

## Checklist of avifauna from sewage treatment plant, Mayiladuthurai District, Tamil Nadu

Wetlands are considered as the important bird habitats as the birds depend on them for feeding, roosting and breeding (Vijayan et al. 2006). Several natural wetlands around the world have been lost owing to manmade activities, thus birds have been depending on man-made artificial wetlands such as agricultural lands, abandoned aquaculture ponds, and salt-pans as alternative foraging and resting grounds.

Sewage treatment plants (STPs) are characterised by a variety of habitats ranging from wetlands to manmade waste stabilisation ponds with open mudflats to grasslands, dry sites and places that are frequently flooded by wastewater (Orłowski 2013). Therefore, investigating bird population characteristics can be utilized to design a suitable management plan for the conservation of one or a group of bird species in a particular habitat. This is the first study to document the avifauna in the sewage treatment plant from Tamil Nadu, India.

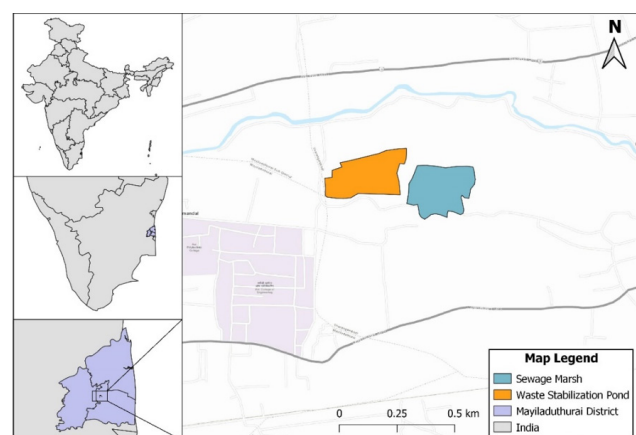
The study site is located in Mannampandal (11.1094603 N, 79.6953181 E), Mayiladuthurai District, Tamil Nadu. This area is used as a waste stabilization pond to treat sewage from the Mayiladuthurai District. Tamil Nadu Water Supply and Drainage Board of Mayiladuthurai manage this area.

Systematic bird surveys were carried out in all the microhabitats of the study area

from September 2018 to March 2020. The observations were made mostly during the evening hours (1600–1800 h) and a few instances in the mornings (0600–0800 h). The total count was used to count the birds (Wetlands International 2010). The birds were observed using Nikon Aculon (8x42) binoculars and photographed using Nikon P900 point and shoot digital camera for the references. The birds were identified using the characteristic features (Grimmett et al. 2011). We followed (Praveen & Jayapal 2022) for the taxonomic classification of birds.

The avian diversity at the STP was represented by 107 species belonging to 51 families and 19 orders and the family dominance is provided in Table 2.

Among the bird species recorded, four species namely Black-headed Ibis *Threskiornis melanocephalus*, Black-tailed Godwit *Limosa limosa*, Painted Stork *Mycteria leucocephala*,



Map showing Sewage Treatment Plant, Mannampandal, Tamil Nadu, southern India and different habitats.

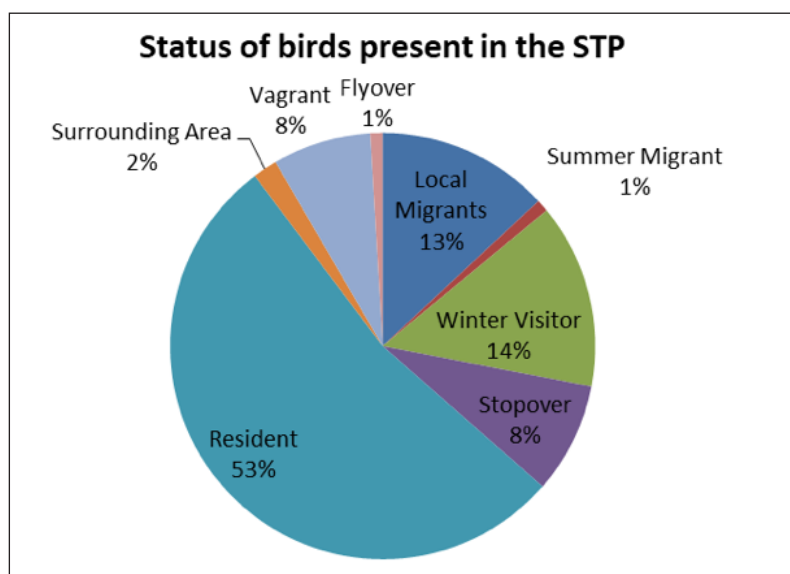
**Table 1. Checklist of birds found in sewage treatment plant, Mayiladuthurai District, Tamil Nadu.**

