



**ASSESSMENT AND IDENTIFICATION OF
POTENTIAL WETLANDS AS BIRD SANCTUARIES
AND CONSERVATION STRATEGIES FOR THEM
IN TAMIL NADU**



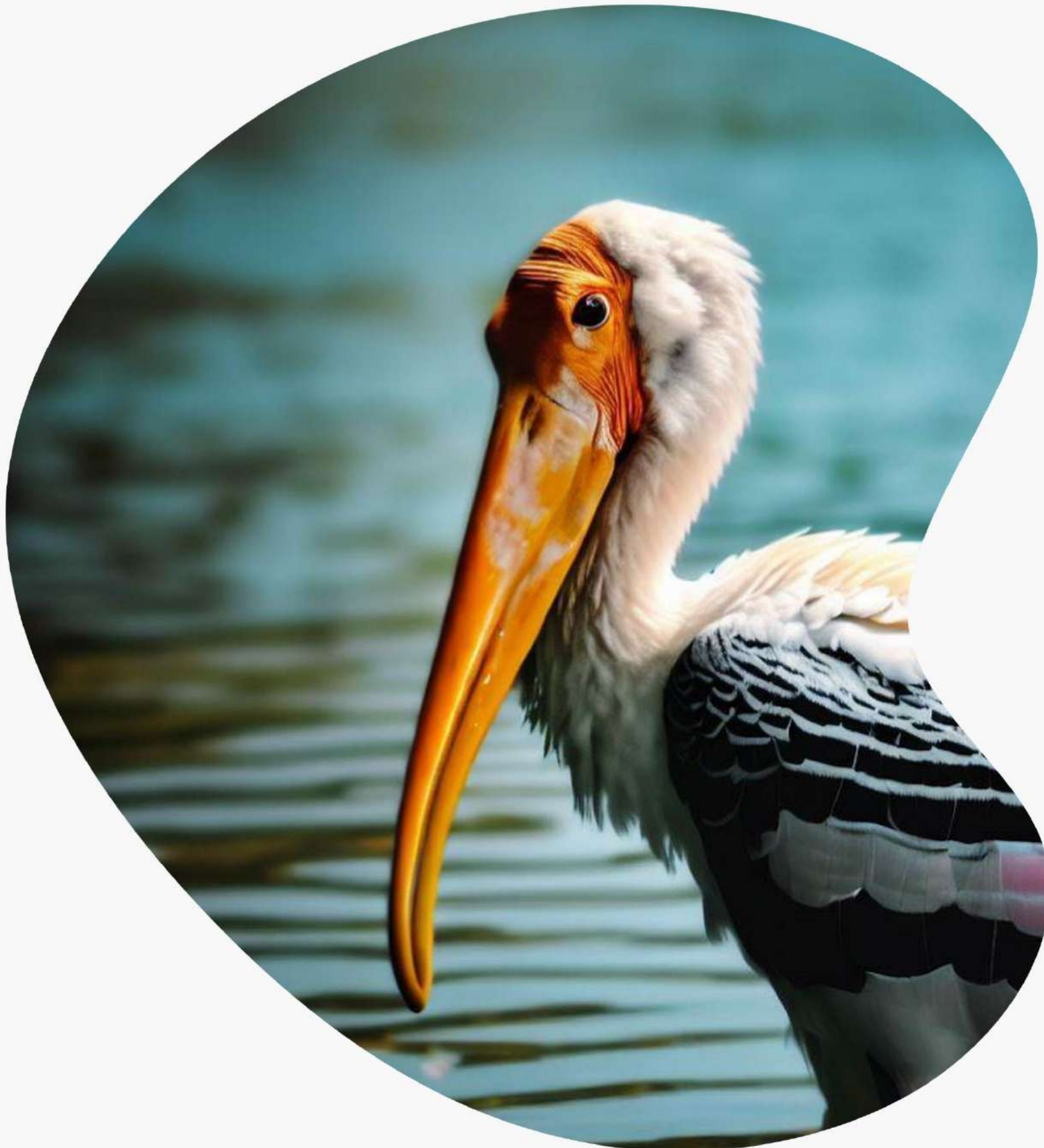
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Citation

Divinia Juanita, D., Riaz Sheriff, M., Shameer, T.T. (2023). Assessment and identification of potential wetlands as bird sanctuaries and conservation strategies for them in Tamil Nadu, Advanced Institute for Wildlife Conservation, Chennai, Tamil Nadu, India. Technical Report, Submitted to Tamil Nadu Forest Department, Government of Tamil Nadu.

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ACKNOWLEDGEMENT

We extend our heartfelt gratitude to **Thiru. A. Udhayan, IFS**, PCCF and Director, Advanced Institute for Wildlife Conservation, Vandalur, whose support and permission were instrumental in the successful completion of our project work.

We would like to show our gratitude to **Thiru. Nihar Ranjan, IFS**, Additional Director, AIWC and **Thiru. M.G. Ganesan**, Deputy Director (Technical), AIWC, for their guidance, encouragement, and support throughout the project.

We would like to show our gratitude to the former Deputy Director of AIWC, **Dr. R. Kanchana, IFS** for her guidance, encouragement, and support throughout the project.

We would like to show gratitude to **Dr. A. Manimozhi**, Scientist C, AIWC, and **Dr. D. Vasantha Kumari, FVAS**, AIWC for their input on the project.

We are greatly thankful to **Dr. Goldin Quadros, N. Mohamed Ibrahim**, and **A. Julffia Begam** from the Wetlands Ecology division team at SACON for sharing their report and providing their valuable advice and inputs in crucial areas of our study.

I am indebted to ebird by Cornell Lab for Ornithology for granting us access to their comprehensive bird data which proved to be an indispensable resource for our study.

We express our sincere thanks to **Mr. Ayyanar**, Government Arts College, Ooty who has given his time and skill. Lastly, we extend our thanks to all the kind-hearted individuals who offered their assistance and support, contributing to the successful culmination of this project.

We express our gratitude to **Dr. T.G. Vinay, IAS**, Director, Directorate of Survey and Settlement, and **Mr. Arun Annamalai**, GIS expert, Commissionerate of Survey and Settlement for their valuable time and input on GIS.

We wish to extend our heartfelt appreciation to the **Tamil Nadu Forest Department** for their generous support in funding this study. Their contribution has empowered us to take significant strides in the fields of wildlife conservation and research.

SUMMARY

Wetlands play a pivotal role as habitats for diverse avian species, offering unique hydrological and ecological characteristics that cater to various bird needs. A preliminary study was undertaken in Tamil Nadu to identify and designate potential wetlands as bird sanctuaries, focusing on effective conservation strategies. Data from secondary sources like eBird, we identified 207 wetlands across the region. These wetlands were classified based on bird abundance, area, and presence of vulnerable species, adhering to wetland assessment protocols. Prominent wetland-rich districts include Chengalpattu, Coimbatore, Kancheepuram, Thiruvallur, Madurai, Villupuram, Salem, and Kanyakumari.

To prioritize conservation efforts, a scoring system was developed, integrating critical factors like bird population and wetland area. Employing advanced Geographic Information System (GIS) technology, we meticulously mapped these prioritized sites, integrating data on boundaries, elevation, and zones of influence. These maps provided comprehensive visualizations of each wetland's distinct attributes, enhanced by overlays illustrating water bodies, agricultural lands, urban developments, and road networks.

A total of 364 bird species were identified from these wetlands and categorized according to their IUCN conservation status. Our analysis revealed 2 Endangered, 336 Least Concern, 16 Near Threatened, 2 Not Recognized, and 8 Vulnerable species. Among avian families, Accipitridae and Scolopacidae stood out with the highest representation, each comprising 25 species. Additionally, noteworthy diversity was observed in the Ardeidae, Laridae, and Columbidae families, encompassing 14, 15, and 9 species respectively. In contrast, several families exhibited limited species, indicating moderate to lower population levels. For example, families like Paridae, Tytonidae, and Upupidae were each represented by a single species, while others contained 2 to 6 species.

Our report stands as a fundamental reference for initiating an assessment of the potential to designate these wetlands as protected areas or community reserves. The focus of this assessment is to ensure the safeguarding of both the avian fauna and their associated habitats.



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1. INTRODUCTION

Wetlands can include marshes, swamps, bogs, fens, and other similar areas (Ramsar Convention on Wetlands, 2021). Wetlands are incredibly important ecosystems, providing a range of ecosystem services such as water purification, flood control, carbon storage, and habitat for numerous plant and animal species. Wetlands are areas where water is the primary factor controlling the environment and the associated plant and animal life. They are characterized by the presence of water, either permanently or seasonally, and the plants and animals that have adapted to living in wet conditions (Odum, 1989). They are also crucial for maintaining biodiversity and supporting the livelihoods of many communities around the world (Millennium Ecosystem Assessment, 2005).

However, wetlands are under threat from various human activities such as urbanization, agriculture, and resource extraction, as well as from natural events such as climate change and sea-level rise (N. Bassi et al., 2014). Conservation efforts are therefore needed to protect and restore wetlands, to ensure that these valuable ecosystems can continue to provide their essential services to society.

Importance of wetland

Wetlands are important ecosystems that provide a wide range of ecological, economic, and social benefits. Wetlands are important because of the below points:

Biodiversity: Wetlands are home to a wide range of plant and animal species. They provide important breeding and feeding grounds for migratory birds, amphibians, fish, and other aquatic organisms. (Ramsar Convention Secretariat, 2021)

Water quality: Wetlands act as natural filters, helping to purify water by removing excess nutrients, pollutants, and sediment. They also help to recharge groundwater supplies and regulate water flow, reducing the risk of floods and droughts. (United States Environmental Protection Agency, 2021)

Climate regulation: Wetlands store large amounts of carbon, helping to mitigate climate change by reducing the amount of carbon dioxide in the atmosphere. They also help to regulate local and regional climates by moderating temperature extremes and reducing the impact of storms and other severe weather events (United Nations Environment Programme, 2015)

Cultural and recreational value: Wetlands have significant cultural and recreational value, providing opportunities for activities such as fishing, birdwatching, hiking, and boating. They also have important cultural significance for many Indigenous peoples around the world. (UNESCO, 2021)

Economic benefits: Wetlands provide a range of economic benefits, including fisheries, forestry, agriculture, and ecotourism. They also help to reduce the cost of infrastructure development by reducing the risk of flooding and erosion. (World Wide Fund for Nature, 2021)

Wetlands in India

India has a wide range of wetlands, covering an area of approximately 4.63 million hectares, according to the National Wetland Atlas of India. These wetlands are distributed across the country, from the Himalayan foothills in the north to the coastal regions in the south and east (National Wetland Atlas of India, 2019).

Some of the major wetlands in India

- 1. Sundarbans:** The Sundarbans is the largest mangrove forest in the world and a UNESCO World Heritage Site. It is located in the delta region of the Ganges, Brahmaputra, and Meghna rivers in West Bengal (Sundarbans: UNESCO World Heritage Centre)
- 2. Chilika Lake:** Chilika Lake is the largest brackish water lagoon in Asia, located in the state of Odisha. It is an important habitat for migratory birds and is home to a variety of fish and other aquatic animals (Chilika Lake: Chilika Development Authority)
- 3. Keoladeo National Park:** Keoladeo National Park, formerly known as Bharatpur Bird Sanctuary, is a wetland reserve located in Rajasthan. It is a designated Ramsar site and an important breeding and feeding ground for many bird species (Keoladeo National Park: Rajasthan Tourism).
- 4. Loktak Lake:** Loktak Lake is the largest freshwater lake in northeastern India, located in the state of Manipur. It is a unique ecosystem, known for its floating phumdis (masses of vegetation) and the endangered sangai deer (Loktak Lake: Loktak Development Authority)

4. Vembanad-Kol Wetland: The Vembanad-Kol Wetland is a complex system of interconnected brackish lagoons and lakes in Kerala. It is a Ramsar site and an important habitat for many fish, bird, and plant species (Vembanad-Kol Wetland: Ramsar Convention on Wetlands).

Threats

Wetlands in India, like in other parts of the world, are facing a range of threats. Some of the main threats to wetlands in India include:

Habitat destruction and fragmentation: Wetlands are often converted for agriculture, urbanization, and industrial development, leading to the loss of critical habitat for many plant and animal species. This can also lead to the fragmentation of wetland habitats, making it difficult for species to move between different areas (Ministry of Environment, Forest and Climate Change, 2019).

Pollution: Wetlands can become contaminated by pollutants from agricultural runoff, industrial effluents, and untreated sewage. This can have harmful effects on the health of wetland ecosystems and the species that depend on them (Ramachandran & Kandasamy, 2016).

Invasive species: Non-native species can be introduced to wetlands through human activities, such as the release of aquarium pets or ballast water from ships. These invasive species can outcompete native species for resources and disrupt the functioning of wetland ecosystems (IUCN, 2021).

Overexploitation: Wetlands are often a source of natural resources such as fish, timber, and peat. Overexploitation of these resources can lead to the degradation of wetland ecosystems and the loss of biodiversity (Bharucha & Pretty, 2010).

Climate change: Climate change is affecting wetlands in a number of ways, including rising sea levels, changes in precipitation patterns, and changes in temperature. These changes can have significant impacts on wetland ecosystems, including changes in plant and animal communities and alterations in the availability of water (IPCC, 2014).

Conservation efforts are needed to address these threats and ensure the long-term health and sustainability of wetlands in India and around the world. This includes measures such as protected area designation, restoration and rehabilitation of degraded wetlands, and the promotion of sustainable use practices.

Wetlands in Tamil Nadu

According to the Tamil Nadu Biodiversity Conservation and Greening Project report, Tamil Nadu has about 8,312 wetlands covering an area of 4.63 lakh hectares (46,300 square kilometers). These wetlands include tanks, ponds, lakes, reservoirs, estuaries, mangroves, and other types of water bodies (Tamil Nadu Biodiversity Conservation and Greening Project, 2020). The wetlands of Tamil Nadu serve as breeding, nesting, and foraging sites for several bird species, including migratory birds that travel long distances every year. In addition, wetlands act as natural water filters, purifying water and improving its quality. They also help regulate the water cycle, preventing flooding during heavy rains and maintaining water availability during droughts. Additionally, wetlands provide important ecological services, such as carbon sequestration and nutrient cycling.

Wetlands in Tamil Nadu are important habitats for a diverse range of bird species, both resident and migratory. The bird diversity in wetlands depends on various factors, including the type of wetland, location, and season. Several wetlands in Tamil Nadu are important bird habitats and attract bird watchers and researchers from across the world.

Several studies have reported a high diversity of bird species in the state's wetlands, with some wetlands serving as important sites for migratory birds. For instance, a study conducted in the wetlands of Kanyakumari district reported the presence of 91 bird species, including 31 migratory species (Rajeshkumar et al., 2019). Another study conducted in the Vellode Birds Sanctuary wetland reported the presence of 127 bird species, including several endangered species such as the painted stork and the black-necked stork (Gopi et al., 2019).

Some of the significant wetlands in Tamil Nadu

- 1. Point Calimere Wildlife and Bird Sanctuary:** Located on the eastern coast of Tamil Nadu, Point Calimere is a designated Ramsar site and an important habitat for migratory birds, sea turtles, and other marine species (Tamil Nadu Forest Department).
- 2. Vedaranyam Salt Pans:** These salt pans, located in Nagapattinam district, are an important wintering ground for many migratory birds, including flamingos (Tamil Nadu Tourism Department).
- 3. Pulicat Lake:** Pulicat Lake is a large brackish water lagoon located on the border between Tamil Nadu and Andhra Pradesh. It is an important habitat for several species of fish, birds, and other aquatic animals (Tamil Nadu Tourism Department).
- 4. Chitrangudi Bird Sanctuary:** Chitrangudi Bird Sanctuary, located in the district of Sivaganga, is a wetland that supports a variety of bird species, including the endangered painted stork (Tamil Nadu Forest Department).
- 5. Oussudu Lake:** Oussudu Lake is a freshwater lake located near the city of Puducherry. It is an important habitat for many bird species and supports several fisheries (Puducherry Tourism Department).

These wetlands, along with many others in Tamil Nadu, face a range of threats, including habitat destruction pollution, and overexploitation. Effective management and conservation efforts are needed to ensure the long-term health and sustainability of these important ecosystems

Wetlands and Birds

Wetlands are crucial habitats for a diverse range of bird species, making them essential homes for many avian populations. These ecosystems, which include marshes, swamps, bogs, and coastal estuaries, offer a unique combination of water and land that supports a rich variety of plants and animals. Birds are particularly drawn to wetlands due to the abundant food sources, nesting opportunities, and shelter they provide.

