

Survey of Birds at Yelahanka Puttenahalli Lake, Bengaluru (2020-2021)

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Introduction

Puttenahalli Lake is one of the lakes located in North Bengaluru and is considered to be one of the important lakes supporting a variety of birds. The lake is home to over 125 bird species and attracts both resident and migratory waterfowl (Subramanya and Naveen 2004). Over 10 species of large colonial nesting waterfowl were known to breed at the lake, which included Oriental Darter, Great, Indian and Little Cormorants, Painted Stork, Black-headed Ibis, Grey and Purple Herons, Indian Pond Heron, Black-crowned Night Heron, Little Egret, breed at the lake, besides a large congregation of waterbirds that roost on the islands in the evening.

Considering the importance of the lake for birds the Government of Karnataka has declared the lake as a bird conservation reserve (Karnataka State Gazette Notification No. FEE: 389 FWL 2014 dated 29-04-2015). While the Karnataka State Forest Department is the custodian of the lake, the lake is being managed by the Yelahanka Puttenahalli Lake and Bird Conservation Trust (YPLBCT: founded in 2013) to conserve the birds and the lake habitat.

Abundance of birds in a wetland indicate its health status, owing to the availability of water, habitat and food source for adults and nestlings. Hence, biodiversity studies and population monitoring can be useful to understand fluctuations in ecosystem functioning and help prioritize areas of conservation. As part of the ongoing conservation effort, a bird survey was initiated to understand the diversity and seasonality of the birds at the lake. This report presents the outcome of the survey.

Study Site

Yelahanka Puttenahalli Lake, located near Puttenahalli village and the Vinayaka Badavane on Doddaballapura Road, Bengaluru is a 11ha water body, along with a plant nursery managed by the Karnataka State Forest Department.



Plate 1. View of Puttenahalli Lake as in March 2020 after rejuvenation

Methods

Field surveys were conducted once a fortnight from March 2020 to April 2021. No data was collected during the month of April 2020 on account of lockdown due to COVID-19 pandemic. Also, the census was not conducted if it was raining. A single observer traversed the walkpath formed along the periphery of the lake recording all the birds that were seen and heard, using 10 minute time-segmented sampling method.

Observations were carried out early morning (06.30 am to 08.30 am) and evening (04.30 pm to 06.30 pm) using a field binocular (Monarch 8X 40). Birds nesting, as evidenced by birds carrying nesting material, presence active nests or presence of week old fledglings (in precocial birds), was duly noted. The data recorded was assessed for species composition, diversity (Shannon 1948 and Pielou 1966), and seasonality with a greater focus on the use of lake by waterbirds.

Results and discussion

A total of number 123 species of birds were recorded at the lake during the study. All the species recorded are listed in Appendix 1 along with other ecological parameters. These species belonged to 19 avian orders (Figure 1) and 52 avian families (Figure 2). Among the 123 species of birds, maximum number of birds were from the order Passeriformes (55 species) and Pelecaniformes (13 species). Among the avian families, Ardeidae and Rallidae were the most common families represented by 10 and 8 species, respectively. Further, details of all species recorded during different months during the survey, starting from March 2020 to April 2021 is presented in Appendix 1.

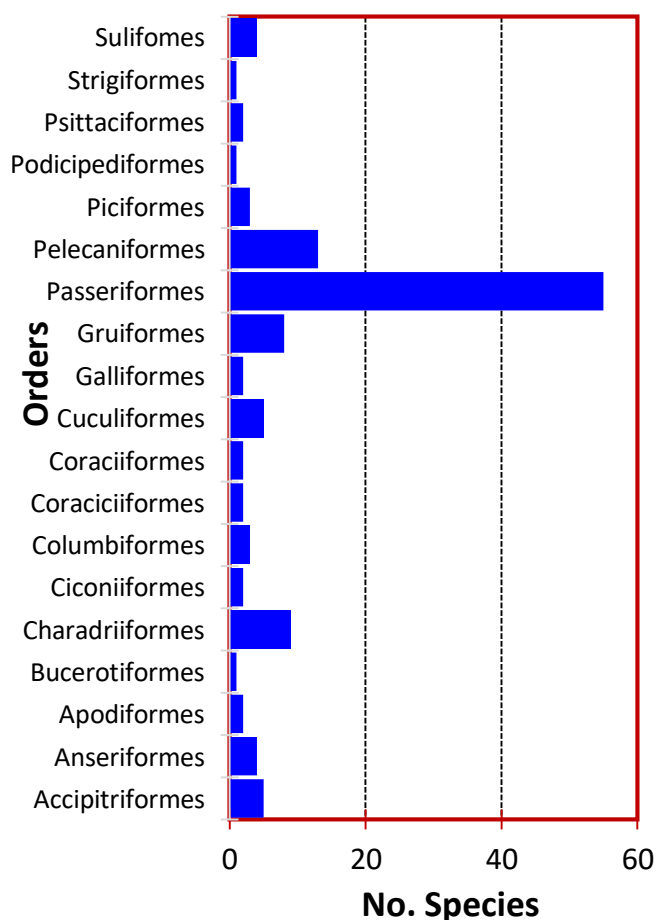


Figure 1. Details of avian orders represented by birds at Yelahanka Puttenahalli Lake