	Order	Family	English name	Scientific name	IUCN Red List	Status to STP	
1	Anseriformes	Anatidae	Lesser Whistling Duck	<i>Dendrocygna javanica</i>	LC	LM	
2			Garganey	<i>Spatula querquedula</i>	LC	SO	
3			Northern Shoveler	<i>Spatula clypeata</i>	LC	SO	
4	Galliformes	Phasianidae	Indian Peafowl	<i>Pavo cristatus</i>	LC	R	
5			Grey Francolin	<i>Francolinus pondicerianus</i>	LC	R	
6	Podicipediformes	Podicipedidae	Little Grebe	<i>Tachybaptus ruficollis</i>	LC	LM	
7	Columbiformes	Columbidae	Rock Pigeon	<i>Columba livia</i>	LC	R	
8			Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	LC	R	
9			Spotted Dove	<i>Streptopelia chinensis</i>	LC	R	
10	Cuculiformes	Cuculidae	Greater Coucal	<i>Centropus sinensis</i>	LC	R	
11			Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	LC	R	
12			Pied Cuckoo	<i>Clamator jacobinus</i>	LC	LM	
13			Asian Koel	<i>Eudynamis scolopaceus</i>	LC	R	
14			Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	LC	LM	
15			Common Hawk Cuckoo	<i>Hierococcyx varius</i>	LC	R	
16	Caprimulgiformes	Apodidae	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	LC	R	
17	Gruiformes	Rallidae	Common Moorhen	<i>Gallinula chloropus</i>	LC	R	
18			Eurasian Coot	<i>Fulica atra</i>	LC	SM	
19			Grey-headed Swamphen	<i>Porphyrio poliocephalus</i>	LC	LM	
20			Watercock	<i>Gallicrex cinerea</i>	LC	Va	
21			White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	LC	R	
22	Charadriiformes	Recurvirostridae	Black-winged Stilt	<i>Himantopus himantopus</i>	LC	WV	
23		Charadriidae	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	LC	Va	
24			Grey-headed Lapwing	<i>Vanellus cinereus</i>	LC	WV	
25			Red-wattled Lapwing	<i>Vanellus indicus</i>	LC	R	
26			Little Ringed Plover	<i>Charadrius dubius</i>	LC	SO	
27		Rostratulidae	Greater Painted-snipe	<i>Rostratula benghalensis</i>	LC	R	
28		Jacanidae	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	LC	LM	
29		Scolopacidae	Scolopacidae	Black-tailed Godwit	<i>Limosa limosa</i>	NT	SO
30				Ruff	<i>Calidris pugnax</i>	LC	SO
31				Little Stint	<i>Calidris minuta</i>	LC	SO
32				Pintail Snipe	<i>Gallinago stenura</i>	LC	WV
33				Common Sandpiper	<i>Actitis hypoleucos</i>	LC	WV
34				Green Sandpiper	<i>Tringa ochropus</i>	LC	WV
35				Marsh Sandpiper	<i>Tringa stagnatilis</i>	LC	WV
36				Wood Sandpiper	<i>Tringa glareola</i>	LC	WV
37	Laridae	Gull-billed Tern	<i>Gelochelidon nilotica</i>	LC	SO		
38	Ciconiiformes	Ciconiidae	Asian Openbill	<i>Anastomus oscitans</i>	LC	SA	
39		Painted Stork	<i>Mycteria leucocephala</i>	NT	FO		
40	Suliformes	Phalacrocoracidae	Little Cormorant	<i>Microcarbo niger</i>	LC	Va	
41	Pelecaniformes	Ardeidae	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	LC	R	
42			Grey Heron	<i>Ardea cinerea</i>	LC	Va	