Abundant Food Sources: Wetlands are teeming with life, including insects, small fish, amphibians, and aquatic plants. This rich biodiversity attracts numerous bird species that rely on these resources for their sustenance. Wading birds, waterfowl, and shorebirds are just a few examples of bird groups that find a plentiful food supply in wetlands.

Nesting and Breeding Grounds: Many bird species use wetlands as ideal locations for nesting and breeding. The dense vegetation and intricate network of water channels offer protection from predators and provide a safe environment for raising their young. Species like herons, egrets, and ducks often build nests in the reeds or trees found in wetlands.

Migration Rest Stops: Wetlands serve as critical rest stops for migratory birds during their long journeys. These areas offer the necessary resources for these birds to refuel and rest before continuing their arduous journeys across continents. Wetlands along migration routes are vital in supporting these annual movements.

Diverse Bird Communities: Due to the varied habitats within wetlands, they attract a diverse array of bird species. From water-loving birds that forage in the ponds to birds of prey that hunt in the surrounding uplands, wetlands sustain a web of interconnected bird communities.

Ecological Importance: Birds play essential roles in wetland ecosystems, contributing to pollination, seed dispersal, and controlling insect populations. Their presence and activities contribute to the overall health and functioning of wetland habitats.

Indicator Species: Birds are often used as indicators of wetland health. Their presence and behavior can provide valuable insights into the overall ecological condition of the wetland. Monitoring bird populations in wetlands can help assess the impact of environmental changes and human activities on these sensitive ecosystems.

Conserving wetlands as natural habitats for birds is not only vital for avian biodiversity but also for maintaining the overall health of our planet's ecosystems. Protecting these wetland areas ensures that birds have a safe and stable home, and it supports a delicate balance of life that extends far beyond the avian world. As a result, preserving wetlands benefits wildlife, humans, and the environment as a whole.

This report presents a compilation of wetlands that exhibit significant potential to be designated as Bird Sanctuaries. The selection process involved evaluating various factors, including ebird data sourced from the citizen science program. Additionally, the report incorporates comprehensive GIS land use/land cover analysis and zone of influence analysis for each wetland.

The assessment of wetlands is conducted by integrating data on bird species distribution, the total area of the wetland, and a threat index derived from GIS data. By combining these datasets, we gain valuable insights into each wetland's ecological significance and conservation value.

The information provided in this report serves as a valuable resource for decision-makers and environmental authorities looking to protect and preserve vital bird habitats and biodiversity. By designating identified wetlands as Bird Sanctuaries, we can promote the conservation of avian species and their natural habitats, ensuring a sustainable and harmonious environment for wildlife and human communities.



Figure 1. Observation of common kingfisher during the field visit

2. OBJECTIVES

1. Identification of hotspots with bird congregations outside protected areas.
2. Wetland bird species composition, relative abundance, and distribution in different wetlands of TN.
3. Formulating conservation and management initiatives to protect suitable wetlands and their avian diversity.

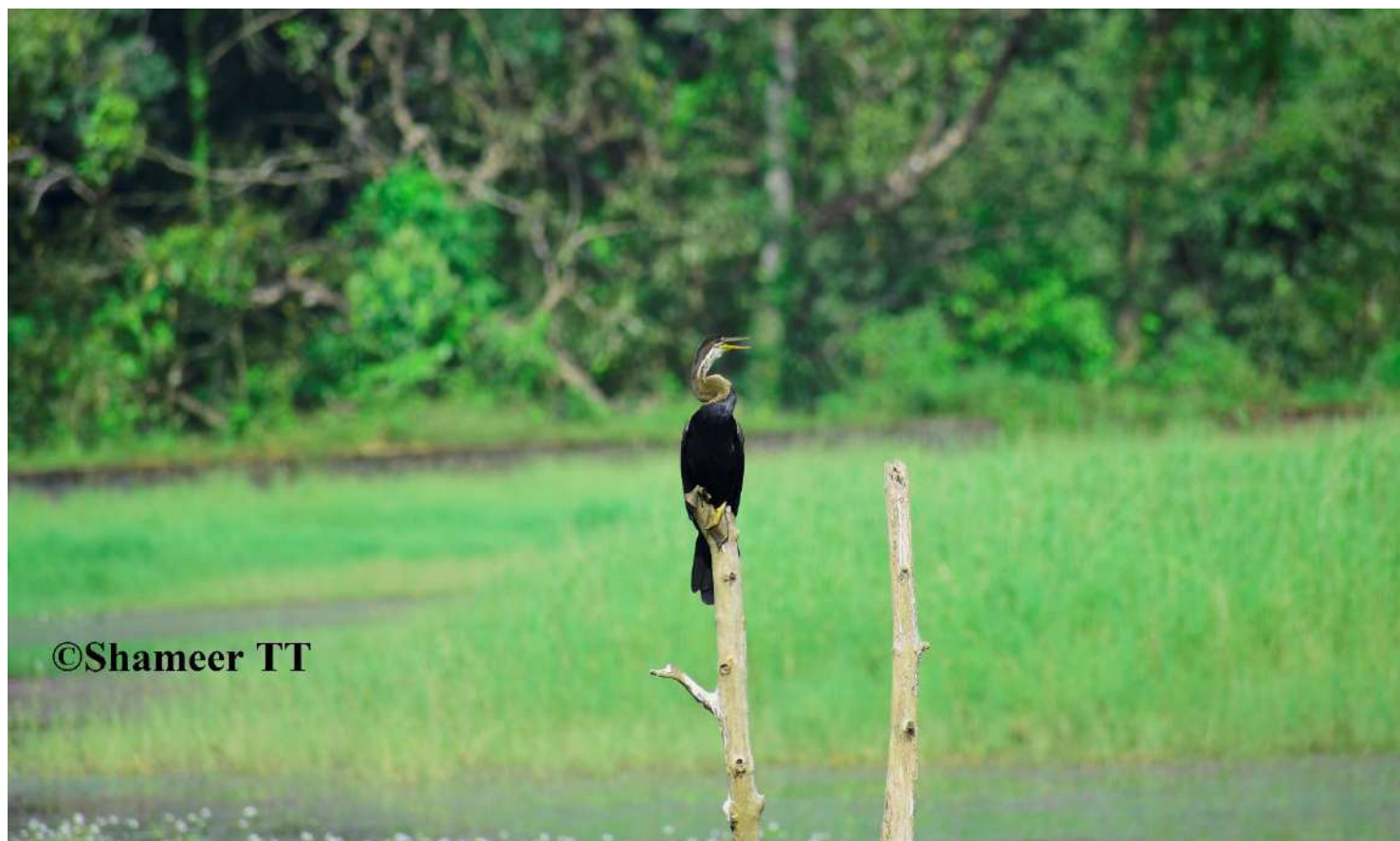


Figure 2. Observation of Oriental darter during the field visit

3. STUDY AREA

Tamil Nadu is a state located in the southern part of India, bordered by the Bay of Bengal to the east, the Indian Ocean to the south, and the states of Kerala, Karnataka, and Andhra Pradesh to the west and north. The state covers an area of approximately 130,058 square kilometres and has a population of over 72 million people, making it the seventh-most populous state in India. The landscape of Tamil Nadu is diverse and includes coastal plains, plateaus, and hills. The state experiences a tropical climate with distinct wet and dry seasons, with the monsoon season lasting from October to December and the summer season lasting from March to May. The state is known for its rich history and cultural heritage, with several ancient temples and monuments scattered throughout its cities and towns. It is home to diverse ecosystems, including wetlands that play a vital role in supporting biodiversity and ecological balance. These wetlands, found in both coastal and inland areas, provide essential habitats for a variety of plant and animal species, including birds.



Figure 3. Map (a): Study area map representing top 10 prioritized wetlands

4. METHODOLOGY

For the assessment and identification of wetlands as bird sanctuaries, the secondary database on bird species was retrieved from ebird, which is a citizen science online platform for sharing and recording information on bird species.

1. eBird

eBird is an online [database](#) of [bird](#) observations providing [scientists](#), [researchers](#), and [amateur](#) naturalists with real-time data about [bird distribution and abundance](#). It is a permanent repository for bird inventory data. A wide range of visualizations, including seasonal occurrence charts, to track the migration timing and abundance of birds in a particular area can be analyzed using eBird data.

2. Secondary data retrieval

The data on bird species was requested from ebird through a proper channel. A request was sent by filling out the request application form. The data was sent to mail from where it was used for data segregation and categorization.

3. Data segregation and classification

The eBird data received from the website consisted of the entire ebird data from the state of Tamil Nadu. eBird data from identified wetlands of Tamil Nadu were separated and segregated from the complete database. Initially, the data was segregated district-wise. Then, it was followed by filtering the bird data for all wetlands (lakes, ponds, reservoirs, and estuaries) from the district eBird database. By evaluating the number of bird species present in each of the wetlands, they were identified for assessment. A total of 201 wetlands have been shortlisted for assessment and categorization.

4. Wetland assessment and categorization:

Each of the identified wetlands were assessed based on the following criteria:

- a.) Number of bird species
- b) Total area
- c) Number of Critically Endangered, Endangered, Vulnerable, Near Threatened and Least Concern species

- d) Number of Migratory, vagrant and resident species
- e) Threat percentage(Threats viz., agriculture, human encroachment, industries, etc were taken into consideration)

Taking all the above criteria into consideration, each of the wetlands was given a score and categorized into groups.

4.5 Scoring system for categorizing wetlands

A scoring system was set for categorizing wetlands and it is as follows:

SI. No.	Range(No. Of Bird species)	Score
1	1-25	1
2	26-50	2
3	51-75	3
4	76-100	4
5	101-125	5
6	126-150	6
7	151-175	7
8	176-200	8
9	201- 225	9
10	226-250	10

Table 1. Scoring for Resident and Least concern species

The threat percentage index was calculated by observing the surroundings of the wetland (for those field sites that were visited) and by using the google earth pro tool for analysis.

The following is the scoring given for the threat % index:

SI. No.	Range (Threat %)	Score
1	1%-10%	10
2	11%-20%	9
3	21%-30%	8
4	31%-40%	7

5	41%- 50%	6
6	51%- 60%	5
7	61%- 70%	4
8	71%- 80%	3
9	81%-90%	2
10	91%-100%	1

Table 2. Scoring for Threat %

The number of critically endangered, endangered, vulnerable, and near-threatened bird species in each of the wetlands were scored based on the following table:

SI. No.	Range(No. Of CR/ EN/ VU/ NT species)	Score
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	More than 10	10

Table 3. Scoring for CR/ EN/ VU/ NT species

After allotment of scores for each of the criteria, the total score was found by taking the average of all the criteria. The wetlands were graded based on the total score (**01- very bad to 10-Good**).

6. Data analysis

To summarize and visualize a large set of ebird data, the EXCEL-pivot table was used. Using the available features, the table was customized to calculate the relative abundance, cumulative abundance, and frequency of occurrence of bird species.

7. Wetland mapping

To prepare the maps, the digitization of 208 potential wetlands around Tamil Nadu was carried out and projected to World Geographic System (WGS) 1984. A polygon layer was created for digitizing each individual wetland using the secondary data location points from Ebird. With the reference of Google earth pro and the “Add polygon feature” tool from QGIS 2.28, digitization was performed. After the digitization of 215 wetlands, buffer analysis was carried out using ArcMap. A 2 km buffer was generated outside the created polygon layers for demarcating the zone of influence around each wetland. After Digitizing to visualize each wetland, we created base maps for each individual wetland using ArcMap layout view. The features which are included in the base maps are wetlands, crops, roads, water lines, and built-up. A 2 km buffer was created for each wetland based on Sacon’s “Prioritised Wetland and its Biodiversity in Tamil Nadu” report. Using ArcMap, we have calculated ZOI using a 10 m resolution LULC data for the year 2021 procured from ESRI’S Land cover atlas (<https://livingatlas.arcgis.com/landcover/>). Using this LULC data we classified seven classes namely water, vegetation, grassland, flooded vegetation, crops, built area, and bare ground using ArcMap. For this study, we have used ASTER DEM data of 30m resolution from NASA’s Earth data (<https://search.earthdata.nasa.gov/search?fi=ASTER>). At first, we downloaded 57 tiles of DEM data compiling the boundary of Tamil Nadu. Using the “Mosaic to a new raster” tool from ArcMap we created a new raster. Using the ‘Clip’ tool from ArcMap, we clipped the extent of the Tamil Nadu boundary from the mosaicked DEM raster.

8. Land Use and Land Cover Change

Using ArcMap, we calculated Land Use and Land Cover Change (LULC) with 10 m resolution LULC data from 2017 - 2021 downloaded from ESRI’S Land cover atlas (<https://livingatlas.arcgis.com/landcover/>) to delineate the changes for the identified wetland within a buffer of 2 km radius. Using this LULC data we classified seven classes namely water, vegetation, grassland, flooded

vegetation, crops, built area, and bare ground using ArcMap for each wetland within the time span of 2017 - 2021. Then mean value of each wetland for 5 years with their defined classes was calculated using the formula

$$\text{Mean area} = \frac{2017 \text{ area} + 2018 \text{ area} + 2019 \text{ area} + 2020 \text{ area} + 2021 \text{ area}}{5}$$

5. Results

208 wetlands from 31 districts of Tamil Nadu were identified based on the data and categorization based on the criteria mentioned in the wetlands assessment and categorization. Chengalpattu, Coimbatore, Kancheepuram, Thiruvallur, Madurai, Villupuram, Salem, and Kanyakumari were the districts that consisted of the most identified wetlands. Out of this, we have categorized the top 10 prioritized wetlands based on the scoring system, which included no of birds, area of the wetland, etc, as mentioned in the methodology.

Table 4. Latitude and Longitude of the wetlands

S. No	Latitude	Longitude	Name of the Wetlands	District
1	13.01296	80.274686	Adayaru Estuary	Chennai
2	11.0456	77.096467	Achankulam	Coimbatore
3	13.03489	79.983086	Nayapakkam lake	Thiruvallur
4	13.05948	80.001131	Nochimedu Lake	Thiruvallur
5	10.81261	78.848866	Kiliyur tank	Trichy
6	12.74877	79.65064	Mamandur lake	Tiruvannamalai
7	10.9865	76.90653	Kolarampathy Lake	Coimbatore
8	12.77546	80.185454	Thaiyur Lake	Chengalpettu
9	9.693748	77.947275	Sengulam Kanmaai,	Madurai
10	12.78662	80.23548	Kelambakkam Back Waters	Chengalpettu

1. Adyar Estuary, Chennai

Adyar Estuary is a backwater that forms the final stretch of the Adyar River before it meets the Bay of Bengal. The geographic coordinates are 13.01295896, 80.27468645. The lake has an area of 1.049 sq. km. It is home to a number of fishes, crustaceans, and marine species. It is also a crucial breeding ground for migratory birds that visit the coast during the winter. Apart from this, the Adyar eco-park is a protected area near the estuary. 201 bird species have been recorded at Adayar estuary until September 2022.

