

Population Characteristics of Migratory Shorebirds in the Point Calimere Wildlife Sanctuary, Tamil Nadu, India

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Abstract

Shorebirds are migrants and migrate thousands of kilometers for feeding and breeding annually. The Point Calimere Wildlife Sanctuary is one of the seasonal feeding or wintering grounds in southern part of India, which is acting as an Australasian migratory flyway route for the migratory shorebirds. The migratory shorebirds were counted by total count method and 7'x50" field binocular and 20 x 60 field spotting scope was used for bird counting. Twenty two species of migratory shorebirds were recorded from August 2014 to April 2015. Out of 22 species of migratory bird species, one species, Euresian Curlew (*Numenius arquata*), is under 'Near Threatened' category and another species, Great Knot (*Calidris tenuirostris*), is under 'Endangered' category as per the IUCN, 2016. The density, diversity and richness of the bird species showed significant variations among the seasons and months ($P < 0.001$). The present study suggests that Point Calimere Wildlife Sanctuary is one of the important feeding grounds for the migratory and the resident species of the water birds seasonally including endangered migratory species.

Keywords: Migratory birds, population, seasons, habitat interactions and conservation.

INTRODUCTION

The Point Calimere Wildlife Sanctuary is one of the seasonal migratory, wintering and foraging grounds in Tamil Nadu. Migration of shore birds through the Asian Australia fly ways, the important migratory routes for the migration of shorebirds, is well known in the world. Tamil Nadu region is important to the migratory water birds as there are many important wetlands such as Point Calimere Swamp, Pichavaram and Muthupet mangrove, etc. Generally the visit of the migratory shore birds starts in the month of August, the pre migratory period, and the birds leave in the month of April, the start of post migratory period. The wetlands of the Point Calimere Wildlife Sanctuary (PCWS) attract birds as the prevailing conditions are suitable for feeding and breeding, and harbour diverse and dense feed species (Pandiyan and Asokan, 2015). Such characteristic features of the wetland in different parts of the world have been reported (Fredrickson and Reid, 1986; Velasquez, 1992; Laubhan and Fredrickson, 1993; Reid, 1993). However, in the present day context these wetlands did not escape the human interferences and frequently get contaminated with anthropogenic pollutants such as pesticides, chemicals, effluents, etc., which lead to habitat loss for shore birds, and

ultimately the populations of birds in terms of distribution, abundance, density, etc., are affected (Krapu and Reinecke, 1992; Davis and Smith, 1998; Sanders, 2000). Hence it becomes essential to assess the various parameters population of migratory shore birds in the context of number, distribution, phenology and trends during the migratory season as stated by Roomen *et al.* (2004), when the conglomeration of the migratory shore birds occurs (Koffi jberg *et al.*, 2003). The present article deals with the population characteristics of migratory shore birds in the Point Calimere Wildlife Sanctuary.

MATERIALS AND METHODS:

Study area

The present study was carried out in the Point Calimere Wildlife Sanctuary between August 2014 to April 2015. The Point Calimere Wildlife Sanctuary (10° 18' N; 79° 51' E) is situated on a low promontory on the Coromandel Coast in Nagapattinam District, Tamil Nadu, and India. The forests of Point Calimere with an area of 24.17 km² were declared as the Point Calimere Wildlife Sanctuary during 1967. The new Sanctuary, with a total area of 377 km² bears the name Point Calimere Wildlife and Bird Sanctuary. The Point Calimere Wildlife and Bird Sanctuary has been declared as a Ramsar site on 19th August 2002. The average rainfall ranges from 1000-1500 mm. Relative humidity remains high throughout the year due to coastal influence. Strong winds are prevalent during certain months, especially in June and July. The other

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two third remains as a continuous sheet of shallow, fresh/brackish/saline (depending on the season) water during the monsoon and during the period of the south westerly winds (May and June). At other times, the water spread dries up, creating mudflats, and during very dry periods, there is water only in the Seruthalaikkadu Creek. Exploitation of the Great Vedaranyam Swamp for salt extraction and other marine-based industries is fast growing. Two private chemical firms have been operating in the leased swamp areas adjoining the wildlife sanctuary. The manufacture of salt involves three stages. Sea water is pumped into reservoirs and then condensed before it is finally allowed to flow into salt-pans, where the salt crystallizes. Only the monsoon makes this environment temporarily habitable for marine organisms.