	Order	Family	English name	Scientific name	IUCN Red List	Status to STP	
43	Pelecaniformes	Ardeidae	Purple Heron	<i>Ardea purpurea</i>	LC	Va	
44			Great Egret	<i>Ardea alba</i>	LC	LM	
45			Little Egret	<i>Egretta garzetta</i>	LC	LM	
46			Cattle Egret	<i>Bubulcus ibis</i>	LC	LM	
47			Indian Pond Heron	<i>Ardeola grayii</i>	LC	LM	
48			Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	LC	Va	
49		Threskiornithidae	Glossy Ibis	<i>Plegadis falcinellus</i>	LC	WV	
50			Black-headed Ibis	<i>Threskiornis melanocephalus</i>	NT	Va	
51		Accipitriformes	Accipitridae	Shikra	<i>Accipiter badius</i>	LC	R
52				Black Kite	<i>Milvus migrans</i>	LC	LM
53	Brahminy Kite			<i>Haliastur indus</i>	LC	R	
54	Strigiformes	Tytonidae	Common Barn Owl	<i>Tyto alba</i>	LC	R	
55		Strigidae	Indian Scops Owl	<i>Otus bakkamoena</i>	LC	R	
56			Spotted Owlet	<i>Athene brama</i>	LC	R	
57	Bucerotiformes	Upupidae	Common Hoopoe	<i>Upupa epops</i>	LC	R	
58	Coraciiformes	Alcedinidae	Common Kingfisher	<i>Alcedo atthis</i>	LC	R	
59			White-throated Kingfisher	<i>Halcyon smyrnensis</i>	LC	R	
60			Pied Kingfisher	<i>Ceryle rudis</i>	LC	R	
61		Meropidae	Green Bee-eater	<i>Merops orientalis</i>	LC	R	
62		Coraciidae	Indian Roller	<i>Coracias benghalensis</i>	LC	R	
63	Piciformes	Megalaimidae	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	LC	R	
64		Picidae	Black-rumped Flameback	<i>Dinopium benghalense</i>	LC	R	
65	Falconiformes	Falconidae	Red-necked Falcon	<i>Falco chicquera</i>	NT	Va	
66	Psittaciformes	Psittaculidae	Rose-ringed Parakeet	<i>Psittacula krameri</i>	LC	R	
67	Passeriformes	Pittidae	Indian Pitta	<i>Pitta brachyura</i>	LC	SO	
68		Oriolidae	Indian Golden Oriole	<i>Oriolus kundoo</i>	LC	LM	
69		Artamidae	Ashy Woodswallow	<i>Artamus fuscus</i>	LC	R	
70		Vangidae	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	LC	R	
71		Dicruridae	Black Drongo	<i>Dicrurus macrocercus</i>	LC	R	
72		Monarchidae	Indian Paradise-flycatcher	<i>Terpsiphone paradisi</i>	LC	LM	
73		Laniidae	Brown Shrike	<i>Lanius cristatus</i>	LC	WV	
74		Corvidae	Rufous Treepie	<i>Dendrocitta vagabunda</i>	LC	R	
75			House Crow	<i>Corvus splendens</i>	LC	R	
76			Large-billed Crow	<i>Corvus macrorhynchos</i>	LC	R	
77		Alaudidae	Jerdon's Bushlark	<i>Mirafra affinis</i>	LC	R	
78		Cisticolidae	Common Tailorbird	<i>Orthotomus sutorius</i>	LC	R	
79			Ashy Prinia	<i>Prinia socialis</i>	LC	R	
80			Plain Prinia	<i>Prinia inornata</i>	LC	R	
81			Acrocephalidae	Booted Warbler	<i>Iduna caligata</i>	LC	WV
82		Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	LC	WV		
83		Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>	LC	WV	
84			Wire-tailed Swallow	<i>Hirundo smithii</i>	LC	WV	

