



Diversity and Conservation of Wetland Avifauna in Nanjarayan Lake, Tiruppur, Tamil Nadu, India

Nandhini M ^{a*} and J Jagatheeswari ^{b++}

^a Chikkanna Government Arts and Science College, Tirupur, India.

^b Department of Zoology, Chikkanna Government College, Tirupur, India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: <https://doi.org/10.56557/upjoz/2024/v45i184445>

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here:

<https://prh.mbimph.com/review-history/4068>

Original Research Article

Received: 02/07/2024

Accepted: 04/09/2024

Published: 05/09/2024

ABSTRACT

This paper shares the results from a big bird survey at Nanjarayan Lake in Tamil Nadu. It ran from 2022 to 2024. To check out the bird variety, see how it changes with the seasons and look at how well different bird species are doing there. Over three years, we did lots of field surveys during different times of the year. We used methods like point counts, transect walks, and habitat checks. In total, we found 184 bird species resident birds that live there all year and migrating ones that visit. We even spotted some species that need special attention. This shows how important the lake is for both local birds and those just flying between. When we looked closely at the numbers through the seasons, we found some big changes in how many birds there were. Winter was especially busy, with a lot of different kinds showing up and the migratory birds arriving. The study also identified key threats to avian biodiversity in the lake, such as habitat degradation, water

⁺⁺ Associated Professor;

*Corresponding author: Email: mbbsnandhu@gmail.com;

Cite as: M, Nandhini, and J Jagatheeswari. 2024. "Diversity and Conservation of Wetland Avifauna in Nanjarayan Lake, Tiruppur, Tamil Nadu, India". *UTTAR PRADESH JOURNAL OF ZOOLOGY* 45 (18):254-67.
<https://doi.org/10.56557/upjoz/2024/v45i184445>.

pollution, and human disturbances. Based on these findings, the study recommends urgent conservation measures, including habitat restoration, pollution control, and the implementation of strict regulations to minimize human impact. This survey underscores the importance of Nanjarayan Lake as a vital bird habitat and calls for enhanced conservation efforts to protect its rich avian diversity. The findings provide valuable baseline data for future ecological studies and contribute to the broader understanding of lake ecosystems in Tamil Nadu.

Keywords: Ramsar wetland; Nanjarayan lake; Tiruppur; avifaunal diversity; conservation; ecology.

1. INTRODUCTION

Nanjarayan Lake, also known as Sarkar Periyapalayam Reservoir, is located in the Tirupur district of Tamil Nadu, India. This artificial lake, originally constructed for irrigation purposes, has evolved into a significant wetland ecosystem over the years, attracting a diverse range of flora and fauna, particularly bird species. The lake, covering an area of approximately 440 acres, is fed primarily by seasonal rains and serves as a critical water resource for the surrounding agricultural lands and communities. Wetlands like Nanjarayan Lake are among the most productive ecosystems on Earth, offering habitat to numerous species, regulating water cycles, and supporting livelihoods. In recent years, there has been increasing awareness of the ecological importance of such wetlands, especially in regions like Tamil Nadu, where rapid urbanization and industrial activities threaten their existence. The lake's unique position within the semi-arid region of Tirupur makes it a vital refuge for both resident and migratory birds, particularly during the winter months. The research conducted by Thapa et al. [1] on the avifaunal diversity in and around Nanjarayan lake, Tiruppur, TamilNadu. an important contribution to the understanding of bird populations in India. By synthesizing insights from various studies, it becomes clear that a multifaceted approach encompassing ecological, technological, and socio-political aspects is essential for the conservation of avifauna.

1.1 Ecological Significance

Nanjarayan Lake plays a crucial role in maintaining local biodiversity and ecological balance. It supports a wide array of bird species, including waterfowl, waders, raptors, and passerines. This lake is especially important for migratory birds, serving as a stopover site along their migratory routes. The diverse habitats within and around the lake, including open water marshy areas, and reed beds, provide ideal

conditions for feeding, nesting, and roosting. Beyond its role in avian ecology, Nanjarayan Lake supports various other wildlife forms, including aquatic organisms, amphibians, reptiles, and insects. The surrounding areas, characterized by agricultural lands and small patches of scrub forests, further enhance the ecological diversity of the region. Moreover, the lake's ability to recharge groundwater and moderate local climate underscores its importance in sustaining the region's environmental health. Avifaunal diversity is influenced by various ecological factors, including habitat availability, climate, and human impacts. Azpiroz et al. [2] highlight the ecological significance of birds in Nanjarayan lake, noting their role as indicators of habitat health and biodiversity.

1.2 Threats to Nanjarayan Lake

Nanjarayan Lake faces several threats. The most pressing of these include habitat loss due to encroachment and land-use change, pollution from agricultural runoff and nearby industries, and the over-extraction of water for irrigation. Additionally, climate change poses a long-term threat by altering rainfall patterns, which could affect the lake's water levels and, consequently, the biodiversity it supports. Human activities, such as fishing, livestock grazing, and tourism, also contribute to the degradation of the lake's habitats. Invasive species, both plant and animal, have further complicated the conservation scenario, as they often outcompete native species, leading to a decline in local biodiversity. These factors collectively threaten the lake's ability to function as a sustainable ecosystem.

Ramsar's 17th Bird Sanctuary was added by official announcement on August 15, 2024.

India is one of the signatories to the Ramsar Tradition marked in 1971 on Ramsar, Iran. India marked the Tradition on February 1, 1982. A add up to of 26 locales were included to the list of Ramsar destinations from 1982 to 2013, but from

2014 to 2024, the nation included 59 modern wetlands to the list of Ramsar locales. Right now, Tamil Nadu has the most elevated number of Ramsar destinations with 18, taken after by Uttar Pradesh with 10. Nanjarayan Bird Haven may be a huge shallow wetland found within the north-eastern portion of Uthukuli circle in Tirupur area of Tamil Nadu. The wetlands in this region depend mainly on weather conditions, especially heavy rains from the Nallur catchment area. Nanjarayan Lake is located 10 km north of Tirupur city, near Sarkar Periyapalayam village in Tirupur district. It is located on the Tirupur - Uthukuli highway. The lake lies below two villages - Sarkar Periyapalayam and Neruperichal. The lake got its name from its restoration and renovation by King Nanjarayan who ruled the region centuries ago. Additionally, about 191 bird

species, 87 butterfly species, 7 amphibian species, 21 reptile species, 11 small mammal species, and 77 plant species have been recorded in and around the lake. The lake serves as a feeding and nesting site for native bird species while migratory birds use the lake as a feeding ground during migration season. The lake also serves as an important source of water for agricultural irrigation in the region. This lake plays a vital part in groundwater revive. The lake has been announced the 17th winged creature haven of Tamil Nadu due to its wealthy winged creature differences. The nearby community has as of now shaped a solid affiliation in ensuring the lake and its environments. The timberland division oversees the lake on a feasible premise in collaboration with the nearby community.

