

Status, abundance and threats to waterbirds of the Great Vedaranyam Swamp, Point Calimere Wildlife Sanctuary (Ramsar Site), South-east coast of India.

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ABSTRACT:

Totally 46 waterbird species were identified at the Great Vedaranyam Swamp of the Point Calimere Wildlife Sanctuary during October 2007 - March 2010. It included waterbird species representing 11 families and 5 orders comprising of winter migrants (30 species), residents (9 species) and seasonal migrants (7 species). The birds were classified into five categories in terms of abundance, namely, common (33%), very rare (30%), very common (15%), rare (11%) and occasional (11%). The highest number of species was observed during November–February (46 species) and lowest during July (5 species). The highest bird number was recorded in January 2010 (3,582 individuals). The commonest species is Greater Flamingo *Phoenicopterus ruber* (1,254 individuals). The major threats and a few management suggestions have been made on the improvements to the conservation of Great Vedaranyam Swamp of the Point Calimere Wildlife Sanctuary.

Keywords:

Waterbirds, Point Calimere, Winter migrants, Flamingos.

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INTRODUCTION

There are about 242 wetland bird species and 67 wetlands support bird species among the 1,300 species of birds recorded in the Indian subcontinent (Grimmett *et al.* 1999, Manakadan and Pittie 2002). Of these, 125 are migrants, among which 102 species are winter migrants, 10 summer migrants and 3 passage migrants. Approximately, 12% of Asian birds are globally threatened (Arun Kumar *et al.*, 2003). Wetland birds comprise about 10% of the globally threatened species and 20% of Asian threatened species. About 34 of the wetland birds are globally threatened species, 34 are critically endangered and one conservation dependent (Manakadan and Pittie, 2002). But the recent studies have shown that the population of the wetland birds is declining (Hussain, 1991; Balachandran, 1993; Arun Kumar *et al.*, 2003) and many wetlands are in jeopardy. This phenomenon is an indication of many environmental changes and possibly the degradation of the wetlands, as the birds are among the first indicators of dangers ahead for an individual wetland or for a wetland type or a region as a whole.

The Ministry of Environment and Forests has identified about 2,175 wetlands in India covering about 4.1 million ha (Alfred and Nandi, 2000), of which 93 are major wetland sites and 19 are Ramsar sites, the Wetlands of International Importance (Asian Waterbird Census, 2001). Many of these wetlands are wintering grounds for migratory birds. There are 465 Important Bird Areas in India (Islam and Rahmani, 2004). Many of them are wetlands and host important migrant and resident waterbirds.

The east coast of India, especially the Tamil Nadu region is important to waterbirds as many important wetlands such as Point Calimere swamps, Pichavaram and Muthpet mangroves, etc. are situated here. These wetlands are especially important in the context that they serve as wintering areas for birds as appreciable number of many bird species annually migrate from Arctic Siberia to wintering grounds in India, an-route passage to Australia (Sampath and Krishnamurthy, 1990). The Great Vedaranyam Swamp of the Point Calimere Wildlife Sanctuary is one of the most important wintering areas for waterbirds in southern India (Sampath, 1989; Manakadan, 1992; Balachandran, 1993, 1998). The Point Calimere Wildlife Sanctuary is identified as an Important Bird Area (IBA) site of India proposed by BirdLife International and Bombay Natural History Society

(Islam and Rahmani, 2004). For this and other reasons, Point Calimere Wildlife Sanctuary also been proposed for inclusion as a Ramsar Site (19th August 2002) by the Wetlands International.

Almost all the previous available information on the waterbirds of the Point Calimere Wildlife Sanctuary is based on the short term study and seasonal surveys (Sugathan, 1985; Sampath and Krishnamurthy, 1989; Perennou and Santharam, 1990; Sampath, 1991; Balachandran and Natarajan, 1992; Kazmierczak *et al.*, 1992; Balachandran and Hussain, 1994; Balachandran, 1995; Manakadan, 1995). Only few studies have covered the ecology of the waterbirds in the study area very long back (Sampath, 1989; Manakadan, 1992). This article provides a four-year systematic overview of status, abundance and threats to waterbirds of Great Vedaranyam Swamp of the Point Calimere Wildlife Sanctuary.