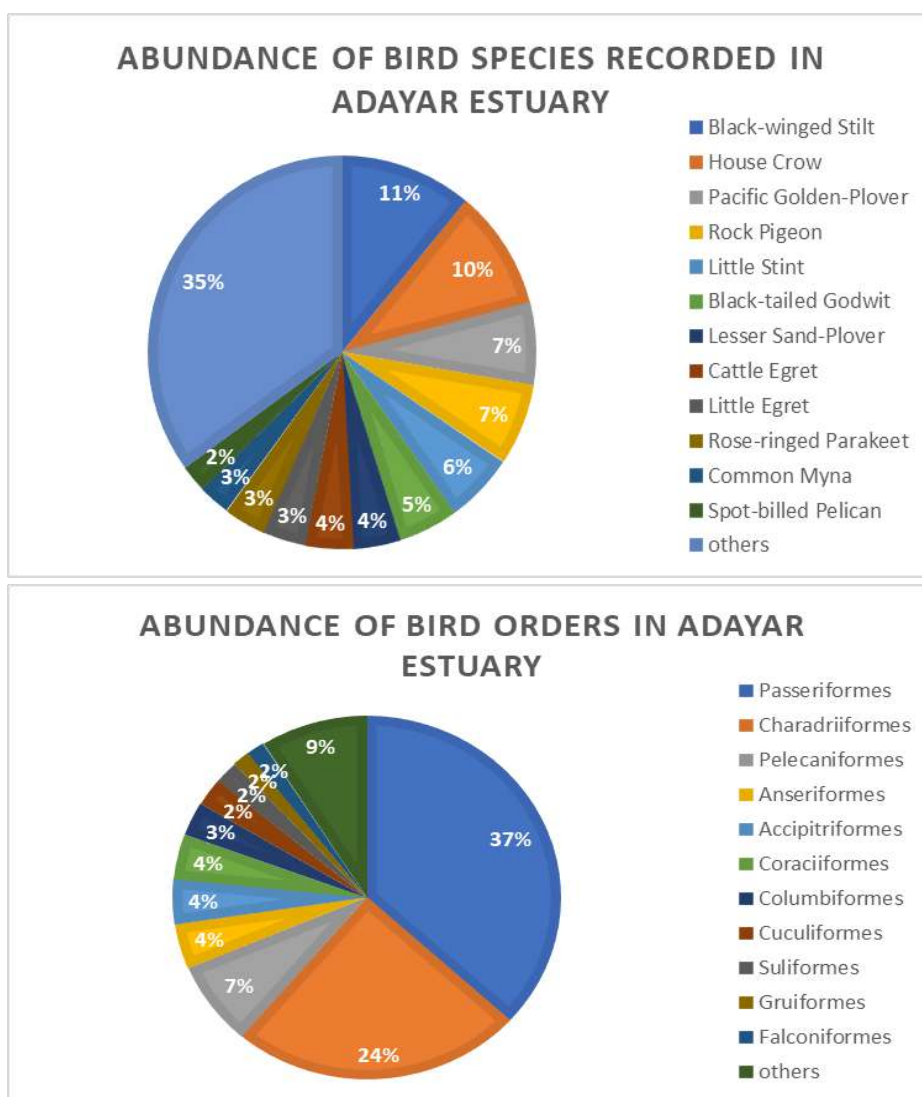


Figure 4. Abundance of bird species and orders in Adayar estuary

Abundance

Among the wetland bird species, the Black-winged Stilt, Pacific Golden-Plover, and Little Stint stand out with substantial numbers, indicating their significant presence in

Wetland habitats. The Black-tailed Godwit, Lesser Sand-Plover, and Cattle Egret also contribute to the richness of wetland avifauna. Additionally, species like the Little Egret, Spot-billed Pelican, Kentish Plover, and Large-billed Crows are encountered in notable numbers within these habitats. The Wood Sandpiper, Great Egret, Painted Stork, and Indian Pond-Heron also play significant roles in wetland ecosystems. At the same time, the Common Sandpiper, Little Cormorant, and Intermediate Egret contribute to the diversity of birdlife.

IUCN Category

The estuary and its surroundings are home to various birds with different conservation statuses. Among the near-threatened birds recorded in the wetland are Bar-tailed Godwit, Black-headed Ibis, Black-tailed Godwit, Curlew Sandpiper, Eurasian Curlew, Eurasian Oystercatcher, Lesser Flamingo, Oriental Darter, Red-necked Falcon and Spot-billed Pelican. Additionally, vulnerable birds like the Black-capped Kingfisher and endangered birds like the Great Knot were recorded in this wetland. During November, December, and January, the estuary attracts around 36 winter visitors, including Amur Falcon, Caspian Tern, Common Greenshank, and others.

Resident/Migratory Behavior

The resident and migratory behaviours of these wetland bird species contribute to the dynamic nature of their habitats. Species like the Black-winged Stilt, Little Stint,

Black-tailed Godwit, Cattle Egret, Little Egret, Spot-billed Pelican, Kentish Plover, Wood Sandpiper, Great Egret, and Indian Pond-Heron exhibit diverse patterns of residency or migration, enhancing the complexity of interactions within wetland ecosystems.

Additionally, migratory species such as the Pacific Golden-Plover and Caspian Tern add a seasonal dimension to wetland bird communities, further enriching these critical habitats.

SI. No.	English Name	Scientific Name	Type of migration	IUCN Category
1	Amur Falcon	<i>Falco amurensis</i>	Widespread winter migrant	Least Concern
2	Ashy Drongo	<i>Dicrurus leucophaeus</i>	Resident	Least Concern
3	Ashy Prinia	<i>Prinia socialis</i>	Resident	Least Concern
4	Ashy Woodswallow	<i>Artamus fuscus</i>	Resident	Least Concern
5	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i>	Resident	Least Concern
6	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	Local resident & widespread winter visitor	Least Concern
7	Asian Koel	<i>Eudynamys scolopaceus</i>	Resident	Least Concern
8	Asian Openbill	<i>Anastomus oscitans</i>	Resident	Least Concern

9	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Resident	Least Concern
10	Asian Pied Starling	<i>Gracupica contra</i>	Resident	Least Concern
11	Barn Swallow	<i>Hirundo rustica</i>	Widespread resident & winter visitor	Least Concern
12	Bar-tailed Godwit	<i>Limosa lapponica</i>	Widespread winter visitor	Near Threatened
13	Bay-backed Shrike	<i>Lanius vittatus</i>	Resident	Least Concern
14	Black Drongo	<i>Dicrurus macrocercus</i>	Resident	Least Concern
15	Black Kite	<i>Milvus migrans</i>	Resident	Least Concern
16	Black-bellied Plover	<i>Enicurus immaculatus</i>	Resident	Least Concern
17	Black-capped Kingfisher	<i>Halcyon pileata</i>	Resident	Vulnerable
18	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Resident	Least Concern
19	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	Resident	Least Concern
20	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Resident	Least Concern
21	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Widespread resident	Near Threatened
22	Black-rumped Flameback	<i>Dinopium benghalense</i>	Resident	Least Concern
23	Black-tailed Godwit	<i>Limosa limosa</i>	Widespread winter visitor	Near Threatened
24	Black-winged Kite	<i>Elanus caeruleus</i>	Resident	Least Concern
25	Black-winged Stilt	<i>Himantopus himantopus</i>	Local resident & widespread winter visitor	Least Concern
26	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Resident	Least Concern
27	Blyth's Pipit	<i>Anthus godlewskii</i>	Widespread winter visitor	Least Concern
28	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Widespread winter visitor	Least Concern
29	Booted Eagle	<i>Hieraaetus pennatus</i>	Widespread winter visitor & local resident	Least Concern
30	Booted Warbler	<i>Iduna caligata</i>	Widespread winter visitor	Least Concern
31	Brahminy Kite	<i>Haliastur indus</i>	Resident	Least Concern
32	Brahminy Starling	<i>Sturnia pagodarum</i>	Resident	Least Concern
33	Broad-billed Sandpiper	<i>Calidris falcinellus</i>	Sparse winter visitor	Least Concern
34	Brown Shrike	<i>Lanius cristatus</i>	Widespread winter visitor	Least Concern

35	Brown-headed Gull	<i>Chroicocephalus brunnicephalus</i>	Widespread winter visitor & resident	Least Concern
36	Caspian Tern	<i>Hydroprogne caspia</i>	Widespread winter visitor	Least Concern
37	Cattle Egret	<i>Bubulcus ibis</i>	Widespread resident	Least Concern
38	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Resident	Least Concern
39	Citrine Wagtail	<i>Motacilla citreola</i>	Local resident & widespread winter visitor	Least Concern
40	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	Resident	Least Concern
41	Common Barn Owl	<i>Tyto alba</i>	Resident	Least Concern
42	Common Greenshank	<i>Tringa nebularia</i>	Widespread winter visitor	Least Concern
43	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Resident	Least Concern
44	Common Iora	<i>Aegithina tiphia</i>	Resident	Least Concern
45	Common Kingfisher	<i>Alcedo atthis</i>	Resident	Least Concern
46	Common Moorhen	<i>Gallinula chloropus</i>	Resident	Least Concern
47	Common Myna	<i>Acridotheres tristis</i>	Resident	Least Concern
48	Common Redshank	<i>Tringa totanus</i>	Widespread winter visitor & resident	Least Concern
49	Common Ringed Plover	<i>Charadrius hiaticula</i>	Vagrant	Least Concern
50	Common Sandpiper	<i>Actitis hypoleucos</i>	Widespread winter visitor & resident	Least Concern
51	Common Snipe	<i>Gallinago gallinago</i>	Widespread winter visitor & local resident	Least Concern
52	Common Tailorbird	<i>Orthotomus sutorius</i>	Resident	Least Concern
53	Common Tern	<i>Sterna hirundo</i>	Widespread winter visitor & resident	Least Concern
54	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Resident	Least Concern
55	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Resident	Least Concern
56	Curlew Sandpiper	<i>Calidris ferruginea</i>	Widespread winter visitor	Near Threatened
57	Daurian Starling	<i>Agropsar sturninus</i>	Local resident & winter visitor	Least Concern
58	Desert Wheatear	<i>Oenanthe deserti</i>	Local resident & widespread winter visitor	Least Concern

59	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Resident	Least Concern
60	Eurasian Coot	<i>Fulica atra</i>	Local resident & widespread winter visitor	Least Concern
61	Eurasian Curlew	<i>Numenius arquata</i>	Widespread winter visitor	Near Threatened
62	Eurasian Hoopoe	<i>Upupa epops</i>	Widespread resident & winter visitor	Least Concern
63	Eurasian Kestrel	<i>Garrulus glandarius</i>	Resident	Least Concern
64	Eurasian Oystercatcher	<i>Haematopus ostralegus</i>	Widespread winter visitor	Near Threatened
65	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Widespread winter visitor & resident	Least Concern
66	Eurasian Wigeon	<i>Mareca penelope</i>	Widespread winter visitor	Least Concern
67	European Roller	<i>Coracias garrulus</i>	Local resident & sparse winter visitor	Least Concern
68	Forest Wagtail	<i>Dendronanthus indicus</i>	Local resident & widespread winter visitor	Least Concern
69	Fulvous Whistling-Duck	<i>Dendrocygna bicolor</i>	Resident	Least Concern
70	Garganey	<i>Spatula querquedula</i>	Widespread winter visitor	Least Concern
71	Glossy Ibis	<i>Plegadis falcinellus</i>	Widespread winter visitor & resident	Least Concern
72	Great Cormorant	<i>Phalacrocorax carbo</i>	Widespread winter visitor & resident	Least Concern
73	Great Crested Tern	<i>Podiceps cristatus</i>	Local resident & sparse winter visitor	Least Concern
74	Great Egret	<i>Ardea alba</i>	Widespread resident & sparse winter visitor	Least Concern
75	Great Knot	<i>Calidris tenuirostris</i>	Sparse winter visitor	Endangered
76	Greater Coucal	<i>Centropus sinensis</i>	Resident	Least Concern
77	Greater Flamingo	<i>Phoenicopterus roseus</i>	Widespread winter visitor & local resident	Least Concern

78	Greater Sand-Plover	<i>Charadrius leschenaultii</i>	Widespread winter visitor	Least Concern
79	Green Bee-eater	<i>Merops orientalis</i>	Resident	Least Concern
80	Green Sandpiper	<i>Tringa ochropus</i>	Widespread winter visitor	Least Concern
81	Greenish Warbler	<i>Phylloscopus trochiloides</i>	Local resident & widespread winter visitor	Least Concern
82	Grey Francolin	<i>Ortygornis pondicerianus</i>	Resident	Least Concern
83	Grey Heron	<i>Ardea cinerea</i>	Widespread winter visitor & resident	Least Concern
84	Grey Wagtail	<i>Motacilla cinerea</i>	Local resident & widespread winter visitor	Least Concern
85	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	Resident	Least Concern
86	Grey-breasted Prinia	<i>Prinia hodgsonii</i>	Resident	Least Concern
87	Grey-fronted Green-Pigeon	<i>Treron affinis</i>	Resident	Least Concern
88	Grey-headed Lapwing	<i>Vanellus cinereus</i>	Widespread winter visitor	Least Concern
89	Grey-headed Swamphen	<i>Porphyrio poliocephalus</i>		Not Recognised
90	Gull-billed Tern	<i>Gelochelidon nilotica</i>	Widespread winter visitor & local resident	Least Concern
91	House Crow	<i>Corvus splendens</i>	Resident	Least Concern
92	House Sparrow	<i>Passer domesticus</i>	Resident	Least Concern
93	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concern
94	Indian Golden Oriole	<i>Oriolus kundoo</i>	Resident	Least Concern
95	Indian Grey Hornbill	<i>Ocyeros birostris</i>	Resident	Least Concern
96	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Resident	Least Concern
97	Indian Peafowl	<i>Pavo cristatus</i>	Resident	Least Concern
98	Indian Pond-Heron	<i>Ardeola grayii</i>	Resident	Least Concern
99	Indian Robin	<i>Copsychus fulicatus</i>	Resident	Least Concern
100	Indian Roller	<i>Coracias benghalensis</i>	Resident	Least Concern
101	Indian Scops-Owl	<i>Otus bakkamoena</i>	Resident	Least Concern
102	Indian Silverbill	<i>Euodice malabarica</i>	Resident	Least Concern
103	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Resident	Least Concern
104	Indian Thick-knee	<i>Burhinus indicus</i>	Resident	Least Concern
105	Intermediate Egret	<i>Ardea intermedia</i>	Resident	Least Concern

106	Jerdon's Bushlark	<i>Mirafra affinis</i>	Resident	Least Concern
107	Jungle Babbler	<i>Argya striata</i>	Resident	Least Concern
108	Jungle Prinia	<i>Prinia sylvatica</i>	Resident	Least Concern
109	Kentish Plover	<i>Charadrius alexandrinus</i>	Widespread winter visitor & resident	Least Concern
110	Large-billed Crow	<i>Corvus macrorhynchos</i>	Resident	Least Concern
111	Laughing Dove	<i>Spilopelia senegalensis</i>	Resident	Least Concern
112	Lesser Black-backed Gull	<i>Larus fuscus</i>	Resident	Least Concern
113	Lesser Crested Tern	<i>Thalasseus bengalensis</i>	Resident	Least Concern
114	Lesser Flamingo	<i>Phoeniconaias minor</i>	Common winter visitor, some resident	Near Threatened
115	Lesser Sand-Plover	<i>Charadrius mongolus</i>	Resident	Least Concern
116	Lesser Whitethroat	<i>Curruca curruca</i>	Widespread winter visitor	Least Concern
117	Little Cormorant	<i>Microcarbo niger</i>	Resident	Least Concern
118	Little Egret	<i>Egretta garzetta</i>	Resident	Least Concern
119	Little Grebe	<i>Tachybaptus ruficollis</i>	Resident	Least Concern
120	Little Ringed Plover	<i>Charadrius dubius</i>	Widespread winter visitor & resident	Least Concern
121	Little Stint	<i>Calidris minuta</i>	Widespread winter visitor	Least Concern
122	Little Swift	<i>Apus affinis</i>	Resident	Least Concern
123	Little Tern	<i>Sternula albifrons</i>	Widespread resident	Least Concern
124	Long-tailed Shrike	<i>Lanius schach</i>	Resident	Least Concern
125	Long-toed Stint	<i>Calidris subminuta</i>	Sparse winter visitor	Least Concern
126	Loten's Sunbird	<i>Cinnyris lotenius</i>	Resident	Least Concern
127	Marsh Sandpiper	<i>Tringa stagnatilis</i>	Widespread winter visitor	Least Concern
128	Mongolian Short-toed Lark	<i>Calandrella dukhunensis</i>	Resident	Least Concern
129	Northern Pintail	<i>Anas acuta</i>	Vagrant	Least Concern
130	Northern Shoveler	<i>Spatula clypeata</i>	Widespread winter visitor	Least Concern
131	Orange-breasted Green-Pigeon	<i>Treron bicinctus</i>	Resident	Least Concern
132	Oriental Darter	<i>Anhinga melanogaster</i>		Near Threatened

133	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Widespread winter visitor & resident	Least Concern
134	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Resident	Least Concern
135	Oriental Pratincole	<i>Glareola maldivarum</i>	Resident	Least Concern
136	Oriental Skylark	<i>Alauda gulgula</i>	Resident	Least Concern
137	Osprey	<i>Pandion haliaetus</i>	Widespread winter visitor & local resident	Least Concern
138	Pacific Golden-Plover	<i>Pluvialis fulva</i>	Widespread winter visitor	Least Concern
139	Paddyfield Pipit	<i>Anthus rufulus</i>	Resident	Least Concern
140	Painted Stork	<i>Mycteria leucocephala</i>	Resident	Near Threatened
141	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	Resident	Least Concern
142	Pallas's Gull	<i>Ichthyaetus ichthyaetus</i>	Widespread winter visitor	Least Concern
143	Peregrine Falcon	<i>Falco peregrinus</i>	Widespread winter visitor & resident	Least Concern
144	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Resident	Least Concern
145	Pied Avocet	<i>Recurvirostra avosetta</i>	Widespread winter visitor & local resident	Least Concern
146	Pied Bushchat	<i>Saxicola caprata</i>	Resident	Least Concern
147	Pied Cuckoo	<i>Clamator jacobinus</i>	Resident	Least Concern
148	Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concern
149	Plain Prinia	<i>Prinia inornata</i>	Resident	Least Concern
150	Purple Heron	<i>Ardea purpurea</i>	Widespread winter visitor & resident	Least Concern
151	Purple Sunbird	<i>Cinnyris asiaticus</i>	Resident	Least Concern
152	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Resident	Least Concern
153	Red Avadavat	<i>Coturnix coromandelica</i>	Resident	Least Concern
154	Red-necked Falcon	<i>Falco chicquera</i>	Near Threatened	
155	Red-rumped Swallow	<i>Cecropis daurica</i>	Widespread resident & winter visitor	Least Concern
156	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Resident	Least Concern
157	Red-wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concern
158	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Resident	Least Concern