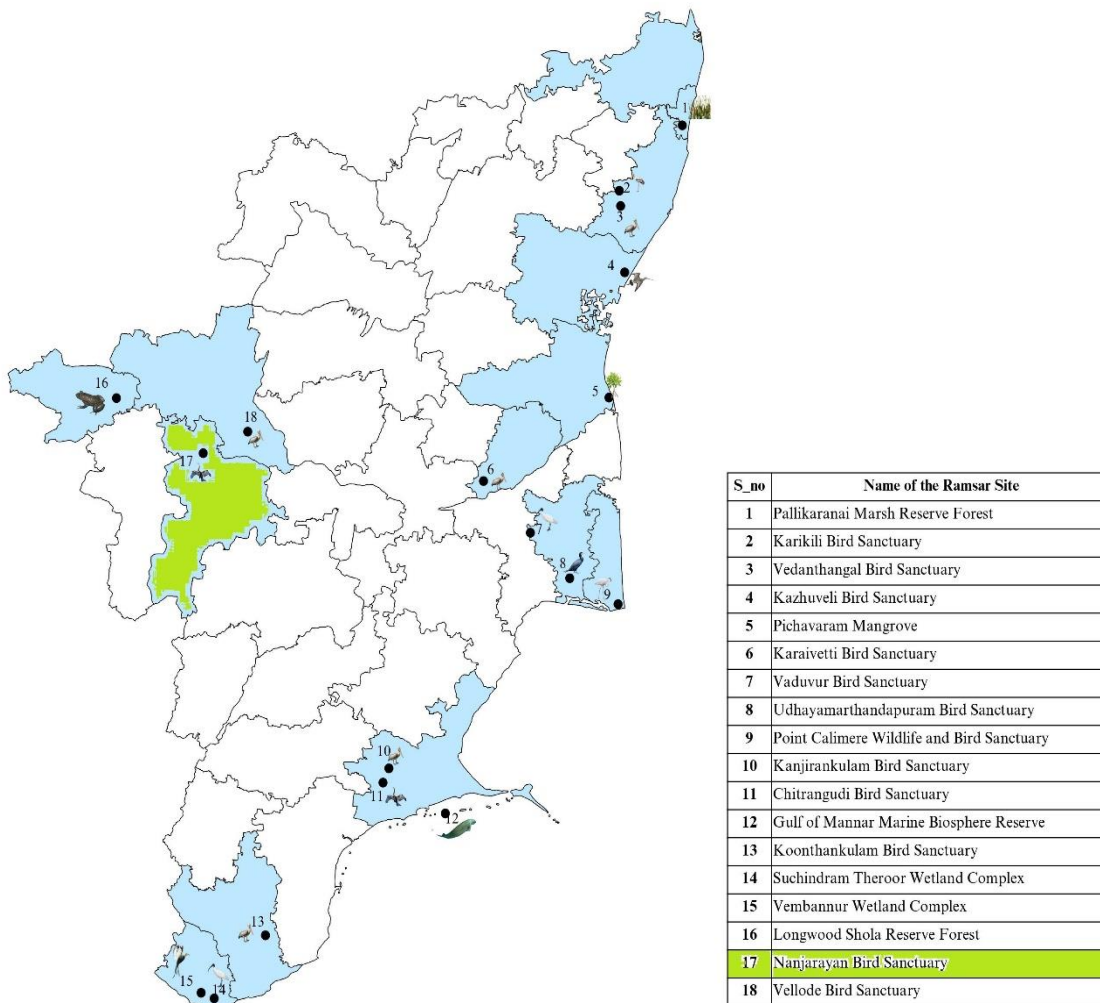


Fig. 1. That map sources in Tamil Nadu wetland mission -list of RAMSAR sites in Tamil Nadu

2. MATERIALS AND METHODS

2.1 Study Area

Location: We did our study at Nanjarayan Lake in Tiruppur, Tamil Nadu, India. This beautiful lake covers about 1.26 km² (0.49 sq. mi) It sits at latitude [11.121209] and longitude [77.362805].

2.2 Data Collection

1. Binoculars are essential for observing birds from a distance without disturbing them [3]. A field guide with illustrations and descriptions bird species is also crucial for accurate identification [4].
2. The notebook and pen are essential for recording observations, including species seen, numbers, behaviours and habitat preference [5].
3. Point – count survey: A method were observed stand at predetermined points

and record all birds species seen or hears with in a specified time frame [6].

4. Transect Surveys: Walking along a predetermined path (Transect) And recording all birds species observed with in a specified distance on either side [7]
5. Statistical analysis: Using method to analyze bird survey data [8]
6. GPS and Mapping: GPS devices were used to record the precise locations of bird sightings. Was employed to map bird distribution and habitat types within the study area.

Ornithologists, bird watchers, and researchers must all know how to identify birds. Proper identification of bird species is important in order to study their behaviour, ecology, and conservation. This paper will focus on the ways that birds are identified, and will emphasize the use of field guides, binoculars, and mobile applications.

