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Avifaunal Diversity of Swamythooppu Salt Pan, Kanyakumari, Tamil Nadu, India

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Abstract: In the present study, an attempt was made to find out the Avifaunal diversity in Swamythooppu salt pan, Kanyakumari, Tamil Nadu, India. The study was carried out using point count methods with 14 points during the study period from Jan 2021 to March 2021. 3158 birds belongs to 39 families of 15 avian orders were observed from the study area. Passeriformes alone accounted for 25 species of birds observed during the study period. The migratory status of the birds in Swamythooppu salt pan revealed that most of the birds were resident (67) and the winter migrants were around 20 species. The greater number of individuals was observed at the S5 site with 411 individuals and the lowest was 117 individuals. Spot-billed Pelican *Pelecanus philippensis* "Globally threatened" species were recorded in the study area were considered as "Near threatened" species. *Anhinga rufa*, *Threskiornis melanocephalus* *Mycteria leucocephala*, *Plegadis falcinellus*, *Platalea leucorodia* were also documented in the study area.

Keywords: Salt pan, Diversity, Migratory birds, Swamythooppu, Feeding guild, Avifauna

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Introduction

Birds have been described as feathered biped warm-blooded vertebrate animals. The total number of bird species inhabiting the earth today has been estimated to be about 8600. Wetlands have been called the 'Kidneys of the landscape' because of the role they play in enhancing the quality of water that flows through them. The Ramsar convention held at Ramsar, Iran in 1971 under the auspices of UNESCO, define wetland as

the Areas of Marsh, Fen, peat land or water whether natural or artificial, permanent or temporarily with water i.e. static or flowing, fresh brackish or salt including areas of marine water the depth of which at low tide does not exceed 6 m (Kumar *et al.*, 2005).

Water birds and wetlands are inseparable elements (Grimmett and Inskipp, 2007). Birds inhabiting wetlands for feeding, breeding, nesting

or roosting were broadly defined as water birds (Kumar *et al.*, 2005). These water birds are essential component of the food web and nutrient cycles of the wetland ecosystems (Dhakate *et al.*, 2008). Abundance of water birds in a particular wetland mainly depends on availability of food, nesting sites and predation risk. It was considered as a good bio-indicators and useful models of the wetlands for studying the various environmental problems (Mistry and Mukherjee, 2015). Wetlands are the main custodians of the water birds (Weller, 1999; Stewart, 2001).

The birds of any coastal wetlands can be divided into at least four groups based on their seasonal occurrence-- (1) Summer (breeding) residents, (2) Winter residents (occurring throughout the winter), (3) Transients (passing through during either fall or spring migrations or both), and (4) Permanent residents. Furthermore, because of their frequently high abundance and their substantial food requirements resulting from high metabolic rates, birds often have a substantial impact on the faunal invertebrates of coastal habitats. Waders are globally the most endangered group of migrant birds and therefore of international conservation concern. More than half of the wader species worldwide are declining mainly as the result of habitat loss affecting breeding, migratory stopover and wintering locations (Delany and Scott, 2006; Thomas *et al.*, 2006). They are also known as biological supermarkets because they provide extensive food chain and rich in biodiversity. Waders have been seen wading through the shallow waters and occasionally probing along dry margins of the wetland. They prefer shallow muddy banks of the pond and close by small water spots. The migratory waders need adequate food supply and safety (Barati and Khalilipoor, 2006). Almost all of them leave the wetland by March-end or early April. Habitats used by waders are diverse ranging from aquatic habitat to dry upland meadows, pastures and crop fields. In the present study, we prepared a checklist and species diversity of the birds found in Swamythoppu salt pan, Kanyakumari, Tamil Nadu, India.

Materials and Methods

Study area:

Swamythoppu salt pan is the name of a village that lies near the southeast of the city of Nagercoil, located at the extreme southern tip of India. Swamythoppu is located at 8.12°N 77.49°E. It receives both set of rainfall from the Southwest monsoon and Northeast monsoon. The salt pan is situated adjacent to the Manakudy estuary, which get its water from the river Palayar, Perennial River. The diversity is very rich in this area as the elixir of life water (Figs. 1A, B).



Fig. 1A: Study area Swamythoppu salt pan.



Fig. 1 B: Study area Swamythoppu salt pan.

Bird survey:

Bird survey was conducted by using distance sampling point count method to observe the avian diversity, distribution in the Swamythoppu salt pan, with an aid of Nikon Binoculars (10 x 50). Water birds were counted using the “direct count”.

Bird survey was conducted, when birds were most active during day from 06:00 to 10:00 h. Fourteen-point count points were plotted randomly using Qgis Software.

The study site was grouped into 3 Stations namely-- (i) Disturbed site with 3 points namely U1, U2 and U3, (ii) Partially Disturbed site with 6 points namely J1, J2, J3, J4, J5 and J6, and (iii) Undisturbed site with 5 points namely S1, S2, S3, S4 and S5. At each point the observer, spent 15 min to documents the birds as well as the atmospheric temperature and water temperature. The birds flying from behind were also noted.