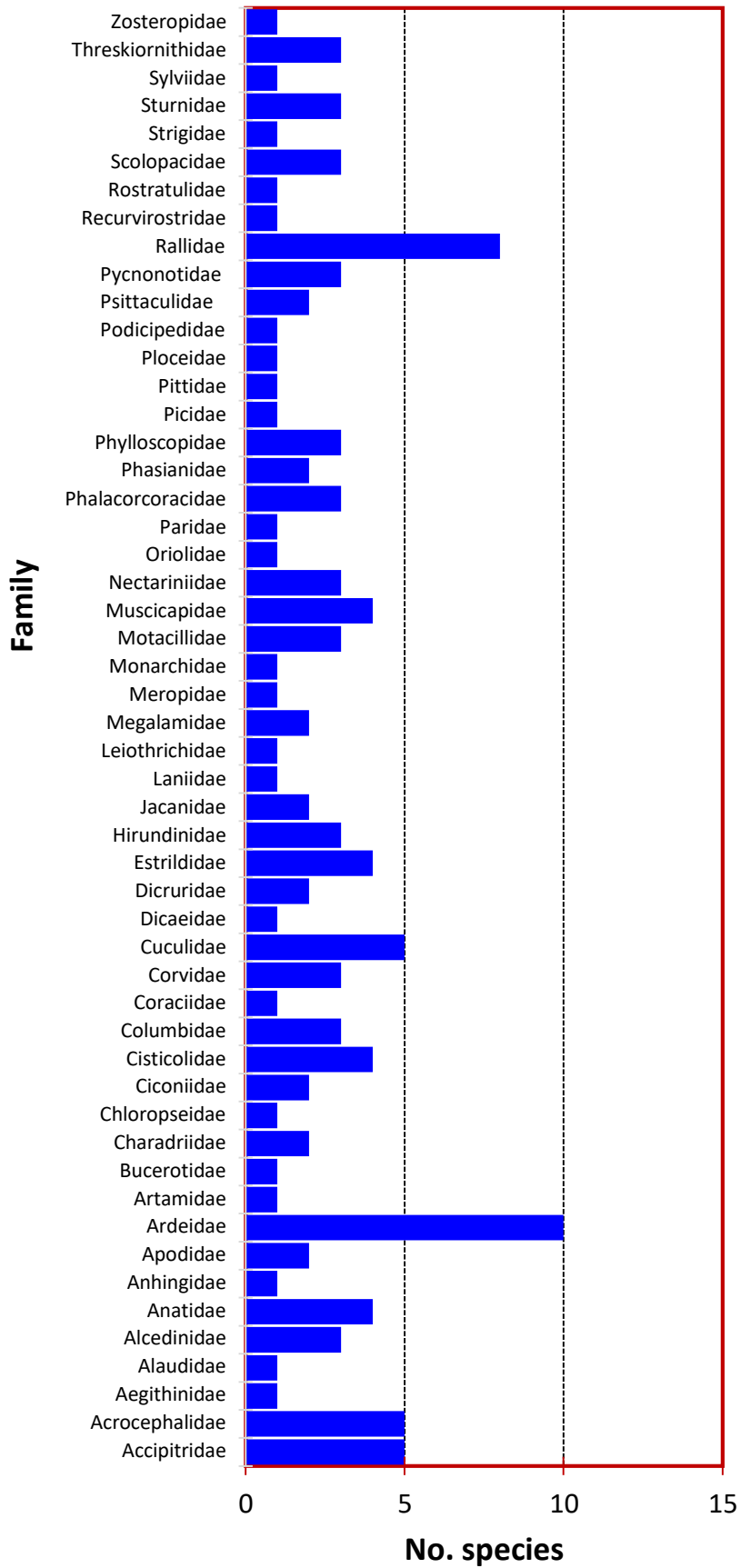


Figure 2. Details of avian families represented by birds at Yelahanka Puttenahalli Lake

The 123 species of birds recorded had different residency status at the lake. Of these, 63 per cent of the species were residents known to breed in Bangalore area and 18 per cent each comprised birds that were breeding residents at the lake and those that were Palearctic migrants from northern latitudes and upper reaches of Himalayas (Figure 3). The breeding residents that were observed breeding at the lake, included Ashy Prinia, Black Kite, Black-crowned Night Heron, Black-headed Ibis, Bronze-winged Jacana, Cinnamon Bittern, Coppersmith Barbet, Eurasian Coot, Eurasian Spoonbill, Glossy Ibis, Grey Heron, Grey-headed Swamphen, Indian Cormorant (Indian Shag), Indian Jungle Crow, Indian Moorhen, Little Cormorant, Little Egret, Little Grebe, Oriental Darter, Pied Bushchat, Purple Heron, White-breasted Waterhen. The migratory birds that were recorded at the lake included Ashy Drongo, Barn Swallow, Blyth's Reed Warbler, Brown Crake, Chestnut -tailed Starling, Common Sandpiper, Eurasian Marsh Harrier, Garganey, Green Warbler, Greenish Warbler, Grey Wagtail, Indian Golden Oriole, Indian Pitta, Leaf warbler sp., Lesser Whitethroat, Montagus Harrier, Northern Pintail, Paddy-field Warbler, Taiga Flycatcher (Red-throated Flycatcher), Thick-billed Warbler and Wood sandpiper. These migrants comprised both landbirds and waterbirds and the details are listed under status in Appendix 1.