Study area

The Great Vedaranyam Swamp of the Point Calimere district (10°18'N, 79°51'E) is situated in the state of Tamil Nadu in Nagapattinam district (Fig. 1). The Great Vedaranyam Swamp stretches for about 48 km from east to west, parallel to Palk Strait separated from it by a sand-bank. There is a gradual north-south slope. Five fresh water channels empty into this part of the swamp. The swamp contains water only during the monsoon and in the summer the water gets dried up gradually and in the park summer a small pool of water can only be seen. The entire swamp belt is about 30 km long and 9 km wide. It is screened from the Bay of Bengal and Palk Strait by narrow strips of sand banks with many openings. The most important openings to the sea from the swamp are "Manavaykal" and "Sellakkani" mouths. Sea water enters to the eastern half of the swamp mostly through these openings. This swamp represents a mixed ecosystem, influenced by both fresh water and seawater. Two industrial salt companies Chemplast (Chemical and Plastics Limited) and DCW (Dharangadhra Chemical Works) and a number of small and large salt units that produce edible salt and industrial salt operate in this area. The climate of the area is monsoonal, but it is not typical of monsoonal climates due to its asymmetrical rainfall regimes. The main contribution to the rainfall is from the north-east monsoon (October–December) and the average rainfall ranges from 1000–1500mm. The highest temperature (34°C) is recorded in May and the lowest (22°C) in December. Relative humidity

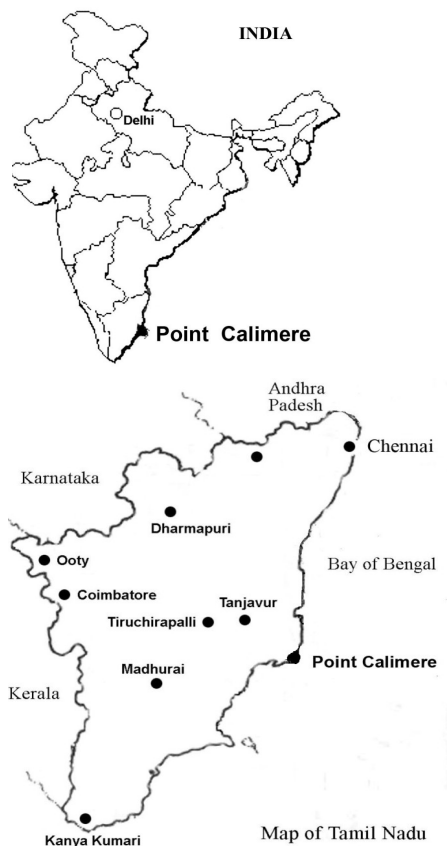


Figure 1. Map of India and Tamil Nadu showing study area.

remains high throughout the year due to coastal influence. Strong winds are prevalent during certain months, especially in June and July.

MATERIALS AND METHODS

The waterbird abundance was estimated by direct count method as described by Nagarajan and Thiyagesan (1996). Observations were made twice a month in the early morning and late evening during October 2007–March 2010. For watching, counting and identifying birds, wide-range binoculars, spotting scope and telescopes were used. The birds were identified by studying their characteristic features in accordance with the identification keys evolved by Ali (1969), King *et al.*, (1978), Sonobe and Usui (2000) and Grimmett *et al.*, (2001). The threats to waterbirds were identified through direct observation, interview with key informants and secondary sources.

In the present study, three sampling stations were marked by spatial transect (5000m x 400m) of the Great Vedaranyam Swamps covering a distance

of about 15 km. The sampling stations were determined based on ecological settings, inlet and outlet of sea water, location of pumping station, vegetation and human activities in the area. The sampling station is about one to two kilometers apart from each other.

Station 1: The station 1 starts near shoreline and ends to Pump House 1. The water occurs throughout year and during rainy season the sea water entered this area. Small patches of vegetation such as *Suaeda monica* and *Salicornia brachita* were recorded. Human activities here include mainly those of prawn and fish collections.

Station 2: The station 2 starts near the Rettai Theevu and end near the shoreline. It is about one kilometer away from station 1. A mound of *Prosopis juliflora* exists in one place and small patches of *Suaeda monica* occur throughout this area. The human activities here include those of prawn and fish collections and boat operations. During heavy rainy season, the fresh water enters this area from the Manavaaikal river. The sea water also intrudes this station during heavy rain.