Photographs were taken whenever possible by using Digital Point and Shoot Camera (Nikon D850 with 200-500 m lens). The recorded wetland birds were identified by using standard field guides (Ali and Ripley, 1981; Grimett *et al.*, 2001; Ali, 2002; Grimett *et al.*, 2007; Grewal *et al.*, 2016).

The birds were categorized based on the migratory status into Resident (R), Winter Migrant (WM) and Local Migrant (RM). Considering the feeding guild, the birds were categorized as Herbivore (HR), Piscivore (PI), Omnivore (OM), Insectivore (IN), Frugivore (FR) and Carnivore (CA) following Ali and Ripley (1987). The statistical analysis and Species Diversity indices were calculated by using MS-Excel 2010 and Past Software.

Results and Discussion

In the present study, 3158 birds belonging to 39 families of 15 avian orders were observed from localities in and around Swamythoopu salt pan during the study period from January 2021 to March 2021. Passeriformes was the most dominantly distributed in the study area during the study period and a maximum of 1346 birds were observed during the month of March followed by 1081 during the month of February.

Birds belonging to Passeriformes alone accounted for 25 species of birds observed during the study period. The birds belonging to the other orders having significant representation in the study area were belonging to the orders

Charadriiformes, Pelecaniformes, Coraciiformes, Cuculiformes, Coraciiformes and Accipitriformes with a distribution of 19, 13, 6, 5 and 4, respectively. Birds of the other 9 orders viz. Anseriformes, Bucerotiformes, Caprimulgiformes, Ciconiiformes, Columbiformes, Galliformes, Gruiformes, Psittaciformes, Suliformes, accounted for less than 3 species of the total birds observed (Fig. 2).

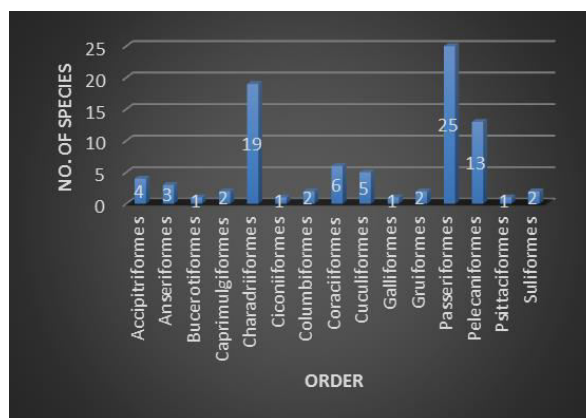


Fig. 2: Avifauna order wise diversity in Swamythoopu salt pan during the study period.

Birds observed during the study period were presented in Table 1 and Figure 3. Result of the present study also showed that maximum number of species was observed in the undisturbed site (Fig. 4) and it is followed by partially disturbed site (30) (Fig. 5) and Disturbed site (27) (Fig. 6). The WPA data showed that in the current study only one species falls under Schedule V, five species fall under Schedule I and remaining 81 species belong to Schedule I (Fig. 7).

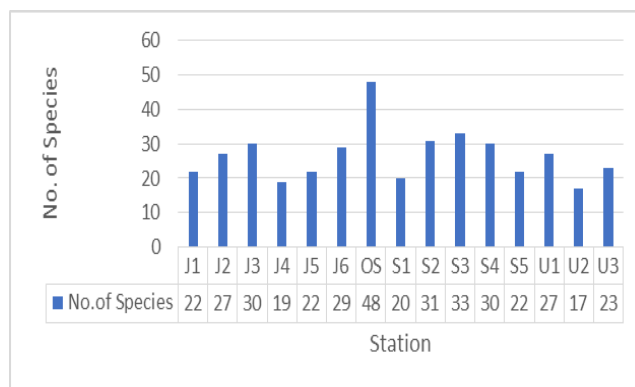


Fig. 3: Total number of species observed in the study site at different Stations in Swamythoopu salt pan.

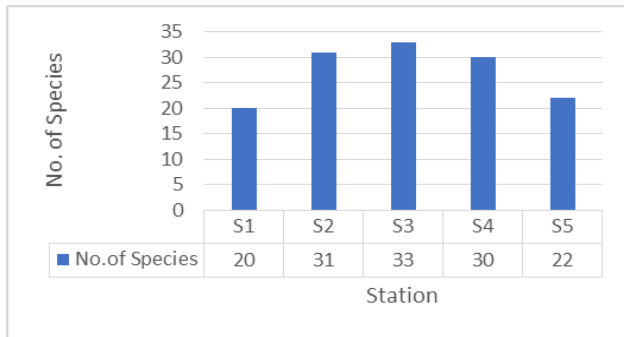


Fig. 4: Bird species observed in the Undisturbed Site in Swamythooppu salt pan.