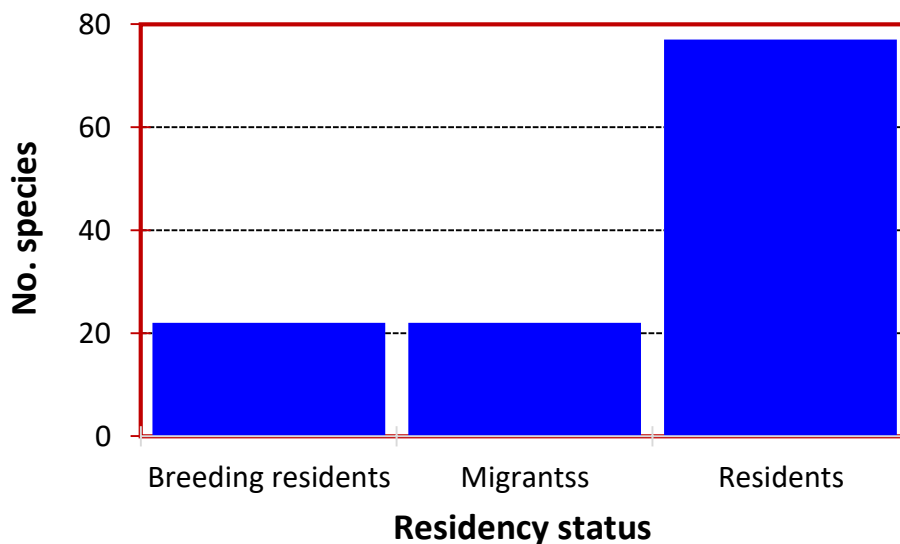


Figure 3. Residency status of birds observed at Puttenahalli lake

Diversity analysis indicated that species richness was more during winter months and declined during non-winter months. This was mainly due to the presence of migrant bird species during winter months (Figure 4). However, the Shannon's diversity index did not show much variation during the entire study period and varied between 3.41 (October 2020) to 3.91 (April 2021) (Figure 5). Similarly, the Pielou's evenness (numbers of individuals in each species at the lake) was positively correlated with species diversity, but did not show much variation among different months and varied in a narrow range from 0.74 (January 2020) to 0.92 (August & September 2020) (Figure7).

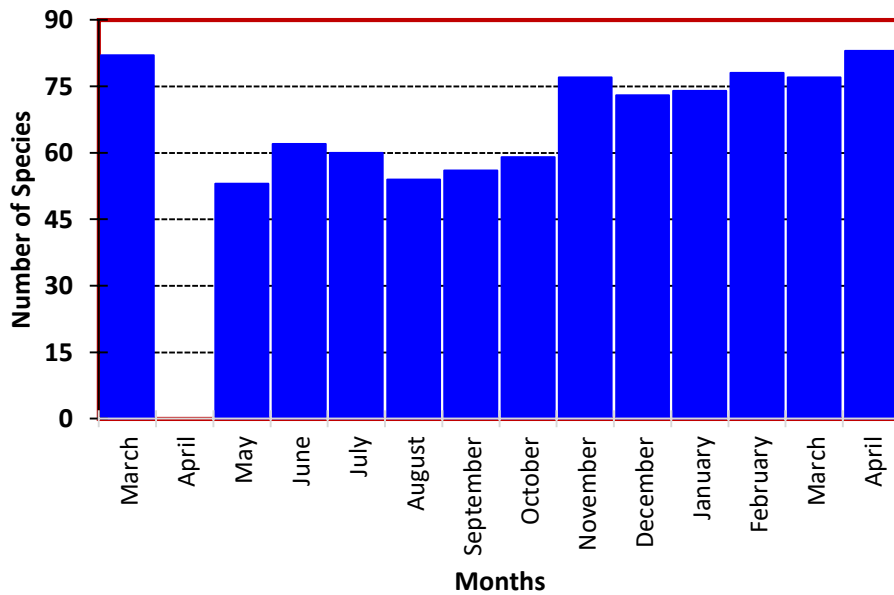


Figure 4. Richness of birds in different months at Puttenahalli Lake

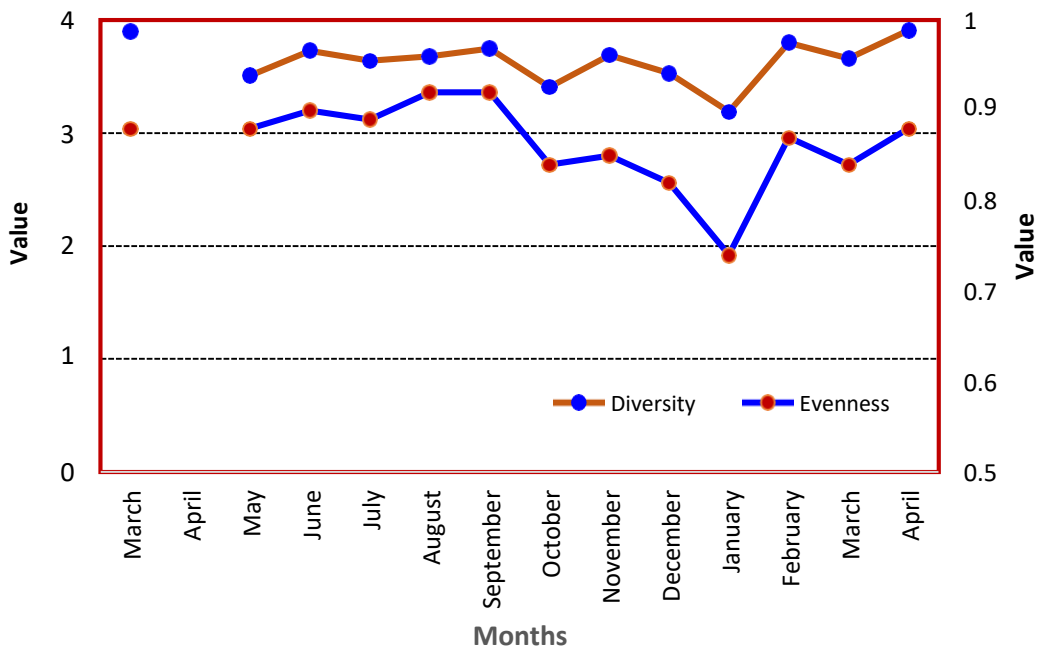


Figure 5. Richness of birds in different months at Puttenahalli Lake

Among the birds recorded it was found that 54 per cent of the birds comprised landbirds that were found in the area surrounding the lake waters, while 41 per cent of the species comprised waterbirds that used different micro-habitats in the water-spread area of the lake (Figure 6). About six species of aerial feeders were also recorded (Figure 6). While the landbirds used the vegetation around the lake, it was interesting to look at how different groups of waterbirds utilized the lake habitat and thus, four habitat areas were identified namely, open water, reedbed and other vegetation area, shallow water area and water-edge

and shoreline. Among the waterbirds observed, those using reedbed and other vegetation and shallow water areas were better represented than the open water and water-edge and shoreline users (Figure 7).

