

Avifaunal diversity and status of Pulicat Lagoon in Tamil Nadu, India

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Abstract

The banks of lagoons are suitable nesting sites for terns, gulls and waders. Bimonthly survey was conducted in Pulicat lagoon East coast of Tamil Nadu. Birds were observed and documented in this lagoon from October 2013 to September 2014. The survey covered majority of the areas of the lagoon. Fifty six species of birds were recorded belong to 29 families and 11 orders of the class Aves. As per IUCN status, 49 Least Concern species, one each of Critically Endangered and Endangered species and five Near Threatened species were recorded from the study area. Reasons for the fall in the number of species from earlier observations were discussed.

Introduction

Birds play significant role in the ecosystem by being as a part of the food web, act as scavenger, predator of insect pests and pollinators. Study of avifaunal diversity is a necessary ecological means which acts as an important indicator to evaluate different habitats both qualitatively and quantitatively (Bilgrami, 1995). To safeguard global species diversity has emerged out as one of the significant issues today (Hu *et al.*, 2011). Worldwide 9,600 species were reported by Ali and Ripely, (1987). India being a mega diversity centre has 1,200 species of birds. Grimmett *et al.*, (1998) reported that more than 13% of the global bird species are found in Indian subcontinent. Sandilyan *et al.*, (2010) reported particularly the long coastal area of India (7500 km) supports a commendable number of resident and migratory water birds of global importance.

Pulicat Lagoon is said to be the second, largest lagoon in India (13° 26' to 13° 43' N latitude and 80° 03' to 80° 81' E longitude). It was about 461 sq.km. in its average area of water spread, but now it has shrunk so much that it may be hardly 350 sq.km. today, and is still shrinking rapidly. Once this lagoon occupied nearly 55 km stretch north to south but today it is shrunk and spread over only 35 km., with a maximum width of about 18 to 19 km. The lagoon extends between the Nellore District of Andhra Pradesh and the Thiruvallur District of Tamil Nadu. It runs parallel to the coast of the Bay of Bengal being separated from by a broad sand-strip called the Sriharikota Island on which the SHAR of the Indian Space Research Organization (ISRO) is located.

Despite its ecological, economic, social and cultural importance the Pulicat Lake is under serious pressure. The major threat is siltation and sandbar formation at the mouth of the lagoon which endangers the complete ecological balance of the

area. The rivers Swarnamuki and Kalangi bring in enormous quantity of water loaded with silt during the monsoon season drains into the Pulicat Lake. This phenomenon regularly occurs year after year and has turned the lake into extensive mudflats. Due to this, a large part of the Lake becomes unproductive for fisheries and is available for short duration for the water bird's usage (Kannan and Pandiyan, 2010).

The present study emphasize the need to identify different category of avifauna and its importance from view of IUCN Red List of Endangered birds priority species or features sensitive to various impacts, key sites where these were under most potential pressure from the environment and ecological changes of this Lake. The following objectives were taken into consideration for the present study, i) to identify the most important sites for shore and lagoon bird conservation and to designate and manage, ii) to identify the species under various threats based on IUCN Red List and iii) to improve our knowledge of the population distribution as well as the ecology and conservation requirements of shore and lagoon birds and to use this knowledge to inform conservation actions.

Material and Methods

Methodology

Birds were observed and documented from October 2013 to September 2014 through bimonthly survey conducted early morning hours from 06.00 to 09.30 hrs and evening from 16.00 to 18.30 hrs. The observations of birds were carried out by line transect method (Rands and Barkham 1981). Binocular Olympus 8X40 DPS-I was used for bird watching and identified with the help of Ali (1997).

Six stations were selected in and around Pulicat Lake for the Survey (Fig.1). Places and respective coordinates are given in the following (Table 1). The shallow waters of the north of the Annamalaicheri village are the only known and recorded habitat of flamingos in the Tamil Nadu part of the Pulicat Bird Sanctuary.

