

## **AVIFAUNAL DIVERSITY OF PALLIKARANAI MARSH**

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### **ABSTRACT**

Wetlands are dynamic ecosystems that offer several tangible and intangible services to communities living around them. The Pallikaranai marsh, one of Chennai’s last remaining natural wetlands is a notable haven for birds, both resident and migratory. Avifaunal diversity at the marsh was observed and documented. A total of 81 species of birds, including four that were designated as Near Threatened, were recorded. The data was uploaded to eBird, a global repository of bird sightings. eBird checklists uploaded by other individuals were also examined, to determine the avian species richness at the marsh. Over the years, the rapid decimation of the marsh owing largely to anthropogenic factors has been a cause for concern. Despite this, Pallikaranai marsh, now a designated Ramsar site continues to harbour several resident bird species and attracts thousands of migratory birds year after year. It is therefore of vital importance to protect the marsh and its denizens.

**Keywords:** *Pallikaranai marsh, Wetland, birds, Diversity, eBird, Species Richness*

### **INTRODUCTION**

A wetland is an area that is covered with water for at least some part of the year. Wetlands are ecotones where terrestrial and aquatic habitats converge. As a result of this union of two distinct ecosystems, wetlands play host to a diverse array of terrestrial and aquatic organisms. Wetlands are also arenas where natural cycles play out, replenishing the earth’s water and minerals (EPA, 2022). Recognising their importance in offering solutions to the problems of food and water scarcity and climate change, many of the United Nation’s Sustainable Development Goals revolve around restoration and management of wetlands around the world. Most of the SDGs are relevant to wetlands but of particular importance are 2 (Zero Hunger), 6 (Clean Water and Sanitation), 11 (Sustainable Cities and Communities), 13 (Climate Action), 14 (Life Below Water) and 15 (Life on Land) (Albu, 2021).

One of the last remaining natural wetlands adjoining the Coromandel Coast, the Pallikaranai marsh is a haven for 337 species of plants and animals, including 115 species of birds. Several migratory birds visit the marsh year after year to spend the winter, raise young and replenish food reserves before returning to their summer homes in other parts of the country or abroad. Some of these birds are near threatened species. Over the years, as the city expanded, the marsh became fragmented. Several educational and corporate institutions have encroached into the marshland; a significant portion of the marsh is being used as a dumpyard and untreated sewage is polluting the pristine waters of the marsh (Vencatesan, 2007).

In today’s world, threatened with global warming, pollution and deforestation, studying birds becomes all the more relevant because birds are sensitive indicators of the environment. Birds are a sort of ‘ecological litmus paper’ (Peterson, 1934). Several citizen-science-based animal conservation websites have emerged in the past decade to engage volunteers in gathering animal diversity data at a time when there are significant threats to animals. One such website is eBird.org. eBird is an online database of bird sightings from around the world. It is a unique virtual space that encourages amateurs to observe birds in and around their neighbourhood and elsewhere, and upload the information in the form of checklists, photographs and audio files. The information is then reviewed by experts and can then be utilised by ornithologists to study diversity, abundance and migration of bird species across the globe (Sullivan *et al.*, 2009). The present study is an attempt to assess the avian diversity at the Pallikaranai marsh.