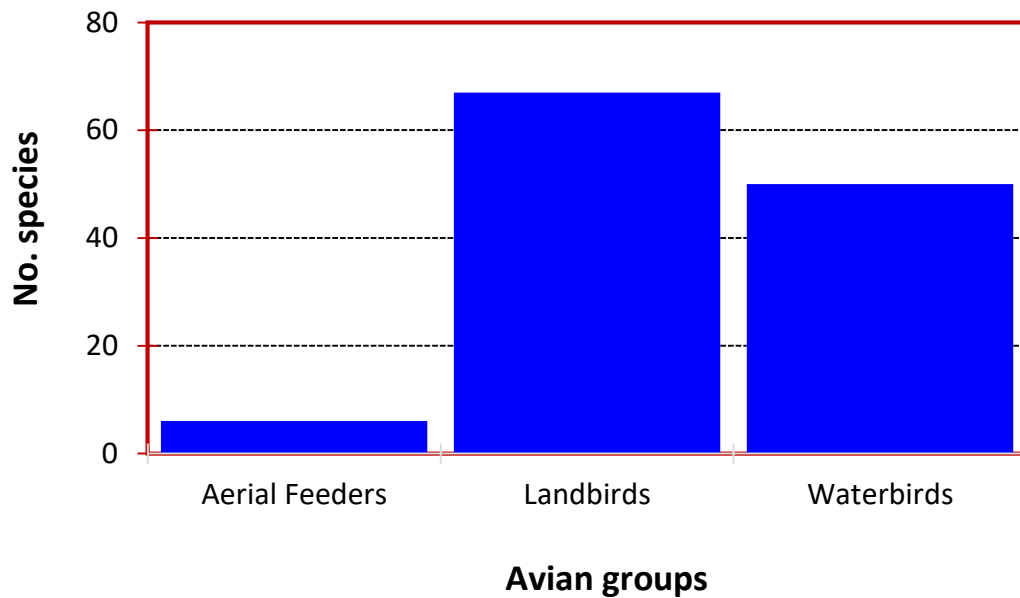


Figure 6. Different avian groups recorded at Puttenahalli Lake (N=123 spp.)

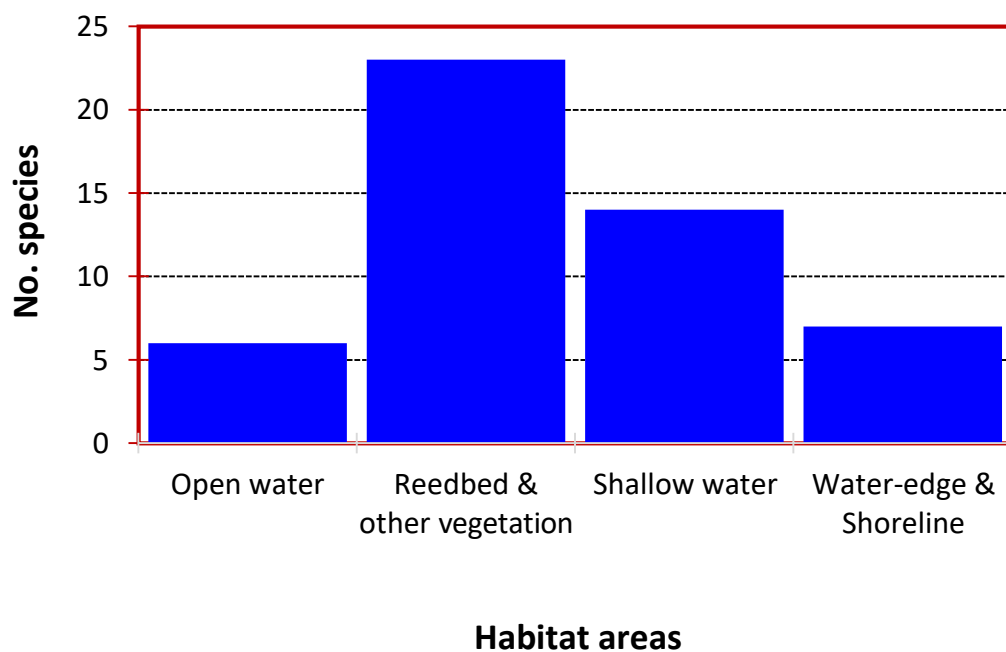


Figure 7. Different types of habitats used by birds at Puttenahalli Lake (N=123 spp.)

As indicated by the relative abundance, 15 of the most abundant species at the lake included, in the order of abundance, Grey-headed Swampphen, Ashy Prinia, Indian Pond Heron, Grey Heron, Bronze-winged Jacana, Rose-ringed Parakeet, Little Cormorant, Eurasian Coot, Indian Jungle Crow, Oriental Darter, Asian Koel, Black Kite, Glossy Ibis, Blyth's Reed Warbler, White-cheeked Barbet (Small Green Barbet) and Black-headed Ibis. The least abundant species of birds included Laughing Dove (Little Brown Dove), Lesser Whitethroat, Pied Cuckoo, Tri-coloured Munia, Wire-tailed Swallow, Asian Openbill, Black-winged Stilt, Brown Crake, Indian Pitta, Jerdons Bushlark, Montagus Harrier, Northern Pintail, Pheasant-tailed Jacana, Taiga Flycatcher (Red-throated Flycatcher), Yellow-billed Babbler and Yellow-watled Lapwing (Appendix 1). These species were recorded either singly or in twos during the entire survey period.

When the waterbirds observed at the lake during the survey were segregated into different taxonomic groups and compared with the birds of the same groups in Bengaluru area (George 1994, Praveen et al. 2016 and Wikipedia 2021; Table 1), it becomes very clear that the lake is poorly represented by open waterbirds and birds that use water-edge, shoreline and wet mudflats. More specifically, the lake habitat is poorly represented by ducks, as only two species of them were seen using the lake waters, and were in low abundances. Similarly, the lake was seen to attract only a few species of sandpipers and plovers that utilize the water-edge, shoreline and wet mudflats, which are totally non-existent at Puttenahalli lake, as compared to the large diversity of this group seen in the Bengaluru area (George 1994, Praveen et al. 2016 and Wikipedia 2021). However, the birds that utilize shallow-water areas and reedbeds and other aquatic vegetation were better represented at the Lake (Table 1).