Results

During the present survey 56 species of birds were recorded belong to 29 different families and 11 orders of class Aves (Table 2). The families with number of birds species observed are Anatidae -1, Scolopacidae -9, Charadriidae- 5, Sternidae- 3, Recurvirostridae- 1, Laridae- 3, Glareolidae- 1,

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Table 1. Location and its coordinates

Stations	Name of the places	Latitude	Longitude
S1	Kunankuppam	13°25'29"N	80°19'27"E
S2	Light house kuppam	13°25'07"N	80°19'03"E
S3	Sattankuppam	13°25'00"N	80°19'07"E
S4	Jameelabad	13°25'39"N	80°18'26"E
S5	Kulathumedu	13°25'31"N	80°19'32"E
S6	Annamalaicheri	13°27'30"N	80°15'49"E

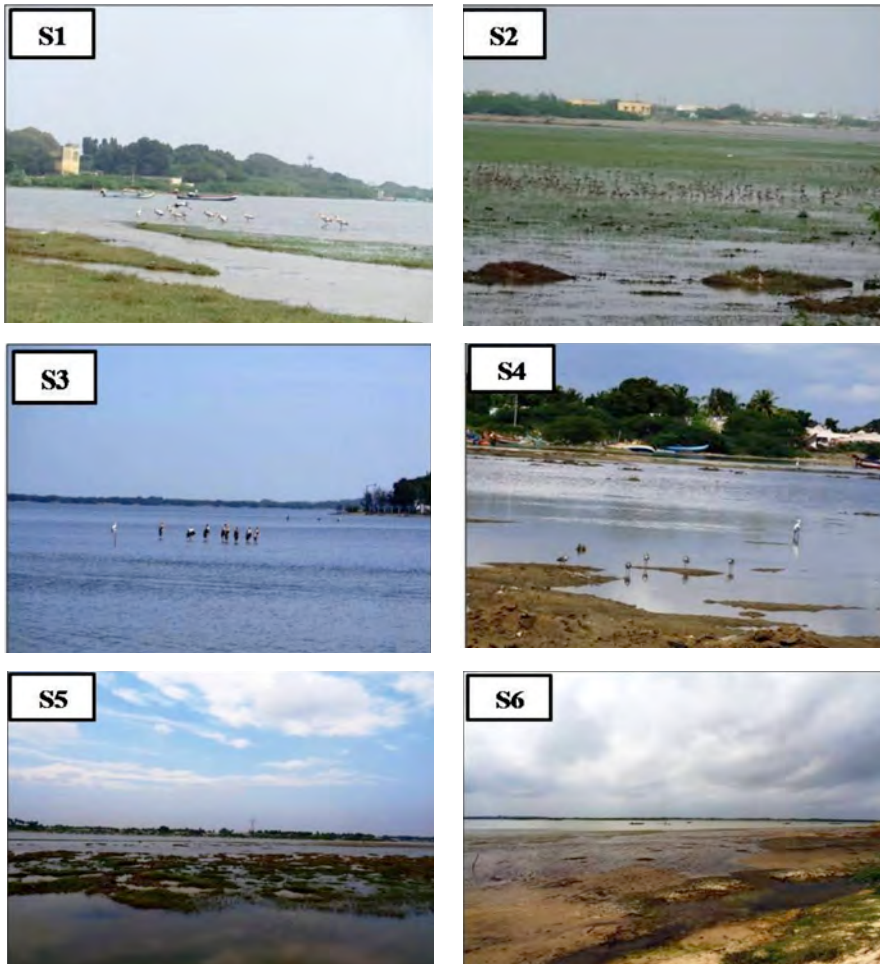


Fig 1: Sampling locations at Pulicat lake

Ciconiidae- 2, Meropidae- 1, Coraciidae- 1, Cerylidae- 1, Columbidae- 2, Alcedinidae- 1, Cuculidae- 1, Corvidae - 2, Sturnidae- 1, Muscicapidae- 1, Leiothrichidae- 1, Passeridae- 1, Dicruridae- 1, Motacillidae - 3, Hirundinidae- 1, Ardeidae- 7, Pelecanidae- 1, Threskiornithidae- 1, Psittaculidae- 1, Phoenicopteridae- 1, and Phalacrocoracidae- 2. Out of all these birds observed at the site, some are local common birds. While some were migratory namely, Common Red shank, Yellow-legged Gull, Eurasian curlew, Little stint, Black-headedgull, Marsh sandpiper, Black

tailed godwit, Wood sand piper, Whimbrel, Common green shank and Temminck's stint. They migrate to India and visit various wetlands apart from Pulicat lake. The resident birds were observed during most of the months of our investigation but the migratory birds were observed mostly during October to December months of 2013.

Based on IUCN Red List , 87% birds come under Least Concern, 9% of Near Threatened species, 2% Endangered and 2% of Critically Endangered category. Among the 56 birds species where 25 species belong to Resident (R),

13 Migrant (M) and 18 species belong to Resident Migrant (RM). Further narrow down and to report Status of birds which observed rare (R), Common and very common, 27 birds were rare (R), 21 species were common (C) and 8 species were very common (VC) (Table 2).