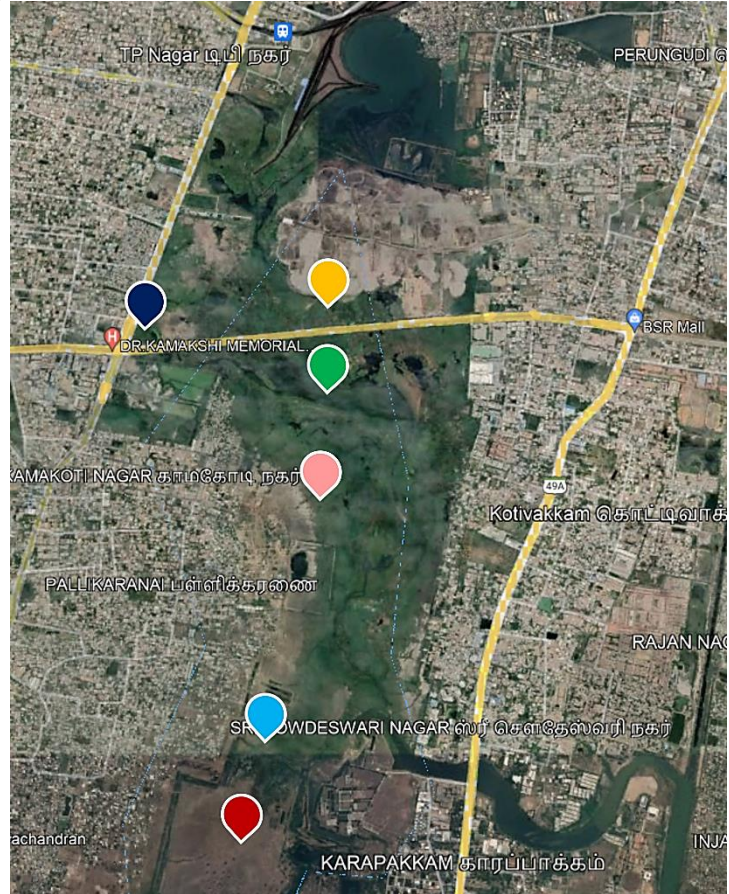
## MATERIALS AND METHODS

### Study Area

The Pallikaranai Marsh which lies between 12°55'N and 80°13'E, is situated 20km south of the Chennai metropolis. According to a study (Care Earth 2002; Joint Committee Report 2003) this freshwater marsh which was once 60 km<sup>2</sup> in area was reduced to a mere 5.93 km<sup>2</sup> in 2007. An area of 250 km<sup>2</sup> is drained by the marsh through two outlets – the Okkium Maduvu and the Kovalam Creek which open into the Bay of Bengal (Vencatesan, 2007; Bhaskar *et al.*, 2017). The Pallikaranai Marsh has an average altitude of 5m above mean sea level (Murali, 2021). In 2007, 3.17 km<sup>2</sup> of the marsh was declared a Reserve Forest which was then designated as a protected Ramsar site in 2022 (Ramsar, 2022).



- Pallikaranai Marsh
- Pallikaranai Marsh – Southern end
- Pallikaranai Marsh – Karapakkam
- Pallikaranai Marsh – Midlands
- Pallikaranai Marsh – NIOT end
- Pallikaranai Marsh – South West Watch Tower