	Order	Family	English name	Scientific name	IUCN Red List	Status to STP
85	Passeriformes	Pycnonotidae	Red-vented Bulbul	<i>Pycnonotus cafer</i>	LC	R
86			White-browed Bulbul	<i>Pycnonotus luteolus</i>	LC	R
87		Leiiothrichidae	Yellow-billed Babbler	<i>Argya affinis</i>	LC	R
88		Sturnidae	Rosy Starling	<i>Pastor roseus</i>	LC	WV
89			Brahminy Starling	<i>Sturnia pagodarum</i>	LC	R
90			Common Myna	<i>Acridotheres tristis</i>	LC	R
91		Turdidae	Orange-headed Thrush	<i>Geokichla citrina</i>	LC	SO
92		Muscicapidae	Indian Robin	<i>Copsychus fulicatus</i>	LC	R
93			Oriental Magpie- Robin	<i>Copsychus saularis</i>	LC	R
94			Pied Bushchat	<i>Saxicola caprata</i>	LC	R
95		Dicaeidae	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	LC	R
96		Nectariniidae	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	LC	R
97			Purple Sunbird	<i>Cinnyris asiaticus</i>	LC	R
98			Loten's Sunbird	<i>Cinnyris lotenius</i>	LC	R
99		Ploceidae	Streaked Weaver	<i>Ploceus manyar</i>	LC	R
100			Baya Weaver	<i>Ploceus philippinus</i>	LC	R
101		Estrildidae	White-rumped Munia	<i>Lonchura striata</i>	LC	R
102	Scaly-breasted Munia		<i>Lonchura punctulata</i>	LC	R	
103	Tricoloured Munia		<i>Lonchura malacca</i>	LC	R	
104	Passeridae	Yellow-throated Sparrow	<i>Gymnoris xanthocollis</i>	LC	R	
105	Motacillidae	Western Yellow Wagtail	<i>Motacilla flava</i>	LC	WV	
106		White-browed Wagtail	<i>Motacilla maderaspatensis</i>	LC	R	
107		Paddyfield Pipit	<i>Anthus rufulus</i>	LC	R	

IUCN Category: LC—Least Concern | NT—Near Threatened | Status to STP: R—Resident | SO—Stop Over | WV—Winter Visitor | SM—Summer Migrant | FO—Fly Over | LM—Local Migrant | Va—Vagrant | SA—Surrounding Area.



Status of bird species recorded at sewage treatment plant of Mayiladuthurai District, Tamil Nadu.

and Red-necked Falcon *Falco chicquera* were listed under 'Near Threatened' and remaining 103 bird species were 'Least Concern' of the IUCN Red List. Based on the occurrence data, about 53% were found to be resident followed by winter visitors (14%) and local migrants (13%). The checklist of birds inhabiting in STP is enlisted in the Table 1.

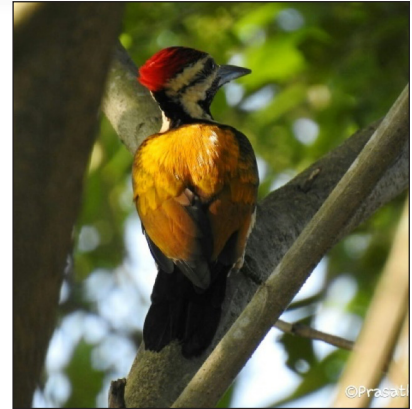
Birds recorded from sewage treatment plant, Mayiladuthurai District, Tamil Nadu



Asian Openbill.



Black Drongo.



