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Cover: *Minervarya cepfi* & *Nyctibatrachus petraeus*—mix media. © P Kritika

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ARTICLE

A study on the avifaunal diversity and community dynamics of Karanji Lake, Mysuru, Karnataka, India

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Abstract: We conducted the present field study to record avifaunal diversity at Karanji Lake, Mysuru, Karnataka, from April 2021 to March 2022 on a bimonthly basis. Point count method with a fixed radius was carried out within the lake premises, with 14 grids. A total of 94 bird species were recorded belonging to 16 orders and 47 families. Highest number of birds was represented by order Passeriformes, with 23 families, and the family Ardeidae dominated with eight species. A total of 90 species were 'Least Concern', and two species were 'Near Threatened'. Further, these birds were grouped into omnivorous (33%), insectivorous (27.6%), carnivorous (23.4%), piscivorous (7.4%), frugivorous (3.2%), nectarivores (2.1%), granivorous (2.1%), and herbivorous (1.1%) based on feeding habits. Shannon-Wiener value was $3.1517 \pm 0.31_{SE}$, Simpson diversity was 0.6937, and Pielou's evenness value was 0.694. The different diversity index values revealed the occurrence of a good number of bird species, conveying that the Karanji Lake still has potential to support avifauna. This study will help understand the conservation of birds at the Lake in future, an important biodiversity perspective.

Keywords: Birds, Chamundi Hills, diversity indices, feeding guilds, Mysore Zoo, Near Threatened, waterbody, wetland birds.

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Author details S. Sushanth is a researcher from Zoo Outreach Organisation, pursuing a PhD on species-composition in abandoned-plantations of the Western Ghats. He has involved in this field for over a decade, with field experience on birds, rodents, herpetofauna, stingless bees, and plants. He is a Rufford and PCI grantee and an IUCN Red List assessor. Dr. K.S. Raghunandan, serving as guest faculty in the Postgraduate Department of Zoology at Maharani's Science College for Women (Autonomous). Government First Grade College, Mysuru. His areas of specialization include entomology (apidology) and ornithology. His current research focuses on the bioecology of Asian giant wild honeybees and avian conservation biology.

Author contributions: SS—data collection, manuscript writing, analysis; KSR—conceived the study, manuscript editing.

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INTRODUCTION

Birds are globally widespread and perform ecologically important functions as pollinator, scavengers, predators, and seed dispersers (Sekercioglu 2006). With over 11,000 species worldwide and approximately 1,358 in the Indian subcontinent (Birdlife International 2026), they are among the most studied taxa and serve as valuable bioindicators of environmental changes because they respond rapidly to changes in landscape configuration, composition, and function (Gregory et al. 2004). Monitoring bird diversity therefore provides insights into habitat quality and ecosystem health. Birds also contribute to multiple ecosystem services, such as provisioning, regulating, cultural, and supporting services, which sustain human well-being (Sekercioglu et al. 2016). Despite their importance, bird communities are increasingly threatened by habitat loss, anthropogenic disturbance, urbanisation, and climate change. Monitoring and conserving bird diversity remain critical for maintaining ecosystem function and biodiversity.

Mysuru City is among the few places in India that has detailed bird documentation since the 1940s. In their landmark survey of the Mysore State, Ali & Whistler (1942–43) documented several wetlands in and around the city, providing an early baseline for avian studies. Wetlands are known to provide key habitats for both resident and migratory birds for breeding, drinking, feeding, resting, and for social interactions (Kaur & Brraich 2021). These freshwater bodies often succumb to changes in land use in their catchment areas, resulting in reduced inflows and a declining quality of the "runoff" that passes through agricultural fields and urban areas (Verma et al. 2001). The depletion of wetlands as a result of numerous human activities and/or climate change poses a serious threat to the diversity and number of waterbird species worldwide, with some species becoming extinct across several wetlands (Wetlands International 2012). With this background, the present study was undertaken to assess current avifaunal diversity at Karanji Lake using the point count method. It quantifies species richness, abundance and guilds while evaluating threats. Outcomes will inform urban wetland conservation in Mysuru.

MATERIALS AND METHODS

Study Area

The study was carried out in Karanji Lake (12.3028º N, 76.6736º E; Image 1), located in the Mysuru District, Karnataka, within the Chamundi Hills foothills. It has an altitude ranging 861–944 m, and the surrounding plateau is 1,024–1,057 m high (Mishra et al. 2007). The lake was constructed by the Maharaja of Mysore and is one of the biggest lakes in Karnataka. The total area of the lake is about 36.4 ha. The green cover area measured within the lake premises is about 14 ha. The lake also has a marshy area of about 0.0675 km^2 and a dry area of 0.280 km^2, and has a catchment area of 745 ha. The lake water capacity is 629.2 ML, and the highest flood level is 744.14 m (Kumara et al. 2010; Mysore Nature 2025).

Sampling Method

The present study was conducted from April 2021 to March 2022 on a bimonthly basis, with a total of 24 surveys. Surveys were conducted between 0630 h and 1000 h, as bird activity is known to be highest during morning hours. Point count method (Bibby et al. 2000) was employed to estimate the bird richness and abundance that was present in the sampling site. There were a total of 14 grids with one point count station per grid. We spent 15 minutes at each point (3.5 h per replication of all the grids), yielding ~84 h of total sampling effort. The birds were counted within the fixed radius (100 m) (Buckland et al. 2001) using binoculars (10 x 42) and a digital camera was used to photograph. Minimum three replications of point count surveys at every sampling point were carried out in each season (summer, winter, and monsoon). The birds were identified using a field guide (Grimmett et al. 2016). Bird species were classified into feeding guilds following Ghosh et al. (2022) and Jamakhandi & Kadadevaru (2024).