Table 1. Occurrence of different groups of waterbirds at Puttenahalli Lake

Taxonomic Groups	No. species	Bird species
Baya & Munias	1	Red Avadavat
Bird of Prey	2	Brahminy Kite, Eurasian Marsh Harrier
Carmorants & Darter	4	Great Cormorant, Little Cormorant, Indian Cormorant, Oriental Darter
Ducks & Geese	2	Garganey, Lesser-whistling Duck
Egrets, Herons & Bitterns	10	Black-crowned Night Heron, Cattle Egret, Cinnamon Bittern, Great Egret, Grey Heron, Indian Pond Heron, Intermediate Egret, Little Egret, Purple Heron, Yellow Bittern
Grebes	1	Little Grebe
Kingfishers	2	Common Kingfisher, Pied Kingfisher, White-browed Kingfisher
Rails, gallinules & Jacanas	10	Bronze-winged Jacana, Brown Crake, Crake Spp., Eurasian Coot, Grey-headed Swampphen, Indian Moorhen, Pheasant-tailed Jacana, Ruddy-breasted Crake, White-breasted Waterhen
Shorebird-Waders	7	Black-winged Stilt, Common Sandpiper, Greater Painted Snipe, Green Sandpiper, Red-wattled Lapwing, Wood sandpiper, Yellow-watled Lapwing
Storks Sponbills & Ibises	5	Asian Openbill, Black-headed Ibis, Eurasian Spoonbill, Glossy Ibis, Painted Stork
Wagtails and pipits	3	Grey Wagtail, Paddyfield Pipit, White-browed Wagtail
Warbler	3	Clamorous reed warbler, Paddy-field Warbler, Zitting Cisticola

Further, five species of breeding residents, 18 species of residents and 11 species of migrants that were observed during 2004 by Subramanya and Naveein (2004) were not encountered during the present

survey. The most significant absence of species among waterbirds included several of the sandpipers, stints, snipes and plovers, which inhabit water-edge, shoreline and wet-mudflats surrounded by less than inch-deep water.

Conservation implications

Considering the importance of Yelahanka Puttenahalli Lake from the point of conservation of waterbirds, as compared with 2004 (Subramanya and Naveein 2004), the roosting population of birds was found to have dropped dramatically. While about 5000-7000 birds were observed using the trees on the two islands for roosting in the 2004 (Subramanya pers. observ.), there were hardly a few hundreds of birds were observed roosting on the islands during the present survey period. The main reason is quite obviously the *Ipomoea cairica* creepers that was found to be over-growing and covering the trees on the islands (Plate 2). This could also be the reason that some of the large waterbirds that were observed nesting on the islands during 2004, namely, Great Cormorant *Phalacrocorax carbo*, Little Egret *Egretta garzetta*, Cattle Egret *Bubulcus ibis* and Painted Stork *Mycteria leucocephala* (Subramanya and Naveein 2004), no longer do so. Thus, there is an urgent need for total removal of this invasive *Ipomoea* creeper from covering the islands.



Plate 2. A view of an island overgrown by *Ipomoea cairica* creepers

Similarly, there is a need to create wet mudflats in the foreshore area, which is presently over-grown with invasive Alligator weed and others (Plate 3), to create wet mudflats and edges of water with inch-deep waters and regularly maintain the same to attract a greater diversity of waders and shorebirds like the Little Ringed Plover *Charadrius dubius*, Pintail Snipe *Gallinago stenura*, Common Snipe *Gallinago gallinago*, Black-tailed Godwit *Limosa limosa*, Marsh Sandpiper *Tringa stagnatilis*, Common Greenshank *Tringa nebularia*, Common Sandpiper *Actitis hypoleucos* and Little Stint *Calidris minuta* which were recorded prior to 2004.



Plate 3. Foreshore are of the lake covered with Alligator weeds

History of lakes in Bangalore area clearly show that the lakes in Bangalore area had a definite seasonal cycle of being inundated during monsoon and going dry by the middle of summer (March-April). The presence of water in the lake throughout the year, has destroyed the lake ecology and has transformed the lake from what was once a seasonal lake into a perennial one. Towards this, there is a need to re-establish the seasonal cycle at the lake by draining the lake from February onwards to attract greater number of shallow-water feeding birds and those that use inch-deep waters and wet-mudflats and also to make the lake a more productive habitat for birds.

Acknowledgment

Yelahanka Puttenahalli Lake and Bird conservation Trust acknowledges WIPRO foundation for their support in funding the survey of bio diversity and bird survey at Puttenahalli bird conservation reserve.

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APPENDIX 1. Details of birds recorded at Yelahanka Puttenahalli Lake Bird Conservation Reserve.