159	Richard's Pipit	<i>Anthus richardi</i>	Widespread winter visitor	Least Concern
160	Rock Pigeon	<i>Columba livia</i>	Resident	Least Concern
161	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Resident	Least Concern
162	Rosy Starling	<i>Pastor roseus</i>	Widespread winter visitor & migrant	Least Concern
163	Ruddy Turnstone	<i>Arenaria interpres</i>	Widespread winter visitor	Least Concern
164	Ruff	<i>Calidris pugnax</i>	Sparse winter visitor	Least Concern
165	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Resident	Least Concern
166	Rufous-tailed Lark	<i>Ammomanes phoenicura</i>	Resident	Least Concern
167	Sanderling	<i>Calidris alba</i>	Widespread winter visitor	Least Concern
168	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Resident	Least Concern
169	Shikra	<i>Accipiter badius</i>	Resident	Least Concern
170	Siberian Stonechat	<i>Saxicola maurus</i>	Local resident & widespread winter visitor	Least Concern
171	Slender-billed Gull	<i>Chroicocephalus genei</i>	Widespread winter visitor	Least Concern
172	Small Pratincole	<i>Glareola lactea</i>	Resident	Least Concern
173	Spot-billed Pelican	<i>Pelecanus philippensis</i>	Resident	Near Threatened
174	Spotted Dove	<i>Spilopelia chinensis</i>	Resident	Least Concern
175	Spotted Owlet	<i>Athene brama</i>	Resident	Least Concern
176	Streak-throated Swallow	<i>Petrochelidon fluvicola</i>	Resident	Least Concern
177	Striated Heron	<i>Butorides striata</i>	Resident	Least Concern
178	Sykes's Warbler	<i>Iduna rama</i>	Widespread winter visitor	Least Concern
179	Tawny Pipit	<i>Anthus campestris</i>	Widespread winter visitor	Least Concern
180	Temminck's Stint	<i>Calidris temminckii</i>	Widespread winter visitor	Least Concern
181	Terek Sandpiper	<i>Xenus cinereus</i>	Widespread winter visitor	Least Concern
182	Tricolored Munia	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
183	Tufted Duck	<i>Aythya fuligula</i>	Widespread winter visitor	Least Concern

184	Western Marsh-Harrier	<i>Circus aeruginosus</i>	Widespread winter visitor	Least Concern
185	Western Reef-Heron	<i>Egretta gularis</i>	Resident	Least Concern
186	Western Yellow Wagtail	<i>Motacilla flava</i>	Widespread winter visitor	Least Concern
187	Whimbrel	<i>Numenius phaeopus</i>	Widespread winter visitor	Least Concern
188	Whiskered Tern	<i>Chlidonias hybrida</i>	Widespread winter visitor & resident	Least Concern
189	White Wagtail	<i>Motacilla alba</i>	Local resident & widespread winter visitor	Least Concern
190	White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Resident	Least Concern
191	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concern
192	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Resident	Least Concern
193	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Resident	Least Concern
194	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concern
195	White-winged Tern	<i>Chlidonias leucopterus</i>	Sparse winter visitor	Least Concern
196	Wood Sandpiper	<i>Tringa glareola</i>	Widespread winter visitor	Least Concern
197	Yellow-billed Babbler	<i>Argya affinis</i>	Resident	Least Concern
198	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	Resident	Least Concern
199	Yellow-throated Sparrow	<i>Gymnoris xanthocollis</i>	Resident	Least Concern
200	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Resident	Least Concern
201	Zitting Cisticola	<i>Cisticola juncidis</i>	Resident	Least Concern

Table 5. Shows the checklist of birds found in Adayar estuary, their common name, scientific name, Migratory status, and IUCN category are provided.

Land Use and Land Cover Changes

Land use and land cover changes over a period of 5 years from 2017 – 2021 indicate that drastic changes were not observed over these periods of time, the mean average of each class was calculated. For this wetland built area was found to be in higher proportion with the mean value of 13.40 sq. km around the wetland, then water body with the proportion of 8.98 sq. km, followed by less proportion of vegetation area with 0.68 sq km, grassland with 0.13 sq km and bare ground with 0.13 sq km.

S.No	Classes	2017_area	2018_area	2019_area	2020_area	2021_area	Mean
1	Water body	9.01	8.97	8.96	8.98	9	8.98
2	Vegetation	0.87	0.71	0.43	0.62	0.78	0.68
3	Built area	13.21	13.41	13.56	13.46	13.35	13.40
4	Bare ground	0.16	0.14	0.12	0.13	0.12	0.13
5	Grassland	0.08	0.09	0.26	0.14	0.08	0.13

Table 6. Calculated mean area of each classes for the period of 5 years from 2017 - 2021

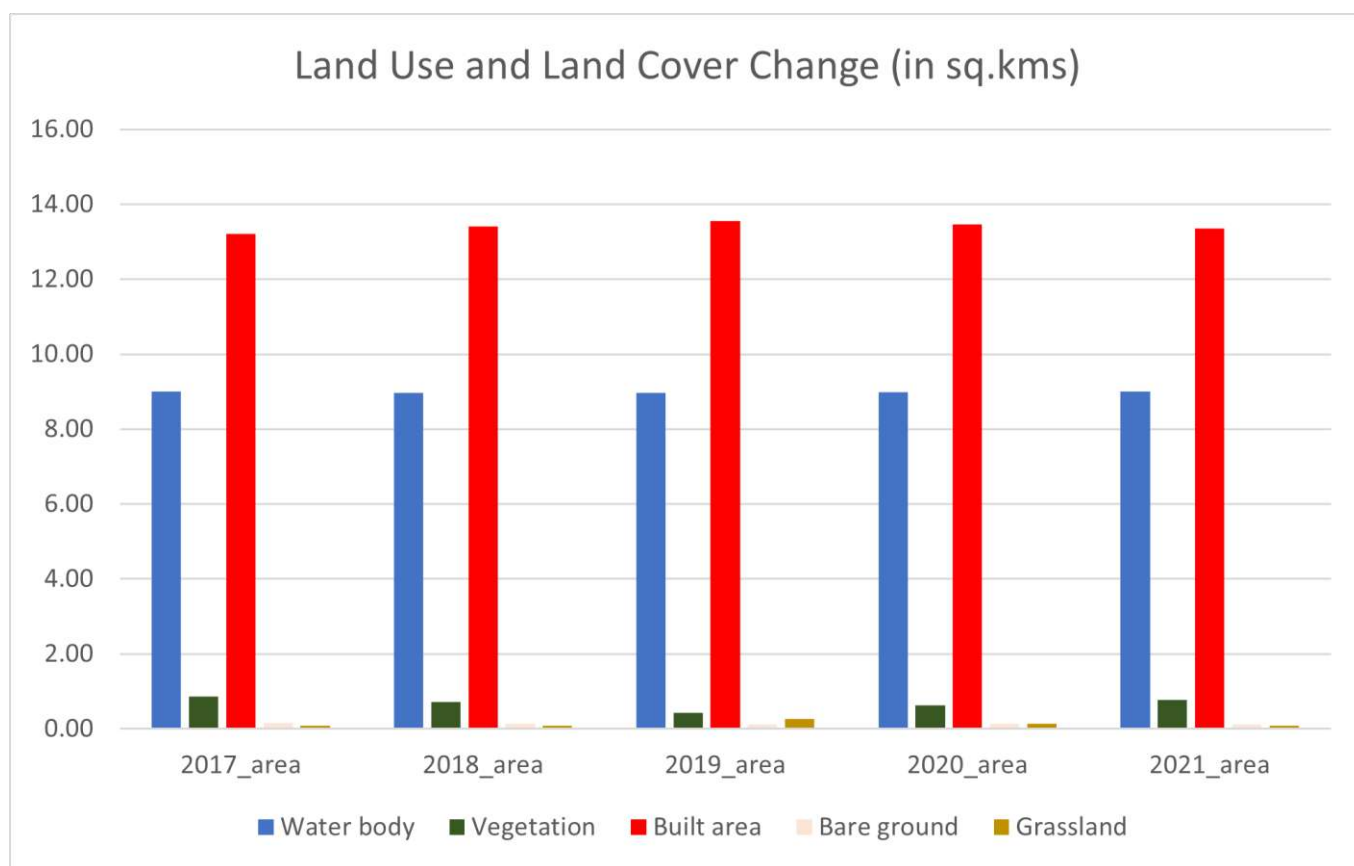


Figure 5. Land use and land cover changes over a period of 5 years from 2017 - 2021 for each classes

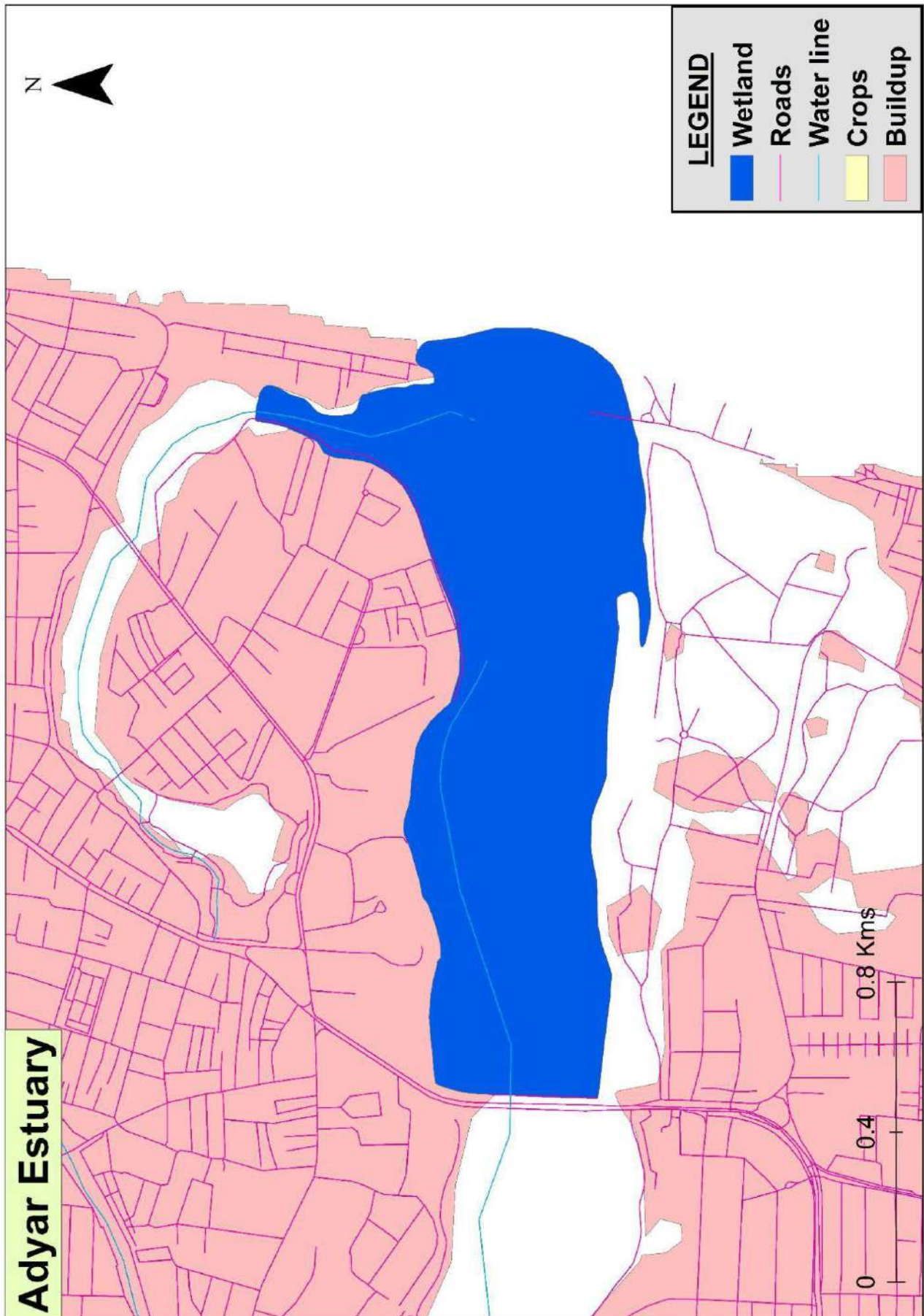


Figure 6. Base map of Adyar Estuary

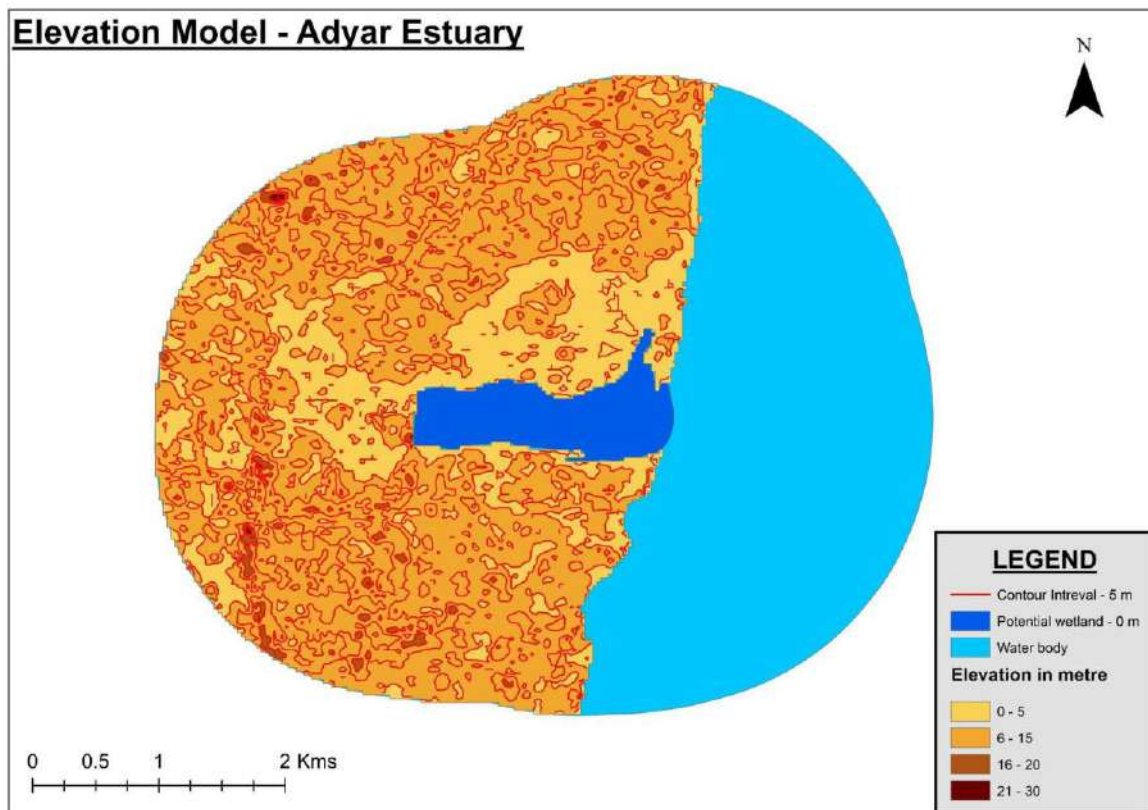


Figure 7. Elevation map of Adyar Estuary

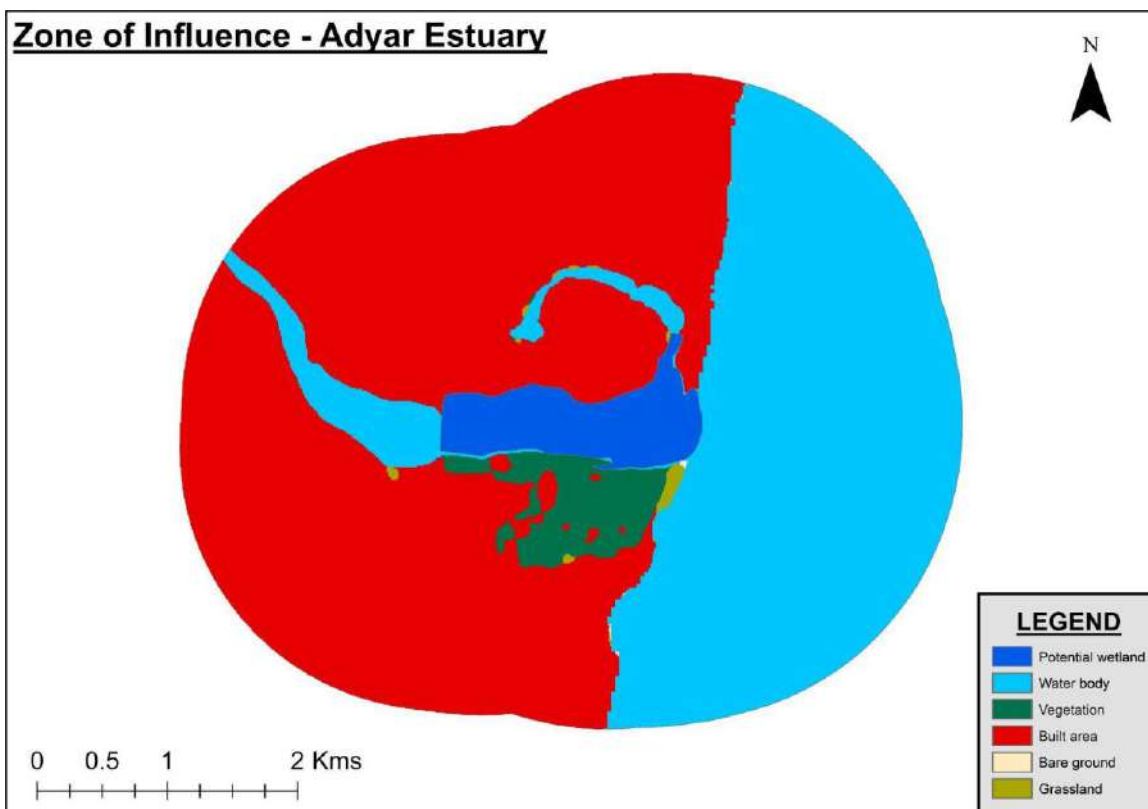


Figure 8. Zone of influence map of Adyar Estuary

2. Achankulam Lake, Coimbatore:

Achankulam Lake is a freshwater lake located in Coimbatore. It is spread over an area of 0.951 sq km. The geographic coordinates are 11.0455996, 77.0964674. The lake is fed by small streams originating from the western ghats and it is an important source of drinking water to the nearby villages. A total of 227 bird species have been recorded at Achankulam from 2012 to September 2022.