Discussion

In the present study, the diversity of avifauna at the Pulicat lagoon during winter and monsoon seasons were high and it may be concluded that the climatic conditions (winter) prevailing in the northern hemisphere at the same time are adverse to these birds especially in getting food and shelter. Asir Ramesh *et al.*, (2005) reported 125 species in the Pulicat lagoon. Terdalkar *et al.*, (2005) justify the reason for available of more avifaunal diversity depend on physical structure of the habitat, food availability and biotic interactions. Berthold (2001) stated that mostly the birds prefer to migrate within the geographical realm of the same continent for breeding and nesting purposes. Avifauna are also recognized as a quick responders to any kind of changes which occur in their ambient conditions lead them to be consider as one of the bio-indicator tool to study environmental monitoring and assessment for any type of ecosystem (Padoa-Schioppa *et al.*, 2006).

The IUCN Red List of endangered birds has already recognized 1226 bird species as threatened globally and India with 88 threatened bird species is ranked at seventh position (Bird Life International, 2010).

Aquatic birds being generally at or near the top of the most wetland food chains are highly susceptible to habitat disturbances and are therefore good indicators to predict the status of wetlands (Kushalan, 1992). Hence these wetlands / lagoons should be prioritized and its conservation

Table 2. List of bird species recorded from Pulicat Lagoon with their IUCN Status (2014)