Station 3: The station 3 starts near Neduntheevu and ends at the Kalaiman Salt Company. The *Prosopis juliflora* occurs in one place and a sparse distribution of *Suaeda monica* occurs in this area. During heavy rainy season, the fresh water enters this area from the Manavaaikal river.

Abbreviations used: R = Resident, with or without breeding records. WM = Winter Migrant, species that breeds in the Palaearctic region/Himalaya during spring and that winters in the Indian subcontinent. SM = Seasonal Migrant, an ‘Indian species’ that occurs seasonally in the Point Calimere. VC = Very Common, sightings possible on almost all days in a season/year. C = Common, sightings of about once a week in a year/season. O = Occasional, about one sighting fortnight/month in a year/season. Ra = Rare, fewer than five sightings per year or three sightings a season. VRa = Very Rare, record based on only one or two sighting during this study.

RESULTS

A total of 46 waterbird species belonging to 11 families and 5 orders were recorded in the Great Vedaranyam Swamp of the Point Calimere Wildlife Sanctuary during the study. At Station 1, the highest number of species gathering (46 species) occurred in November and December 2008 and January and February 2009 and 2010 and the lowest

number of species (15 species) in July 2009. At Station 2, maximum number of 42 species were recorded during December 2007, 2008 and 2009 and January of 2008, 2009 and 2010 and minimum numbers of 5 species were observed during July 2008. At Station 3, highest number of species were recorded (39 species) in December 2007, 2008 and 2009 and January of 2008, 2009 and 2010 and lowest number (5 species) in July 2008 (Fig.2). Of the overall total of 46 species recorded, 30 (65%) species were winter migrants, 9 (20%) were residents and 7 (15%) were seasonal migrants. The birds were divided into five categories in terms of abundance, namely, common (33%), very rare (30%), very common (15%), rare (11%) and occasional (11%).

Accounts of 46 species of waterbirds recorded from the Great Vedaranyam Swamp of the Point Calimere Wildlife Sanctuary are given in Tables 1. The most dominant species was Greater Flamingo *Phoenicopterus ruber* (maximum count 1,254 individuals) followed by Northern Pintail *Anas acuta*, Little Stint *Calidris minuta*, Brown-headed Gull *Larus brunnicephalus* and Caspian Tern *Sterna caspia*. The Greater Flamingo is very common seasonal migrant to the Point Calimere Wildlife Sanctuary and is seen large congregation during monsoon season, but some birds could be found almost throughout the year.

For some species, there were only few records (<10 individuals), namely, Western Reef-Egret *Egretta gularis*, Black-Headed Ibis *Threskiornis melanocephalus*, Northern Shoveller *Anas clypeata*, Grey Plover *Pluvialis squatarola*, Common Ringed Plover *Charadrius hiaticula*, Whimbrel *Numenius phaeopus*, Eurasian Curlew *Numenius arquata*, Terek Sandpiper *Xenus cinereus*, Common Sandpiper *Actitis hypoleucos*,

Ruddy Turnstone *Arenaria interpres*, Red-necked Phalarope *Phalaropus lobatus*, Black-winged Stilt *Himantopus himantopus*, Red-wattled Lapwing *Vanellus indicus*, Heuglin's Gull *Larus heuglini* and Pallas's Gull *Larus ichthyaetus*.

Birds such as Little Egret *Egretta garzetta*, Grey Heron *Ardea cinerea*, Large Egret *Casmerodius albus*, Indian Pond-Heron *Ardeola grayii*, Painted Stork *Mycteria leucocephala*, Little Ringed Plover *Charadrius dubius*, Common Greenshank *Tringa nebularia*, Brown-headed Gull *Larus brunnicephalus*, Black-headed Gull *Larus ridibundus*, Gull-billed Tern *Gelochelidon nilotica* and Caspian Tern *Sterna caspia* were present in all months with peak numbers in December and January.