### Methods

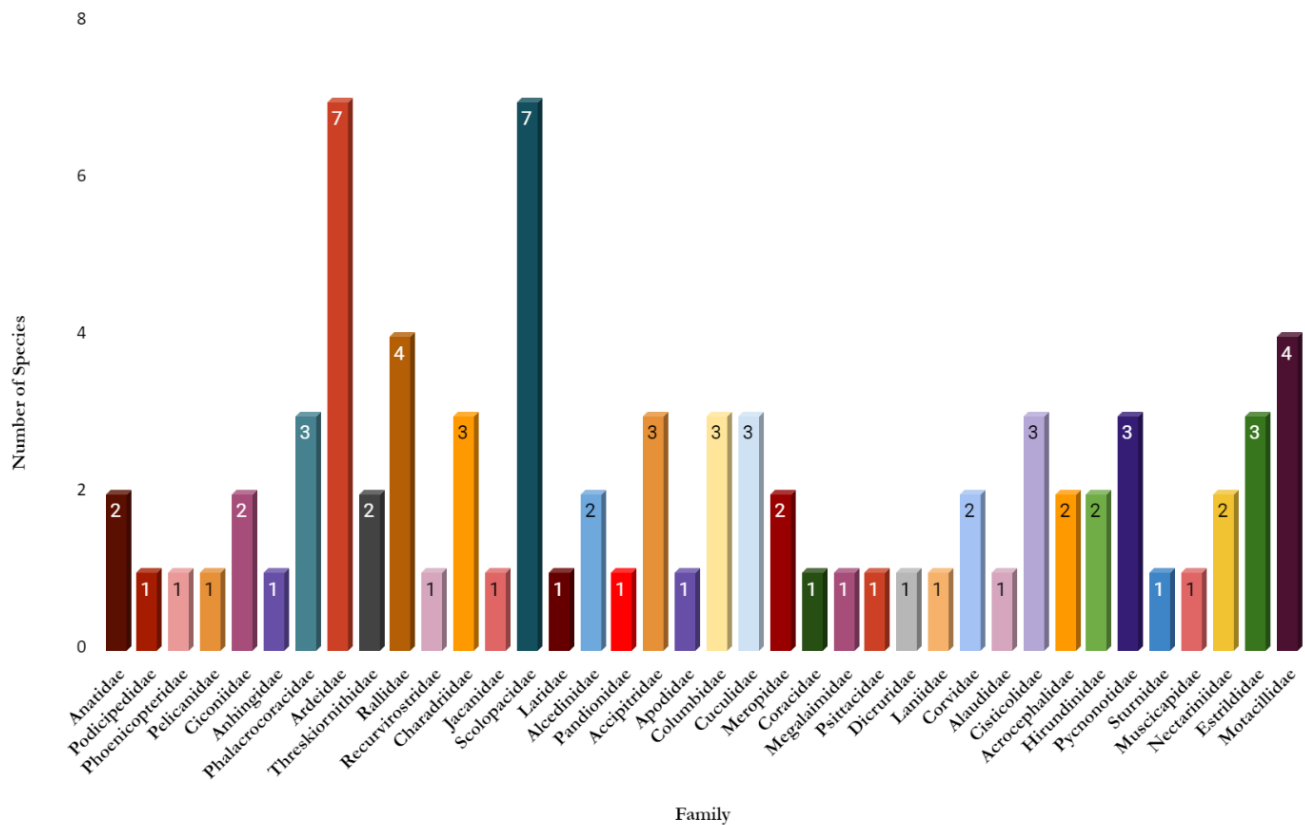
Observations were carried out from six locations in and around the marsh. These locations were well-known hotspots on eBird. They were Pallikaranai Marsh, Pallikaranai Marsh- Southern end, Pallikaranai Marsh - Karapakkam, Pallikaranai Marsh - Midlands, Pallikaranai Marsh - NIOT end and Pallikaranai Marsh - South West Watch Tower.

The study was conducted during the years 2018 to 2022. Avian diversity was assessed using the point count method (Hutto *et al.*, 1986; Bibby *et al.*, 2000). Birds were recorded by direct sighting and calls. The surveys were mainly carried out from 07.00 to 10.00 hours and 15.00 to 18.00 hours. However, opportunistic counts were also carried out during other times of the day. Most of the surveys were carried out during the months of October to February, which was the migratory season and a few surveys were carried out in the months of June to August. Checklists were made from the edge of the marsh without entering the marsh itself for fear of disturbing the birds and their nesting grounds. Identification of bird species was carried out with the help of a

standard field guide (Grimmett *et al.*, 2016). The taxonomic order and nomenclature of Majumder *et al.* (2022) was followed. The bird species recorded were categorised into two groups based on their status as residents or migrants, based on Grimmett *et al.* (2016). The conservation status of birds was determined using a standard field guide (Majumder *et al.*, 2022), the State of India’s Birds Report (SoIB, 2020) and IUCN, 2022. A pair of binoculars (Olympus, 10X50 DPSI and 8X40 DPSI) and digital cameras (Canon PowerShot SX430 IS and Nikon B500) were used to observe and photograph the birds and their habitat. Checklists and photographs were uploaded to eBird.

Checklists available on eBird from 1984 till date and literature were also examined to ascertain the species richness and species diversity over the past three decades ((Sullivan *et al.*, 2014). A preliminary wetland assessment was conducted during the study period with the help of the Asian Waterbird Census Wetland Assessment Form (Asian Waterbird Census, 2022).

## RESULTS AND DISCUSSION



**Figure 1: Distribution of Avifaunal species based on Family**

In total, birds belonging to 81 species, 38 families and 12 orders were recorded over the study period (Table 1). Of them, four species namely the Spot-billed Pelican, Painted Stork, Oriental Darter and Black-headed Ibis are designated as ‘Near- threatened’ by the IUCN. Of the 81 species, 63 were found to be resident while the remaining 18 were migrant. The residents and migrants were further categorised based on their association with the habitat as aquatic, wetland dependent and terrestrial.