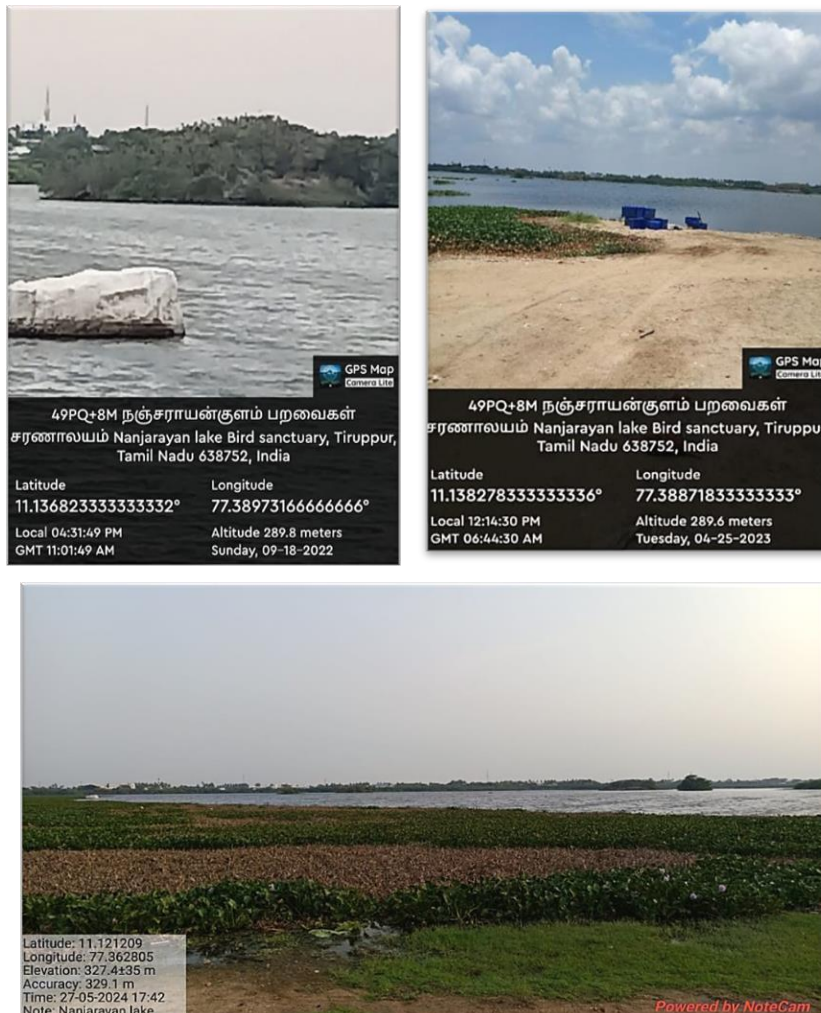


Fig. 2. Study area view in 2022-2023-2024

3. RESULTS AND DISCUSSION

3.1 Birds in Nanjarayan Lake Tiruppur

Table 1. Avifaunal abundance and IUCN status about Nanjarayan Lake Tiruppur

S.NO	Common Name	Abundance	IUCN
1	Gadwall	RARE	LC
2	Ruddy Shelduck	RARE	LC
3	Eurasian Wigeon	RARE	LC
4	Bar - headed Goose	UNCOMMON	LC
5	Northern Pintail	UNCOMMON	LC
6	Cotton Pygmy - Goose	RARE	LC
7	Green -winged Teal	UNCOMMON	LC
8	Northern Shoveler	UNCOMMON	LC
9	Garganey	UNCOMMON	LC
10	Lesser Whistling -Duck	UNCOMMON	LC
11	Indian Spot -billed Duck	COMMON	LC
12	Red Collared - Dove	RARE	LC
13	Spotted Dove	COMMON	LC
14	Laughing Dove	COMMON	LC
15	Rock Pidgeon	COMMON	LC
16	Eurasian Collared -Dove	COMMON	LC
17	Common Cuckoo	RARE	LC
18	Gray - bellied Cuckoo	RARE	LC
19	Common Hawk -Cuckoo	RARE	LC
20	Blue -faced Malkoha	COMMON	LC
21	Pied Cuckoo	COMMON	LC
22	Greater Coucal	COMMON	LC
23	Asian Koel	COMMON	LC
24	Brown - backed Needletail	RARE	LC
25	Little Swift	UNCOMMON	LC
26	Alpine Swift	UNCOMMON	LC
27	Asian Palm Swift	COMMON	LC
28	Indian Nightjar	RARE	LC
29	Ruddy - breasted Crake	RARE	LC
30	Baillon's Crake	RARE	LC
31	Eurasian Moorhen	COMMON	LC
32	Eurasian Coot	COMMON	LC
33	Gray-headed Swamphen	COMMON	LC
34	White -breasted Waterhen	COMMON	LC
35	Common Redshank	RARE	LC
36	Broad - billed Sandpiper	RARE	LC
37	Curlew Sandpiper	RARE	NT
38	Temmick's Stint	UNCOMMON	LC
39	Ruff	UNCOMMON	LC
40	Common Greenshank	RARE	LC
41	Marsh Sandpiper	UNCOMMON	LC
42	Common Snipe	UNCOMMON	LC
43	Little Stint	UNCOMMON	LC
44	Green Sandpiper	UNCOMMON	LC
45	Wood Sandpiper	UNCOMMON	LC
46	Black - tailed Godwit	RARE	NT
47	Common Sandpiper	UNCOMMON	LC
48	Slender - billed Gull	RARE	LC
49	Brown - headed Gull	RARE	LC
50	River Tern	RARE	VU
51	Whiskered Tern	RARE	LC
52	Greater Painted -Snipe	RARE	LC
53	Pied Avocet	RARE	LC
54	Black -winged Stilt	COMMON	LC
55	Tibetan Sand - Plover	RARE	LC
56	Kentish Plover	RARE	LC
57	Little Ringed Plover	COMMON	LC
58	Yellow -wattled Lapwing	COMMON	LC
59	Red -wattled Lapwing	COMMON	LC

S.NO	Common Name	Abundance	IUCN
60	Indian Thick - K nee	RARE	LC
61	Small Pratincole	RARE	LC
62	Indian Courser	RARE	LC
63	Barred Buttonquail	RARE	LC
64	Pheasant -tailed Jacana	RARE	NT
65	Asian Woolly - necked Stork	RARE	LC
66	Asian Openbill	RARE	LC
67	Painted Stork	COMMON	NT
68	Oriental Darter	COMMON	LC
69	Indian Cormorant	COMMON	LC
70	Great Cormorant	COMMON	LC
71	Little Cormorant	COMMON	LC
72	Spot -billed Pelican	COMMON	NT
73	Western Reef - Heron	RARE	LC
74	Cinnamon Bittern	RARE	LC
75	Striated Heron	RARE	LC
76	Great Egret	COMMON	LC
77	Little Egret	COMMON	LC
78	Medium Egret	COMMON	LC
79	Yellow Bittern	RARE	LC
80	Indian Pond-Heron	COMMON	LC
81	Eastern Cattle Egret	COMMON	LC
82	Gray Heron	COMMON	LC
83	Black -crowned Night Heron	COMMON	LC
84	Black Bittern	RARE	LC
85	Puple Heron	COMMON	LC
86	Eurasian Spoonbill	COMMON	LC
87	Black-headed Ibis	COMMON	NT
88	Glossy Ibis	COMMON	LC
89	Short - toed Snake - Eagle	RARE	LC
90	Montagu's Harrier	RARE	LC
91	Oriental Honey - buzzard	RARE	LC
92	Western Marsh Harrier	RARE	LC
93	White - eyed Buzzard	RARE	LC
94	Black - winged Kite	RARE	LC
95	Booted Eagle	RARE	LC
96	Shikra	UNCOMMON	LC
97	Black Kite	COMMON	LC
98	Brahminy Kite	RARE	LC
99	Blue - tailed Bee- eater	UNCOMMON	LC
100	Asian Green Bee-eater	COMMON	LC
101	Common Kingfisher	COMMON	LC
102	Pied Kingfisher	COMMON	LC
103	White -throated Kingfisher	COMMON	LC
104	Indian Roller	COMMON	LC
105	Ashy Woodswallow	RARE	LC
106	Common Lora	RARE	LC
107	Ashy Drongo	RARE	LC
108	Black Drango	COMMON	LC
109	Rufous -tailed Lark	RARE	LC
110	Oriental Skylark	RARE	LC
111	Ashy -crowned Sparrow	COMMON	LC
112	Jerdon`s Bushlark	UNCOMMON	LC
113	Rufous Treepie	COMMON	LC
114	Large -billed Crow	COMMON	LC
115	House Crow	COMMON	LC
116	Common Tailorbird	COMMON	LC
117	Plain Prinia	COMMON	LC
118	Large Gray Babbler	COMMON	LC
119	Yellow -billed Babbler	COMMON	LC
120	Jungle Prinia	RARE	LC
121	Zitting Cisticola	RARE	LC
122	Ashy Prinia	COMMON	LC
123	White - browed Bulbul	RARE	LC
124	Red -vented Bulbul	COMMON	LC
125	Tawny Pipit	RARE	LC