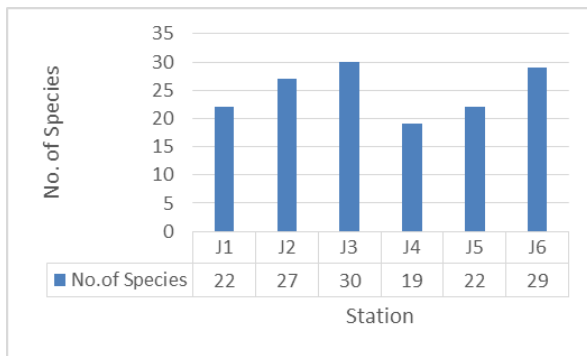


Fig. 5: Bird species observed in the partially disturbed site in Swamythooppu salt pan.

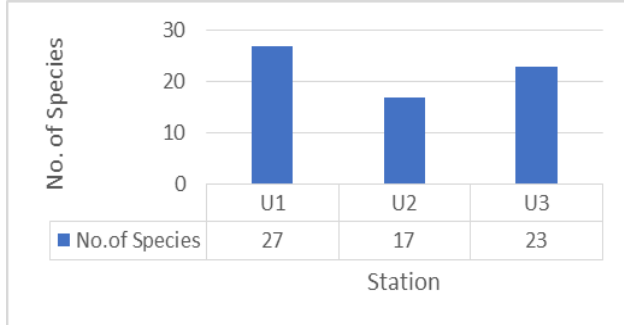


Fig. 6: Species observed in the Disturbed Site in Swamythooppu salt pan.

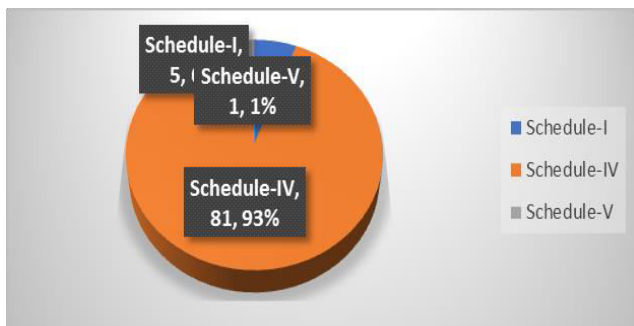


Fig. 7: WPA birds species ranking in Swamythooppu salt pan.

The IUCN data showed that in the present study, only 5 species are near threatened and all the remaining species are least concern (82). The species distributed in the Partially Disturbed site had a maximum species of 30 at Station J3, and it is followed by J6, J2, J5, J1 and J4 with species of 29, 27, 22, 22, and 19, respectively. The species distributed in the Undisturbed site had a maximum species of 33 at Station S3 and it is followed by S2, S4, S5 and S1 with species of 31, 30, 22 and 20, respectively. The species distributed in the Disturbed site has a maximum species of 27 at Station U1 and it was followed by U3 and U2 with species of 23 and 17, respectively (Fig. 8).

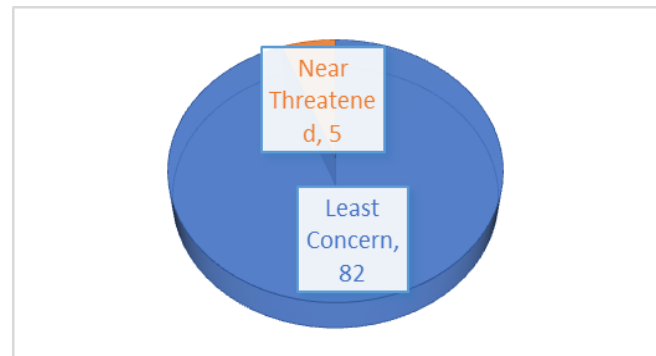


Fig. 8: IUCN species ranking of birds in Swamythooppu salt pan during the study period.

The migratory status of the birds in Swamythooppu salt pan revealed that most of the birds were resident (67) and the winter migrants were around 20 species. The feeding guild provided the habitat preference about the birds. Omnivore was the most dominant species with 29 individuals and it was followed by Insectivore (24), Carnivore (15), Piscivore (11), Herbivore (3), Granivore (2), Nectarivore (2) and Frugivore (1), respectively. The maximum species was observed at S3 site with 33 species. The greater number of individuals were observed at the S5 site with 411 individuals and the lowest was 117 individuals (Fig. 9).

The dominance was high at the S5 site (0.596) and the low value was found at the S2 site (0.064). The maximum Simpson reciprocal dominance value was found at the J3 Site and the minimum

value was found at the S5 site (0.403). The Shannon wiener index was high at the J3 site and low was observed at the S5 site (1.081). The Evenness was high at the J3 site and the lowest was at the S5 site (0.134). The species richness was high at the J3 site (5.7) and the low value was found at the U2 site (2.99) (Table 2).