Of the 81 species of birds recorded, the dominant families were found to be Ardeidae and Scolopacidae, with a representation of 7 species each. They were followed by Motacillidae and Rallidae with 4 species each (Figure 1).

**Table 1: Checklist of Avian fauna at Pallikaranai Marsh**

	Order and Family	Common Name	Scientific Name	Habitat	Residential Status	Conservation status
	<b>Order:</b>					
1	<b>Anseriformes</b> Family: Anatidae	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	A	R	LC
2		Northern Pintail	<i>Anas acuta</i>	A	M	LC
	<b>Order:</b>					
	<b>Podicipediformes</b>					
3	Family: Podicipedidae	Little Grebe	<i>Tachybaptus ruficollis</i>	A	R	LC
	<b>Order:</b>					
	<b>Phoenicopteriformes</b>					
4	Family: Phoenicopteridae	Greater Flamingo	<i>Phoenicopterus roseus</i>	A	M	LC
	<b>Order:</b>					
	<b>Ciconiiformes</b>					
5	Family: Ciconiidae	Asian Openbill	<i>Anastomus oscitans</i>	A	R	LC
6		Painted Stork	<i>Mycteria leucocephala</i>	A	R	NT
	<b>Order: Suliformes</b>					
7	Family: Anhingidae	Oriental Darter	<i>Anhinga melanogaster</i>	A	R	NT
8	Family: Phalacrocoracidae	Little Cormorant	<i>Microcarbo niger</i>	A	R	LC
9		Great Cormorant	<i>Phalacrocorax carbo</i>	A	R	LC
10		Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	A	R	LC
	<b>Order:</b>					
	<b>Pelecaniformes</b>					
11	Family: Pelicanidae	Spot-billed Pelican	<i>Pelecanus philippensis</i>	A	R	NT
12	Family: Ardeidae	Grey Heron	<i>Ardea cinerea</i>	A	R	LC
13		Purple Heron	<i>Ardea purpurea</i>	A	R	LC
14		Great Egret	<i>Ardea alba</i>	A	R	LC
15		Intermediate Egret	<i>Ardea intermedia</i>	A	R	LC
16		Little Egret	<i>Egretta garzetta</i>	A	R	LC
17		Cattle Egret	<i>Bubulcus ibis</i>	WD	R	LC

18		Indian Pond-Heron	<i>Ardeola grayii</i>	A	R	LC
19	Family: Threskiornithidae	Glossy Ibis	<i>Plegadis falcinellus</i>	A	R	LC
20		Black-headed Ibis	<i>Threskiornis melanocephalus</i>	A	R	NT
	<b>Order: Gruiformes</b>					
21	Family: Rallidae	Eurasian Moorhen	<i>Gallinula chloropus</i>	A	R	LC
22		Eurasian Coot	<i>Fulica atra</i>	A	R	LC
23		Grey-headed Swampphen	<i>Porphyrio poliocephalus</i>	A	R	LC
24		White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	A	R	LC
	<b>Order: Charadriiformes</b>					
25	Family: Recurvirostridae	Black-winged Stilt	<i>Himantopus himantopus</i>	A	R	LC
26	Family: Charadriidae	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	A	M	LC
27		Grey-headed Lapwing	<i>Vanellus cinereus</i>	A	M	LC
28		Red-wattled Lapwing	<i>Vanellus indicus</i>	A	R	LC
29	Family: Jacanidae	Bronze-winged Jacana	<i>Metopidius indicus</i>	A	R	LC
30	Family: Scolopacidae	Ruff	<i>Calidris pugnax</i>	A	M	LC
31		Marsh Sandpiper	<i>Tringa stagnatilis</i>	A	M	LC
32		Wood Sandpiper	<i>Tringa glareola</i>	A	M	LC
33		Little Stint	<i>Calidris minuta</i>	A	M	LC
34		Common Redshank	<i>Tringa totanus</i>	A	M	LC
35		Greater Painted-Snipe	<i>Rostratula benghalensis</i>	A	M	LC
36		Common Snipe	<i>Gallinago gallinago</i>	A	M	LC
37	Family: Laridae	Whiskered Tern	<i>Chlidonias hybrida</i>	A	R	LC