S.NO	Common Name	Abundance	IUCN
126	Blyth's Pipit	RARE	LC
127	Gray Wagtail	RARE	LC
128	Western Yellow Wagtail	UNCOMMON	LC
129	White Wagtail	UNCOMMON	LC
130	Tree Pipet	RARE	LC
131	White -browed Wagtail	COMMON	LC
132	Paddyfield Pipit	COMMON	LC
133	Chestnut - tailed Starling	RARE	NT
134	Rosy Starling	UNCOMMON	LC
135	Brahminy Starling	UNCOMMON	LC
136	Common Myna	COMMON	LC
137	Verditer Flycatcher	RARE	LC
138	Bluethroat	RARE	LC
139	Oriental Magpie - Robin	RARE	LC
140	Siberian Stonechat	RARE	LC
141	Pied Bushchat	COMMON	LC
142	Indian Robin	COMMON	LC
143	Puple -rumped Sunbird	UNCOMMON	LC
144	Puple Sunbird	COMMON	LC
145	Red Avadavat	RARE	LC
146	Tricolored Munia	UNCOMMON	LC
147	Indian Silverbill	COMMON	LC
148	Scaly -Breasted Munia	COMMON	LC
149	White - rumped Munia	UNCOMMON	LC
150	Sykes's Warbler	UNCOMMON	LC
151	Thick - billed Warbler	RARE	LC
152	Booted Warbler	UNCOMMON	LC
153	Blyth's Reed Warbler	UNCOMMON	LC
154	Paddyfield Warbler	UNCOMMON	LC
155	Clamorous Reed Waebler	UNCOMMON	LC
156	Streak - throated Swallow	UNCOMMON	LC
157	Red -rumped Swallow	UNCOMMON	LC
158	Barn Swallow	UNCOMMON	LC
159	Yellow - throated Sparrow	RARE	LC
160	House Sparrow	COMMON	LC
161	Pale - billed Flowerpecker	UNCOMMON	LC
162	Indian Golden Oriole	UNCOMMON	LC
163	Long - tailed Shrike	UNCOMMON	LC
164	Bay -backed Shrike	UNCOMMON	LC
165	Brown Shrike	UNCOMMON	LC
166	Baya Weaver	COMMON	LC
167	Lesser whitethroat	UNCOMMON	LC
168	Indian paradise - Flycatcher	UNCOMMON	LC
169	Green Warbler	RARE	LC
170	Common Woodshrike	RARE	LC
171	Indian Peafowl	COMMON	LC
172	Gray Francolin	COMMON	LC
173	Eurasian Hoopoe	COMMON	LC
174	Rose -ringed Parakeet	COMMON	LC
175	Little Grebe	COMMON	LC
176	Black -rumped Flameback	UNCOMMON	LC
177	Coppersmith Barbet	UNCOMMON	LC
178	Barn Owl	RARE	LC
179	Short - eared Owl	RARE	LC
180	Spotted Owlet	UNCOMMON	LC
181	Pchesnut - bellied Sandgrouse	RARE	LC
182	Eurasian Hobby	RARE	LC
183	Eurasian kestrel	RARE	LC
184	Red - necked Falcon	RARE	NT

Table 2. List of birds recorded at Nanjarayan Lake, Tiruppur

S.NO	Order	Family	Common Name	Scientific Name
1	Anseriformes	Anatidae	Gadwall	<i>Mareca strepera</i>
2	Anseriformes	Anatidae	Ruddy Shelduck	<i>Tadorna ferruginea</i>
3	Anseriformes	Anatidae	Eurasian Wigeon	<i>Mareca penelope</i>

S.NO	Order	Family	Common Name	Scientific Name
4	Anseriformes	Anatidae	Bar - headed Goose	<i>Anser indicus</i>
5	Anseriformes	Anatidae	Northern Pintail	<i>Anas acuta</i>
6	Anseriformes	Anatidae	Cotton Pygmy - Goose	<i>Nettapus coromandelianus</i>
7	Anseriformes	Anatidae	Green -winged Teal	<i>Anas crecca</i>
8	Anseriformes	Anatidae	Northern Shoveler	<i>Spatula clypeata</i>
9	Anseriformes	Anatidae	Garganey	<i>Spatula querquedula</i>
10	Anseriformes	Anatidae	Lesser Whistling -Duck	<i>Dendrocygna javanica</i>
11	Anseriformes	Anatidae	Indian Spot -billed Duck	<i>Anas poecilorhyncha</i>
12	Columbiformes	Columbidae	Red Collared - Dove	<i>Streptopelia tranquebarica</i>
13	Columbiformes	Columbidae	Spotted Dove	<i>Spilopelia chinensis</i>
14	Columbiformes	Columbidae	Laughing Dove	<i>Spilopelia senegalensis</i>
15	Columbiformes	Columbidae	Rock Pidgeon	<i>Columba livia</i>
16	Columbiformes	Columbidae	Eurasian Collared -Dove	<i>Streptopelia decaocta</i>
17	Cuculiformes	Cuculidae	Common Cuckoo	<i>Cuculus canorus</i>
18	Cuculiformes	Cuculidae	Gray - bellied Cuckoo	<i>Cacomantis passerinus</i>
19	Cuculiformes	Cuculidae	Common Hawk -Cuckoo	<i>Hierococyx varius</i>
20	Cuculiformes	Cuculidae	Blue -faced Malkoha	<i>Phaenicophaeus viridirostris</i>
21	Cuculiformes	Cuculidae	Pied Cuckoo	<i>Clamator jacobinus</i>
22	Cuculiformes	Cuculidae	Greater Coucal	<i>Centropus sinensis</i>
23	Cuculiformes	Cuculidae	Asian Koel	<i>Eudynamis scolopaceus</i>
24	Caprimulgiformes	Apodidae	Brown - backed Needletail	<i>Hirundapus giganteus</i>
25	Caprimulgiformes	Apodidae	Little Swift	<i>Apus affinis</i>
26	Caprimulgiformes	Apodidae	Alpine Swift	<i>Tachymarptis melba</i>
27	Caprimulgiformes	Apodidae	Asian Palm Swift	<i>Cypsiurus balasienis</i>
28	Caprimulgiformes	Caprimulgidae	Indian Nightjar	<i>Caprimulgus asiaticus</i>
29	Gruiformes	Rallidae	Ruddy - breasted Crake	<i>Zapornia fusca</i>
30	Gruiformes	Rallidae	Baillon's Crake	<i>Zapornia pusilla</i>
31	Gruiformes	Rallidae	Eurasian Moorhen	<i>Gallinula chloropus</i>
32	Gruiformes	Rallidae	Eurasian Coot	<i>Fulica atra</i>
33	Gruiformes	Rallidae	Gray-headed Swamphen	<i>Pophyrrio poliocephalus</i>
34	Gruiformes	Rallidae	White -breasted Waterhen	<i>Amaurornis phoenicurus</i>
35	Charadriiformes	Scolopacidae	Common Redshank	<i>Tringa totanus</i>
36	Charadriiformes	Scolopacidae	Broad - billed Sandpiper	<i>Calidris falcinellus</i>
37	Charadriiformes	Scolopacidae	Curlew Sandpiper	<i>Calidris Ferruginea</i>
38	Charadriiformes	Scolopacidae	Temmick's Stint	<i>Calidris temminckii</i>
39	Charadriiformes	Scolopacidae	Ruff	<i>Calidris Pugnax</i>
40	Charadriiformes	Scolopacidae	Common Greenshank	<i>Tringa nebularia</i>
41	Charadriiformes	Scolopacidae	Marsh Sandpiper	<i>Tringa stagnatilis</i>
42	Charadriiformes	Scolopacidae	Common Snipe	<i>Gallinago gallinago</i>
43	Charadriiformes	Scolopacidae	Little Stint	<i>Calidris minuta</i>
44	Charadriiformes	Scolopacidae	Green Sandpiper	<i>Tringa ochropus</i>
45	Charadriiformes	Scolopacidae	Wood Sandpiper	<i>Tringa glareola</i>
46	Charadriiformes	Scolopacidae	Black - tailed Godwit	<i>Limosa limosa</i>
47	Charadriiformes	Scolopacidae	Common Sandpiper	<i>Actitis hypoleucos</i>
48	Charadriiformes	Laridae	Slender - billed Gull	<i>Chroicocephalus genei</i>
49	Charadriiformes	Laridae	Brown - headed Gull	<i>Chroicocephalus brunnicephalus</i>
50	Charadriiformes	Laridae	River Tern	<i>Sterna aurantia</i>
51	Charadriiformes	Laridae	Whiskered Tern	<i>Chlidonias hybrida</i>
52	Charadriiformes	Rostratulidae	Greater Painted -Snipe	<i>Rostratula benghalensis</i>
53	Charadriiformes	Recurvirostridae	Pied Avocet	<i>Recurvirostra avosetta</i>
54	Charadriiformes	Recurvirostridae	Black -winged Stilt	<i>Himantopus himantopus</i>
55	Charadriiformes	Charadriidae	Tibetan Sand - Plover	<i>Anarhynchus atrifrons</i>
56	Charadriiformes	Charadriidae	Kentish Plover	<i>Anarhynchus alexandrinus</i>
57	Charadriiformes	Charadriidae	Little Ringed Plover	<i>Charadrius dubius</i>
58	Charadriiformes	Charadriidae	Yellow -wattled Lapwing	<i>Vanellus malabaricus</i>
59	Charadriiformes	Charadriidae	Red -wattled Lapwing	<i>Vanellus indicus</i>
60	Charadriiformes	Burhinidae	Indian Thick - K nee	<i>Burhinus indicus</i>
61	Charadriiformes	Glareolidae	Small Pratincole	<i>Glareola lactea</i>
62	Charadriiformes	Glareolidae	Indian Courser	<i>Cursorius coromandelicus</i>
63	Charadriiformes	Turnicidae	Barred Buttonquail	<i>Turnix suscitator</i>
64	Charadriiformes	Jacaniidae	Pheasant -tailed Jacana	<i>Hydrophasianus chirurgus</i>
65	Ciconiiformes	Ciconiidae	Asian Woolly - necked Stork	<i>Ciconia episcopus</i>
66	Ciconiiformes	Ciconiidae	Asian Openbill	<i>Anastomus oscitans</i>
67	Ciconiiformes	Ciconiidae	Painted Stork	<i>Mycteria leucocephala</i>
68	Suliformes	Anhingidae	Oriental Darter	<i>Anhinga melanogaster</i>
69	Suliformes	Phalacrocoracidae	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>