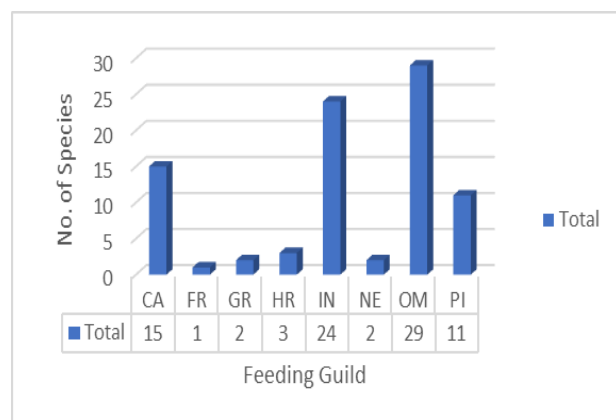


Fig. 9: Feeding Guild of Birds in Swamythooppu salt pan.

The record of 114 species of birds in Swamythooppu salt pan during the study showed that the diversity was very high. Near threatened species *Limosalimosa* and *Numenius arrquata*, *Mycteria leucocephala*, *Anhinga melanogaster*, *Pelecanus philippensis*, and *Threskiornis melanocephalus* was recorded during the study period. The arrival of migratory birds started from end of August and continued up to October and last for up to March before the start of summer. This influenced the species diversity in the Swamythooppu salt pan as the study has been completely done in the migratory season thus the species number was also high.

Among the 20 migratory bird species, *Pluvialiss quatarola* (Grey plover), *Charadrius dubius* (Little ringed plover), *Tringatotanus* (Common redshank), *Tringanebularia* showed lengthy wintering behavior. The data obtained will provide some useful information to understand more about their population, migration movements and distributions. Shore bird population increased during December and January and drastically decreased in June and July and this might be due to effect of scanty rainfall or less feeding ground for the birds due to flooding.

Kannan and Pandian (2012) reported similar findings. Mass decline of water and terrestrial birds from important habitats such as coastal area were also reported (Sandilyan, 2010), but in the present study we documented 3,158 birds belonging to 87 species which indicated the preferable habitat available in Swamythooppu salt pan for the migratory birds (Fig. 10).

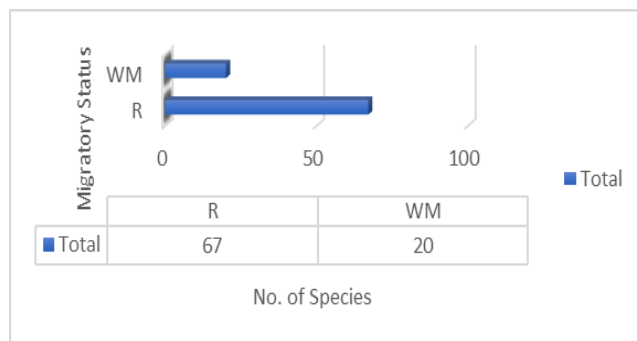


Fig. 10: Migratory Status of Birds in Swamythooppu salt pan.

Due to the geographical and environmental reasons a particular bird may appear, increase or decrease in number and disappear as the habitat changes. As the area is prone to cyclones during some instance species drown might also occur (Kannan and Pandian, 2012). In the present study also, sudden occurrence of water level rise in the month of January leads to abrupt decline of species richness in the study area.

Birds' parameters such as species richness, evenness and diversity of birds are frequently used as indicators of habitat quality (Weller, 1978). Spot-billed Pelican *Pelecanus philippensis* "Globally threatened" species were recorded in the study area and considered as "Near threatened" species. Darter *Anhinga rufa*, Oriental white ibis *Threskiornis melanocephalus* Painted stork *Mycteria leucocephala*, Glossy Ibis *Plegadis falcinellus*, and Eurasian Spoonbill *Platalea leucorodia* were also documented in the study area.

Migratory water birds are the remarkable components of the wetland. The presence of a large number of migratory birds in a particular wetland makes charismatic. These birds connect continents and countries. Therefore, it is