Data Analysis

To assess the adequacy of sampling for bird diversity and sampling effort sufficiency, species accumulation curves were plotted with the cumulative number of bird species that were recorded across all the sampling sites against cumulative effort using the R software v4.3.1 and RStudio v2025.09.2 + 418 (R core team 2025; RStudio team 2025) with 'vegan' package (Oksanen et al. 2025) and all the graphs were created with 'ggplot2' package (Wickham 2016). The diversity indices (including species richness, Shannon-Wiener diversity, Simpson diversity, and Pielou's evenness) were calculated using the same

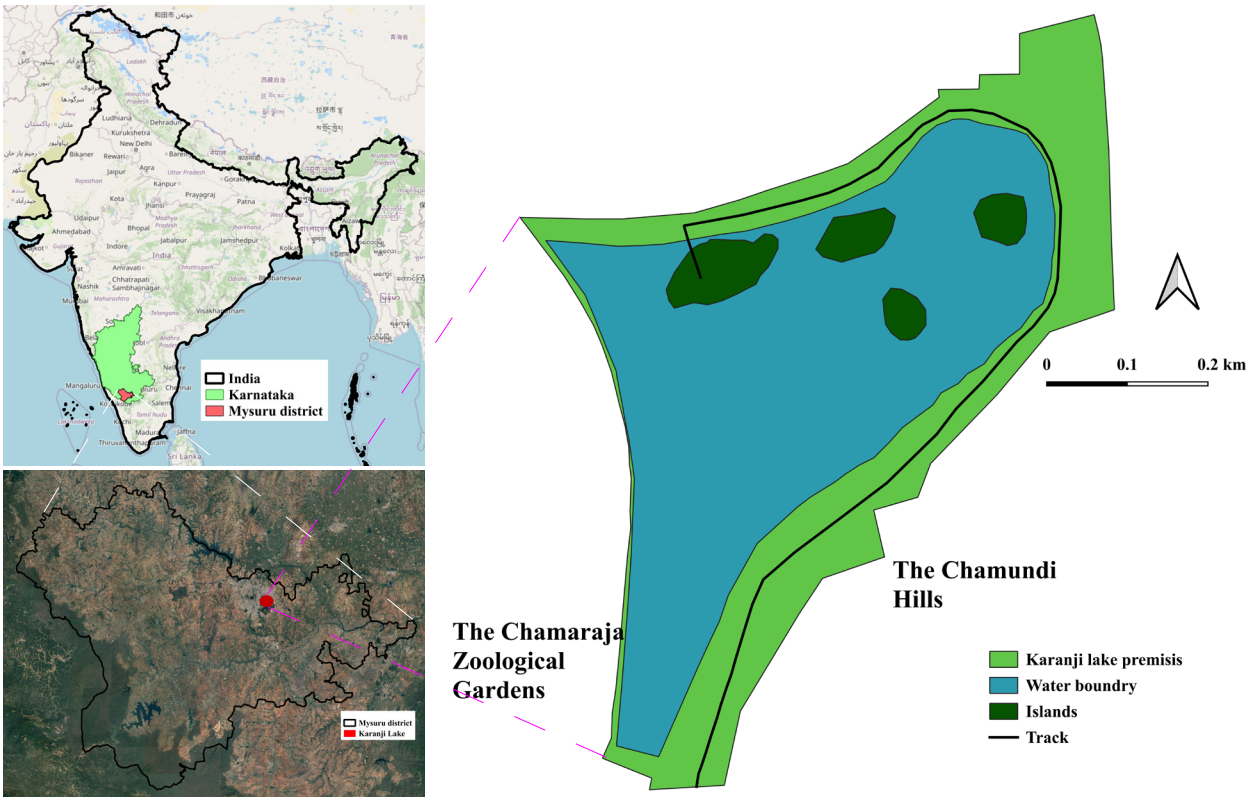

Image 1. The map of the study area, created using QGIS v3.26.2 (https://qgis.org) along with the survey track (from the entrance to the end point—1.5 km).

software with 'vegan' package (Oksanen et al. 2025).

RESULTS AND DISCUSSION

A total of 94 bird species were recorded belonging to 16 orders and 47 families. The order Passeriformes and the family Ardeidae had the highest number of bird species in them, with 43 and eight, respectively. Three Western Ghats endemic birds were recorded (White-spotted Fantail *Rhipidura albogularis*, White-cheeked Barbet *Psilopogon viridis*, and Mottled Wood-Owl *Strix ocellata*). According to their feeding guilds, the birds were categorised into eight groups, viz., omnivorous (31 species), insectivorous (26 species), carnivorous (22 species), piscivorous (7 species), frugivorous (3 species), nectarivores (2 species), granivorous (2 species), and herbivorous (1 species) (Table 1; Image 4). Based on IUCN 2026, there were only two categories: 'Least Concern' (LC) (90 species), 'Near Threatened' (NT) (2 species) (Black-headed Ibis *Threskiornis melanocephalus* and Spot-billed Pelican *Pelecanus philippensis*) and two species are not assessed (Grey-headed Swamphen *Porphyrio poliocephalus* and Cinereous Tit *Parus cinereus*) (Table 1).