The lake is home to a number of a variety of birds with different conservation statuses. Among the near-threatened birds recorded in the wetland are Black-headed Ibis, Black-tailed Godwit, Curlew Sandpiper, Eurasian Curlew, Oriental Darter, Painted Stork, Red-necked Falcon, Spot-billed Pelican and Woolly-necked stork. Additionally, vulnerable birds like the greater spotted eagle and Indian spotted eagle were recorded in this wetland. During the months of November, December, and January the lake attracts around 26 winter visitors including Rosy Starling, Ruff, Thick-billed warbler, and others.

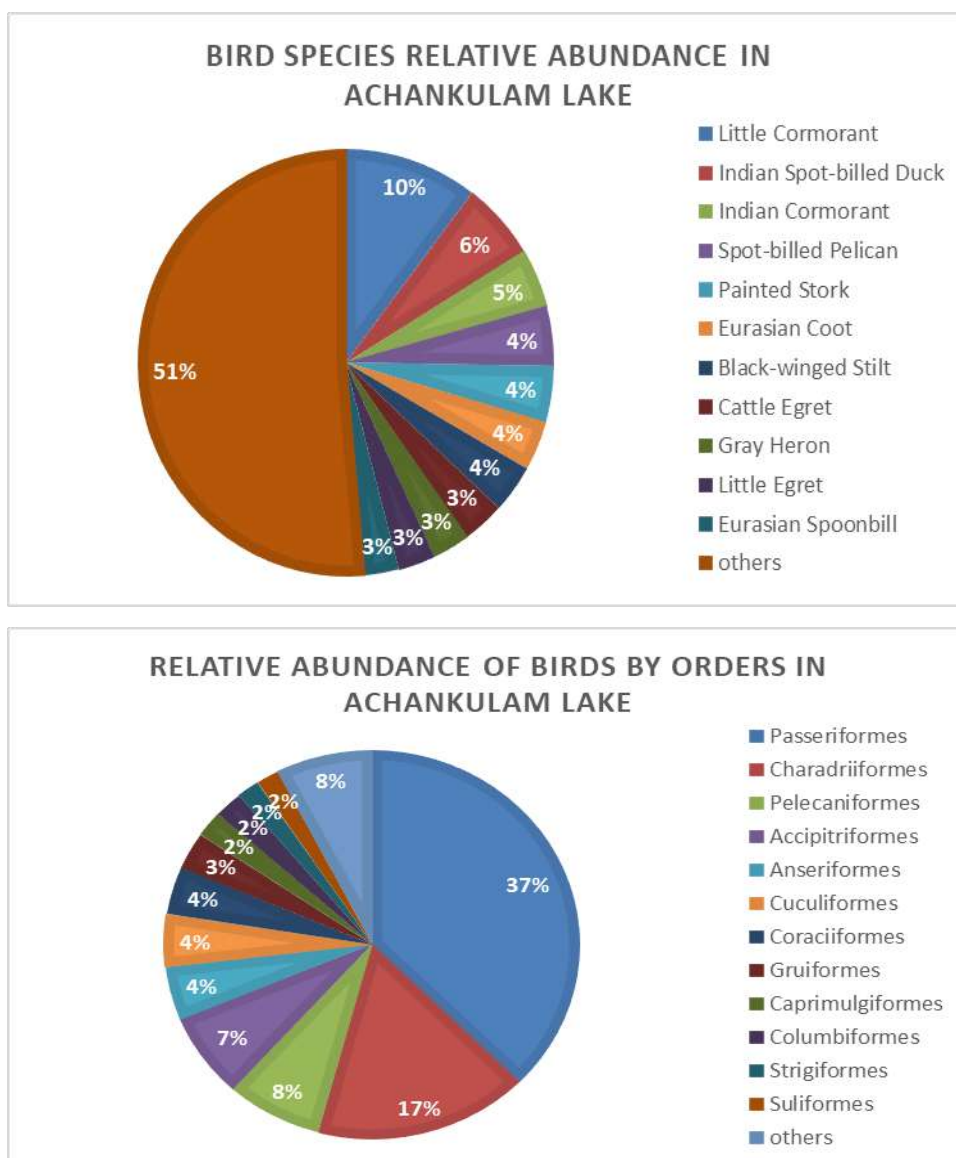


Figure 9. Relative abundance of bird species and orders in Achankulam Lake

Abundance:

The wetland bird community boasts a diverse range of species, with some showing particularly abundant numbers. The Indian Spot-billed Duck leads this group, followed closely by the Spot-billed Pelican, Painted Stork, Eurasian Coot, and Cattle Egret, indicating their significant presence within these vital ecosystems. Other abundant species include the Gray Heron, Little Egret, Eurasian Spoonbill, and Indian Pond-Heron, contributing to the overall richness of wetland avifauna. The Gray-headed Swamphen, Red-wattled Lapwing, and House Crow also make noteworthy contributions to the abundance of wetland birds, reflecting the complex interactions within these habitats.

IUCN Category:

Within this diverse assemblage of wetland bird species observed in this wetland, their conservation statuses span different categories. The classification of "Least Concern" applies to species such as the Eurasian Coot, Gray Heron, Little Egret, and Great Egret. Similarly, the Painted Stork and Spot-billed Pelican could also share this designation. The Indian Spot-billed Duck, Cattle Egret, and Gray-headed Swamphen might also be encompassed within the "Least Concern" category. On the other hand, the Black-headed Ibis, Black-tailed Godwit, Curlew Sandpiper, Greater Spotted Eagle, Indian Spotted Eagle, and Oriental Darter are among the birds that are considered to be in near threatened as per IUCN.

Resident/Migratory Behavior:

The behaviors of these wetland bird species exhibit a spectrum of residency and migration patterns, shaping the dynamic nature of these habitats. The Indian Spot-billed Duck, Spot-billed Pelican, Painted Stork, Eurasian Coot, Cattle Egret, and Gray-headed Swamphen are among those that contribute to the resident populations, enhancing the stability of wetland ecosystems throughout the year. In contrast, migratory behaviors are evident in species like the Gray Heron, Little Egret, Eurasian Spoonbill, Indian Pond-Heron, Red-wattled Lapwing, and Ruff, which add seasonal variations to the avian composition of wetlands. This interplay of resident and migratory species underscores the intricate relationships within these critical habitats.

SI No	Common Name	Scientific Name	Types of migration	IUCN Category
1	Alpine Swift	<i>Tachymarptis melba</i>	Resident	Least Concern
2	Ashy Drongo	<i>Dicrurus leucophaeus</i>	Resident	Least Concern
3	Ashy Prinia	<i>Prinia socialis</i>	Resident	Least Concern
4	Ashy Woodswallow	<i>Artamus fuscus</i>	Resident	Least Concern

5	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i>	Resident	Least Concern
6	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	Local resident & widespread winter visitor	Least Concern
7	Asian Koel	<i>Eudynamis scolopaceus</i>	Resident	Least Concern
8	Asian Openbill	<i>Anastomus oscitans</i>	Resident	Least Concern
9	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Resident	Least Concern
10	Baillon's Crake	<i>Zapornia pusilla</i>	Common winter visitor, some resident	Least Concern
11	Banded Bay Cuckoo	<i>Cacomantis sonneratii</i>	Resident	Least Concern
12	Bar-headed Goose	<i>Anser indicus</i>	Widespread winter visitor & local resident	Least Concern
13	Barn Swallow	<i>Hirundo rustica</i>	Widespread resident & winter visitor	Least Concern
14	Barred Buttonquail	<i>Turnix suscitator</i>	Resident	Least Concern
15	Baya Weaver	<i>Ploceus philippinus</i>	Resident	Least Concern
16	Bay-backed Shrike	<i>Lanius vittatus</i>	Resident	Least Concern
17	Black Bittern	<i>Ixobrychus flavicollis</i>	Resident	Least Concern
18	Black Drongo	<i>Dicrurus macrocercus</i>	Resident	Least Concern
19	Black Eagle	<i>Ictinaetus malaiensis</i>	Resident	Least Concern
20	Black Kite	<i>Milvus migrans</i>	Resident	Least Concern
21	Black-bellied Plover	<i>Enicurus immaculatus</i>	Resident	Least Concern
22	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Resident	Least Concern
23	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	Resident	Least Concern
24	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Resident	Near Threatened
25	Black-naped Oriole	<i>Oriolus chinensis</i>	Resident	Least Concern

26	Black-rumped Flameback	<i>Dinopium benghalense</i>	Resident	Least Concern
27	Black-tailed Godwit	<i>Limosa limosa</i>	Widespread winter visitor	Near Threatened
28	Black-winged Kite	<i>Elanus caeruleus</i>	Resident	Least Concern
29	Black-winged Stilt	<i>Himantopus himantopus</i>	Local resident & widespread winter visitor	Least Concern
30	Blue-cheeked Bee-eater	<i>Merops persicus</i>	Resident	Least Concern
31	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	Resident	Least Concern
32	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Resident	Least Concern
33	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Widespread winter visitor	Least Concern
34	Bonelli's Eagle	<i>Aquila fasciata</i>	Resident	Least Concern
35	Booted Eagle	<i>Hieraaetus pennatus</i>	Widespread winter visitor & local resident	Least Concern
36	Booted Warbler	<i>Iduna caligata</i>	Widespread winter visitor	Least Concern
37	Brahminy Kite	<i>Haliastur indus</i>	Resident	Least Concern
38	Brahminy Starling	<i>Sturnia pagodarum</i>	Resident	Least Concern
39	Bronze-winged Jacana	<i>Metopidius indicus</i>	Resident	Least Concern
40	Brown Boobook	<i>Ninox scutulata</i>	Resident	Least Concern
41	Brown Shrike	<i>Lanius cristatus</i>	Widespread winter visitor	Least Concern
42	Brown-backed Needletail	<i>Hirundapus giganteus</i>	Resident	Least Concern
43	Brown-breasted Flycatcher	<i>Muscicapa muttui</i>	Resident	Least Concern
44	Cattle Egret	<i>Bubulcus ibis</i>	Resident	Least Concern
45	Chestnut-bellied Sandgrouse	<i>Pterocles exustus</i>	Resident	Least Concern
46	Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>	Resident	Least Concern

47	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	Resident	Least Concern
48	Chestnut-winged Cuckoo	<i>Clamator coromandus</i>	Resident	Least Concern
49	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Resident	Least Concern
50	Citrine Wagtail	<i>Motacilla citreola</i>	Local resident & widespread winter visitor	Least Concern
51	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	Resident	Least Concern
52	Common Barn Owl	<i>Tyto alba</i>	Resident	Least Concern
53	Common Buzzard	<i>Buteo buteo</i>	Widespread winter visitor & local resident	Least Concern
54	Common Cuckoo	<i>Cuculus canorus</i>	Resident	Least Concern
55	Common Greenshank	<i>Tringa nebularia</i>	Widespread winter visitor	Least Concern
56	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Resident	Least Concern
57	Common Iora	<i>Aegithina tiphia</i>	Resident	Least Concern
58	Common Kingfisher	<i>Alcedo atthis</i>	Resident	Least Concern
59	Common Moorhen	<i>Gallinula chloropus</i>	Resident	Least Concern
60	Common Myna	<i>Acridotheres tristis</i>	Resident	Least Concern
61	Common Redshank	<i>Tringa totanus</i>	Widespread winter visitor & resident	Least Concern
62	Common Sandpiper	<i>Actitis hypoleucos</i>	Widespread winter visitor & resident	Least Concern
63	Common Snipe	<i>Gallinago gallinago</i>	Widespread winter visitor & local resident	Least Concern
64	Common Tailorbird	<i>Orthotomus sutorius</i>	Resident	Least Concern
65	Common Tern	<i>Sterna hirundo</i>	Widespread winter visitor & resident	Least Concern
66	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Resident	Least Concern

67	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Resident	Least Concern
68	Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	Resident	Least Concern
69	Crested Serpent-Eagle	<i>Spilornis cheela</i>	Resident	Least Concern
70	Curlew Sandpiper	<i>Calidris ferruginea</i>	Widespread winter visitor	Near Threatened
71	Dusky Crag-Martin	<i>Ptyonoprogne concolor</i>	Resident	Least Concern
72	Eastern Orphean Warbler	<i>Curruca crassirostris</i>	Resident	Least Concern
73	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Resident	Least Concern
74	Eurasian Coot	<i>Fulica atra</i>	Local resident & widespread winter visitor	Least Concern
75	Eurasian Hoopoe	<i>Upupa epops</i>	Widespread resident & winter visitor	Least Concern
76	Eurasian Kestrel	<i>Garrulus glandarius</i>	Resident	Least Concern
77	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Widespread winter visitor & resident	Least Concern
78	Eurasian Wigeon	<i>Mareca penelope</i>	Widespread winter visitor	Least Concern
79	Gadwall	<i>Mareca strepera</i>	Widespread winter visitor	Least Concern
80	Garganey	<i>Spatula querquedula</i>	Widespread winter visitor	Least Concern
81	Glossy Ibis	<i>Plegadis falcinellus</i>	Widespread winter visitor & resident	Least Concern
82	Great Cormorant	<i>Phalacrocorax carbo</i>	Widespread winter visitor & resident	Least Concern
83	Great Egret	<i>Ardea alba</i>	Widespread resident & sparse winter visitor	Least Concern
84	Greater Coucal	<i>Centropus sinensis</i>	Resident	Least Concern
85	Greater Flamingo	<i>Phoenicopterus roseus</i>	Widespread winter visitor & local resident	Least Concern

86	Greater Painted-Snipe	<i>Rostratula benghalensis</i>	Resident	Least Concern
87	Greater Spotted Eagle	<i>Clanga clanga</i>	Widespread winter visitor & resident	Vulnerable
88	Green Bee-eater	<i>Merops orientalis</i>	Resident	Least Concern
89	Green Sandpiper	<i>Tringa ochropus</i>	Widespread winter visitor	Least Concern
90	Green Warbler	<i>Phylloscopus nitidus</i>	Resident	Least Concern
91	Greenish Warbler	<i>Phylloscopus trochiloides</i>	Local resident & widespread winter visitor	Least Concern
92	Green-winged Teal	<i>Aethopyga nipalensis</i>	Resident	Least Concern
93	Grey Francolin	<i>Ortygornis pondicerianus</i>	Resident	Least Concern
94	Grey Heron	<i>Ardea cinerea</i>	Widespread winter visitor & resident	Least Concern
95	Grey Wagtail	<i>Motacilla cinerea</i>	Local resident & widespread winter visitor	Least Concern
96	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	Resident	Least Concern
97	Grey-breasted Prinia	<i>Prinia hodgsonii</i>	Resident	Least Concern
98	Grey-headed Lapwing	<i>Vanellus cinereus</i>	Widespread winter visitor	Least Concern
99	Grey-headed Swampphen	<i>Porphyrio poliocephalus</i>	Not Recognised	Not Recognised
100	Gull-billed Tern	<i>Gelochelidon nilotica</i>	Widespread winter visitor & local resident	Least Concern
101	House Crow	<i>Corvus splendens</i>	Resident	Least Concern
102	House Sparrow	<i>Passer domesticus</i>	Resident	Least Concern
103	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concern
104	Indian Golden Oriole	<i>Oriolus kundoo</i>	Resident	Least Concern
105	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Resident	Least Concern