The Migratory shorebirds were counted by following the total counts method. The study was carried out fortnightly using the 'total count' method and the birds were counted individually as described by (Goss-Custard et al. 1990). The study area was divided into three stations for the study purpose and each area was 2000m in length and 500m width. Observations were made in the forenoon 6.00Am to 11.00 am, the birds were counted and identified. The birds were counted with the help of 7'x50" field binocular and 20 x 60 filed spotting scope from different vantage points in the study area. The birds were identified by their characteristic features in accordance with the identification keys of Grimmett et al. (2007). From the data collected mean population, density and diversity of each shore bird species were determined.

Season

The study period was divided into three seasons based on the migration of shorebirds, the season and the migratory route. Pre- Migratory season including month of August to October (Pre- monsoon) Migratory season including month of November to January (Monsoon) Post-Migratory season based on the February to April (Post- monsoon).

RESULTS

List of Migratory shorebirds:

The result of migratory shorebird species recorded in the Point Calimere Wildlife Sanctuary is presented in Table 1. A total of 22 species of migratory shorebirds belonged to 3 orders and 14 families' was recorded during the study period. The birds with highest number of species were those of the order Ciconiiforms (11 species), followed by Charadriiformes (10 species) Anseriformes (1 species). Out of 22 species of migratory bird species, one species, Eurasian Curlew (*Numenius arquata*), has been categorized under 'Near Threatened' and another species, Great Knot (*Calidris tenuirostris*), under 'Endangered' category as per the IUCN, 2016.

The density, diversity and richness of the bird species showed significant variations among the seasons and months ($P < 0.001$).

Among the 22 species of migratory shorebirds recorded from the Point Calimere Wildlife Sanctuary in three different study areas during August 2014 to April 2015 (Table 1), the Little stint, (1840.8 ± 1125 /ha.) Heuglin's gull, (1199.8 ± 414.81 /ha.) and Northern pintail (1292.6 ± 405.31 /ha.) showed high density in PCWS, followed by Terek sandpiper (0.1 ± 0.16 /ha.) whimbrel, Great knot, Black headed gull and Greater-crested tern and Bar-tailed godwit, which were relatively in low density. Northern pintail, Bar-tailed godwit, Great knot, Pacific golden plover and Pallas gull were absent in the Post- monsoon; Whimbrel, Black-headed gull, Greater-crested tern and Sandwich tern were absent during the pre- Monsoon season; and Great knot was absent in the Monsoon season. The present study suggests that Point Calimere Wildlife Sanctuary is one of the important feeding grounds for the migratory and resident species of the shore birds seasonally.

Fig.1. Overall density of Migratory Shorebirds recorded in the Point Calimere Wildlife Sanctuary from August 2014 to April 2015.

Fig.2. Overall diversity of Migratory Shorebirds recorded in the Point Calimere Wildlife Sanctuary from August 2014 to April 2015.

Fig.3. Overall richness of Migratory Shorebirds recorded in the Point Calimere Wildlife Sanctuary from August 2014 to April 2015.

DISCUSSION

Generally wetlands seasonally act as feeding and breeding habitats for the migratory shore birds as they provide suitable environmental conditions and rich feed. In the present study out 22 species of migratory shorebirds including 20 least concern, 1 'Near threatened', and 1 species 'Endangered' were recorded in the Point Calimere Wildlife Sanctuary during the period of August 2014 to April 2015. However, Manikadan (1992) has recorded 54 water bird species in the Great Vedaranyam Swamp of the Point Calimere Wildlife Sanctuary. Ramsar Site Report (2002) has indicated that 119 water birds and 138 land birds visit the Point Calimere Wildlife Sanctuary. Baruah (2005) recorded 269 species of birds from the Point Calimere Wildlife Sanctuary of which 103 species are migratory water birds. Comparison of the present study with the previous studies showed that there has been rapid decline in the number of shore bird species. Balachandran (2006) has stated that Point Calimere Wildlife Sanctuary is getting degraded as a result of human interferences and a decline of over 70% has been noted in the wader's populations. The main reasons for decline of shore birds in the study area

Table 1. Overall density of Migratory Shorebirds recorded in the Point calimere Wildlife Sanctuary from August 2014 to April 2015.