S. No	Order	Family	Common Name	Scientific name	Status*	Rel. Abun	2020												2021			
							Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr		
1	Psittaciformes	Psittaculidae	Alexandrine Parakeet	<i>Psittacula eupatria</i>	L,R	0.3867									+	+	+	+	+	+	+	
2	Passeriformes	Dicruridae	Ashy Drongo	<i>Dicrurus leucophaeus</i>	L,M	0.6906	+								+	+	+	+	+	+	+	+
3	Passeriformes	Cisticolidae	Ashy Prinia	<i>Prinia socialis</i>	L,BR	4.1575	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	Passeriformes	Artamidae	Ashy Woodswallow	<i>Arthamus fuscus</i>	A,R	0.0552				+							+					
5	Cuculiformes	Cuculidae	Asian Koel	<i>Eudynamys scolopaceus</i>	L,R	0.0276	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
6	Ciconiiformes	Ciconiidae	Asian Openbill	<i>Anastomus oscitans</i>	W,SW,R	0.0138													+			
7	Apodiformes	Apodidae	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	A,R	0.0552	+							+								
8	Passeriformes	Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>	A,M	0.5939	+							+	+	+	+	+	+	+	+	+
9	Passeriformes	Ploceidae	Baya Weaver	<i>Ploceus philippinus</i>	L,R	0.0829				+		+	+									
10	Passeriformes	Dicruridae	Black Drongo	<i>Dicrurus macrocercus</i>	L,R	0.4006	+				+			+	+	+				+	+	+
11	Accipitriformes	Accipitridae	Black Kite	<i>Milvus migrans</i>	L,BR	2.6105	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
12	Pelecaniformes	Ardeidae	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	W,SW,BR	1.8232	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
13	Pelecaniformes	Threskiornithidae	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	W,SW,BR	2.0442	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
14	Piciformes	Picidae	Black-rumped Flameback	<i>Dinopium benghalense</i>	L,R	0.1105	+				+			+	+				+			
15	Charadriiformes	Recurvirostridae	Black-winged Stilt	<i>Himantopus himantopus</i>	W,SW,R	0.0138								+								
16	Passeriformes	Acrocephalidae	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	L,M	2.2514	+							+	+	+	+	+	+	+	+	+
17	Passeriformes	Acrocephalidae	Booted Warbler	<i>Iduna caligata</i>	L,R	0.1934	+									+	+	+	+	+	+	
18	Accipitriformes	Accipitridae	Brahminy Kite	<i>Haliastur indus</i>	L,R	0.8287	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
19	Charadriiformes	Jacanidae	Bronze-winged Jacana	<i>Metopidius indicus</i>	W,RV,BR	3.0249	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
20	Gruiformes	Rallidae	Brown Crake	<i>Amaurornis akool</i>	W,RV,M	0.0138																+
21	Passeriformes	Laniidae	Brown Shrike	<i>Lanius cristatus</i>	L,R	0.0691											+		+			+
22	Pelecaniformes	Ardeidae	Cattle Egret	<i>Bubulcus ibis</i>	W,WS,R	1.1740	+		+	+	+			+	+	+	+	+	+	+	+	+
23	Passeriformes	Sturnidae	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	L,M	0.3039	+									+	+	+	+	+	+	+
24	Passeriformes	Paridae	Cinereous Tit (Great Tit)	<i>Parus cinereus</i>	L,R	0.3453	+		+	+	+	+	+	+	+	+						+

S. No	Order	Family	Common Name	Scientific name	Status*	Rel. Abun	2020												2021						
							Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr					
25	Pelecaniformes	Ardeidae	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	W,RV,BR	0.0552						+												+	
26	Passeriformes	Acrocephalidae	Clamorous reed warbler	<i>Acrocephalus stentoreus</i>	W,RV,R	0.3315	+				+			+					+	+	+	+	+	+	+
27	Cuculiformes	Cuculidae	Common Hawk Cuckoo	<i>Hierococcyx varius</i>	L,R	0.0967											+	+				+	+	+	+
28	Passeriformes	Aegithinidae	Common Iora	<i>Aegithina tiphia</i>	L,R	0.0414					+														
29	Coraciiformes	Alcedinidae	Common Kingfisher	<i>Alcedo atthis</i>	W,RV,R	0.1105											+	+	+	+	+	+	+	+	+
30	Passeriformes	Sturnidae	Common Myna	<i>Acridotheres tristis</i>	L,R	1.7956	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
31	Charadriiformes	Scolopacidae	Common Sandpiper	<i>Actitis hypoleucos</i>	W,WS,M	0.0414	+																		1
32	Passeriformes	Cisticolidae	Common Tailorbird	<i>Orthotomus sutorius</i>	L,R	1.9337	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
33	Piciformes	Megalamidae	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	L,BR	1.0221	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
34	Gruiformes	Rallidae	Eurasian Coot	<i>Fulica atra</i>	W,RV,BRR	0.0276	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
35	Accipitriformes	Accipitridae	Eurasian Marsh Harrier	<i>Circus aeruginosus</i>	W,RV,M	2.7762	+		+								+				+	+			
36	Pelecaniformes	Threskiornithidae	Eurasian Spoonbill	<i>Platalea leucorodia</i>	W,SW,BR	0.1519	+															+	+	+	
37	Columbiformes	Columbidae	Feral Pigeon	<i>Columba levia</i>	L,R	0.1381	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
38	Anseriformes	Anatidae	Garganey	<i>Anas querquedula</i>	W,M	1.3674																			+
39	Pelecaniformes	Threskiornithidae	Glossy Ibis	<i>Plegadis falcinellus</i>	W,SW,BR	0.0276	1		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
40	Suliformes	Phalacrocoracidae	Great Cormorant	<i>Phalacrocorax carbo</i>	W,R	2.3066			+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+
41	Pelecaniformes	Ardeidae	Great Egret	<i>Ardea alba</i>	W,SW,R	0.3453	+		+	+													+	+	+
42	Charadriiformes	Rostratulidae	Greater Painted Snipe	<i>Rostratula benghalensis</i>	W,RV,R	0.2210	+																		+
43	Passeriformes	Meropidae	Green Bee-eater	<i>Merops orientalis</i>	L,R	0.0691	+				+	+	+	+	+	+	+	+	+	+	+	+	+	+	
44	Charadriiformes	Scolopacidae	Green Sandpiper	<i>Tringa ochropus</i>	W,SW,M	0.4558	+										+	+	+	+	+	+	+	+	+
45	Passeriformes	Phylloscopidae	Green Warbler	<i>Phylloscopus nitidus</i>	L,M	0.6354	+															+			
46	Passeriformes	Phylloscopidae	Greenish Warbler	<i>Phylloscopus trochiloides</i>	L,M	0.0414									+		+	+	+	+	+	+	+		
47	Galliformes	Phasianidae	Grey Francolin	<i>Francolinus pondicerianus</i>	L,R	0.2762									+	+			+	+	+				
48	Pelecaniformes	Ardeidae	Grey Heron	<i>Ardea cinerea</i>	W,SW,BR	0.0829	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
49	Passeriformes	Motacillidae	Grey Wagtail	<i>Motacilla cinerea</i>	W,WS,M	3.6050	+										+	+	+	+	+	+	+	+	
50	Cuculiformes	Cuculidae	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	L,R	0.8978																			+