106	Indian Peafowl	<i>Pavo cristatus</i>	Resident	Least Concern
107	Indian Pitta	<i>Pitta brachyura</i>	Resident	Least Concern
108	Indian Pond-Heron	<i>Ardeola grayii</i>	Resident	Least Concern
109	Indian Robin	<i>Copsychus fulicatus</i>	Resident	Least Concern
110	Indian Roller	<i>Coracias benghalensis</i>	Resident	Least Concern
111	Indian Silverbill	<i>Euodice malabarica</i>	Resident	Least Concern
112	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Resident	Least Concern
113	Indian Spotted Eagle	<i>Clanga hastata</i>	Vulnerable	Vulnerable
114	Indian Swiftlet	<i>Aerodramus unicolor</i>	Resident	Least Concern
115	Indian Thick-knee	<i>Burhinus indicus</i>	Resident	Least Concern
116	Intermediate Egret	<i>Ardea intermedia</i>	Resident	Least Concern
117	Jerdon's Bushlark	<i>Mirafra affinis</i>	Resident	Least Concern
118	Jungle Babbler	<i>Argya striata</i>	Resident	Least Concern
119	Jungle Myna	<i>Acridotheres fuscus</i>	Resident	Least Concern
120	Jungle Prinia	<i>Prinia sylvatica</i>	Resident	Least Concern
121	Kentish Plover	<i>Charadrius alexandrinus</i>	Widespread winter visitor & resident	Least Concern
122	Knob-billed Duck	<i>Sarkidiornis melanotos</i>	Resident	Least Concern
123	Large Grey Babbler	<i>Argya malcolmi</i>	Resident	Least Concern
124	Large-billed Crow	<i>Corvus macrorhynchos</i>	Resident	Least Concern
125	Large-billed Leaf Warbler	<i>Phylloscopus magnirostris</i>	Sparse winter visitor	Least Concern
126	Laughing Dove	<i>Spilopelia senegalensis</i>	Resident	Least Concern
127	Lesser Black-backed Gull	<i>Larus fuscus</i>	Resident	Least Concern

128	Lesser Crested Tern	<i>Thalasseus bengalensis</i>	Resident	Least Concern
129	Lesser Sand-Plover	<i>Charadrius mongolus</i>	Resident	Least Concern
130	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Resident	Least Concern
131	Lesser Whitethroat	<i>Curruca curruca</i>	Widespread winter visitor	Least Concern
132	Little Cormorant	<i>Microcarbo niger</i>	Resident	Least Concern
133	Little Egret	<i>Egretta garzetta</i>	Resident	Least Concern
134	Little Grebe	<i>Tachybaptus ruficollis</i>	Resident	Least Concern
135	Little Ringed Plover	<i>Charadrius dubius</i>	Widespread winter visitor & resident	Least Concern
136	Little Stint	<i>Calidris minuta</i>	Widespread winter visitor	Least Concern
137	Little Swift	<i>Apus affinis</i>	Resident	Least Concern
138	Little Tern	<i>Sternula albifrons</i>	Resident	Least Concern
139	Long-tailed Shrike	<i>Lanius schach</i>	Resident	Least Concern
140	Loten's Sunbird	<i>Cinnyris lotenius</i>	Resident	Least Concern
141	Marsh Sandpiper	<i>Tringa stagnatilis</i>	Widespread winter visitor	Least Concern
142	Montagu's Harrier	<i>Circus pygargus</i>	Widespread winter visitor	Least Concern
143	Mottled Wood-Owl	<i>Strix ocellata</i>	Resident	Least Concern
144	Northern Pintail	<i>Anas acuta</i>	Vagrant	Least Concern
145	Northern Shoveler	<i>Spatula clypeata</i>	Widespread winter visitor	Least Concern
146	Oriental Darter	<i>Anhinga melanogaster</i>	Resident	Near Threatened
147	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Widespread winter visitor & resident	Least Concern
148	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Resident	Least Concern
149	Oriental Skylark	<i>Alauda gulgula</i>	Resident	Least Concern

150	Osprey	<i>Pandion haliaetus</i>	Widespread winter visitor & local resident	Least Concern
151	Pacific Golden-Plover	<i>Pluvialis fulva</i>	Widespread winter visitor	Least Concern
152	Paddyfield Pipit	<i>Anthus rufulus</i>	Resident	Least Concern
153	Paddyfield Warbler	<i>Acrocephalus agricola</i>	Widespread winter visitor	Least Concern
154	Painted Stork	<i>Mycteria leucocephala</i>	Resident	Near Threatened
155	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	Resident	Least Concern
156	Pectoral Sandpiper	<i>Calidris melanotos</i>	Resident	Least Concern
157	Peregrine Falcon	<i>Falco peregrinus</i>	Widespread winter visitor & resident	Least Concern
158	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Resident	Least Concern
159	Pied Bushchat	<i>Saxicola caprata</i>	Resident	Least Concern
160	Pied Cuckoo	<i>Clamator jacobinus</i>	Resident	Least Concern
161	Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concern
162	Plain Prinia	<i>Prinia inornata</i>	Resident	Least Concern
163	Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	Resident	Least Concern
164	Purple Heron	<i>Ardea purpurea</i>	Widespread winter visitor & resident	Least Concern
165	Purple Sunbird	<i>Cinnyris asiaticus</i>	Resident	Least Concern
166	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Resident	Least Concern
167	Rain Quail	<i>Coturnix coromandelica</i>	Resident	Least Concern
168	Red Avadavat	<i>Coturnix coromandelica</i>	Resident	Least Concern
169	Red Collared-Dove	<i>Streptopelia tranquebarica</i>	Resident	Least Concern

170	Red-rumped Swallow	<i>Cecropis daurica</i>	Widespread resident & winter visitor	Least Concern
171	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Resident	Least Concern
172	Red-wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concern
173	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Resident	Least Concern
174	Richard's Pipit	<i>Anthus richardi</i>	Widespread winter visitor	Least Concern
175	River Tern	<i>Sterna aurantia</i>	Vulnerable	Vulnerable
176	Rock Pigeon	<i>Columba livia</i>	Resident	Least Concern
177	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Resident	Least Concern
178	Rosy Starling	<i>Pastor roseus</i>	Widespread winter visitor & migrant	Least Concern
179	Ruddy Turnstone	<i>Arenaria interpres</i>	Widespread winter visitor	Least Concern
180	Ruddy-breasted Crake	<i>Zapornia fusca</i>	Resident	Least Concern
181	Ruff	<i>Calidris pugnax</i>	Sparse winter visitor	Least Concern
182	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Resident	Least Concern
183	Sanderling	<i>Calidris alba</i>	Widespread winter visitor	Least Concern
184	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Resident	Least Concern
185	Shikra	<i>Accipiter badius</i>	Resident	Least Concern
186	Short-toed Snake-Eagle	<i>Circaetus gallicus</i>	Resident	Least Concern
187	Siberian Stonechat	<i>Saxicola maurus</i>	Local resident & widespread winter visitor	Least Concern
188	Sirkeer Malkoha	<i>Taccocua leschenaultii</i>	Resident	Least Concern
189	Slaty-breasted Rail	<i>Lewinia striata</i>	Resident	Least Concern
190	Small Pratincole	<i>Glareola lactea</i>	Resident	Least Concern
191	Spot-billed Pelican	<i>Pelecanus philippensis</i>	Resident	Near Threatened

192	Spotted Dove	<i>Spilopelia chinensis</i>	Resident	Least Concern
193	Spotted Owlet	<i>Athene brama</i>	Resident	Least Concern
194	Spotted Redshank	<i>Tringa erythropus</i>	Widespread winter visitor	Least Concern
195	Stork-billed Kingfisher	<i>Pelargopsis capensis</i>	Resident	Least Concern
196	Streak-throated Swallow	<i>Petrochelidon fluvicola</i>	Resident	Least Concern
197	Striated Heron	<i>Butorides striata</i>	Resident	Least Concern
198	Sykes's Warbler	<i>Iduna rama</i>	Widespread winter visitor	Least Concern
199	Tawny Pipit	<i>Anthus campestris</i>	Widespread winter visitor	Least Concern
200	Temminck's Stint	<i>Calidris temminckii</i>	Widespread winter visitor	Least Concern
201	Terek Sandpiper	<i>Xenus cinereus</i>	Widespread winter visitor	Least Concern
202	Thick-billed Warbler	<i>Arundinax aedon</i>	Sparse winter visitor	Least Concern
203	Tickell's Leaf Warbler	<i>Phylloscopus affinis</i>	Widespread winter visitor	Least Concern
204	Tree Pipit	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
205	Tricolored Munia	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
206	Verditer Flycatcher	<i>Eumyias thalassinus</i>	Resident	Least Concern
207	Western Marsh-Harrier	<i>Circus aeruginosus</i>	Widespread winter visitor	Least Concern
208	Western Reef-Heron	<i>Egretta gularis</i>	Resident	Least Concern
209	Western Yellow Wagtail	<i>Motacilla flava</i>	Widespread winter visitor	Least Concern
210	Whiskered Tern	<i>Chlidonias hybrida</i>	Widespread winter visitor & resident	Least Concern
211	White Wagtail	<i>Motacilla alba</i>	Local resident & widespread winter visitor	Least Concern

212	White-bellied Drongo	<i>Dicrurus caerulescens</i>	Resident	Least Concern
213	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concern
214	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Resident	Least Concern
215	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Resident	Least Concern
216	White-cheeked Barbet	<i>Psilopogon viridis</i>	Resident	Least Concern
217	White-rumped Munia	<i>Lonchura striata</i>	Resident	Least Concern
218	White-rumped Needletail	<i>Lonchura striata</i>	Resident	Least Concern
219	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concern
220	Wire-tailed Swallow	<i>Hirundo smithii</i>	Resident	Least Concern
221	Wood Sandpiper	<i>Tringa glareola</i>	Widespread winter visitor	Least Concern
222	Woolly-necked Stork	<i>Ciconia episcopus</i>	Near Threatened	Near Threatened
223	Yellow Bittern	<i>Ixobrychus sinensis</i>	Resident	Least Concern
224	Yellow-billed Babbler	<i>Argya affinis</i>	Resident	Least Concern
225	Yellow-throated Sparrow	<i>Gymnoris xanthocollis</i>	Resident	Least Concern
226	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Resident	Least Concern
227	Zitting Cisticola	<i>Cisticola juncidis</i>	Resident	Least Concern

Table 7. Shows the checklist of birds found in Achankulam lake, their common name, scientific name, Migratory status, and IUCN category are provided.

Land Use and Land Cover Changes

Land use and land cover changes over a period of 5 years from 2017 – 2021 indicates that drastic changes were not observed over these periods of time, the mean average of each class was calculated. For this wetland crop area were found to be in higher proportion with mean value of 10.61 sq.kms around the wetland, then built area with the proportion

of 8.62 sq.kms, followed by less proportion of vegetation area with 2.87 sq kms, grassland with 0.11 sq kms and water body with 0.06 sq kms.

S.No	Classes	2017_area	2018_area	2019_area	2020_area	2021_area	Mean
1	Water body	0.04	0.07	0.05	0.06	0.09	0.06
2	Vegetation	2.81	2.15	2.07	3.64	3.65	2.87
3	Crops	11.14	11.96	11.66	9.39	8.92	10.61
4	Build area	8.10	7.99	8.46	9.04	9.48	8.62
5	Grassland	0.18	0.10	0.03	0.14	0.13	0.11

Table 8. Calculated mean area of each classes for the period of 5 years from 2017 - 2021

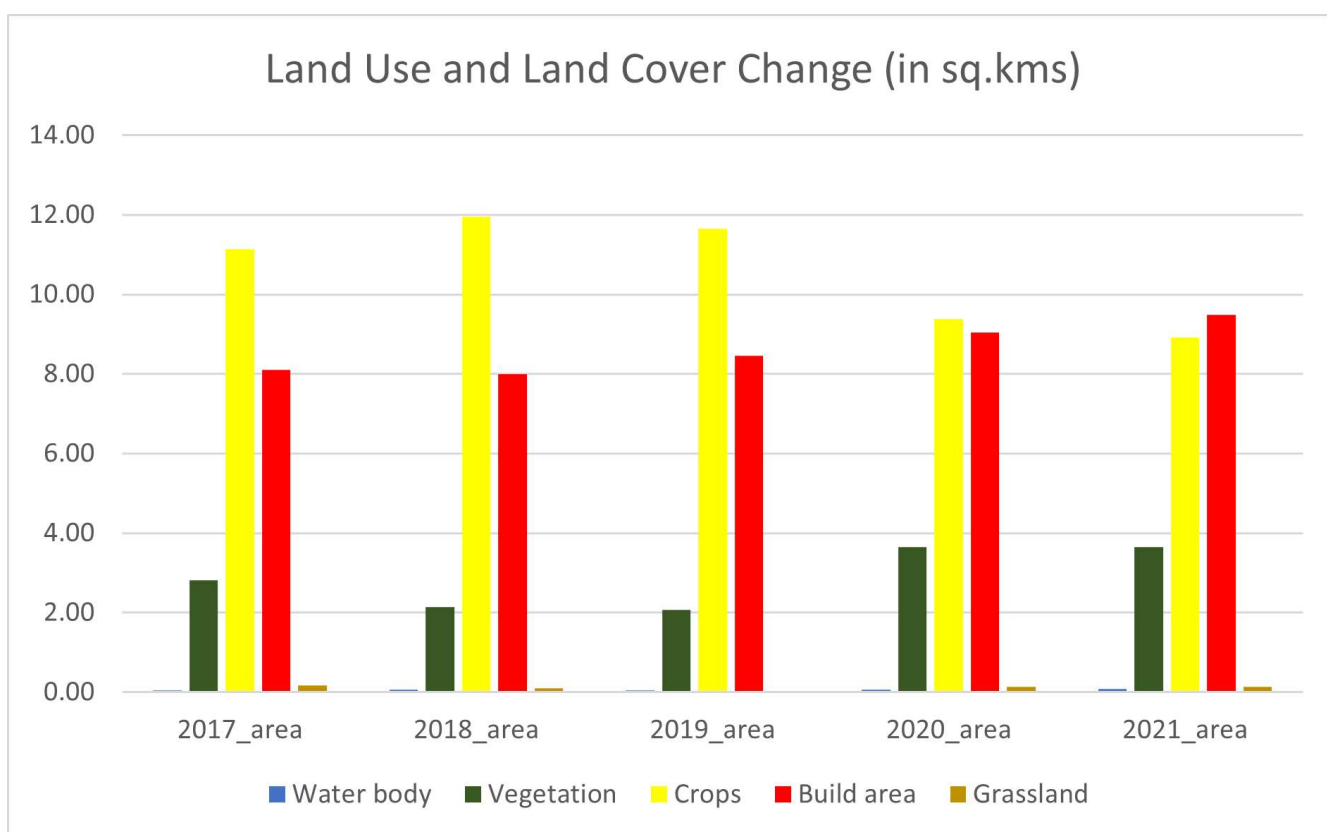


Figure 10. Land use and land cover changes over a period of 5 years from 2017 - 2021 for each classes