There is lot of variations in avifauna data generated on this swamps. The population of waterbirds increased from November to January (Fig. 3). At Station 1, a peak of waterbird population was observed during January 2010, with a maximum of 3,582 individuals and a minimum of 101 individuals during July 2009. At Station 2, the minimum and maximum bird population ranged from 11 individuals (during July 2008) to 2,244 individuals (during January 2009). At Station 3, the highest number of population was recorded (2,033 individuals) during January 2010 and lowest population during June and July 2008 (8 individuals) (Fig. 3).

DISCUSSION

The Great Vedaranyam Swamp of the Point Calimere Wildlife Sanctuary serves as the foraging ground for fresh, brackish or saline water-preferring bird species comprising residents, seasonal migrants and winter migrants from the Palaearctic region. This area is primarily important during

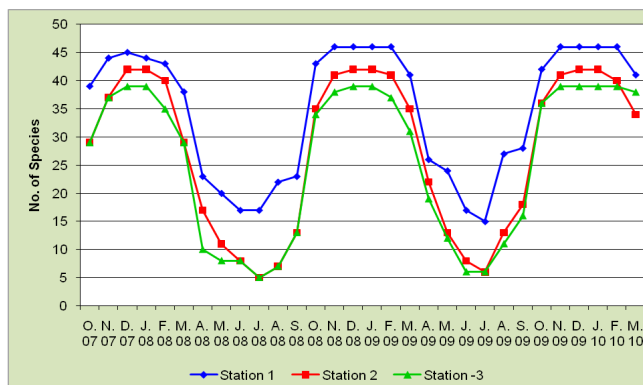


Figure 2: Monthly fluctuations in the number of bird species at the Point Calimere Wildlife Sanctuary during 2007-2010.

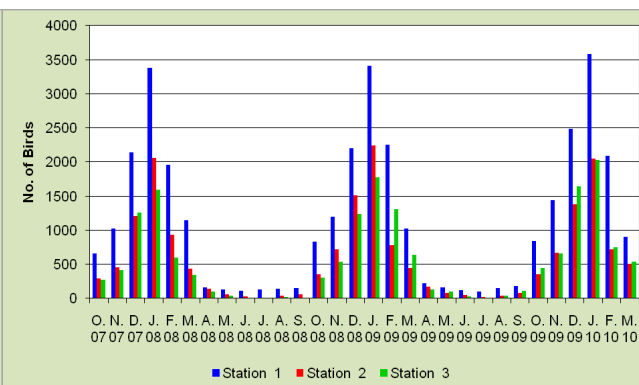


Figure 3: Monthly fluctuations of waterbird population in the Point Calimere Wildlife Sanctuary during 2007-2010.

Table 1. Number and status of waterbirds observed at three stations of Point Calimere Wildlife Sanctuary during October 2007- March 2010. NR – Not Recorded.