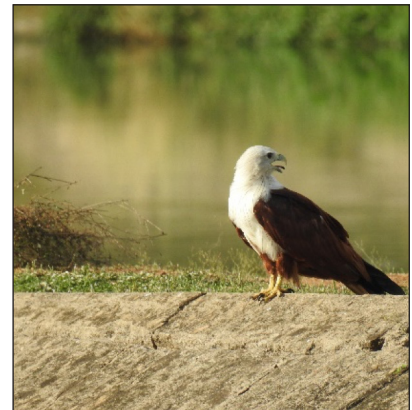
Black-rumped Flameback.



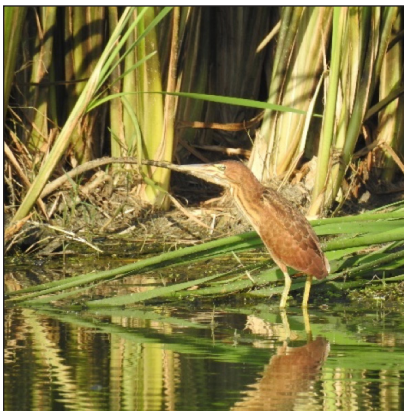
Black-tailed Godwit.



Blue-faced Malkoha.



Brahminy Kite.



Cinnamon Bittern.



Common Hawk-Cuckoo.



Common Hoopoe.



Common Kingfisher.



Common Moorhen.



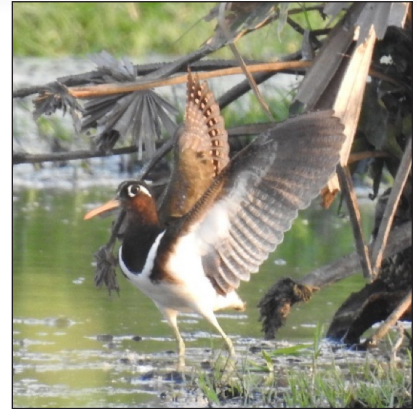
Eurasian Collard-Dove.



Garganey.



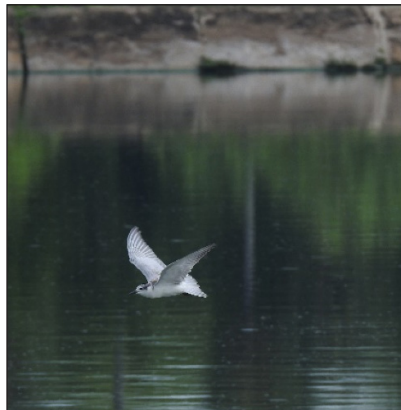
Great Egret.



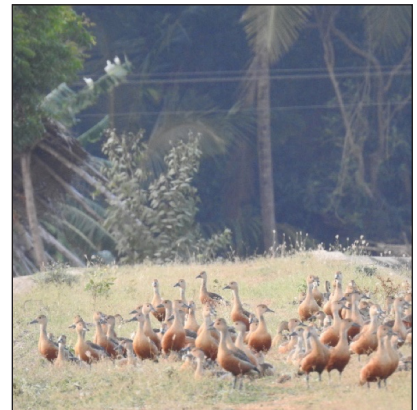
Greater Painted-Snipe.



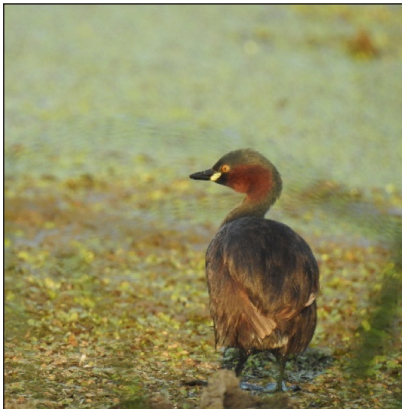
Green Bee-eater.



Gull-billed Tern.