S.NO	Order	Family	Common Name	Scientific Name
70	Suliformes	Phalacrocoracidae	Great Cormorant	<i>Phalacrocorax carbo</i>
71	Suliformes	Phalacrocoracidae	Little Cormorant	<i>Microcarbo niger</i>
72	Pelecaniformes	Pelecanidae	Spot -billed Pelican	<i>Pelecanus philippensis</i>
73	Pelecaniformes	Ardeidae	Western Reef - Heron	<i>Egretta gularis</i>
74	Pelecaniformes	Ardeidae	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>
75	Pelecaniformes	Ardeidae	Striated Heron	<i>Butorides striata</i>
76	Pelecaniformes	Ardeidae	Great Egret	<i>Ardea alba</i>
77	Pelecaniformes	Ardeidae	Little Egret	<i>Egretta garzetta</i>
78	Pelecaniformes	Ardeidae	Medium Egret	<i>Ardea intermedia</i>
79	Pelecaniformes	Ardeidae	Yellow Bittern	<i>Ixobrychus sinensis</i>
80	Pelecaniformes	Ardeidae	Indian Pond-Heron	<i>Ardeola grayii</i>
81	Pelecaniformes	Ardeidae	Eastern Cattle Egret	<i>Bubulcus coromandus</i>
82	Pelecaniformes	Ardeidae	Gray Heron	<i>Ardea cinerea</i>
83	Pelecaniformes	Ardeidae	Black -crowned Night Heron	<i>Nycticorax nycticorax</i>
84	Pelecaniformes	Ardeidae	Black Bittern	<i>Ixobrychus flavicollis</i>
85	Pelecaniformes	Ardeidae	Purple Heron	<i>Ardea purpurea</i>
86	Pelecaniformes	Threskiornithidae	Eurasian Spoonbill	<i>Platalea leucorodia</i>
87	Pelecaniformes	Threskiornithidae	Black-headed Ibis	<i>Threskiornis melanocephalus</i>
88	Pelecaniformes	Threskiornithidae	Glossy Ibis	<i>Plegadis falcinellus</i>
89	Accipitriformes	Accipitridae	Short - toed Snake - Eagle	<i>Circaetus gallicus</i>
90	Accipitriformes	Accipitridae	Montagu's Harrier	<i>Circus pygargus</i>
91	Accipitriformes	Accipitridae	Oriental Honey - buzzard	<i>Pernis ptilorhynchus</i>
92	Accipitriformes	Accipitridae	Western Marsh Harrier	<i>Circus aeruginosus</i>
93	Accipitriformes	Accipitridae	White - eyed Buzzard	<i>Butastur teesa</i>
94	Accipitriformes	Accipitridae	Black - winged Kite	<i>Elanus caeruleus</i>
95	Accipitriformes	Accipitridae	Booted Eagle	<i>Hieraaetus pennatus</i>
96	Accipitriformes	Accipitridae	Shikra	<i>Accipiter badius</i>
97	Accipitriformes	Accipitridae	Black Kite	<i>Milvus migrans</i>
98	Accipitriformes	Accipitridae	Brahminy Kite	<i>Haliastur indus</i>
99	Coraciiformes	Meropidae	Blue - tailed Bee- eater	<i>Merops philippinus</i>
100	Coraciiformes	Meropidae	Asian Green Bee-eater	<i>Merops orientalis</i>
101	Coraciiformes	Alcedinidae	Common Kingfisher	<i>Alcedo atthis</i>
102	Coraciiformes	Alcedinidae	Pied Kingfisher	<i>Ceryle rudis</i>
103	Coraciiformes	Alcedinidae	White -throated Kingfisher	<i>Halcyon smyrnensis</i>
104	Coraciiformes	Coraciidae	Indian Roller	<i>Coracias benghalensis</i>
105	Passeriformes	Artamidae	Ashy Woodswallow	<i>Artamus fuscus</i>
106	Passeriformes	Aegithinidae	Common Lora	<i>Aegithina tiphia</i>
107	Passeriformes	Dicruridae	Ashy Drongo	<i>Dicrurus leucophaeus</i>
108	Passeriformes	Dicruridae	Black Drongo	<i>Dicrurus macrocercus</i>
109	Passeriformes	Alaudidae	Rufous -tailed Lark	<i>Ammomanes phoenicura</i>
110	Passeriformes	Alaudidae	Oriental Skylark	<i>Alauda gulgula</i>
111	Passeriformes	Alaudidae	Ashy -crowned Sparrow	<i>Eremopterix griseus</i>
112	Passeriformes	Alaudidae	Jerdon's Bushlark	<i>Mirafra affinis</i>
113	Passeriformes	Corvidae	Rufous Treepie	<i>Dendrocitta vagabunda</i>
114	Passeriformes	Corvidae	Large -billed Crow	<i>Corvus macrorhynchos</i>
115	Passeriformes	Corvidae	House Crow	<i>Corvus splendens</i>
116	Passeriformes	Cisticolidae	Common Tailorbird	<i>Orthotomus sutorius</i>
117	Passeriformes	Cisticolidae	Plain Prinia	<i>Prinia inornata</i>
118	Passeriformes	Leiothrichidae	Large Gray Babbler	<i>Argya malcolmi</i>
119	Passeriformes	Leiothrichidae	Yellow -billed Babbler	<i>Argya affinis</i>
120	Passeriformes	Cisticolidae	Jungle Prinia	<i>Prinia sylvatica</i>
121	Passeriformes	Cisticolidae	Zitting Cisticola	<i>Cisticola juncidis</i>
122	Passeriformes	Cisticolidae	Ashy Prinia	<i>Prinia socialis</i>
123	Passeriformes	Pycnonotidae	White - browed Bulbul	<i>Pycnonotus luteolus</i>
124	Passeriformes	Pycnonotidae	Red -vented Bulbul	<i>Pycnonotus cafer</i>
125	Passeriformes	Motacillidae	Tawny Pipit	<i>Anthus campestris</i>
126	Passeriformes	Motacillidae	Blyth's Pipit	<i>Anthus godlewskii</i>
127	Passeriformes	Motacillidae	Gray Wagtail	<i>Motacilla cinerea</i>
128	Passeriformes	Motacillidae	Western Yellow Wagtail	<i>Motacilla flava</i>
129	Passeriformes	Motacillidae	White Wagtail	<i>Motocilla alba</i>
130	Passeriformes	Motacillidae	Tree Pipet	<i>Anthus trivialis</i>
131	Passeriformes	Motacillidae	White -browed Wagtail	<i>Motacilla maderaspatensis</i>
132	Passeriformes	Motacillidae	Paddyfield Pipit	<i>Anthus rufulus</i>
133	Passeriformes	Sturnidae	Chestnut - tailed Starling	<i>Sturnia malabarica</i>
134	Passeriformes	Sturnidae	Rosy Starling	<i>Pastor roseus</i>
135	Passeriformes	Sturnidae	Brahminy Starling	<i>Stunia pagodarum</i>