S. No	Birds		Order	Family	IUCN Redlist 2014	Habitat	Status
	Common name	Scientific name					
1	Lesserwhistling-duck	<i>Dendrocygna javanica</i>	Anseriformes	Anatidae	LC	R	R
2	Common Red shank	<i>Tringa tetanus</i>	Charadriiformes	Scolopacidae	LC	M	R
3	Little ringed plover	<i>Charadrius dubius</i>	Charadriiformes	Charadriidae	LC	RM	R
4	Red-wattled Lapwing	<i>Vanellus indicus</i>	Charadriiformes	Charadriidae	LC	R	C
5	Whiskered tern	<i>Chlidonias hybridus</i>	Charadriiformes	Sternidae	LC	RM	C
6	Blackwinged stilt	<i>Himantopus himantopus</i>	Charadriiformes	Recurvirostridae	LC	R	R
7	Yellow-legged Gull	<i>Larus cachinnas</i>	Charadriiformes	Laridae	LC	M	R
8	Eurasian curlew	<i>Numenius arquata</i>	Charadriiformes	Scolopacidae	NT	M	R
9	Little stint	<i>Calidris minuta</i>	Charadriiformes	Scolopacidae	LC	M	R
10	Black-headed gull	<i>Chroicocephalus ridibundus</i>	Charadriiformes	Laridae	LC	M	R
11	Marsh sandpiper	<i>Tringa stagnatilis</i>	Charadriiformes	Scolopacidae	LC	M	R
12	Black tailed godwit	<i>Limosa limosa</i>	Charadriiformes	Scolopacidae	NT	M	C
13	Kentish plover	<i>Charadrius alexandrinus</i>	Charadriiformes	Charadriidae	LC	RM	R
14	Wood sand piper	<i>Tringa glareola</i>	Charadriiformes	Scolopacidae	LC	M	R
15	Whimbrel	<i>Numenius phaeopus</i>	Charadriiformes	Scolopacidae	LC	M	C
16	Common green shank	<i>Tringa nebularia</i>	Charadriiformes	Scolopacidae	LC	M	R
17	Temminck's stint	<i>Calidris temminckii</i>	Charadriiformes	Scolopacidae	LC	M	R
18	Pacific golden plover	<i>Pluvialis fulva</i>	Charadriiformes	Charadriidae	LC	M	R
19	Small pratincole	<i>Glareola lactea</i>	Charadriiformes	Glareolidae	LC	R	R
20	Caspian tern	<i>Sterna caspia</i>	Charadriiformes	Sternidae	LC	RM	R
21	Black-bellied tern	<i>Sterna acuticauda</i>	Charadriiformes	Sternidae	EN	R	R
22	Pallas's gull	<i>Larus ichthyaetus</i>	Charadriiformes	Laridae	LC	M	R
23	Lesser sand plover	<i>Charadrius mongolus</i>	Charadriiformes	Charadriidae	LC	RM	R
24	Asian openbill stork	<i>Anastomus oscitanus</i>	Ciconiiformes	Ciconiidae	LC	R	C
25	Painted stork	<i>Mycteria leucocephala</i>	Ciconiiformes	Ciconiidae	NT	RM	C
26	Cattle Egret	<i>Bulbulcus ibis</i>	Ciconiiformes	Ardeidae	LC	RM	C
27	Little green heron	<i>Butorides striatus</i>	Ciconiiformes	Ardeidae	LC	R	C
28	Small Bee-eater	<i>Merops orientalis</i>	Coraciiformes	Meropidae	LC	R	C
29	Indian Roller	<i>Coracias benghalensis</i>	Coraciiformes	Coraciidae	LC	R	C
30	Lesser-pied kingfisher	<i>Ceryle rudis</i>	Coraciiformes	Cerylidae	LC	R	C
31	Blue rock pigeon	<i>Columba livia</i>	Columbiformes	Columbidae	LC	R	VC
32	Mountain imperial-pigeon	<i>Ducula badia</i>	Columbiformes	Columbidae	LC	R	R
33	Small blue kingfisher	<i>Alcedo atthis</i>	Coraciiformes	Alcedinidae	LC	RM	C
34	Asian koel (Female)	<i>Eudynamys scolopacea</i>	Cuculiformes	Cuculidae	LC	R	C
35	Jungle Crow	<i>Corvus macrorhynchos</i>	Passeriformes	Corvidae	LC	R	VC
36	House crow	<i>Corvus splendens</i>	Passeriformes	Corvidae	LC	R	VC
37	Common myna	<i>Acridotheres tristis</i>	Passeriformes	Sturnidae	LC	R	VC
38	Indian chat	<i>Cercomela fusca</i>	Passeriformes	Muscicapidae	LC	R	R
39	Jungle babbler	<i>Turdoides striatus</i>	Passeriformes	Leiothrichidae	LC	R	R
40	House sparrow	<i>Passer domesticus</i>	Passeriformes	Passeridae	LC	R	VC
41	Black drongo	<i>Dicrurus leucophaeus</i>	Passeriformes	Dicruridae	LC	R	VC
42	Large pied wagtail	<i>Motacilla maderaspatensis</i>	Passeriformes	Motacillidae	LC	R	R
43	Common swallow	<i>Hirundo rustica</i>	Passeriformes	Hirundinidae	LC	RM	C
44	Paddy field pipit	<i>Anthus rufulus</i>	Passeriformes	Motacillidae	LC	RM	C
45	Yellow wagtail	<i>Motacilla flava</i>	Passeriformes	Motacillidae	LC	RM	R
46	White-bellied heron	<i>Ardea insignis</i>	Pelecaniformes	Ardeidae	CE	R	C
47	Little egret	<i>Egretta garzetta</i>	Pelecaniformes	Ardeidae	LC	R	VC
48	Spot-billed pelican	<i>Pelicanus philippensis</i>	Pelecaniformes	Pelecanidae	NT	RM	C
49	Black-crowned night-heron	<i>Nycticorax nycticorax</i>	Pelecaniformes	Ardeidae	LC	R	R
50	Oriental white ibis	<i>Threskiornis melanocephalus</i>	Pelecaniformes	Threskiornithidae	NT	R	C
51	Grey heron	<i>Adea cinerea</i>	Pelecaniformes	Ardeidae	LC	RM	C
52	Median egret	<i>Mesophoyx intermedia</i>	Pelecaniformes	Ardeidae	LC	RM	VC
53	Rose-ringed parakeet	<i>Psittacula krameri</i>	Psittaciformes	Psittaculidae	LC	RM	R
54	Greater flamingo	<i>Phoenicopterus roseus</i>	Phoenicopteriformes	Phoenicopteridae	LC	RM	R
55	Little cormorant	<i>Phalacrocorax niger</i>	Suliformes	Phalacrocoracidae	LC	RM	C
56	Indian shag	<i>Phalacrocorax fuscicollis</i>	Suliformes	Phalacrocoracidae	LC	RM	C

LC- Least Concern, NT- Near Threatened, R-rare, CE- Critical Endangered, EN- Endangered, M-Migrant, R- Resident, RM - Resident Migrant, R-Rare, C-Common, VC- Very Common.

value should be highlighted.

Conclusion

A technically sound and comprehensive approach with people's participation to preserve this natural treasure are essential. Habitat loss and alterations should be assessed as soon as possible after natural disasters and management strategies such as removal of silt deposition, opening of closed river mouths, prevention of soil erosion and maintenance of fresh water discharge should be adopted to restore the habitat to its natural shape. Further, the present study on the Survey of Avian fauna would be useful for future initiatives in studying ecotourism and conserving the Pulicat lagoon.

Acknowledgement

One of the author (RR) acknowledge the funding support by DST (SERB) to carry out this work .Ref: No SR/SO/AS-12/2012 dt:11.1.2013.

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