The order Passeriformes had the highest number of bird species of 43, with the highest occurrence percentage of 45.75%. The lowest number of species recorded was in four orders (Ciconiiformes, Podicipediformes, Psittaciformes, and Strigiformes) with one species each and with 1.06% occurrence each (Image 5). The family Ardeidae had the highest number of bird species, with eight recorded and the highest occurrence of 8.52%. The least number of bird species was recorded in 21 different families with one species in each and 1.06% occurrence each (Table 2; Image 3).

The species accumulation curve suggested that the sampling effort was adequate, as it reached an asymptote from the tenth month (Image 2). The species richness was 94. The Shannon-Wiener diversity value was $3.1517 \pm 0.31_{SE}$. The Simpson's diversity index value was 0.6937, and the Pielou's evenness value was 0.694 (Table 3).

Karanji Lake serves as a key urban ecology site in Mysuru City, sustaining a wide variety and diversity of birds. It serves as breeding ground for several bird species (Black-headed Ibis *Threskiornis melanocephalus*, Spot-billed Pelican *Pelecanus philippensis*, Greater

Table 1. The updated list of bird species recorded in Karanji Lake, Mysuru.

	Common name	Scientific name	IUCN Red List	Diet
I	Accipitriformes			
i	Accipitidae			
1	Shikra	*Accipiter badius*	LC	CV
2	Black Kite	*Milvus migrans*	LC	CV
3	Brahminy Kite	*Haliastur Indus*	LC	CV
II	Anseriformes			
ii	Anatidae			
4	Indian Spot-billed Duck	*Anas poecilorhyncha*	LC	OV
5	Lesser Whistling-Duck	*Dendrocygna javanica*	LC	OV
iii	Phasianidae			
6	Indian Peafowl	*Pavo cristatus*	LC	OV
III	Bucerotiformes			
iv	Bucerotidae			
7	Indian Grey Hornbill	*Ocyceros birostris*	LC	OV
v	Upupidae			
8	Common Hoopoe	*Upupa epops*	LC	OV
IV	Charadriiformes			
vi	Charadriidae			
9	Red-wattled Lapwing	*Vanellus indicus*	LC	CV
vii	Jacanidae			
10	Bronze-winged Jacana	*Metopidius indicus*	LC	CV
viii	Scolopacidae			
11	Green Sandpiper	*Tringa ochropus*	LC	OV
12	Common Sandpiper	*Actitis hypoleucos*	LC	CV
13	Wood Sandpiper	*Tringa glareola*	LC	CV
V	Ciconiiformes			
ix	Ciconiidae			
14	Painted Stork	*Mycteria leucocephala*	LC	CV
VI	Columbiformes			
x	Columbidae			
15	Rock Dove	*Columba livia*	LC	OV
16	Spotted Dove	*Spilopelia chinensis*	LC	GV
VII	Coraciiformes			
xi	Alcedinidae			
17	Common Kingfisher	*Alcedo atthis*	LC	PV
18	White-throated Kingfisher	*Halcyon smyrnensis*	LC	PV
19	Stork-billed Kingfisher	*Pelargopsis capensis*	LC	PV
VIII	Cuculiformes			
xii	Cuculidae			
20	Greater Coucal	*Centropus sinensis*	LC	OV
21	Asian Koel	*Eudynamys scolopaceus*	LC	OV
22	Common Hawk-Cuckoo	*Hierococcyx varius*	LC	IV
IX	Gruiformes			
xiii	Rallidae			
23	Eurasian Coot	*Fulica atra*	LC	OV
24	Eurasian Moorhen	*Gallinula chloropus*	LC	OV
25	Grey-headed Swamphen	*Porphyrio poliocephalus*	-	OV
26	White-breasted Waterhen	*Amaurornis phoenicurus*	LC	OV
X	Passeriformes			
xiv	Acrocephalidae			
27	Sykes's Warbler	*Iduna rama*	LC	IV
28	Clamorous Reed Warbler	*Acrocephalus stentoreus*	LC	IV
29	Blyth's Reed Warbler	*Acrocephalus dumetorum*	LC	IV
30	Booted Warbler	*Iduna caligata*	LC	IV
xv	Aegithinidae			
31	Common Iora	*Aegithina tiphia*	LC	IV
xvi	Apodidae			
32	Asian Palm Swift	*Cypsiurus balasiensis*	LC	IV
33	Little Swift	*Apus affinis*	LC	IV
xvii	Campephagidae			
34	Small Minivet	*Pericrocotus cinnamomeus*	LC	IV
35	Black-headed Cuckooshrike	*Coracina melanoptera*	LC	IV
xviii	Chloropseidae			
36	Jerdon's Leafbird	*Chloropsis jerdoni*	LC	OV
xix	Cisticolidae			
37	Common Tailorbird	*Orthotomus sutorius*	LC	OV
38	Ashy Prinia	*Prinia socialis*	LC	IV
xx	Corvidae			
39	House Crow	*Corvus splendens*	LC	OV
40	Large-billed Crow	*Corvus macrorhynchos*	LC	OV
xxi	Dicaeidae			
41	Pale-billed Flowerpecker	*Dicaeum erythrorhynchos*	LC	OV
xxii	Dicruridae			
42	Black Drongo	*Dicrurus macrocercus*	LC	IV
43	Ashy Drongo	*Dicrurus leucophaeus*	LC	IV
xxiii	Estrildidae			
44	Scaly-breasted Munia	*Lonchura punctulata*	LC	OV
45	White-rumped Munia	*Lonchura striata*	LC	GV
xxiv	Hirundinidae			