Plate1: Avifaunal diversity in Swamythooppu salt pan



Red wattled lapwing



Eurassian Spoonbill



Bay backed Shrike



Indian pond heron



Brahminy Starling



Brahminy Kite



Barn Swallow



Large Pied wagtail



Glossy Ibis



Large Egret



Common Kingfisher



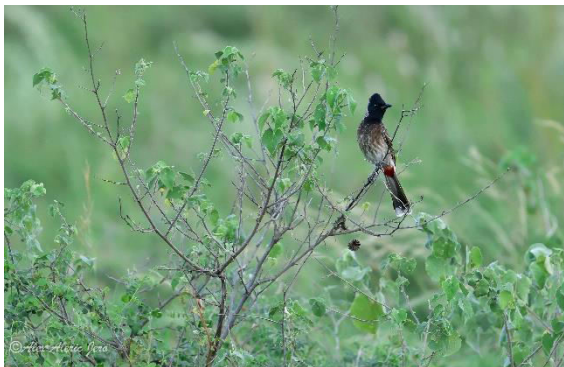
Black drongo



Ashy Woodswallow



Oriental White ibis



Red vented bulbul



Brown Shrike



Pied Kingfisher



Pied Cuckoo



Common Sandpiper



Common Myna



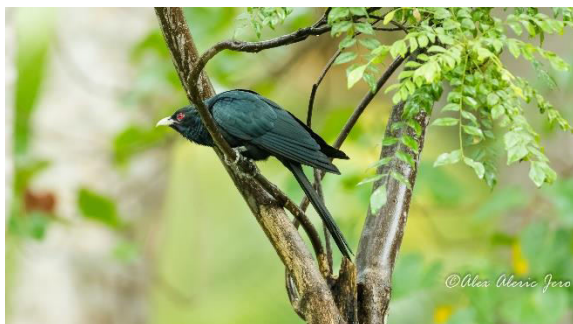
Indian Spot billed Duck



Red naped ibis



Spot billed Pelican



Little Egret



Asian Koel



Median Egret



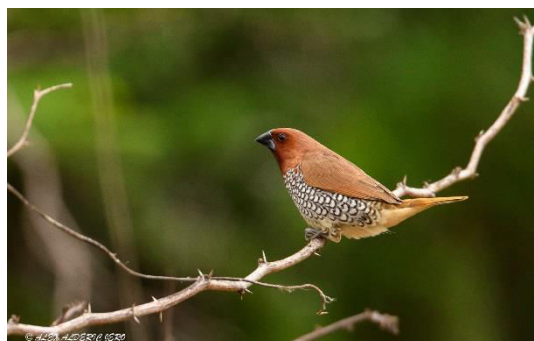
Blue faced malkoha



Brahminy kite



White throated kingfisher



Open billed stock



Scaly breasted Munia



Indian Roller





Northern Pintail Duck



Marsh SandPiper



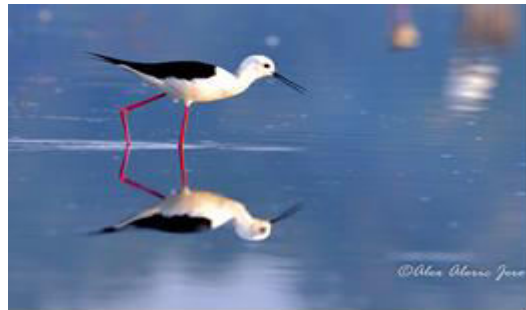
Green Bee eater



Blue Tailed Bee eater



Garganey



Black winged Stilt



Common Sandpiper



Purple Heron



Grey Heron



Indian Robin

Table 1: Checklist of Birds documented in Swamythoopu salt pan

S. No.	Order	Family	English Name	Scientific Name	Authority	IUCN	WPA	Feeding Guild	Migratory Status
1	Anseriformes	Anatidae	Garganey	<i>Spatula querquedula</i>	(Linnaeus, 1758)	LC	Sch-IV	OM	WM
2	Anseriformes	Anatidae	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	J.R. Forster, 1781	LC	Sch-IV	HR	R
3	Anseriformes	Anatidae	Northern Pintail	<i>Anas acuta</i>	Linnaeus, 1758	LC	Sch-IV	OM	WM
4	Galliformes	Phasianidae	Grey Francolin	<i>Francolinus pondicerianus</i>	(J.F. Gmelin, 1789)	LC	Sch-IV	OM	R
5	Columbiformes	Columbidae	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	(Friedrich, 1838)	LC	Sch-IV	OM	R
6	Columbiformes	Columbidae	Spotted Dove	<i>Streptopelia chinensis</i>	(Scopoli, 1786)	LC	Sch-IV	OM	R
7	Cuculiformes	Cuculidae	Greater Coucal	<i>Centropus sinensis</i>	(Stephens, 1815)	LC	Sch-IV	CA	R
8	Cuculiformes	Cuculidae	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	(Jerdon, 1840)	LC	Sch-IV	OM	R
9	Cuculiformes	Cuculidae	Pied Cuckoo	<i>Clamator jacobinus</i>	(Boddaert, 1783)	LC	Sch-IV	OM	R
10	Cuculiformes	Cuculidae	Asian Koel	<i>Eudynamis scolopacea</i>	(Linnaeus, 1758)	LC	Sch-IV	HR	R
