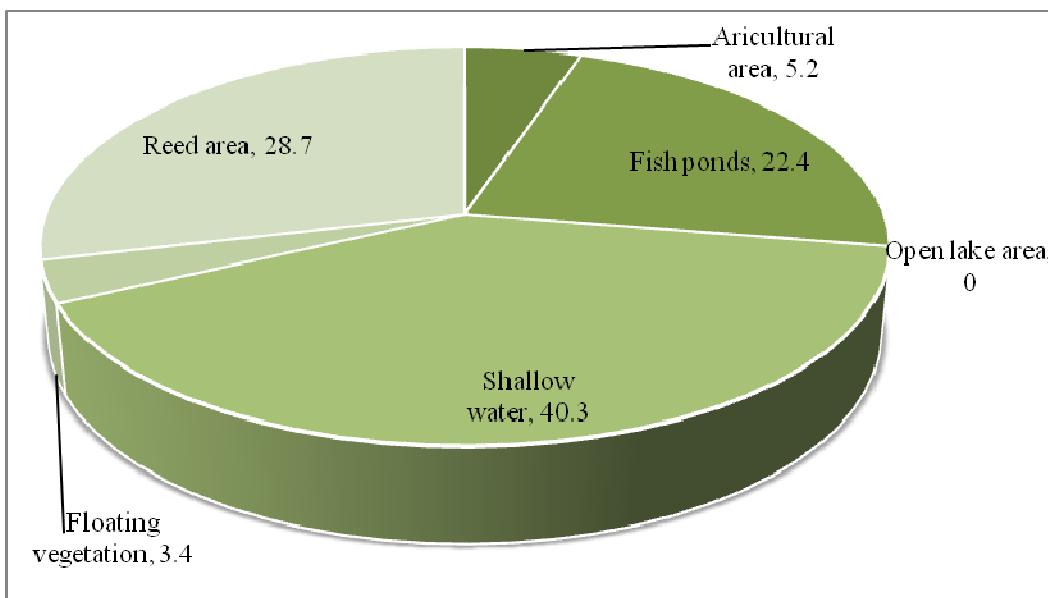


Figure-4
Percent habitat utilization of the family Ardeidae

Habitat utilization by egrets, herons and storks at different habitats: Many habitat types may occur within an area. Bird may utilize only a few of these. Most of the birds are strictly confined to particular habitat where abundant natural food and suitable micro habitat exist⁶. In the present study 6 habitats were identified. The habitat distribution of various species in different habitats was analyzed. The species distribution versus various habitats has been illustrated in figure-4. The family Ardeidae was majorly observed in shallow water areas (40.3%), followed by in Reed areas (28.7%), Fish ponds (22.4%), Agricultural

areas (5.2%) and Floating vegetation (3.4%). While in open lake areas no bird species was recorded. The variation in the utilization pattern of these habitats is mainly attributed to the availability of preferred food and also other abiotic and biotic factors.

Conclusion

Kolleru Lake is one of the most important wetlands of the state as variety of migratory birds visits this wetland during winter

season. The study suggests that a minimum water level should be maintained to attract more number of egrets, storks and herons, since most of the species prefer to forage in such low level water areas. Apart from this aforestation activity should be undertaken with suitable native trees for attracting breeding of egrets and storks in future in this important wet land.

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