| Scientific name | English name | Max. no. at Station 1 | Max. no. at Station 2 | Max. no. at Station 3 | Status |
|------------------------------------|----------------------|-----------------------|-----------------------|-----------------------|--------|
| <i>Pelecanus philippensis</i> | Spot-billed Pelican | 52 | 66 | 23 | R C |
| <i>Phalacrocorax niger</i> | Little Cormorant | 14 | NR | 16 | R Ra |
| <i>Egretta garzetta</i> | Little Egret | 63 | 41 | 34 | R VC |
| <i>Egretta gularis</i> | Western Reef-Egret | 3 | 4 | 9 | SM O |
| <i>Ardea cinerea</i> | Grey Heron | 22 | 7 | 8 | R O |
| <i>Casmerodius albus</i> | Large Egret | 59 | 47 | 31 | R VC |
| <i>Mesophoyx intermedia</i> | Median Egret | 24 | 13 | 17 | R C |
| <i>Ardeola grayii</i> | Indian Pond-Heron | 11 | 6 | 6 | R C |
| <i>Mycteria leucocephala</i> | Painted Stork | 94 | 88 | 42 | R VC |
| <i>Platalea leucorodia</i> | Eurasian Spoonbill | 18 | 21 | 14 | SM O |
| <i>Threskiornis melanocephalus</i> | Black-Headed Ibis | 4 | NR | 4 | SM VRa |
| <i>Phoenicopterus ruber</i> | Greater Flamingo | 1254 | 841 | 569 | SM VC |
| <i>Phoenicopterus minor</i> | Lesser Flamingo | 117 | 63 | NR | SM Ra |
| <i>Anas acuta</i> | Northern Pintail | 468 | 369 | 311 | WM VC |
| <i>Anas querquedula</i> | Garganey | 132 | 126 | 114 | WM C |
| <i>Anas crecca</i> | Common Teal | 110 | 87 | 71 | WM C |
| <i>Anas clypeata</i> | Northern Shoveller | 9 | 7 | 3 | WM O |
| <i>Pluvialis squatarola</i> | Grey Plover | 5 | 4 | 4 | WM VRa |
| <i>Charadrius hiaticula</i> | Common Ringed Plover | 8 | 5 | 5 | WM VRa |
| <i>Charadrius dubius</i> | Little Ringed Plover | 36 | 29 | 31 | SM C |
| <i>Charadrius alexandrinus</i> | Kentish Plover | 18 | 2 | 11 | SM C |
| <i>Charadrius mongolus</i> | Lesser Sand Plover | 33 | 17 | 25 | WM C |
| <i>Limosa limosa</i> | Black-tailed Godwit | 96 | 61 | 50 | WM C |
| <i>Limosa lapponica</i> | Bar-tailed Godwit | 89 | 52 | 42 | WM C |
| <i>Numenius phaeopus</i> | Whimbrel | 4 | NR | NR | WM VRa |
| <i>Numenius arquata</i> | Eurasian Curlew | 6 | 3 | 9 | WM Ra |
| <i>Tringa totamus</i> | Common Redshank | 32 | 18 | 13 | WM C |
| <i>Tringa stagnatilis</i> | Marsh Sandpiper | 19 | 11 | 11 | WM O |
| <i>Tringa nebularia</i> | Common Greenshank | 16 | 8 | NR | WM Ra |
| <i>Xenus cinereus</i> | Terek Sandpiper | 6 | 4 | 6 | WM VRa |
| <i>Actitis hypoleucos</i> | Common Sandpiper | 6 | 4 | 9 | WM VRa |
| <i>Calidris ferruginea</i> | Curlew Sandpiper | 88 | 39 | 41 | WM C |
| <i>Arenaria interpres</i> | Ruddy Turnstone | 9 | 4 | NR | WM VRa |
| <i>Calidris minuta</i> | Little Stint | 274 | 154 | 165 | WM VC |
| <i>Phalaropus lobatus</i> | Red-necked Phalarope | 8 | 3 | NR | WM VRa |
| <i>Himantopus himantopus</i> | Black-winged Stilt | 9 | 6 | 8 | WM VRa |
| <i>Vanellus indicus</i> | Red-wattled Lapwing | 4 | NR | NR | R VRa |
| <i>Larus heuglini</i> | Heuglin's Gull | 5 | NR | 5 | WM VRa |
| <i>Larus ichthyæetus</i> | Pallas's Gull | 4 | 5 | NR | WM VRa |
| <i>Larus brunnicapillus</i> | Brown-headed Gull | 163 | 84 | 133 | WM C |
| <i>Larus ridibundus</i> | Black-headed Gull | 13 | 6 | 7 | WM VRa |
| <i>Gelochelidon nilotica</i> | Gull-billed Tern | 123 | 48 | 96 | WM C |
| <i>Sterna caspia</i> | Caspian Tern | 147 | 87 | 117 | WM VC |
| <i>Sterna hirundo</i> | Common Tern | 11 | 6 | 8 | WM VRa |
| <i>Sterna albifrons</i> | Little Tern | 132 | 77 | 87 | WM C |
| <i>Chlidonias hybridus</i> | Whiskered Tern | 18 | 8 | 6 | WM Ra |

November to January/early February after which it gets flooded during the north-east monsoon rains, when it attracts large number of species includes waders, flamingos, ducks, sandpipers, gulls and terns. Every year from October (onset of north-east

monsoon) onwards a considerable number of waterbirds reach this wetland. The peak winter population of the migratory bird's viz., waders, flamingos, ducks, sandpipers, gulls and terns has been during December-January. The basic

requirements of the migratory waterbirds at their wintering sites are adequate food supply and safety, which are fulfilled by this wetland. Most of the migratory waterbirds leave the wetland by late April or early May.