11	Cuculiformes	Cuculidae	Common Hawk Cuckoo	<i>Hierococcyx varius</i>	(Vahl, 1797)	LC	Sch-IV	OM	R
12	Caprimulgiformes	Apodidae	Indian House Swift	<i>Apus affinis</i>	(J.E. Gray, 1830)	LC	Sch-IV	IN	R
13	Caprimulgiformes	Apodidae	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	(J.E. Gray, 1829)	LC	Sch-IV	IN	R
14	Gruiformes	Rallidae	Grey-headed Swampphen	<i>Porphyrio poliocephalus</i>	(Latham, 1801)	LC	Sch-IV	OM	R
15	Gruiformes	Rallidae	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	(Pennant, 1769)	LC	Sch-IV	OM	R
16	Charadriiformes	Recurvirostridae	Black-winged Stilt	<i>Himantopus himantopus</i>	(Linnaeus, 1758)	LC	Sch-IV	OM	R
17	Charadriiformes	Charadriidae	Grey Plover	<i>Pluvialis squatarola</i>	(Linnaeus, 1758)	LC	Sch-IV	OM	WM
18	Charadriiformes	Charadriidae	Pacific Golden Plover	<i>Pluvialis fulva</i>	(J.F. Gmelin, 1789)	LC	Sch-IV	OM	WM
19	Charadriiformes	Charadriidae	Red-wattled Lapwing	<i>Vanellus indicus</i>	(Boddaert, 1783)	LC	Sch-IV	OM	R
20	Charadriiformes	Charadriidae	Lesser Sand Plover	<i>Charadrius mongolus</i>	Pallas, 1776	LC	Sch-IV	OM	WM
21	Charadriiformes	Charadriidae	Little Ringed Plover	<i>Charadrius dubius</i>	Scopoli, 1786	LC	Sch-IV	OM	WM
22	Charadriiformes	Rostratulidae	Greater Painted-snipe	<i>Rostratula benghalensis</i>	(Linnaeus, 1758)	LC	Sch-IV	OM	R
23	Charadriiformes	Scolopacidae	Eurasian Curlew	<i>Numenius arquata</i>	(Linnaeus, 1758)	NT	Sch-IV	OM	WM
24	Charadriiformes	Scolopacidae	Ruff	<i>Calidris pugnax</i>	(Linnaeus, 1758)	LC	Sch-IV	OM	WM
25	Charadriiformes	Scolopacidae	Little Stint	<i>Calidris minuta</i>	(Leisler, 1812)	LC	Sch-IV	OM	WM
26	Charadriiformes	Scolopacidae	Common Sandpiper	<i>Actitis hypoleucos</i>	(Linnaeus, 1758)	LC	Sch-IV	OM	WM
27	Charadriiformes	Scolopacidae	Common Greenshank	<i>Tringa nebularia</i>	(Gunnerus, 1767)	LC	Sch-IV	OM	WM
28	Charadriiformes	Scolopacidae	Marsh Sandpiper	<i>Tringa stagnatilis</i>	(Bechstein, 1803)	LC	Sch-IV	OM	WM
29	Charadriiformes	Scolopacidae	Wood Sandpiper	<i>Tringa glareola</i>	Linnaeus, 1758	LC	Sch-IV	OM	WM
30	Charadriiformes	Scolopacidae	Common Redshank	<i>Tringa totanus</i>	(Linnaeus, 1758)	LC	Sch-IV	OM	R
31	Charadriiformes	Glareolidae	Small Pratincole	<i>Glareola lactea</i>	Temminck, 1820	LC	Sch-IV	OM	WM