	Common name	Scientific name	IUCN Red List	Diet
46	Red-rumped Swallow	*Cecropis daurica*	LC	IV
47	Barn Swallow	*Hirundo rustica*	LC	IV
xxv	Monarchidae			
48	Indian Paradise Flycatcher	*Terpsiphone paradisi*	LC	IV
xxvi	Motacillidae			
49	Forest Wagtail	*Dendronanthus indicus*	LC	IV
50	Gray Wagtail	*Motacilla cinerea*	LC	CV
51	White-browed Wagtail	*Motacilla maderaspatensis*	LC	IV
xxvii	Muscicapidae			
52	Asian Brown Flycatcher	*Muscicapa dauurica*	LC	IV
53	Indian Robin	*Saxicoloides fulicatus*	LC	OV
54	Oriental Magpie Robin	*Copsychus saularis*	LC	OV
55	Tickell's Blue Flycatcher	*Cyornis tickelliae*	LC	IV
56	White-rumped Shama	*Copsychus malabaricus*	LC	IV
xxviii	Nectariniidae			
57	Purple-rumped Sunbird	*Leptocoma zeylonica*	LC	NV
58	Purple Sunbird	*Cinnyris asiaticus*	LC	NV
xxix	Oriolidae			
59	Indian Golden Oriole	*Oriolus kundoo*	LC	OV
xxx	Paridae			
60	Cinereous Tit	*Parus cinereus*	-	IV
xxxi	Phylloscopidae			
61	Green Warbler	*Phylloscopus nitidus*	LC	IV
xxxii	Pittidae			
62	Indian Pitta	*Pitta brachyura*	LC	CV
xxxiii	Pycnonotidae			
63	Red-whiskered Bulbul	*Pycnonotus jocosus*	LC	OV
64	Red-vented Bulbul	*Pycnonotus cafer*	LC	OV
xxxiv	Rhipiduridae			
65	White-spotted Fantail	*Rhipidura albogularis*	LC	IV
xxxv	Sturnidae			
66	Common Myna	*Acridotheres tristis*	LC	OV
67	Jungle Myna	*Acridotheres fuscus*	LC	OV
68	Chestnut-tailed Starling	*Sturnia malabarica*	LC	OV
xxxvi	Zosteropidae			
69	Indian White-eye	*Zosterops palpebrosus*	LC	HV
XI	Pelecaniformes			
xxxvii	Ardeidae			
70	Purple Heron	*Ardea purpurea*	LC	CV
71	Indian Pond Heron	*Ardeola grayii*	LC	OV
72	Little Egret	*Egretta garzetta*	LC	CV
73	Intermediate Egret	*Ardea intermedia*	LC	CV
74	Great White Egret	*Ardea alba*	LC	CV
75	Cattle Egret	*Bubulcus ibis*	LC	CV
76	Gray Heron	*Ardea cinerea*	LC	CV
77	Black-crowned Night Heron	*Nycticorax nycticorax*	LC	OV
xxxviii	Threskiornithidae			
78	Red-naped Ibis	*Pseudibis papillosa*	LC	CV
79	Black-headed Ibis	*Threskiornis melanocephalus*	NT	CV
80	Glossy Ibis	*Plegadis falcinellus*	LC	CV
XII	Piciformes			
xxxix	Megalaimidae			
81	Coppersmith Barbet	*Megalaima haemacephala*	LC	FV
82	White cheeked Barbet	*Psilopogon viridis*	LC	FV
xl	Meropidae			
83	Asian Green Bee-eater	*Merops orientalis*	LC	IV
84	Blue-tailed Bee-eater	*Merops philippinus*	LC	IV
xli	Picidae			
85	Black-rumped Flameback	*Dinopium benghalense*	LC	OV
86	White-naped Woodpecker	*Chrysocolaptes festivus*	LC	OV
XIII	Podicipediformes			
xlii	Podicipedidae			
87	Little Grebe	*Tachybaptus ruficollis*	LC	CV
XIV	Psittaciformes			
xliii	Psittaculidae			
88	Rose-ringed Parakeet	*Psittacula krameri*	LC	FV
XV	Strigiformes			
xliv	Strigidae			
89	Mottled Wood-Owl	*Strix ocellata*	LC	CV
XVI	Sulliformes			
xlv	Anhingidae			
90	Oriental Darter	*Anhinga melanogaster*	LC	CV
xlvi	Pelecanidae			
91	Spot-billed Pelican	*Pelecanus philippensis*	NT	PV
xlvii	Phalacrocoracidae			
92	Great Cormorant	*Phalacrocorax carbo*	LC	PV
93	Little Cormorant	*Microcarbo niger*	LC	PV
94	Indian Cormorant	*Phalacrocorax fuscicollis*	LC	PV

I (Capital roman numerals)—order | I (sentence case roman numerals)—family | 1 (Arabic numerals)—species | LC—Least Concerned | NT—Near Threatened | GV—Granivorous | CV—Carnivorous | OV—Omnivorous | IV—Insectivorous | FV—Frugivorous | HV—Herbivorous.

Table 2. Family-wise bird species recorded in Karanji Lake, Mysuru.