Unfortunately, when compared to previous reports, the waterbirds richness and abundance was seriously declined due to various ecological and anthropogenic pressures in the study area. Earlier, Manakadan (1992) has recorded 54 waterbird species and Ramsar Site Report (2002) has indicated that 119 waterbirds visit the Point Calimere Wildlife Sanctuary. According to Nagarajan and Thiyagesan (2006), the Greater Flamingo *Phoenicopterus ruber* population which usually consisted of around 20,000 individuals declined from 3,351 in 1986 to 1,254 in the present study. Balachandran (2006) stated that until the 1990s, Point Calimere was the most important site for waders, supporting hundreds of thousands of birds throughout the migration season and now degraded as a result of human interference, and a decline of over 70% has been noted in the wader populations.

In the 1980s, the Point Calimere supported >10,000 Lesser Sand Plover, >15,000 Black-winged Stilt, >50,000 Black-tailed Godwit, >200,000 Little Stint and >150,000 Curlew Sandpipers (Balachandran 2006), but these have now become scarce (<500 during the present study period, 2007–2010). Compared to previous reports from Tamil Nadu Forest Department Census Records (unpubl. data), the abundance of many waterbird species are now becoming very rare and uncommon and declining year after year. A considerable number of Pied Avocets *Recurvirostra avosetta*, Crab Plover *Dromas ardeola*, Eurasian Oystercatcher *Haematopus ostralegus*, Sanderling *Calidris alba*, Spotted Redshank *Tringa erythropus*, Ruff *Philomachus pugnax*, Pacific Reef Egret *Egretta sacra*, Pacific Golden Plover *Pluvialis fulva* and River Tern *Sterna aurantia* were reported earlier, but have not been sighted since 2007.

However, the occurrence of 46 waterbird species during the study period is, perhaps, an indication of the fact that the Great Vedaranyam Swamp of the Point Calimere Wildlife Sanctuary may not only become a favourable habitat for waterbirds but may also become into an ideal place for birdwatchers, naturalists, tourists, and researchers, since the waterbirds are of great importance for their esthetic, sporting, and economic values.

Major threats

There is an intensive illegal hunting of Little Stints and Curlew Sandpipers by professional bird trappers who depend on birds for their livelihood. The gregarious Little Stint and Curlew Sandpiper are particularly vulnerable to clap-traps, as they forage on mudflats with shallow water, *i.e.* in areas that are ideal for the use of this type of trap.

There is a serious problem caused by salt production. Local people manufacture salt here for over a century. More serious concerns are two factories in the region that manufactured marine chemicals. For a decade, the factories have been pumping on vast volume of sea water into the swamps. The salt is concentrated through evaporation in holding pans covering thousands of acres drastically increasing the salinity of the water and affecting the fragile food chain. The result in decreasing food is believed to major causes in birds decline.

This ecologically vital ecosystem is under constant threat due to ever-increasing anthropogenic pressures. The rich prawn and fish resources of the Great Vedaranyam Swamps attracted powerful business interests. Intensive fishing activities and the use of mechanized boats affect the bird fauna. The most sensitive species appear to be ducks, waders and other long distance migrants, which feed, in large flocks on the ground or water level. Disturbances can be energetically costly due to lost feeding time and increased escape activities.

Climate change or dramatic decline of rainfall is thought to be causing more frequent droughts resulting in reduced water levels and the drying out of many wetlands in Central Asia. This phenomenon may be a great threat to the survival of the migratory birds.

Management implications

The area is required to be stopped appropriately to check the illegal hunting to prevent further population loss of birds. We have to strengthen enforcement of existing restrictions on the hunting of migratory birds.

To give strict guidelines to the salt companies to stop the salt production at least during the migratory seasons of birds.

Changes in the wintering population of birds at Great Vedaranyam Swamps are studied in relation to various causes of decline, to address remedial measures in a global conservation strategy.

Measurement of water chemistry should be



done on a regular basis to allow long-term monitoring of changes in nutrient levels and other parameters

Anthropogenic factors are the root causes for wetland degradation and habitat destruction of waterbirds. Therefore, conservation education and awareness programmes are essential for local farmers, students, fishing community and visitors to the lake. Publication of factsheets, checklists and pocket guide about biodiversity of Point Calimere Swamp will help to widen the local knowledge among conservationists.

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