32	Charadriiformes	Laridae	Caspian Tern	<i>Hydroprogne caspia</i>	(Pallas, 1770)	LC	Sch-IV	PI	WM
33	Charadriiformes	Laridae	Whiskered Tern	<i>Chlidonias hybrida</i>	(Pallas, 1811)	LC	Sch-IV	PI	R
34	Charadriiformes	Laridae	Lesser Crested Tern	<i>Thalasseus bengalensis</i>	(Lesson, 1831)	LC	Sch-IV	CA	WM
35	Ciconiiformes	Ciconiidae	Painted Stork	<i>Mycteria leucocephala</i>	(Pennant, 1769)	NT	Sch-IV	PI	R
36	Suliformes	Anhingidae	Oriental Darter	<i>Anhinga melanogaster</i>	Pennant, 1769	NT	Sch-IV	PI	R
37	Suliformes	Phalacrocoracidae	Little Cormorant	<i>Microcarbo niger</i>	(Vieillot, 1817)	LC	Sch-IV	PI	R
38	Pelecaniformes	Pelecanidae	Spot-billed Pelican	<i>Pelecanus philippensis</i>	J.F. Gmelin, 1789	NT	Sch-IV	PI	R
39	Pelecaniformes	Ardeidae	Yellow Bittern	<i>Ixobrychus sinensis</i>	(J.F. Gmelin, 1789)	LC	Sch-IV	PI	R
40	Pelecaniformes	Ardeidae	Grey Heron	<i>Ardea cinerea</i>	Linnaeus, 1758	LC	Sch-IV	CA	R
41	Pelecaniformes	Ardeidae	Purple Heron	<i>Ardea purpurea</i>	Linnaeus, 1766	LC	Sch-IV	CA	R
42	Pelecaniformes	Ardeidae	Great Egret	<i>Ardea alba</i>	Linnaeus, 1758	LC	Sch-IV	CA	R
43	Pelecaniformes	Ardeidae	Intermediate Egret	<i>Ardea intermedia</i>	Wagler, 1829	LC	Sch-IV	CA	R
44	Pelecaniformes	Ardeidae	Little Egret	<i>Egretta garzetta</i>	(Linnaeus, 1766)	LC	Sch-IV	CA	R
45	Pelecaniformes	Ardeidae	Western Reef Egret	<i>Egretta gularis</i>	(Bosc, 1792)	LC	Sch-IV	CA	WM
46	Pelecaniformes	Ardeidae	Cattle Egret	<i>Bubulcus ibis</i>	(Linnaeus, 1758)	LC	Sch-IV	CA	R
47	Pelecaniformes	Ardeidae	Indian Pond Heron	<i>Ardeola grayii</i>	(Sykes, 1832)	LC	Sch-IV	CA	R
48	Pelecaniformes	Threskiornithidae	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	(Latham, 1790)	NT	Sch-IV	CA	R
49	Pelecaniformes	Threskiornithidae	Red-naped Ibis	<i>Pseudibis papillosa</i>	(Temminck, 1824)	LC	Sch-IV	OM	R
50	Pelecaniformes	Threskiornithidae	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Linnaeus, 1758	LC	Sch-I	PI	R
51	Accipitriformes	Accipitridae	Booted Eagle	<i>Hieraaetus pennatus</i>	(J.F. Gmelin, 1788)	LC	Sch-I	CA	R
52	Accipitriformes	Accipitridae	Shikra	<i>Accipiter badius</i>	(J.F. Gmelin, 1788)	LC	Sch-I	CA	R
53	Accipitriformes	Accipitridae	Black Kite	<i>Milvus migrans</i>	(Boddaert, 1783)	LC	Sch-I	CA	R
54	Accipitriformes	Accipitridae	Brahminy Kite	<i>Haliastur indus</i>	(Boddaert, 1783)	LC	Sch-I	CA	R
55	Bucerotiformes	Upupidae	Common Hoopoe	<i>Upupa epops</i>	Linnaeus, 1758	LC	Sch-IV	IN	R
56	Coraciiformes	Alcedinidae	Common Kingfisher	<i>Alcedo atthis</i>	(Linnaeus, 1758)	LC	Sch-IV	PI	R
57	Coraciiformes	Alcedinidae	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	(Linnaeus, 1758)	LC	Sch-IV	PI	R
58	Coraciiformes	Alcedinidae	Pied Kingfisher	<i>Ceryle rudis</i>	(Linnaeus, 1758)	LC	Sch-IV	PI	R
59	Coraciiformes	Meropidae	Green Bee-eater	<i>Merops orientalis</i>	Latham, 1801	LC	Sch-IV	IN	R
60	Coraciiformes	Meropidae	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Linnaeus, 1767	LC	Sch-IV	IN	R
61	Coraciiformes	Coraciidae	Indian Roller	<i>Coracias benghalensis</i>	(Linnaeus, 1758)	LC	Sch-IV	IN	R
62	Psittaciformes	Psittaculidae	Rose-ringed Parakeet	<i>Psittacula krameri</i>	(Scopoli, 1769)	LC	Sch-IV	HR	R
63	Passeriformes	Artamidae	Ashy Woodswallow	<i>Artamus fuscus</i>	Vieillot, 1817	LC	Sch-IV	IN	R
64	Passeriformes	Dicruridae	Black Drongo	<i>Dicrurus macrocercus</i>	Vieillot, 1817	LC	Sch-IV	IN	R
65	Passeriformes	Monarchidae	Indian Paradise-flycatcher	<i>Terpsiphone paradisi</i>	(Linnaeus, 1758)	LC	Sch-IV	IN	WM
66	Passeriformes	Laniidae	Brown	<i>Lanius cristatus</i>	Linnaeus,	LC	Sch-IV	IN	R