	Name of the family	No. of bird species recorded	% Occurrence		Name of the family	No. of bird species recorded	% Occurrence
1	Accipitridae	3	3.19	25	Monarchidae	1	1.06
2	Anatidae	2	2.13	26	Motacillidae	3	3.19
3	Phasianidae	1	1.06	27	Muscicapidae	5	5.33
4	Bucerotidae	1	1.06	28	Nectariniidae	2	2.13
5	Upupidae	1	1.06	29	Oriolidae	1	1.06
6	Charadriidae	1	1.06	30	Paridae	1	1.06
7	Jacanidae	1	1.06	31	Phylloscopidae	1	1.06
8	Scolopacidae	3	3.19	32	Pittidae	1	1.06
9	Ciconiidae	1	1.06	33	Pycnonotidae	2	2.13
10	Columbidae	2	2.13	34	Rhipiduridae	1	1.06
11	Alcedinidae	3	3.19	35	Sturnidae	3	3.19
12	Cuculidae	3	3.19	36	Zosteropidae	1	1.06
13	Rallidae	4	4.27	37	Ardeidae	8	8.52
14	Acrocephalidae	4	4.27	38	Threskiornithidae	3	3.19
15	Aegithinidae	1	1.06	39	Megalaimidae	2	2.13
16	Apodidae	2	2.13	40	Meropidae	2	2.13
17	Campephagidae	2	2.13	41	Picidae	2	2.13
18	Chloropseidae	1	1.06	42	Podicipedidae	1	1.06
19	Cisticolidae	2	2.13	43	Psittaculidae	1	1.06
20	Corvidae	2	2.13	44	Strigidae	1	1.06
21	Dicaeidae	1	1.06	45	Anhingidae	1	1.06
22	Dicruridae	2	2.13	46	Pelecanidae	1	1.06
23	Estrildidae	2	2.13	47	Phalacrocoracidae	3	3.19
24	Hirundinidae	2	2.13	**Total**		**94**	**100**

Cormorant *Phalacrocorax carbo*, Indian Cormorant *Phalacrocorax fuscicollis*, Little Cormorant *Microcarbo niger*, Grey Heron *Ardea cinerea*, Pond Heron *Ardeola grayii*, Black-crowned Night Heron *Nycticorax nycticorax*, Painted Stork *Mycteria leucocephala*, Indian Spot-billed Duck *Anas poecilorhyncha*, Lesser whistling Duck *Dendrocygna javanica*, Black Kite *Milvus migrans*, Brahminy Kite *Haliastur indus*) (S. Sushanth pers. obs.). Earlier studies on birds from the same area have recorded 135 species of birds (Kumara et al. 2010), which is a decline in bird diversity compared to the present study. The bird diversity is lower than the other two major lakes of Mysuru (Kukkarahalli lake and Lingambudhi lake) with 98 and 213 species, respectively (Kumara et al. 2010). All of these declines, even though there are methodological limitations in different survey periods, underscore its role amid ongoing urbanization pressures. However, index values indicate substantial richness of the wetland's biodiversity; species richness

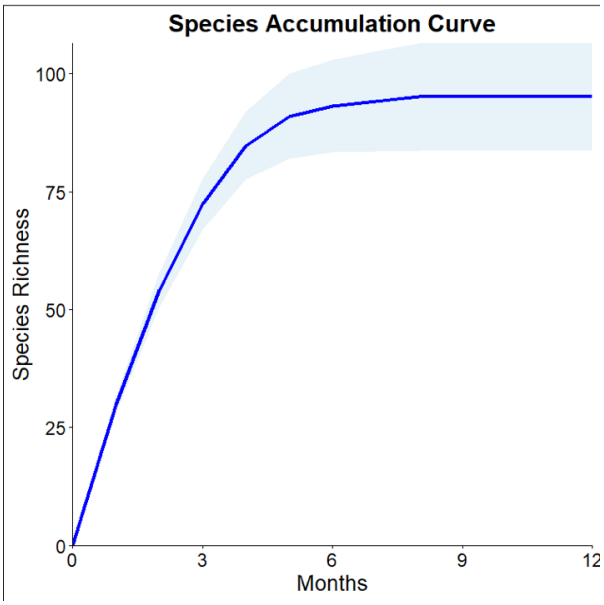

Image 2. Species accumulation curve for birds of Karanji Lake, Mysuru. The feather area indicates 95% confidence intervals.