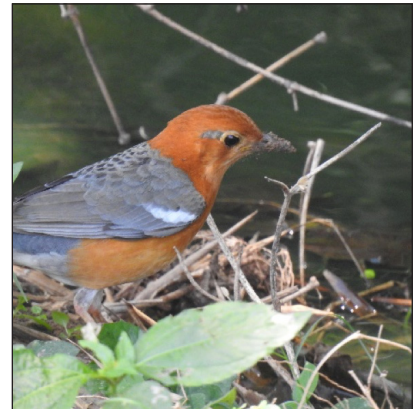
Lesser Whistling-Duck.



Little Grebe.



Northern Shoveler.



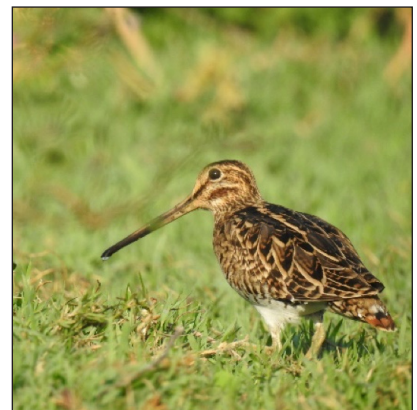
Orange-headed Thrush.



Pheasant-tailed Jacana.



Pied Kingfisher.



Pintail Snipe.



Shikra.



Streaked Weaver.



Watercock.



Western Yellow Wagtail.



White-throated Kingfisher.



Wire-tailed Swallow.



Wood Sandpiper.



Yellow-throated Sparrow.

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Out of 107 species, 38 species were classified as waterbirds belonging to six orders and 13 families. Of the 38 species, 16 species are listed as regular wintering migrants to India under the CAF (Central Asian Flyway) National Action Plan 2018, India in which two species namely, Black-tailed Godwit and Little Stint are listed under the species shortlisted for the preparation of Single Species Action Plan. The

birds found breeding in the STP were Greater Painted-Snipe *Rostratula benghalensis*, White-breasted Waterhen *Amaurornis phoenicurus*, Common Moorhen *Gallinula chloropus*, Red-wattled Lapwing *Vanellus indicus*, Baya Weaver *Ploceus philippinus*, Streaked Weaver *Ploceus manyar*, Spotted Dove *Streptopelia chinensis*, Black Drongo *Dicrurus macrocercus*, and Purple Sunbird *Cinnyris asiaticus*.

**Table 2. Order-wise (family and species) avian diversity at sewage treatment plant, Mayiladuthurai**

	Order	No. of family	No. of species
1	Passeriformes	23	41
2	Charadriiformes	6	16
3	Coraciiformes	3	5
4	Pelecaniformes	2	10
5	Strigiformes	2	3
6	Piciformes	2	2
7	Galliformes	1	2
8	Anseriformes	1	3
9	Podicipediformes	1	1
10	Columbiformes	1	3
11	Caprimulgiformes	1	1
12	Cuculiformes	1	6
13	Gruiformes	1	5
14	Ciconiiformes	1	2
15	Suliformes	1	1
16	Accipitriformes	1	3
17	Bucerotiformes	1	1
18	Falconiformes	1	1
19	Psittaciformes	1	1
	<b>Total</b>	<b>51</b>	<b>107</b>

Ecological studies of birds in the Mayiladuthurai District of Tamil Nadu are scarce. The present observation was the first study to assess the avian diversity in the STP of the district.

Earlier study by Ali et al. (2011) in the Mayiladuthurai region recorded 75 species of birds of which 11 species belonged to waterbirds. This study indicates that this area is having diverse avifauna and also this habitat is used by different species of birds for wintering and stopover during migratory season.

The usage of artificial wetlands, including waste stabilization ponds (WSPs), by waterbirds in the current scenario is typically opportunistic but little consideration has been given by

managers of WSPs to the potential implications for either wastewater treatment or waterbird conservation objectives (Murray et al. 2014). Hence, we suggest that it is important to conserve these artificial wetlands for the survival of the birds in future.

## References

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