			Shrike		1758					
67	Passeriformes	Laniidae	Bay-backed Shrike	<i>Lanius vittatus</i>	Valenciennes, 1826	LC	Sch-IV	IN	R	
68	Passeriformes	Corvidae	Rufous Treepie	<i>Dendrocitta vagabunda</i>	(Latham, 1790)	LC	Sch-IV	IN	R	
69	Passeriformes	Corvidae	House Crow	<i>Corvus splendens</i>	Vieillot, 1817	LC	Sch-V	OM	R	
70	Passeriformes	Corvidae	Large-billed Crow	<i>Corvus macrorhynchos</i>	Wagler, 1827	LC	Sch-IV	OM	R	
71	Passeriformes	Cisticolidae	Common Tailorbird	<i>Orthotomus sutorius</i>	(Pennant, 1769)	LC	Sch-IV	IN	R	
72	Passeriformes	Acrocephalidae	Booted Warbler	<i>Iduna caligata</i>	(M.H.C. Lichtenstein, 1823)	LC	Sch-IV	IN	R	
73	Passeriformes	Acrocephalidae	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Blyth, 1849	LC	Sch-IV	IN	R	
74	Passeriformes	Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>	Linnaeus, 1758	LC	Sch-IV	IN	R	
75	Passeriformes	Pycnonotidae	Red-vented Bulbul	<i>Pycnonotus cafer</i>	(Linnaeus, 1766)	LC	Sch-IV	FR	R	
76	Passeriformes	Leiothrichidae	Yellow-billed Babbler	<i>Argya affinis</i>	(Jerdon, 1845)	LC	Sch-IV	IN	R	
77	Passeriformes	Sturnidae	Rosy Starling	<i>Pastor roseus</i>	(Linnaeus, 1758)	LC	Sch-IV	IN	WM	
78	Passeriformes	Sturnidae	Brahminy Starling	<i>Sturnia pagodarum</i>	(J.F. Gmelin, 1789)	LC	Sch-IV	IN	R	
79	Passeriformes	Sturnidae	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	(J.F. Gmelin, 1789)	LC	Sch-IV	IN	R	
80	Passeriformes	Sturnidae	Common Myna	<i>Acridotheres tristis</i>	(Linnaeus, 1766)	LC	Sch-IV	IN	R	
81	Passeriformes	Muscicapidae	Indian Robin	<i>Copsychus fulicatus</i>	(Linnaeus, 1766)	LC	Sch-IV	IN	R	
82	Passeriformes	Nectariniidae	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	(Linnaeus, 1766)	LC	Sch-IV	NE	R	
83	Passeriformes	Nectariniidae	Purple Sunbird	<i>Cinnyris asiaticus</i>	(Latham, 1790)	LC	Sch-IV	NE	R	
84	Passeriformes	Estrildidae	Indian Silverbill	<i>Euodice malabarica</i>	(Linnaeus, 1758)	LC	Sch-IV	GR	WM	
85	Passeriformes	Estrildidae	Scaly-breasted Munia	<i>Lonchura punctulata</i>	(Linnaeus, 1758)	LC	Sch-IV	GR	R	
86	Passeriformes	Motacillidae	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	J.F. Gmelin, 1789	LC	Sch-IV	IN	R	
87	Passeriformes	Motacillidae	Paddyfield Pipit	<i>Anthus rufulus</i>	Vieillot, 1818	LC	Sch-IV	IN	R	

**Resident (R), Winter Migrant (WM), Local Migrant (R/M), Herbivore (HR), Piscivore (PI), Omnivore (OM), Insectivore (IN), Frugivore (FR) and Carnivore (CA)

Table 2: Diversity indices of birds in Swamythooppu salt pan

Diversity Indices	J1	J2	J3	J4	J5	J6	S1	S2	S3	S4	S5	U1	U2	U3
Taxa_S	22	27	30	19	22	29	20	31	33	30	22	26	<u>17</u>	23
Individuals	123	159	162	117	148	137	241	198	315	249	411	149	215	120
Dominance_D	0.088	0.098	0.062	0.139	0.101	0.066	0.222	0.064	0.082	0.115	0.596	0.099	0.207	0.211
Simpson_1-D	0.911	0.901	0.937	0.860	0.898	0.933	0.777	0.935	0.917	0.885	0.403	0.900	0.792	0.788
Shannon_H	2.695	2.736	3.033	2.394	2.623	2.977	2.045	2.987	2.88	2.598	1.081	2.66	1.988	2.192
Evenness_e^H/S	0.672	0.571	0.691	0.576	0.626	0.676	0.386	0.639	0.539	0.447	0.134	0.549	0.429	0.389
Margalef	4.364	5.129	5.7	3.78	4.202	5.691	3.464	5.673	5.563	5.256	3.489	4.996	2.979	4.595

considered as an excellent environmental indicator at both global and local scales (Balachandran, 2006). There is a fluctuation of birds in different months during the study period. This may be due to the influence of the season as well as the fishing practice of the local peoples that drives the birds away from the study area.

In the present study 3158 birds belonging to 39 families of 15 avian orders were observed from localities in and around Swamythooppu salt pan during the study period. The Biodiversity of birds (photographs of few birds) at Swamythooppu salt pan has been shown in Plate 1. The data obtained from this study will provide some useful information to understand more about their population, migration movements and distributions. This study was conducted only for a shorter period. A more intensive study is needed for this region to identify and record more number of birds.

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