S.NO	Order	Family	Common Name	Scientific Name
136	Passeriformes	Sturnidae	Common Myna	<i>Acridotheres tristis</i>
137	Passeriformes	Muscicapidae	Verditer Flycatcher	<i>Eumyias thalassinus</i>
138	Passeriformes	Muscicapidae	Bluethroat	<i>Luscinia svecica</i>
139	Passeriformes	Muscicapidae	Oriental Magpie - Robin	<i>Copsychus saularis</i>
140	Passeriformes	Muscicapidae	Siberian Stonechat	<i>Saxicola maurus</i>
141	Passeriformes	Muscicapidae	Pied Bushchat	<i>Saxicola caprata</i>
142	Passeriformes	Muscicapidae	Indian Robin	<i>Copsychus fulvicatus</i>
143	Passeriformes	Nectariniidae	Puple - rumped Sunbird	<i>Leptocoma zeyonica</i>
144	Passeriformes	Nectariniidae	Puple Sunbird	<i>Cinnyris asiaticus</i>
145	Passeriformes	Estrildidae	Red Avadavat	<i>Amandava amandava</i>
146	Passeriformes	Estrildidae	Tricolored Munia	<i>Lonchura malacca</i>
147	Passeriformes	Estrildidae	Indian Silverbill	<i>Euodica malabarica</i>
148	Passeriformes	Estrildidae	Scaly -Breasted Munia	<i>Lonchura punctulata</i>
149	Passeriformes	Estrildidae	White - rumped Munia	<i>Lonchura striata</i>
150	Passeriformes	Acrocephalidae	Sykes's Warbler	<i>Iduna rama</i>
151	Passeriformes	Acrocephalidae	Thick - billed Warbler	<i>Arundinax aedon</i>
152	Passeriformes	Acrocephalidae	Booted Warbler	<i>Iduna caligata</i>
153	Passeriformes	Acrocephalidae	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>
154	Passeriformes	Acrocephalidae	Paddyfield Warbler	<i>Acrocephalus agricola</i>
155	Passeriformes	Acrocephalidae	Clamorous Reed Waebler	<i>Acrocephalus stentoreus</i>
156	Passeriformes	Hirundinidae	Streak - throated Swallow	<i>Petrochelidon fluvicola</i>
157	Passeriformes	Hirundinidae	Red -rumped Swallow	<i>Cecropis daurica</i>
158	Passeriformes	Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>
159	Passeriformes	Passeridae	Yellow - throated Sparrow	<i>Gymnoris xanthocollis</i>
160	Passeriformes	Passeridae	House Sparrow	<i>Passer domesticus</i>
161	Passeriformes	Dicaeidae	Pale - billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>
162	Passeriformes	Oriolidae	Indian Golden Oriole	<i>Oriolus kundoo</i>
163	Passeriformes	Laniidae	Long - tailed Shrike	<i>Lanius schach</i>
164	Passeriformes	Laniidae	Bay -backed Shrike	<i>Lanius vittatus</i>
165	Passeriformes	Laniidae	Brown Shrike	<i>Lanius cristatus</i>
166	Passeriformes	Ploceidae	Baya Weaver	<i>Ploceus philippinus</i>
167	Passeriformes	Sylviidae	Lesser whitethroat	<i>Curruca curruca</i>
168	Passeriformes	Monarchidae	Indian paradise - Flycatcher	<i>Terpsiphone paradisi</i>
169	Passeriformes	Phylloscopidae	Green Warbler	<i>Phylloscopus nitidus</i>
170	Passeriformes	Vangidae	Common Woodshrike	<i>Tephrodornis pondicerianus</i>
171	Galliformes	Phasianidae	Indian Peafowl	<i>Pavo cristatus</i>
172	Galliformes	Phasianidae	Gray Francolin	<i>Ortygornis pondicerianus</i>
173	Bucerotiformes	Upupidae	Eurasian Hoopoe	<i>Upupa epops</i>
174	Psittaciformes	Psittaculidae	Rose -ringed Parakeet	<i>Psittacula krameri</i>
175	Podicipediformes	Podicipedidae	Little Grebe	<i>Tachybaptus ruficollis</i>
176	Piciformes	Picidae	Black -rumped Flameback	<i>Dinopium benghalense</i>
177	Piciformes	Megalaimidae	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>
178	Strigiformes	Tytonidae	Barn Owl	<i>Tyto alba</i>
179	Strigiformes	Strigidae	Short - eared Owl	<i>Asio flammeus</i>
180	Strigiformes	Strigidae	Spotted Owlet	<i>Athene brama</i>
181	Pteroclitiformes	Pteroclitidae	Pchesnut - bellied Sandgrouse	<i>Pterocles exustus</i>
182	Falconiformes	Falconidae	Eurasian Hobby	<i>Falco subbuteo</i>
183	Falconiformes	Falconidae	Eurasian kestrel	<i>Falco tinnunculus</i>
184	Falconiformes	Falconidae	Red - necked Falcon	<i>Falco chichquera</i>