S.No.	Species Name	Pre-Monsoon			Monsoon			Post-Monsoon		
		August	September	October	November	December	January	February	March	April
1	Northern pintail	309.3±84.29	649±97.56	682.1±158.38	1292.6±405.31	992±132.54	830.5±350.07	0	0	0
2	Bar tailed godwit	0	1±1	0.5±0.5	1.5±1.5	3.6±1.96	3.5±2.24	0	0	0
3	Eurasian curlew	9±2.62	15±2.70	23.8±0.94	14±4.20	7.8±2.52	12.5±4.84	6±2.54	9.5±4.94	9.3±1.56
4	Whimbrel	0	0	0	0	0.3±0.33	2.3±0.3	0	0	1.3±1.33
5	Little stint	294.6±61.20	579.1±117.41	590.3±79.36	780.8±240.51	1515.8±200	1840.8±1125	3.1±3.16	22±22	1.6±1.66
6	Temminck's stint	2.5±1.14	10.6±3.89	7.3±3.63	11.1±3.39	0	0	1.1±1.16	1.3±1.33	
7	Curlew sandpiper	10.6±6.76	9±3.63	0.6±0.66	1±1	0	310±116.06	0	7.5±4.88	0
8	Spotted redshank	9.5±9.5	1.3±1.33	0	0	0	4±2.64	1.8±1.22	3.3±2.12	1.3±0.98
9	Marsh sandpiper	72±37.36	66.8±15.60	46.6±16.51	31.6±8.96	58.5±14.01	70.6±17.74	51.6±14.31	35.8±10.10	0
10	Common greenshank	63.5±33.41	20.8±4.17	15.5±6.05	21±3	24±6.34	11.5±4.46	0	2.3±1.66	1.8±1.22
11	Green sandpiper	0.6±0.66	10.1±5.90	0	0	0	0	0	0	0
12	Wood sandpiper	26.8±14.43	28.3±9.81	23.3±11.35	11.3±5.08	4.1±1.01	0	2.5±1.36	2.5±2.12	0.6±0.66
13	Terek sandpiper	0.1±0.16	6.1±1.97	2.6±1.90	1.3±0.84	2.3±0.84	3.8±1.66	1±0.68	2.1±0.79	2±0.68
14	Ruddy turnstone	0	0	0	0	0	1.1±0.74	0	0	1.1±0.74
15	Great knot	0	4.8±2.90	0.3±0.33	0	0	0	0	0	0
16	Pacific-golden plover	22.5±13.29	63.1±16.99	6.8±6.83	18±11.73	0	0	0	0	0
17	Grey plover	0	0	0	0	2.8±1.83	0	1.1±1.16	1.6±1.66	0
18	Heuglin's gull	948.6±293	833.8±172.85	359.8±88.26	1162.5±295.34	799.8±156.71	1199.8±414.81	0	3.3±3.33	3.8±2.42
19	Pallas's gull	0	0	0.8±0.83	2.8±1.37	0	0	0	0	0
20	Black headed gull	0	0	0	0	0.3±0.33	4±2.96	30.5±17.41	16.5±16.5	0
21	Greater-crested tern	0	0	0	7±3.14	0	0.3±0.33	2.5±2.5	0	0
22	Sandwich tern	0	0	0	5.3±5.33	6.1±6.16	0	6.1±6.16	0	0

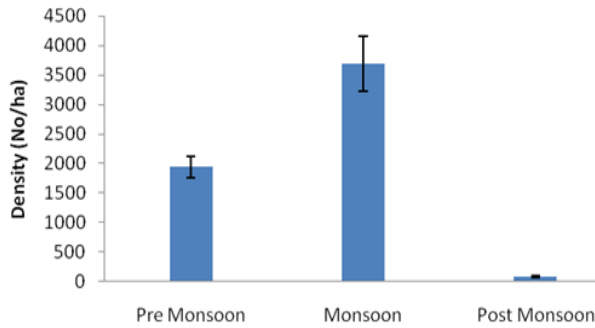


Fig.1. Overall density of Migratory Shorebirds recorded in the Point Calimere Wildlife Sanctuary from August 2014 to April 2015.