S. No	Order	Family	Common Name	Scientific name	Status*	Rel. Abun	2020												2021					
							Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr				
51	Gruiformes	Rallidae	Grey-headed Swamphe	<i>Porphyrio poliocephalus</i>	W,RV,BR	0.1243	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
52	Passeriformes	Corvidae	House Crow	<i>Corvus splendens</i>	L,R	5.5525	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
53	Suliformes	Phalacrocoracidae	Indian Cormorant (Indian Shag)	<i>Phalacrocorax fuscicollis</i>	W,BR	0.7873	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
54	Passeriformes	Oriolidae	Indian Golden Oriole	<i>Oriolus kundoo</i>	L,M	0.3177	+									+	+	+	+	+	+	+	+	+
55	Bucerotiformes	Bucerotidae	Indian Grey Hornbill	<i>Ocyrceros birostris</i>	L,R	0.0414	+									+								
56	Passeriformes	Corvidae	Indian Jungle Crow	<i>Corvus cristatus</i>	L,BR	2.7762	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
57	Gruiformes	Rallidae	Indian Moorhen	<i>Gallinula chloropus</i>	W,RV,BR	1.7403	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
58	Passeriformes	Monarchidae	Indian Paradise Flycatcher	<i>Terpsiphone paradisi</i>	L,R	0.0552										+	+							
59	Galliformes	Phasianidae	Indian Peafowl	<i>Pavo cristatus</i>	L,R	0.2901	+			+	+	+	+			+	+			+				+
60	Passeriformes	Pittidae	Indian Pitta	<i>Pitta brachyura</i>	L,M	0.0138										1								
61	Pelecaniformes	Ardeidae	Indian Pond Heron	<i>Ardeola grayii</i>	W,WS,R	3.7983	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
62	Passeriformes	Muscicapidae	Indian Robin	<i>Copsychus fulicatus</i>	L,R	0.1105	+		+	+	+	+												
63	Coraciiformes	Coraciidae	Indian Roller	<i>Coracias benghalensis</i>	L,R	0.0967	+									+				+	+	+	+	+
64	Passeriformes	Estrildidae	Indian Silverbill	<i>Euodice malabarica</i>	L,R	0.0276																		+
65	Anseriformes	Anatidae	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	W,RV,R	1.2431	+		+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
66	Passeriformes	Zosteropidae	Indian White-eye	<i>Zosterops palpebrosus</i>	L,R	0.5939	+		+	+	+	+	+	1	+	+	+	+	+	+	+	+	+	+
67	Pelecaniformes	Ardeidae	Intermediate Egret	<i>Ardea intermedia</i>	L,SW,R	1.9613	+		+	+	+		+	+	+	+	+	+	+	+	+	+	+	+
68	Passeriformes	Alaudidae	Jerdons Bushlark	<i>Mirafra affinis</i>	L,R	0.0138				+														
69	Passeriformes	Chloropseidae	Jerdon's Leafbird (Jerdon's Chloropsis)	<i>Chloropsis jerdoni</i>	L,R	0.0414	+		+															
70	Passeriformes	Sturnidae	Jungle Myna	<i>Acridotheres fuscus</i>	L,R	1.8232	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
71	Columbiformes	Columbidae	Laughing Dove (Little Brown Dove)	<i>Spilopelia senegalensis</i>	L,R	0.0276	+																	
72	Passeriformes	Phylloscopidae	Leaf warbler sp.	<i>Phylloscopus</i> sp.	L,M	0.0138																		+
73	Passeriformes	Sylviidae	Lesser Whitethroat	<i>Sylvia curruca</i>	L,M	0.0276														+				+
74	Anseriformes	Anatidae	Lesser-whistling Duck	<i>Dendrocygna javanica</i>	W,RV,R	0.1243	+					+			+									
75	Suliformes	Phalacrocoracidae	Little Cormorant	<i>Microcarbo niger</i>	W,SW,BR	2.7901	+				+	+	+	+	+	+	+	+	+	+	+	+	+	+