Table 3. Avifaunal order wise number of species in different family

S.NO	Order	Family	Species
1	Anseriformes	1	11
2	Columbiformes	1	5
3	Cuculiformes	1	7
4	Caprimulgiformes	2	5
5	Gruiformes	1	6
6	Charadriiformes	9	30
7	Ciconiiformes	1	3
8	Suliformes	2	4
9	Pelecaniformes	2	17
10	Accipitriformes	1	10
11	Coraciiformes	2	6
12	Passeriformes	24	66

S.NO	Order	Family	Species
13	Galliformes	2	2
14	Bucerotiformes	1	1
15	Psittaciformes	1	1
16	Podicipediformes	1	1
17	Piciformes	2	2
18	Strigiformes	2	3
19	Pterocliiformes	1	1
20	Falconiformes	3	3
	Total	60	184

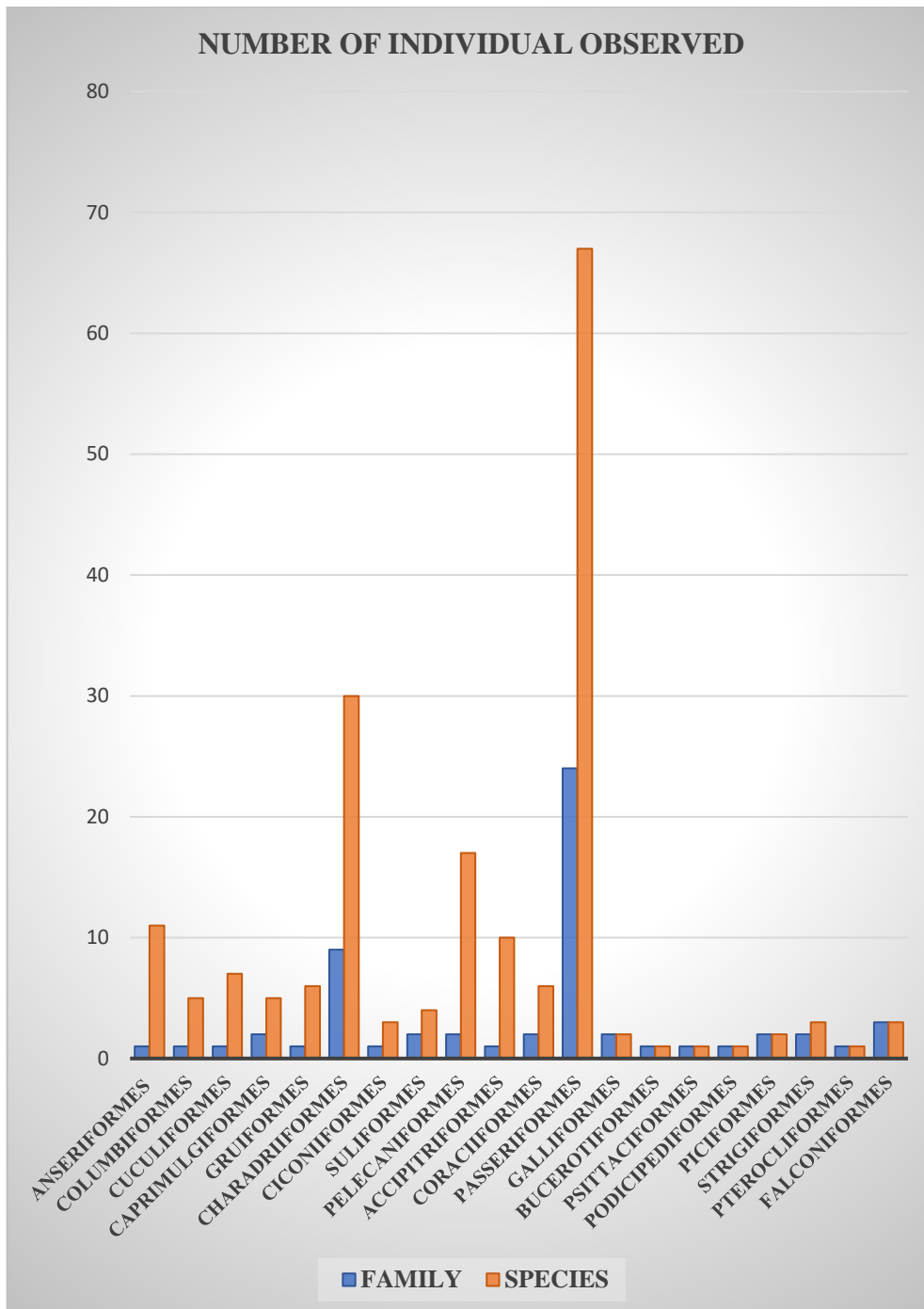


Fig. 3. Avifaunal order wise number of species in different family

3.2 Results

During the course of this study, a total of 184 bird species were recorded at Nanjarayan Lake, Tirupur, Tamil Nadu. These species were observed across various seasons from 2022 to 2024, showcasing the lake's significance as a crucial habitat for both resident and migratory birds. The results highlight the diversity, abundance, and seasonal variation of the avian community at the lake.

3.3 Conservation Implications

The results underscore the importance of Nanjarayan Lake as a vital bird habitat in Tamil Nadu, supporting a rich avian biodiversity including species of conservation concern. Recommendations for conservation include habitat restoration, pollution control, and the establishment of protected zones to mitigate human disturbances. Continued monitoring and community engagement are essential to ensure the long-term conservation of this critical wetland ecosystem. This results section provides a detailed summary of the findings from the survey of 184 bird species at Nanjarayan Lake, highlighting species composition, seasonal variations, habitat utilization, and conservation implications

3.4 Conservation Challenges

Despite its ecological importance, Nanjarayan Lake faces several conservation challenges. Habitat degradation due to agricultural encroachment and urbanization poses a significant threat to the lake's biodiversity. The reduction in natural vegetation and the fragmentation of habitats have likely impacted species that rely on specific microhabitats for nesting and foraging.

Pollution from agricultural runoff, including pesticides and fertilizers, is another major concern. The eutrophication of the lake can lead to harmful algal blooms, which deplete oxygen levels and disrupt the food web, ultimately affecting bird populations [9]. The study observed that water quality issues were particularly pronounced during the monsoon season, when runoff is at its peak.

Human disturbances, such as fishing, boating, and livestock grazing, were also identified as significant threats, especially during the breeding season. The abandonment of nests due to

human activities has been reported in other studies as well and remains a critical issue at Nanjarayan Lake [10].