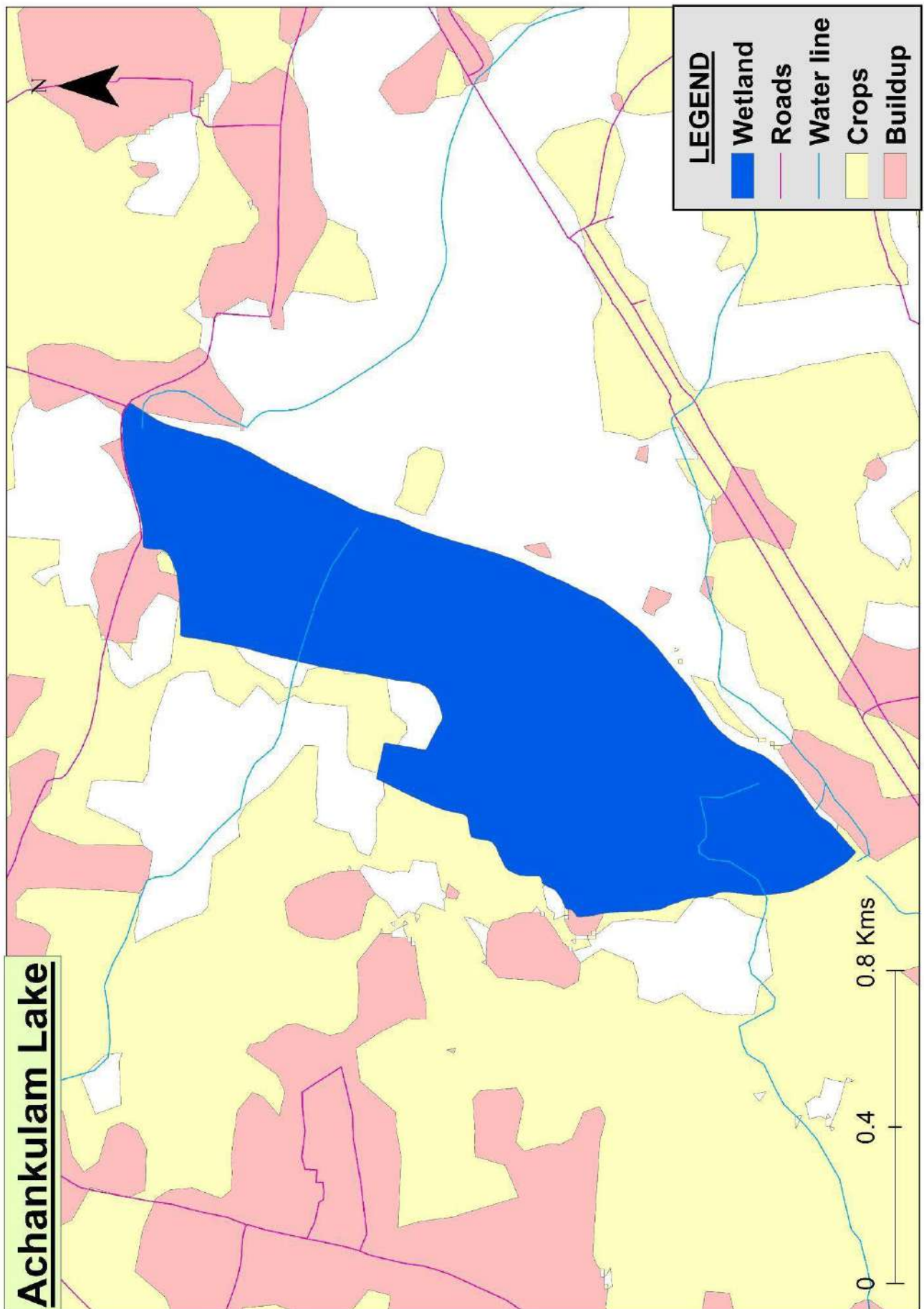


Figure 11. Base map of Achankulam Lake

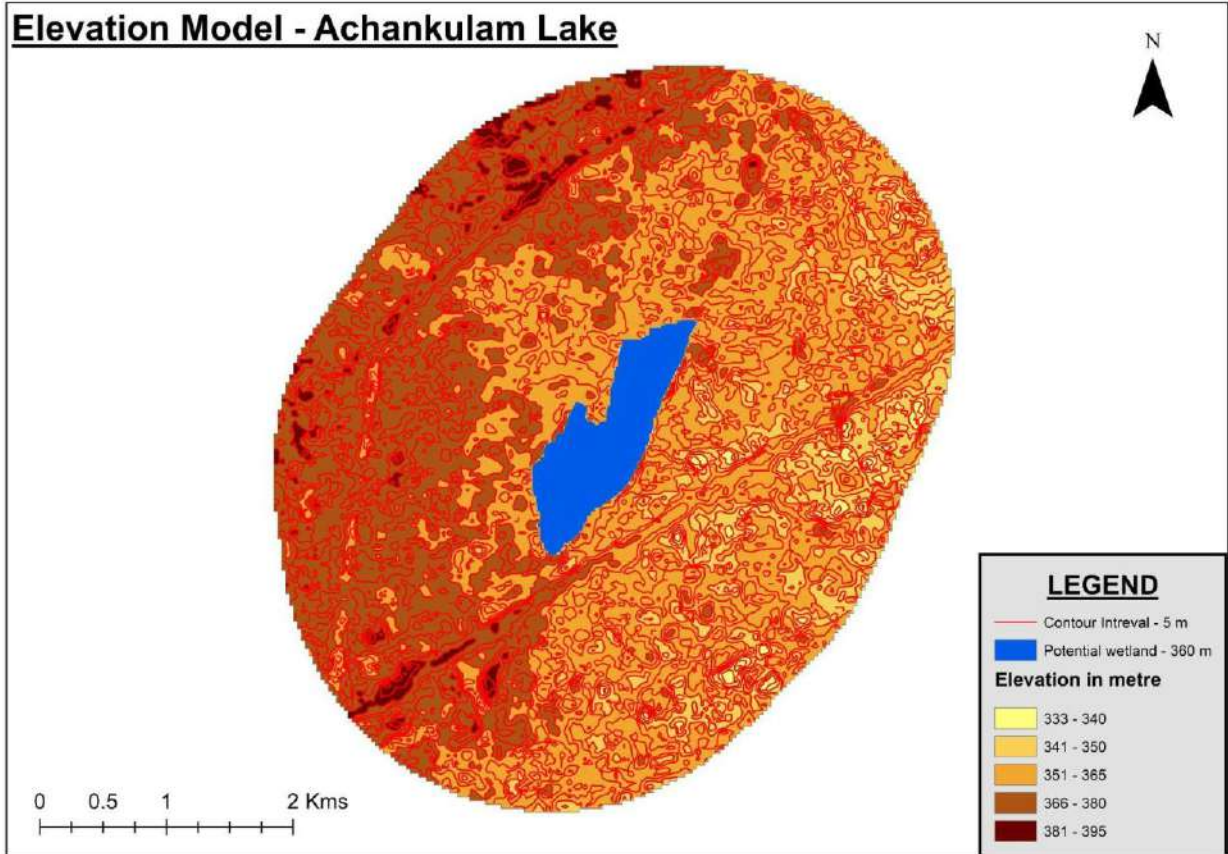


Figure 12. Elevation map of Achankulam Lake

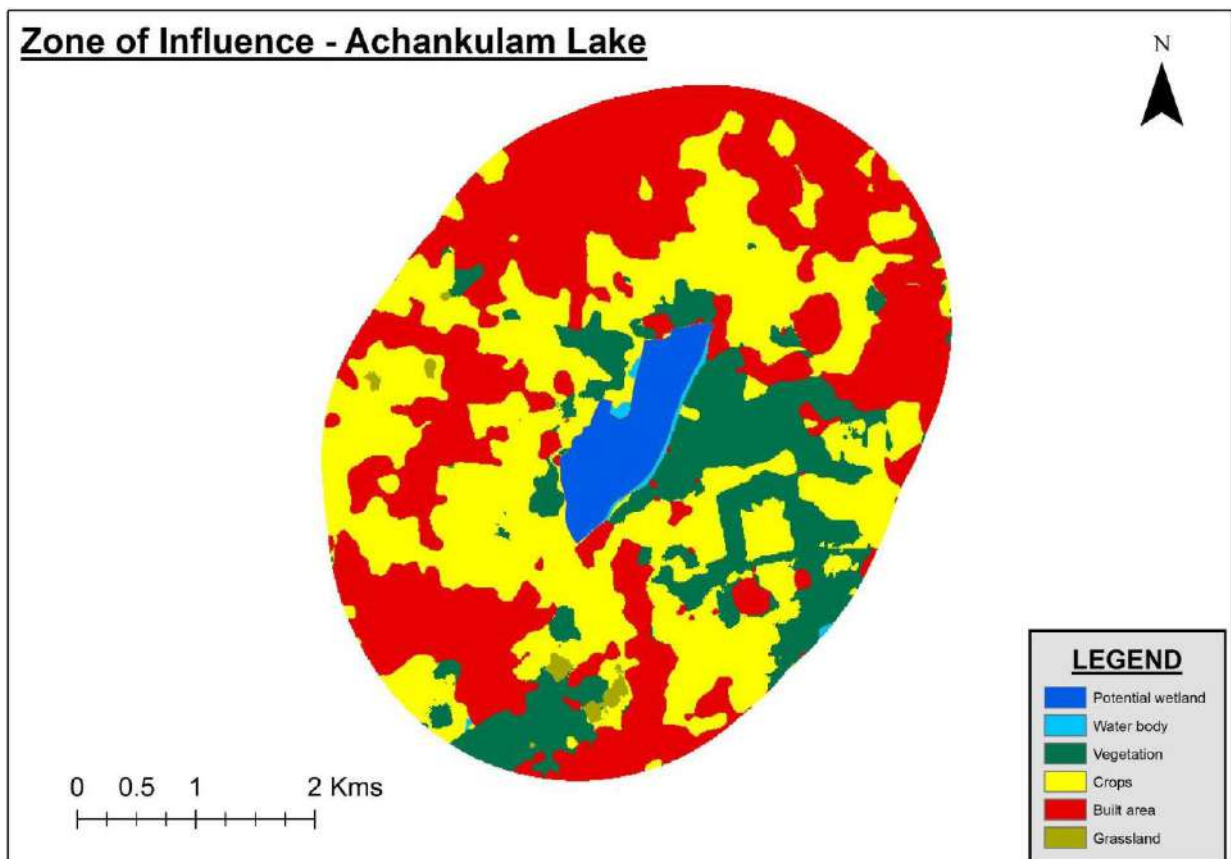


Figure 13. Zone of influence map of Achankulam Lake

3.Nayapakkam lake, Thiruvallur:

Nayapakkam lake is located near Kadambathur, Thiruvallur .It is located 35 km from Chennai. The geographical coordinates of the lake are 13.03488769 and 79.98308559. The lake is spread over an area of 0.216 sq. km. 191 bird species have been recorded at Nayapakkam Lake from 2012 to September 2022.

The lake is home to a variety of birds with different conservation statuses. Among the near-threatened birds recorded in the wetland are Black-headed Ibis, Black-tailed Godwit, Oriental Darter, Painted Stork, Red-necked Falcon, Pallid Harrier, and Spot-billed Pelican. Additionally, vulnerable birds like the Common pochard, greater spotted eagle, Indian spotted eagle, and river tern were recorded in this wetland. During November, December, and January the lake attracts around 51 winter visitors including Green sandpipers, Northern shoveler, Caspian tern, and others.

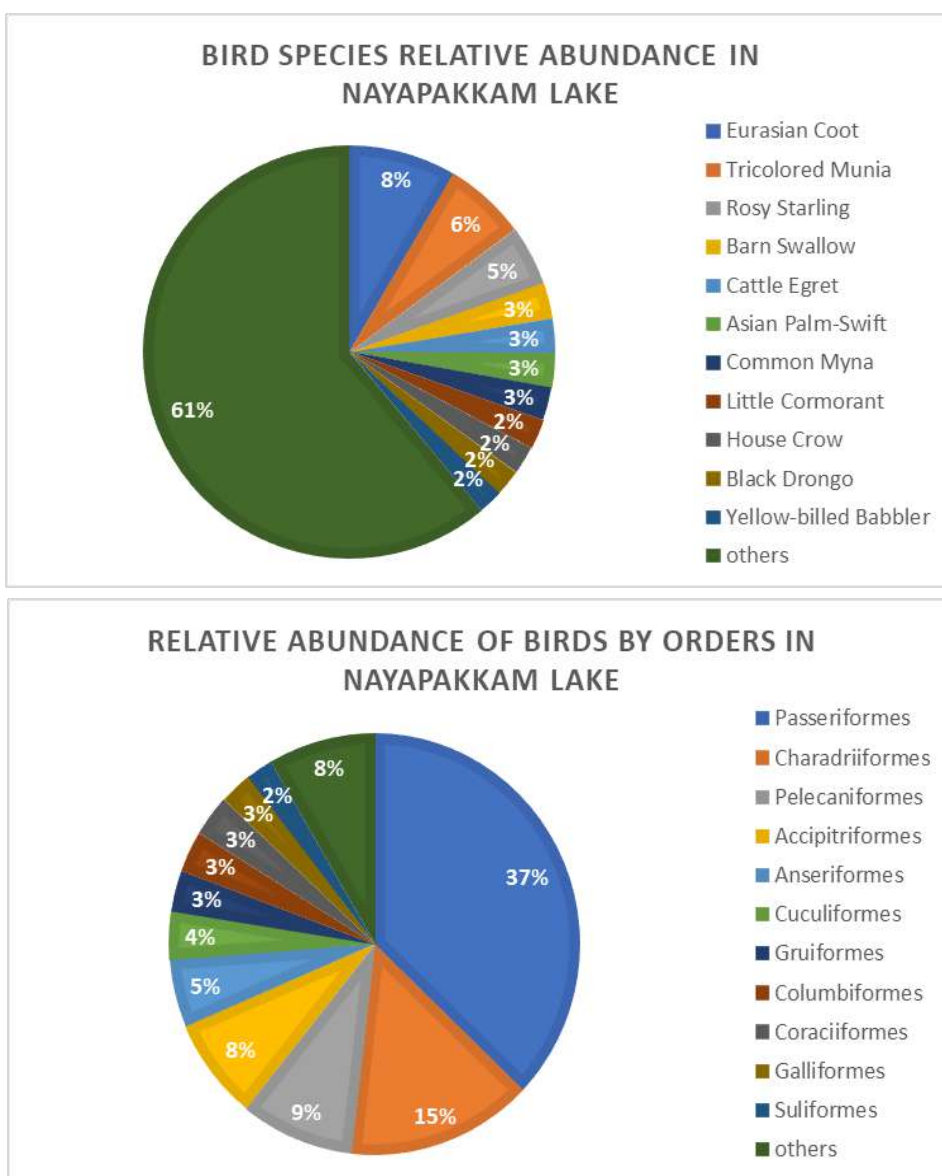


Figure 14. Relative abundance of bird species and orders in Nayapakkam Lake

Abundance:

Among the diverse wetland birds, the Eurasian Coot is prominent, with a significant population of 2951 individuals. The Cattle Egret follows, its numbers amounting to 942. The elegant Little Egret stands out with an observed count of 510, while the Indian Pond-Heron contributes to the wetland community with 594 sightings. The presence of the Cotton Pygmy-Goose (587), Garganey (546), and Fulvous Whistling-Duck (509) further enriches the wetland ecosystem. Additionally, the Rock Pigeon (473) and Eurasian Wigeon (443) contribute to species diversity within these habitats.

IUCN Category:

Many of these wetland bird species likely fall under the "Least Concern" category, indicating their populations. This assessment generally applies to species like the Eurasian Coot, Cattle Egret, Little Egret, and Indian Pond-Heron. The Black-tailed Godwit, Common Pochard, Greater Spotted Eagle, Oriental Darter, Pallid Harrier, Red-necked Falcon, and Spot-billed Pelican are classified as near threatened, while the River Tern is categorized as vulnerable.

Resident/Migratory Behavior:

The observed presence of Cotton Pygmy-Goose, Garganey, Fulvous Whistling-Duck, and Indian Spot-billed Duck indicates the likely resident status of these species, emphasizing their close association with wetlands. The Little Grebe, with its sighting count of 340, adds to the richness of these habitats as a resident bird. While many of these species might exhibit resident behaviors, it's important to note that wetlands also serve as important stopover points for migratory species, such as the Pacific Golden Plover, which might utilize these areas during seasonal migrations. The sightings of other species like Caspian Tern, Pied Harrier, and Barred Buttonquail might also reflect their migratory behaviors and their utilization of wetlands as part of their annual journeys.