<b>Order:</b>						
<b>Coraciiformes</b>						
38	Family: Alcedinidae	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	WD	R	LC
39		Pied Kingfisher	<i>Ceryle rudis</i>	WD	R	LC
<b>Order:</b>						
<b>Accipitriformes</b>						
40	Family: Pandionidae	Osprey	<i>Pandion haliaetus</i>	WD	M	LC
41	Family: Accipitridae	Eurasian Marsh-Harrier	<i>Circus aeruginosus</i>	T	M	LC
42		Shikra	<i>Accipiter badius</i>	T	R	LC
43		Black Kite	<i>Milvus migrans</i>	T	R	LC
<b>Order:</b>						
<b>Apodiformes</b>						
44	Family: Apodidae	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	T	R	LC
<b>Order:</b>						
<b>Columbiformes</b>						
45	Family: Columbidae	Rock Pigeon	<i>Columba livia</i>	T	R	LC
46		Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	T	R	LC
47		Spotted Dove	<i>Spilopelia chinensis</i>	T	R	LC
<b>Order:</b>						
<b>Cuculiformes</b>						
48	Family: Cuculidae	Greater Coucal	<i>Centropus sinensis</i>	T	R	LC
49		Asian Koel	<i>Eudynamys scolopaceus</i>	T	R	LC
50		Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	T	R	LC
<b>Order:</b>						
<b>Coraciiformes</b>						
51	Family: Meropidae	Asian Green Bee-eater	<i>Merops orientalis</i>	T	R	LC
52		Blue-tailed Bee-eater	<i>Merops philippinus</i>	T	R	LC
53	Family: Coraciidae	Indian Roller	<i>Coracias benghalensis</i>	T	R	LC

	<b>Order: Piciformes</b>					
54	Family: Megalaimidae	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	T	R	LC
	<b>Order: Psittaciformes</b>					
55	Family: Psittacidae	Rose-ringed Parakeet	<i>Psittacula krameri</i>	T	R	LC
	<b>Order: Passeriformes</b>					
56	Family: Dicruridae	Black Drongo	<i>Dicrurus macrocerus</i>	T	R	LC
57	Family: Laniidae	Brown Shrike	<i>Lanius cristatus</i>	T	M	LC
58	Family: Corvidae	House Crow	<i>Corvus splendens</i>	T	R	LC
59		Large-billed Crow	<i>Corvus macrorhynchos</i>	T	R	LC
60	Family: Alaudidae	Jerdon's Bushlark	<i>Mirafra affinis</i>	T	R	LC
61		Common Tailorbird	<i>Orthotomus sutorius</i>	T	R	LC
62	Family: Cisticolidae	Ashy Prinia	<i>Prinia socialis</i>	T	R	LC
63		Plain Prinia	<i>Prinia inornata</i>	T	R	LC
64	Family: Acrocephalidae	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	T	M	LC
65		Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	T	R	LC
66	Family: Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>	T	M	LC
67		Red-rumped Swallow	<i>Cecropis daurica</i>	T	R	LC
68		Red-vented Bulbul	<i>Pycnonotus cafer</i>	T	R	LC
69	Family: Pycnonotidae	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	T	R	LC
70		White-browed Bulbul	<i>Pycnonotus luteolus</i>	T	R	LC
71	Family: Sturnidae	Common Myna	<i>Acridotheres tristis</i>	T	R	LC
72	Family: Muscicapidae	Pied Bushchat	<i>Saxicola caprata</i>	T	R	LC