3.5 Implications for Conservation and Management

extend this conversation by discussing the global distribution and conservation status of ecologically rare bird species. Their findings indicate that many bird populations are declining due to habitat loss and environmental changes [11]. This aligns with the situation in Tiruppur, where deforestation and land-use changes pose significant threats to avifaunal diversity.

The findings from this study have several implications for the conservation and management of Nanjarayan Lake

3.6 Habitat Protection

There is an urgent need to protect the remaining natural habitats around the lake from further encroachment and degradation. Establishing protected areas or community reserves could provide legal protection and help preserve critical habitats for bird species.

Pollution Control: Implementing measures to control agricultural runoff, such as buffer zones and sustainable farming practices, would help improve water quality and reduce the impact of eutrophication on bird populations.

Community Involvement: Engaging local communities in conservation efforts is essential for the long-term protection of the lake. Education and awareness programs could foster a conservation ethic among local residents, who play a crucial role in maintaining the lake's ecological health.

3.7 Ongoing Monitoring

Continued monitoring of bird populations and habitat conditions is necessary to track the effectiveness of conservation efforts and to detect any emerging threats. Citizen science initiatives, involving local birdwatchers and volunteers, could complement formal monitoring programs and provide valuable data.

3.8 Future Research Directions

This study has provided a comprehensive baseline for the avian diversity at Nanjarayan Lake, but there are several areas where further research is needed:

Climate Change Impacts: Recent studies have identified specific trends and patterns in avifaunal diversity. For example, [12] discuss how climate and vegetation structure influence songbird distribution in Canadian boreal regions, indicating that similar studies could elucidate the impacts of climate on bird populations in Tiruppur. Future research could focus on the potential impacts of climate change on migratory patterns and species distributions at the lake. Understanding these changes is crucial for developing adaptive conservation strategies.

In-depth Habitat Studies: Detailed studies on the specific habitat requirements of key species, particularly those that are threatened or declining, would help inform habitat management and restoration efforts.

3.9 Impacts of Human Activity

Human activities, including urbanization and agricultural expansion, have profound effects on wetland ecosystems. Xu et al. [13] reveals that urbanization negatively influences bird diversity in river wetlands, indicating that habitat alteration can lead to a decline in avian populations. This finding is particularly relevant to the Nanjarayan Lake area, where surrounding development may threaten the ecological integrity of the sanctuary. Furthermore, the grazing pressure from geese has been shown to jeopardize the conservation and restoration of reed belts, which are vital for bird breeding and feeding [14].

3.10 Recreational Value and Sustainable Tourism

The recreational value of wetlands is increasingly recognized as a critical aspect of sustainable tourism management. Mangan et al. [15] employed a travel cost model to estimate the recreational value of Pakistan's largest freshwater lake, suggesting that understanding economic benefits can support conservation efforts. This approach could be beneficial for Nanjarayan Lake, where developing eco-tourism could promote conservation while providing economic incentives.

4. CONCLUSION

The survey conducted from 2022 to 2024 at Nanjarayan Lake revealed a remarkable diversity of avian species, with a total of 184 species recorded. This diversity underscores the lake's significance as a critical habitat for both resident

and migratory birds in Tamil Nadu. The findings highlight the importance of Nanjarayan Lake as a biodiversity hotspot, particularly for waterbirds and other wetland-dependent species

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Thapa MK, Dutta S, Das HJ, Pradhan TK, Mahanta D, Tossa S, Kalita R, Sharma K. Avifaunal diversity and status in and around Ranga Reserve Forest, Lakhimpur, Assam, India. *Munis Entomology & Zoology*. 2024;19(2):543-55
2. Azpiroz A, Isacch J, Dias R, Giacomo AD, Fontana CS, Palare, Cristina Morales. Ecology and conservation of grassland birds in southeastern South America: a review. *Journal of Field Ornithology*. 2012; 83:217-246. Available:<http://doi.org/10.1111/J.1557-9263.2012.00372.X>
3. Smith J. *Birdwatching essential: A beginner's guide to birdwatching equipment*. Boston, MA: Publiser; 2018
4. Johnson A, Brown L. *Birdwatchers field guide: A comprehensive handbook for bird identification*. Newyork, NY: Publiser; 2020.
5. Botha J, Haussmann NS. Comparing bird sightings between grassland and marsh habitats at a rehabilitated wetland in Gauteng province, South Africa. *Biodiversites Journal of Biological Diversity*; 2023.
6. Martin -Schwarze A, Niemi J, Dixon P. Joint Modeling of Distances and Times in point -count Surveys. *Journal of Agricultural, Biological and Environmental Statistics*; 2021.
7. Barlow J, Gerrodette T, Forcada J. Factors affecting perpendicular sighting distances on shipboard line-transect for cetaceans. *J. Cetacean Res. Manage*; 2023.
8. Achen CH. *The statistical Analisis of Quasi-Experiments*; 2023.

9. Balachandran S. Restoration of Pallikaranai Marsh: A Key Habitat for Waterbirds in Chennai. *Journal of Wetland Conservation*. 2009;12(2):112-120.
10. Venkatraman C. Community Conservation and the Success of Vedanthangal Bird Sanctuary. *Conservation India Journal*. 2010;4(1):24-29.
11. Loiseau N, Mouquet N, Casajus N, Grenié Matthias, Guéguen M, Maitner Brian Salvin, Mouillot, D, Ostling A, Renaud J, Tucker C, Velez L, Thuiller W, Violle C. Global distribution and conservation status of ecologically rare mammal and bird species. *Nature Communications*. 2020;11.
Available:<http://doi.org/10.1038/s41467-020-18779-w>
12. Cumming S, Stralberg D, Lefevre Kara L, Sólymos P, Bayne E, Fang S, Fontaine T, Mazerolle, D, Schmiegelow F, Song Samantha J. Climate and vegetation hierarchically structure patterns of songbird distribution in the Canadian boreal region. *Ecography*. 2014;37:137-151.
Available:<http://doi.org/10.1111/J.1600-0587.2013.00299.X>
13. Xu, Qing-Xue, Zhou Lizhi, Xia S, Zhou, Jian. Impact of Urbanisation Intensity on Bird Diversity in River Wetlands around Chaohu Lake, China. *Animals : an Open Access Journal from MDPI*; 2022.
Available:<http://doi.org/10.3390/ani12040473>
14. Bakker ES, Veen Ciska GF, Heerdt, Gerard JN, Ter, Huig, Naomi, Sarneel J. High Grazing Pressure of Geese Threatens Conservation and Restoration of Reed Belts. *Frontiers in Plant Science*; 2018.
Available:<http://doi.org/10.3389/fpls.2018.01649>
15. Mangan T, Brouwer R, Lohano HD, Nangraj GM. Estimating the recreational value of Pakistan's largest freshwater lake to support sustainable tourism management using a travel cost model. *Journal of Sustainable Tourism*; 2013;21:473-486.
Available:<http://doi.org/10.1080/09669582.2012.708040>

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of the publisher and/or the editor(s). This publisher and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.

© Copyright (2024): Author(s). The licensee is the journal publisher. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<https://prh.mbimph.com/review-history/4068>