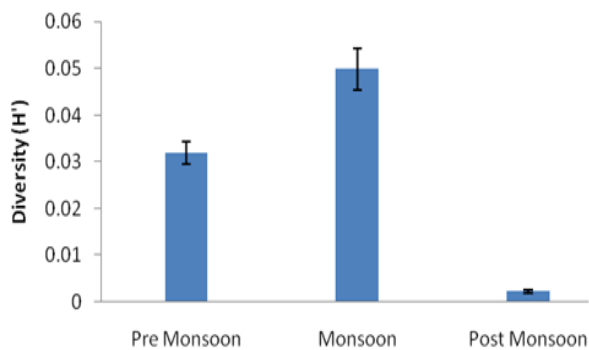


Fig.2. Overall diversity of Migratory Shorebirds recorded in the Point Calimere Wildlife Sanctuary from August 2014 to April 2015.

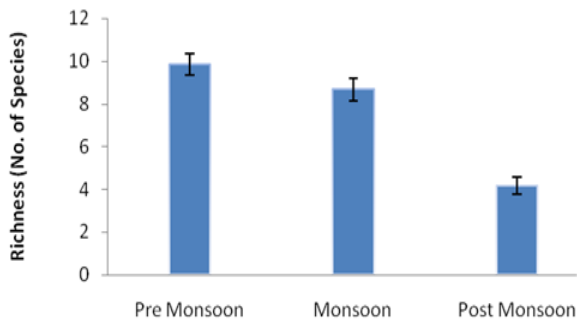


Fig.3. Overall richness of Migratory Shorebirds recorded in the Point Calimere Wildlife Sanctuary from August 2014 to April 2015.

could be due to shooting of birds, significant decline of annual rainfall, hypersaline conditions due to salt-pans, embankments constructed in the swamp by chemical companies and fish/ brawn catching carried out by local peoples in the swamp. They are may be high number of benthic organism availability of most preferred food items such as polychaetes, Arthropod, molluscs, insects, plankton, etc. Earlier studies also have reported large attraction of waders during migratory season in different wetlands of India and

other countries (Whitelaw *et al.*, 1978; Sampath and Krishnamurthy, 1990; Oswin, 1999; Divakaran, 2000; Pandiyan, 2000, 2002, Pandiyan, et al. 2006; Pandiyan and Asokan, 2013b; Pandiyan et al. 2014; Pandiyan and Asokan, 2015, ; Sridharan, 2003; Khurshid, 2004; Wearne and Underhill, 2005; Kannan *et al.*, 2008; Sandilyan, 2009; Nagarjuna *et al.*, 2010). The population of water birds in the study area is significantly changing among months. The migratory shore birds' visit starts from the month of August and a considerable number of bird's species reach this wetland. The migratory shorebirds reach the maximum number in the months of December, January and February. Northern Pintail, Little Stint, Temminck's stint, Curlew sandpiper, Spotted redshank, Terek sandpiper, Marsh sandpiper, Wood sandpiper, Common greenshank and Heuglin's gull were the most widely represented migratory bird species in all the three stations, and occurring sociably during the pre-monsoon, Monsoon and post-monsoon. These stations also become ideal place for birdwatchers, naturalists, tourists, and researchers, since the water birds are of great importance for their esthetic, sporting, and economic values Further, the present study indicates that the Point Calimere Wildlife Sanctuary attracts a large number of waders, mostly Little stint, Plovers, Sandpipers, Spoon bill, Flamingos, and aerial foragers. The other bird groups namely egrets, ducks, gulls and terns also occur in good numbers during the pre-migratory and migratory season depth, salinity, etc. (Ringelman *et al.* 1982; Skagen& Knopf 1994; Weller 1999; Pandiyan 2002; Foneman *et al.* 2001; Sridharan 2003; Connor & Gabor 2006).

CONCLUSION

The present study suggests that the Point Calimere Wildlife Sanctuary as one of the important seasonal forging grounds for the migratory and the resident species of the shore birds. The above information will be useful for the preparation of a management plan for ornithologists and for maintenance. The Point Calimere Wildlife Sanctuary is under great pressure on account of many threats which have led to decrease of swamps and their biological resource possible. The main threats were hunting or poaching, increased salinity due to salt production and human disturbances. There is an instant need to restore and conserve this accessible wetland to maintain and improve the ecological stability.

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