73	Family: Nectariniidae	Purple- rumped Sunbird	<i>Leptocoma zeylonica</i>	T	R	LC
74		Purple Sunbird	<i>Cinnyris asiaticus</i>	T	R	LC
75	Family: Estrildidae	Indian Silverbill	<i>Euodice malabarica</i>	T	R	LC
76		Scaly- breasted Munia	<i>Lonchura punctulata</i>	T	R	LC
77		Tricolored Munia	<i>Lonchura malacca</i>	T	R	LC
78		Western Yellow Wagtail	<i>Motacilla flava</i>	WD	M	LC
79	Family: Motacillidae	Citrine Wagtail	<i>Motacilla citreola</i>	WD	M	LC
80		White- browed Wagtail	<i>Motacilla maderaspatensi</i>	WD	R	LC
81		Paddyfield Pipit	<i>Anthus rufulus</i>	T	R	LC

A = Aquatic, WD = Wetland Dependent, T = Terrestrial, M = Migrant, R = Resident, LC = Least Concern, NT = Near Threatened

A review of eBird checklists revealed that 214 species have been recorded from 1984 till date. However, some of those species have not been recorded in the last ten years or more. The Curlew Sandpiper, a near threatened winter migrant, was last recorded in 2004.

A preliminary wetland assessment revealed that the Pallikaranai Marsh was subject to anthropogenic threats such as sewage and plastic waste polluting the waters of the marsh, a garbage dump, large buildings and human habitation encroaching into the marsh, grazing cattle and stray dogs disturbing the birdlife at the marsh, vegetation such as Water Hyacinth taking over part of the marsh, a busy highway intersecting the marsh and one phase of the Chennai Metro (a rapid transit system) being constructed alongside part of the marsh.

Earlier studies recorded 115 species of birds (Vencatesan, 2007) and 110 species of resident and migratory birds (Raj *et al.*, 2010). Out of the four species designated as Near Threatened that were recorded in the present study, two of them, namely the Spot-billed Pelican and the Black-headed Ibis were also recorded by Raj *et al.*, 2010. There has been a significant depletion of wetland area over the years. According to a study (Care Earth 2002; Joint Committee Report 2003) this freshwater marsh has lost 90% of its original area. Such extensive habitat loss could explain the reduction in the number of bird species recorded at the marsh. The results of the preliminary wetland assessment were corroborated by earlier studies which also reported encroachment of the marsh by buildings, the garbage dump, pasture land and cultivable land (Murali, 2021; Vencatesan, 2007; Azeez *et al.*, 2007). Despite the deterioration of the quality of the Marsh and the depletion in the area of the Marsh, a multitude of migratory and resident bird species continue to visit the marsh year after year or reside there, respectively. This was observed during this study and in earlier studies (Vencatesan, 2007; Raj *et al.*, 2010) and historical eBird records (eBird, 2021).

It is heartening to note that Pallikaranai marsh has finally been declared a Ramsar site after several years. It is of utmost importance to conserve such wetlands that serve as breeding and feeding grounds for thousands of migratory birds.





Photo 1: Northern Pintail (*Anas acuta*)



Photo 2: Greater Flamingo (*Phoenicopterus roseus*)



Photo 3: Spot-billed Pelican (*Pelicanus philippensis*)



Photo 4: Painted Stork (*Mycteria leucocephala*)

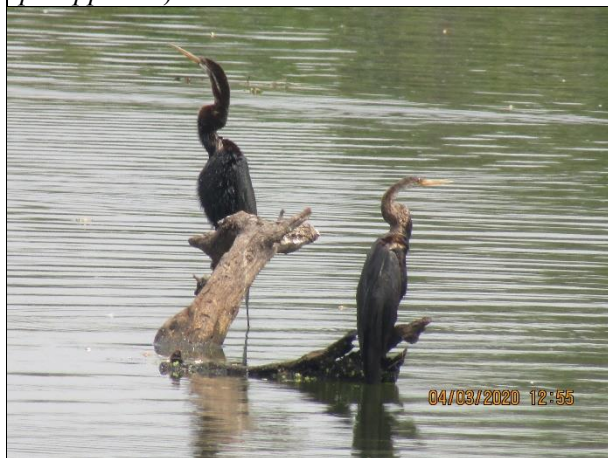


Photo 5: Oriental Darter (*Anhinga melanogaster*)



Photo 8: Black-headed Ibis (*Threskiornis melanocephalus*)

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