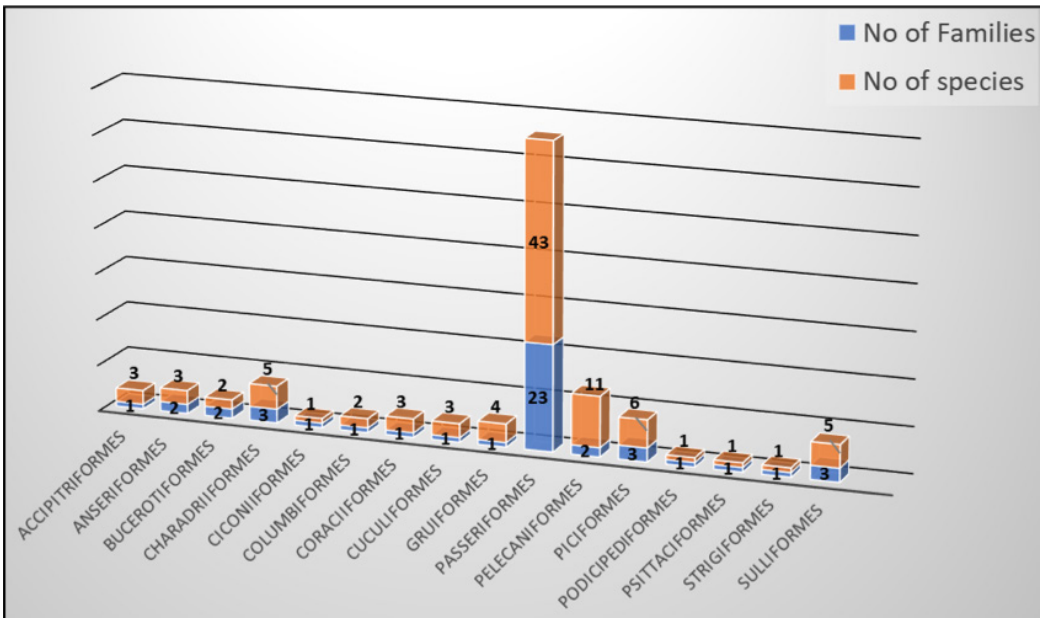

Image 3. Graph representing order-wise families and species recorded at Karanji Lake, Mysuru.

Table 3. Diversity Indices values of birds recorded at Karanji Lake, Mysuru.

	Diversity Indices	Values
1	Species richness	94
2	Shannon-Wiener diversity Index	$3.1517 \pm 0.31_{SE}$
3	Simpson diversity Index	0.6937
4	Pielou's evenness	0.694

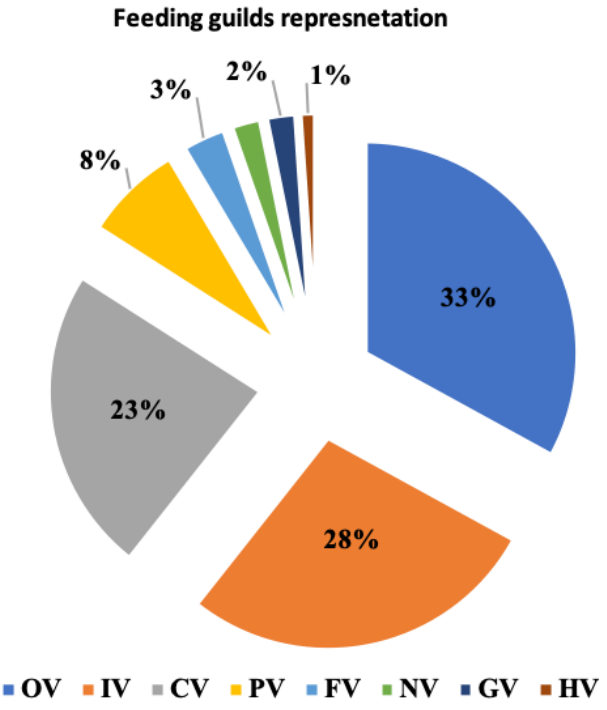

Image 4. Representation of feeding guilds of birds recorded at Karanji Lake, Mysuru: CV—Carnivorous | FV—Frugivorous | GV—Granivorous | HV—Herbivorous | IV—Insectivorous | NV—Nectarivorous | OV—Omnivorous | PV—Piscivorous.

and Shannon-Wiener values reflect robust taxonomic representation along with high community uncertainty driven by even species proportions. Simpson's value signifies low dominance probability among species pairs, wherein Pielou evenness demonstrates equitable abundance distribution supporting stability.

The dominance of certain birds in lake ecosystems is known to reflect habitat structure, food availability, and ecological suitability. The order Passeriformes dominated as they are globally the most species-rich and commonly abundant bird order, dominating mixed lake-edge and adjacent terrestrial habitats, where shrubs, trees, and open ground favour insectivores, omnivores, and generalists, explaining the higher number of omnivores and insectivores (Francl & Schnell 2002; Traut & Hostetler 2004; Schmitt & Edwards 2022; Naveen et al. 2025, 2026). Habitat heterogeneity of lakes (such as open water, shallow margin, aquatic vegetation, and riparian trees) provides a mosaic of complementary habitats for wetland birds (along with food), which are known to be key drivers of waterbird abundance, explaining the elevated presence of Pelecaniformes and Ardeidae (Ramachandran et al. 2017; Ramesh et al. 2020; Meerhoff & González-Sagrario 2022; Nag 2022).