S. No	Order	Family	Common Name	Scientific name	Status*	Rel. Abun	2020												2021			
							Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr		
76	Pelecaniformes	Ardeidae	Little Egret	<i>Egretta garzetta</i>	W,SW,BR	1.6022	+	+	+	+	+			+	+	+	+	+	+	+	+	+
77	Podicipediformes	Podicipedidae	Little Grebe	<i>Tachybaptus ruficollis</i>	W,SW,BR	0.6215	+	+	+	+	+	+			+		+	+	+	+	+	+
78	Apodiformes	Apodidae	Little Swift (Indian House Swift)	<i>Apus affinis</i>	A,R	0.0829					+		+	+	+						+	+
79	Accipitriformes	Accipitridae	Montagus Harrier	<i>Circus pygargus</i>	L,M	0.0138															+	
80	Anseriformes	Anatidae	Northern Pintail	<i>Anas acuta</i>	W,M	0.0138										+						
81	Sulifomes	Anhingidae	Oriental Darter	<i>Anhinga melanogaster</i>	W,BR	2.7762	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
82	Passeriformes	Muscicapidae	Oriental Magpie-Robin	<i>Copsychus saularis</i>	L,R	0.7735	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
83	Passeriformes	Motacillidae	Paddyfield Pipit	<i>Anthus rufulus</i>	L,R	0.0691	+		+												+	
84	Passeriformes	Acrocephalidae	Paddy-field Warbler	<i>Acrocephalus agricola</i>	W,RV,M	0.0967	+										+	+	+			+
85	Ciconiiformes	Ciconiidae	Painted Stork	<i>Mycteria leucocephala</i>	W,SW,R	0.0691	+		+												+	+
86	Passeriformes	Dicaeidae	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	L,R	1.5608	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
87	Charadriiformes	Jacaniidae	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	W,RV,R	0.0138					1											
88	Passeriformes	Muscicapidae	Pied Bushchat	<i>Saxicola caprata</i>	L,BR	0.7320	+		+	+	+	+	+		+	+	+	+	+	+	+	+
89	Cuculiformes	Cuculidae	Pied Cuckoo	<i>Clamator jacobinus</i>	L,R	0.0276															+	+
90	Passeriformes	Cisticolidae	Plain Prinia	<i>Prinia subflava</i>	???	0.0967																
91	Coraciiformes	Alcedinidae	Pied Kingfisher	<i>Ceryle rudis</i>	W,R	1.2983	+								+						+	+
92	Pelecaniformes	Ardeidae	Purple Heron	<i>Ardea purpurea</i>	W,RV,BR	0.5249	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
93	Passeriformes	Nectariniidae	Purple Sunbird	<i>Cinnyris asiaticus</i>	L,R	0.0138	+		+	+					+	+	+	+	+	+	+	+
94	Passeriformes	Nectariniidae	Purple/Loten's Sunbird	<i>Cinnyris sp.</i>	L,R	1.0497									+							
95	Passeriformes	Nectariniidae	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	L,R	0.0829	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
96	Passeriformes	Estrildidae	Red Avadavat	<i>Amandava amandava</i>	W,RV,R	0.2348															+	+
97	Passeriformes	Hirundinidae	Red-rumped Swallow	<i>Cecropis daurica</i>	A,R	0.5801	+		+	+	+	+	+	+	+	+						
98	Passeriformes	Pycnonotidae	Red-vented Bulbul	<i>Pycnonotus cafer</i>	L,R	0.7459	+			+	+	+	+	+	+	+	+	+	+	+	+	+
99	Charadriiformes	Charadriidae	Red-wattled Lapwing	<i>Vanellus indicus</i>	W,WS,R	1.8923	+				+	+	+	+	+	+	+	+	+	+	+	+
100	Passeriformes	Pycnonotidae	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	L,R	0.0000	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
101	Psittaciformes	Psittaculidae	Rose-ringed Parakeet	<i>Psittacula krameri</i>	L,R	2.8591	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+

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102	Gruiformes	Rallidae	Ruddy-breasted Crane	<i>Porzana fusca</i>	W,RV,R	0.0552				+	+							+			+	
103	Passeriformes	Corvidae	Rufous Treepie	<i>Dendrocitta vagabunda</i>	L,R	0.0552	+				+	+										
104	Passeriformes	Estrildidae	Scaly-breasted Munia (Spotted Munia)		L,R	0.6354	+				+	+	+	+	+	+	+	+	+	+	+	
105	Accipitriformes	Accipitridae	Shikra	<i>Accipiter badius</i>	L,R	0.0967					+	+						+	+	+	+	
106	Cuculiformes	Cuculidae	Southern Coucal	<i>Centropus parotti</i>	L,R	1.6851	+			+	+	+	+	+	+	+	+	+	+	+	+	
107	Columbiformes	Columbidae	Spotted Dove	<i>Streptopelia chinensis</i>	L,R	1.3950	+			+	+	+	+	+	+	+	+	+	+	+	+	
108	Strigiformes	Strigidae	Spotted owlet	<i>Athene brama</i>	L,R	0.1243				+	+	+	+									
109	Passeriformes	Muscicapidae	Taiga Flycatcher (Red-throated Flycatcher)	<i>Ficedula albicilla</i>	L,M	0.0138															+	
110	Passeriformes	Acrocephalidae	Thick-billed Warbler	<i>Arundinax aedon</i>	L,M	0.1105												+	+		+	
111	Passeriformes	Estrildidae	Tri-coloured Munia	<i>Lochura malacca</i>	L,R	0.0276							+									
112	Gruiformes	Rallidae	UI Rail		W,RV,	0.0276														+	+	
113	Gruiformes	Rallidae	White-breasted Waterhen	<i>Amauornis phoenicurus</i>	W,RV,BR	1.2431	+			+	+	+	+	+	+	+	+	+	+	+	+	
114	Passeriformes	Pycnonotidae	White-browed Bulbul	<i>Pycnonotus luteolus</i>	L,R	0.0691	+			+	+											
115	Passeriformes	Motacillidae	White-browed Wagtail (Large Pied Wagtail)	<i>Motacilla maderaspatensis</i>	W,WS,R	1.9751	+			+	+	+	+	+	+	+	+	+	+	+	+	
116	Piciformes	Megalamiidae	White-cheeked Barbet (Small Green Barbet)	<i>Psilopogon viridis</i>	L,R	2.2376	+			+	+	+	+	+	+	+	+	+	+	+	+	
117	Coraciiformes	Alcedinidae	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	W,RV,R	1.7403	+			+	+	+	+	+	+	+	+	+	+	+	+	
118	Passeriformes	Hirundinidae	Wire-tailed Swallow	<i>Hirundo smithii</i>	A,R	0.0276	+															
119	Charadriiformes	Scolopacidae	Wood Sandpiper	<i>Tringa glareola</i>	W,WS,M	1.2983	+									+	+	+	+	+	+	
120	Pelecaniformes	Ardeidae	Yellow Bittern	<i>Ixobrychus sinensis</i>	W,RV,R	0.0552															+	
121	Passeriformes	Leiothrichidae	Yellow-billed Babbler	<i>Argya affinis</i>	L,R	0.0138												+				
122	Charadriiformes	Charadriidae	Yellow-watled Lapwing	<i>Vanellus malabaricus</i>	L,R	0.0138														+		
123	Passeriformes	Cisticolidae	Zitting Cisticola	<i>Cisticola juncidis</i>	W,RV,R	0.2210					+	+	+	+	+						+	

* Grouping: A= Aerial bird, L=Landbird, W=Waterbird; Habitat: SW=Shallow Waterbird, OW= Openwater bird, RV=Reedbed & vegetation, WS=Water edge & Shoreline birds; Status: BR=Breeding Resident, R=Resident & M=Migrant