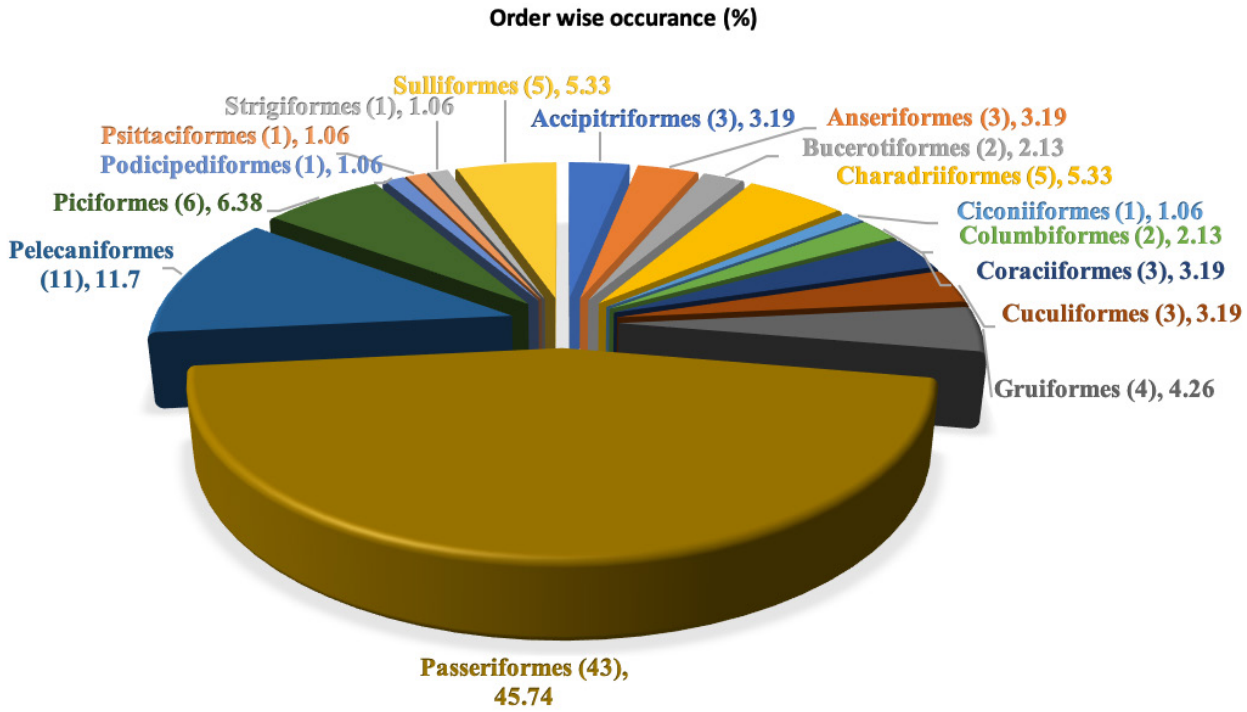

Image 5. Order-wise bird species recorded in Karanji Lake, Mysuru.

Wetland habitat heterogeneity (wooded area, marshes, open water) supports functional diversity through dominant feeding guilds, primarily omnivores, insectivores, and carnivores, that drive pest regulation and nutrient cycling, indicating robust trophic interactions typical of urban refugia (Panda et al. 2021). However, the prevalence of omnivores and insectivores alongside declining representation of other guilds indicates strong ecological filtering and reduced resource heterogeneity (Ahmed & Khan 2022). Such guild patterns favouring broad trophic niches under urban-driven habitat simplification—predictably erode trophic complexity and functional diversity (Hagen et al. 2017; El-Sabaawi 2018; Sol et al. 2020; Panda et al. 2021; Ahmed & Khan 2022). The present study also highlights that there could be a potentially significant relationship between Karanji Lake and Chamundi Hills, as there were personal observations of the movement of birds between both of these places. They are two separate areas, but connected by some of these life forms which are dependent on both of these areas. Further, systematic investigation is required to understand the fine-scale relationship between birds and these areas.

Urban wetlands like Karanji Lake act as an important refugium and help maintain species richness and functional diversity because they provide necessary resources that can support both resident and migratory birds within otherwise heavily built-up landscapes, making them especially valuable where natural wetlands have been lost or degraded. However, during the study, it was found that Karanji Lake is under several threats, falling into i) anthropogenic (sewage intrusion, tourist boating, path alterations) and ii) ecological threats (hyacinth mats, natural siltation, eutrophication), as these threats should be considered to take conservation actions by the concerned authorities. All of these are known to affect the bird community negatively, consistent with regional declines potentially reducing migratory influx (Bhendekar et al. 2024; Nandhini & Jagatheeswari 2024). Detailed studies in future would help to directly assess the effect of these threats on bird populations of the area. Bhatnagar et al. (2007) reported similar findings in India. It was observed that the various decaying weeds in the lakes formed floating vegetation islands/mats, which are known to deteriorate habitat quality and also interfere with foraging activities of waterbirds. These threats are also known to affect the distribution of wetland birds and cause local extinctions (Harisha & Hosetti 2017), which might lead to fewer migratory bird visits to the lake.

Considering these facts, there is a need to create awareness among local people about the richness of this place and take adequate steps and measures towards protection and conservation of the Lake, avifauna and

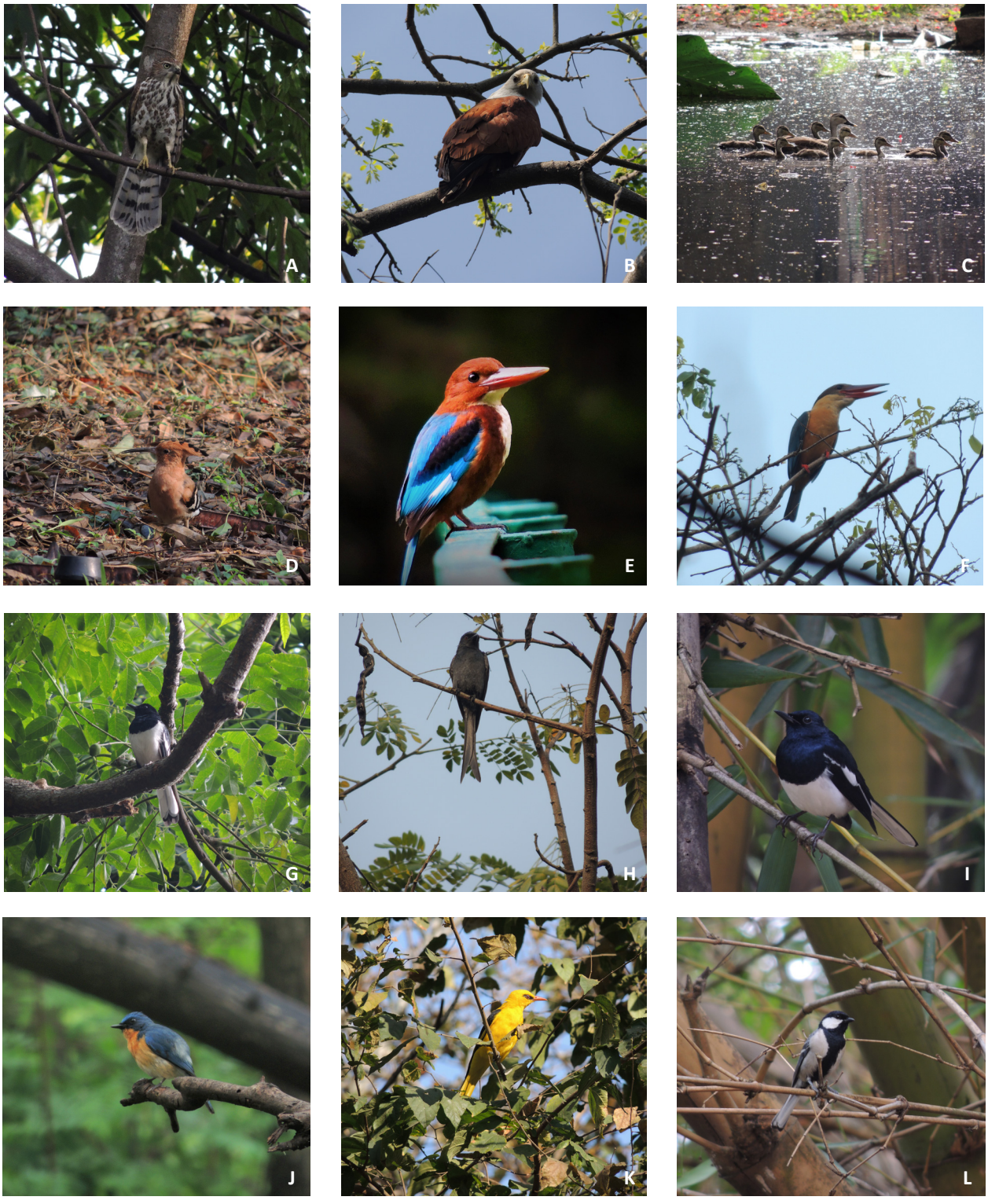

Image 6 A—L. Photographs of select birds recorded at the Karanji Lake, Mysuru during the study period. A—Shikra | B—Brahminy Kite | C—Indian Spot-billed Duck | D—Eurasian Hoopoe | E—White-throated Kingfisher | F—Stork-billed Kingfisher | G—Black-headed Cuckooshrike | H—Ashy Drongo | I—Oriental magpie Robin | J—Tickell's Blue Flycatcher | K—Indian Golden Oriole | L—Cinerous Tit. © S. Sushanth.

Image 6 M—T. Photographs of select birds recorded at the Karanji Lake, Mysuru during the study period. M—Indian Pitta | N—Purple Heron | O—Black-rumped Flameback | P—White-naped Woodpecker | Q—Rose-ringed Parakeet | R—Mottled Wood-Owl | S—Spot-billed Pelican | T—Great Cormorant. © S. Sushanth.

the lake's avian heritage. Conservation via targeted measures such as aquatic de-weeding, wastewater diversion, mechanical/biolocontrol hyacinth eradication, and water aeration by mechanical pumps needs to be carried out from time to time for sustaining aquatic bird populations; more native trees and host plants should be planted, which would attract prey base and increase prey abundance (Grutters et al. 2015; Woo et al. 2018; Peterson et al. 2025). Hence, it is required by the Sri Chamarajendra Zoological Gardens to help restore its biodiversity value, bolster flyway stopovers, and model urban wetland management, with speculated Chamundi Hills connectivity. Further follow-up studies of the same lake for a longer period will help to determine the species-specific aquatic and other bird and habitat conservation. Conservation of such wetlands is essential to sustain migratory bird populations, as it is probably an abode during their migratory route, serving a vital role in the conservation of these species (Harisha & Hosetti 2017). Thus, to have a long-term conservation measure, it is necessary to have knowledge about bird species diversity present in an area. The richness of species diversity in the present study site may be attributed to its geographical location, heterogeneity of land characteristics, and number of tree & shrub species, which makes the place more complex structurally.

CONCLUSION

The outcome of the present study highlights the importance of wetland habitat as refugia for avifaunal diversity in urban ecosystems, with Karanji Lake sustaining 94 species and critical guilds despite urbanization pressures, thereby maintaining ecological regulation via pest control and nutrient cycling. Management must prioritize sewage diversion, hyacinth eradication, and zoned tourism to preserve breeding sites for NT species like Painted Stork, preventing trophic cascades from guild loss. The current study not only acts as baseline data from scientific and systematic effort, but also helps in understanding the value of such urban wetlands. Such studies will also aid in monitoring and conserving bird diversity in and around urban areas. Although the present habitat is providing shelter and acting as a breeding ground for many bird species, there is a need for an awareness campaign and bio-monitoring programmes for maintaining and protecting the avian heritage. However, if proper steps are not taken, the available richness of these glorified birds is under threat due to uncontrolled urbanization constraints. These may severely affect the ecological balance and alter the avian diversity of this Lake. Future research should deploy radio-telemetry for hills-lake connectivity and functional trait analyses to quantify resilience thresholds under climate-urban gradients.

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