SI No	Common Name	Scientific Name	Types of Migration	IUCN Category
1	Ashy Drongo	<i>Dicrurus leucophaeus</i>	Resident	Least Concern
2	Ashy Prinia	<i>Prinia socialis</i>	Resident	Least Concern
3	Ashy Woodswallow	<i>Artamus fuscus</i>	Resident	Least Concern
4	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i>	Resident	Least Concern
5	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	Local Resident & Widespread Winter Visitor	Least Concern

6	Asian Koel	<i>Eudynamys scolopaceus</i>	Resident	Least Concern
7	Asian Openbill	<i>Anastomus oscitans</i>	Resident	Least Concern
8	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Resident	Least Concern
9	Baillon's Crake	<i>Zapornia pusilla</i>	Common Winter Visitor, Some Resident	Least Concern
10	Barn Swallow	<i>Hirundo rustica</i>	Widespread Resident & Winter Visitor	Least Concern
11	Barred Buttonquail	<i>Turnix suscitator</i>	Resident	Least Concern
12	Baya Weaver	<i>Ploceus philippinus</i>	Resident	Least Concern
13	Bay-backed Shrike	<i>Lanius vittatus</i>	Resident	Least Concern
14	Black Bittern	<i>Ixobrychus flavicollis</i>	Resident	Least Concern
15	Black Drongo	<i>Dicrurus macrocercus</i>	Resident	Least Concern
16	Black Kite	<i>Milvus migrans</i>	Resident	Least Concern
17	Black-breasted Weaver	<i>Ploceus benghalensis</i>	Resident	Least Concern
18	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Resident	Least Concern
19	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	Resident	Least Concern
20	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Resident	Near Threatened
21	Black-rumped Flameback	<i>Dinopium benghalense</i>	Resident	Least Concern
22	Black-tailed Godwit	<i>Limosa limosa</i>	Widespread Winter Visitor	Near Threatened
23	Black-winged Kite	<i>Elanus caeruleus</i>	Resident	Least Concern
24	Black-winged Stilt	<i>Himantopus himantopus</i>	Local Resident & Widespread Winter Visitor	Least Concern
25	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	Resident	Least Concern

26	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Resident	Least Concern
27	Blyth's Pipit	<i>Anthus godlewskii</i>	Widespread Winter Visitor	Least Concern
28	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Widespread Winter Visitor	Least Concern
29	Booted Eagle	<i>Hieraaetus pennatus</i>	Widespread Winter Visitor & Local Resident	Least Concern
30	Booted Warbler	<i>Iduna caligata</i>	Widespread Winter Visitor	Least Concern
31	Brahminy Starling	<i>Sturnia pagodarum</i>	Resident	Least Concern
32	Bronze-winged Jacana	<i>Metopidius indicus</i>	Resident	Least Concern
33	Brown Shrike	<i>Lanius cristatus</i>	Widespread Winter Visitor	Least Concern
34	Brown-breasted Flycatcher	<i>Muscicapa muttui</i>	Resident	Least Concern
35	Caspian Tern	<i>Hydroprogne caspia</i>	Widespread Winter Visitor	Least Concern
36	Cattle Egret	<i>Bubulcus ibis</i>	Widespread Resident	Least Concern
37	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	Resident	Least Concern
38	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Resident	Least Concern
39	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	Resident	Least Concern
40	Common Babbler	<i>Argya caudata</i>	Resident	Least Concern
41	Common Barn Owl	<i>Tyto alba</i>	Resident	Least Concern
42	Common Cuckoo	<i>Cuculus canorus</i>	Resident	Least Concern
43	Common Greenshank	<i>Tringa nebularia</i>	Widespread Winter Visitor	Least Concern
44	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Resident	Least Concern
45	Common Iora	<i>Aegithina tiphia</i>	Resident	Least Concern

46	Common Kingfisher	<i>Alcedo atthis</i>	Resident	Least Concern
47	Common Moorhen	<i>Gallinula chloropus</i>	Resident	Least Concern
48	Common Myna	<i>Acridotheres tristis</i>	Resident	Least Concern
49	Common Pochard	<i>Aythya ferina</i>	Widespread Winter Visitor	Vulnerable
50	Common Sandpiper	<i>Actitis hypoleucos</i>	Widespread Winter Visitor & Resident	Least Concern
51	Common Snipe	<i>Gallinago gallinago</i>	Widespread Winter Visitor & Local Resident	Least Concern
52	Common Tailorbird	<i>Orthotomus sutorius</i>	Resident	Least Concern
53	Common Tern	<i>Sterna hirundo</i>	Widespread Winter Visitor & Resident	Least Concern
54	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Resident	Least Concern
55	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Resident	Least Concern
56	Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	Widespread Resident	Least Concern
57	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Resident	Least Concern
58	Eurasian Coot	<i>Fulica atra</i>	Local Resident & Widespread Winter Visitor	Least Concern
59	Eurasian Hoopoe	<i>Upupa epops</i>	Widespread Resident & Winter Visitor	Least Concern
60	Eurasian Kestrel	<i>Garrulus glandarius</i>	Resident	Least Concern
61	Eurasian Sparrowhawk	<i>Accipiter nisus</i>	Widespread Winter Visitor & Resident	Least Concern
62	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Widespread Winter Visitor & Resident	Least Concern
63	Eurasian Wigeon	<i>Mareca penelope</i>	Widespread Winter Visitor	Least Concern

64	Fulvous Whistling-Duck	<i>Dendrocygna bicolor</i>	Resident	Least Concern
65	Garganey	<i>Spatula querquedula</i>	Widespread Winter Visitor	Least Concern
66	Glossy Ibis	<i>Plegadis falcinellus</i>	Widespread Winter Visitor & Resident	Least Concern
67	Great Cormorant	<i>Phalacrocorax carbo</i>	Widespread Winter Visitor & Resident	Least Concern
68	Great Egret	<i>Ardea alba</i>	Widespread Resident & Sparse Winter Visitor	Least Concern
69	Greater Coucal	<i>Centropus sinensis</i>	Resident	Least Concern
70	Greater Flamingo	<i>Phoenicopterus roseus</i>	Widespread Winter Visitor & Local Resident	Least Concern
71	Greater Painted-Snipe	<i>Rostratula benghalensis</i>	Resident	Least Concern
72	Greater Spotted Eagle	<i>Clanga clanga</i>	Widespread Winter Visitor & Resident	Vulnerable
73	Green Bee-eater	<i>Merops orientalis</i>	Resident	Least Concern
74	Green Sandpiper	<i>Tringa ochropus</i>	Widespread Winter Visitor	Least Concern
75	Green-winged Teal	<i>Aethopyga nipalensis</i>	Resident	Least Concern
76	Grey Francolin	<i>Ortygornis pondicerianus</i>	Resident	Least Concern
77	Grey Heron	<i>Ardea cinerea</i>	Widespread Winter Visitor & Resident	Least Concern
78	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	Resident	Least Concern
79	Grey-breasted Prinia	<i>Prinia hodgsonii</i>	Resident	Least Concern
80	Grey-headed Swampphen	<i>Porphyrio poliocephalus</i>	-	Not Recognised
81	Gull-billed Tern	<i>Gelochelidon nilotica</i>	Widespread Winter Visitor & Local Resident	Least Concern

82	House Crow	<i>Corvus splendens</i>	Resident	Least Concern
83	House Sparrow	<i>Passer domesticus</i>	Resident	Least Concern
84	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concern
85	Indian Courser	<i>Cursorius coromandelicus</i>	Resident	Least Concern
86	Indian Golden Oriole	<i>Oriolus kundoo</i>	Resident	Least Concern
87	Indian Nightjar	<i>Caprimulgus asiaticus</i>	Resident	Least Concern
88	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Resident	Least Concern
89	Indian Peafowl	<i>Pavo cristatus</i>	Resident	Least Concern
90	Indian Pond-Heron	<i>Ardeola grayii</i>	Widespread Resident	Least Concern
91	Indian Robin	<i>Copsychus fulicatus</i>	Resident	Least Concern
92	Indian Roller	<i>Coracias benghalensis</i>	Resident	Least Concern
93	Indian Silverbill	<i>Euodice malabarica</i>	Resident	Least Concern
94	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Resident	Least Concern
95	Indian Spotted Eagle	<i>Clanga hastata</i>	-	Vulnerable
96	Indian Thick-knee	<i>Burhinus indicus</i>	Resident	Least Concern
97	Intermediate Egret	<i>Ardea intermedia</i>	Resident	Least Concern
98	Jerdon's Bushlark	<i>Mirafra affinis</i>	Resident	Least Concern
99	Jungle Bush-Quail	<i>Perdica asiatica</i>	Resident	Least Concern
100	Jungle Prinia	<i>Prinia sylvatica</i>	Resident	Least Concern
101	Knob-billed Duck	<i>Sarkidiornis melanotos</i>	Resident	Least Concern
102	Large Cuckooshrike	<i>Coracina macei</i>	Resident	Least Concern
103	Large Grey Babbler	<i>Argya malcolmi</i>	Resident	Least Concern

104	Large-billed Crow	<i>Corvus macrorhynchos</i>	Resident	Least Concern
105	Laughing Dove	<i>Spilopelia senegalensis</i>	Resident	Least Concern
106	Lesser Sand-Plover	<i>Charadrius mongolus</i>	Resident	Least Concern
107	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Resident	Least Concern
108	Lesser Whitethroat	<i>Curruca curruca</i>	Widespread Winter Visitor	Least Concern
109	Little Cormorant	<i>Microcarbo niger</i>	Resident	Least Concern
110	Little Egret	<i>Egretta garzetta</i>	Resident	Least Concern
111	Little Grebe	<i>Tachybaptus ruficollis</i>	Resident	Least Concern
112	Little Ringed Plover	<i>Charadrius dubius</i>	Widespread Winter Visitor & Resident	Least Concern
113	Little Swift	<i>Apus affinis</i>	Resident	Least Concern
114	Little Tern	<i>Sternula albifrons</i>	Widespread Resident	Least Concern
115	Long-tailed Shrike	<i>Lanius schach</i>	Resident	Least Concern
116	Loten's Sunbird	<i>Cinnyris lotenius</i>	Resident	Least Concern
117	Marsh Sandpiper	<i>Tringa stagnatilis</i>	Widespread Winter Visitor	Least Concern
118	Mongolian Short-toed Lark	<i>Calandrella dukhunensis</i>	Resident	Least Concern
119	Montagu's Harrier	<i>Circus pygargus</i>	Widespread Winter Visitor	Least Concern
120	Northern Pintail	<i>Anas acuta</i>	Vagrant	Least Concern
121	Northern Shoveler	<i>Spatula clypeata</i>	Widespread Winter Visitor	Least Concern
122	Oriental Darter	<i>Anhinga melanogaster</i>	-	Near Threatened
123	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Widespread Winter Visitor & Resident	Least Concern
124	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Resident	Least Concern

125	Oriental Pratincole	<i>Glareola maldivarum</i>	Resident	Least Concern
126	Oriental Skylark	<i>Alauda gulgula</i>	Resident	Least Concern
127	Oriental Turtle-Dove	<i>Streptopelia orientalis</i>	Widespread Resident & Winter Visitor	Least Concern
128	Osprey	<i>Pandion haliaetus</i>	Widespread Winter Visitor & Local Resident	Least Concern
129	Pacific Golden-Plover	<i>Pluvialis fulva</i>	Widespread Winter Visitor	Least Concern
130	Paddyfield Pipit	<i>Anthus rufulus</i>	Resident	Least Concern
131	Paddyfield Warbler	<i>Acrocephalus agricola</i>	Widespread Winter Visitor	Least Concern
132	Painted Stork	<i>Mycteria leucocephala</i>	Widespread Resident	Near Threatened
133	Pallid Harrier	<i>Circus macrourus</i>	Widespread Winter Visitor	Near Threatened
134	Peregrine Falcon	<i>Falco peregrinus</i>	Widespread Winter Visitor & Resident	Least Concern
135	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Resident	Least Concern
136	Pied Bushchat	<i>Saxicola caprata</i>	Resident	Least Concern
137	Pied Cuckoo	<i>Clamator jacobinus</i>	Resident	Least Concern
138	Pied Harrier	<i>Circus melanoleucos</i>	Widespread Winter Visitor & Local Resident	Least Concern
139	Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concern
140	Pin-tailed Snipe	<i>Pterocles alchata</i>	Vagrant	Least Concern
141	Plain Prinia	<i>Prinia inornata</i>	Resident	Least Concern
142	Purple Heron	<i>Ardea purpurea</i>	Widespread Winter Visitor & Resident	Least Concern
143	Purple Sunbird	<i>Cinnyris asiaticus</i>	Resident	Least Concern

144	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Resident	Least Concern
145	Rain Quail	<i>Coturnix coromandelica</i>	Resident	Least Concern
146	Red Avadavat	<i>Coturnix coromandelica</i>	Resident	Least Concern
147	Red Collared-Dove	<i>Streptopelia tranquebarica</i>	Resident	Least Concern
148	Red-necked Falcon	<i>Falco chicquera</i>	Widespread Winter Visitor & Local Resident	Near Threatened
149	Red-rumped Swallow	<i>Cecropis daurica</i>	Widespread Resident & Winter Visitor	Least Concern
150	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Resident	Least Concern
151	Red-wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concern
152	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Resident	Least Concern
153	Richard's Pipit	<i>Anthus richardi</i>	Widespread Winter Visitor	Least Concern
154	River Tern	<i>Sterna aurantia</i>	Migrant	Vulnerable
155	Rock Pigeon	<i>Columba livia</i>	Resident	Least Concern
156	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Resident	Least Concern
157	Rosy Starling	<i>Pastor roseus</i>	Widespread Winter Visitor & Migrant	Least Concern
158	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Resident	Least Concern
159	Rufous-tailed Lark	<i>Ammomanes phoenicura</i>	Resident	Least Concern
160	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Resident	Least Concern
161	Shikra	<i>Accipiter badius</i>	Resident	Least Concern
162	Short-toed Snake-Eagle	<i>Circaetus gallicus</i>	Resident	Least Concern
163	Siberian Stonechat	<i>Saxicola maurus</i>	Resident & Widespread Winter Visitor	Least Concern

164	Spot-billed Pelican	<i>Pelecanus philippensis</i>	Resident	Near Threatened
165	Spotted Dove	<i>Spilopelia chinensis</i>	Resident	Least Concern
166	Spotted Owlet	<i>Athene brama</i>	Resident	Least Concern
167	Streaked Weaver	<i>Ploceus manyar</i>	Resident	Least Concern
168	Streak-throated Swallow	<i>Petrochelidon fluvicola</i>	Resident	Least Concern
169	Striated Heron	<i>Butorides striata</i>	Resident	Least Concern
170	Sykes's Warbler	<i>Iduna rama</i>	Widespread Winter Visitor	Least Concern
171	Tawny-bellied Babbler	<i>Dumetia hyperythra</i>	Resident	Least Concern
172	Temminck's Stint	<i>Calidris temminckii</i>	Widespread Winter Visitor	Least Concern
173	Tricolored Munia	<i>Anthus trivialis</i>	Resident & Widespread Winter Visitor	Least Concern
174	Watercock	<i>Gallicrex cinerea</i>	Resident	Least Concern
175	Western Marsh-Harrier	<i>Circus aeruginosus</i>	Widespread Winter Visitor	Least Concern
176	Western Reef-Heron	<i>Egretta gularis</i>	Resident	Least Concern
177	Western Yellow Wagtail	<i>Motacilla flava</i>	Widespread Winter Visitor	Least Concern
178	Whimbrel	<i>Numenius phaeopus</i>	Widespread Winter Visitor	Least Concern
179	Whiskered Tern	<i>Chlidonias hybrida</i>	Widespread Winter Visitor & Resident	Least Concern
180	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concern
181	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Resident	Least Concern
182	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Resident	Least Concern
183	White-eyed Buzzard	<i>Butastur teesa</i>	Resident	Least Concern

184	White-rumped Munia	<i>Lonchura striata</i>	Resident	Least Concern
185	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concern
186	Wood Sandpiper	<i>Tringa glareola</i>	Widespread Winter Visitor	Least Concern
187	Yellow Bittern	<i>Ixobrychus sinensis</i>	Resident	Least Concern
188	Yellow-billed Babbler	<i>Argya affinis</i>	Resident	Least Concern
189	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	Resident	Least Concern
190	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Resident	Least Concern
191	Zitting Cisticola	<i>Cisticola juncidis</i>	Resident	Least Concern

Table 9. Shows the checklist of birds found in Nayapakkam lake, their common name, scientific name, Migratory status, and IUCN category are provided.



Figure 15. Observation of Great Egret during field visit

Land Use and Land Cover Changes:

Land use and land cover changes over a period of 5 years from 2017 – 2021 indicate drastic changes were not observed over these periods of time. The mean average of each

The class was calculated. For this wetland grassland was found to be in higher proportion with the mean value of 6.87 sq. km around the wetland, then crop area with a proportion of 6.52 sq. km, followed by less proportion of built area with 2.01 sq km, water body with 1.401 sq km, flooded vegetation with 0.73 sq km and vegetation with 0.05 sq km.

S.No	Classes	2017_area	2018_area	2019_area	2020_area	2021_area	Mean
1	Water body	1.09	0.52	0.38	0.65	1.22	1.40
2	Vegetation	0.10	0.03	0.03	0.03	0.05	0.05
3	Flooded vegetation	0.84	0.80	0.18	0.97	0.86	0.73
4	Crops	6.35	8.12	9.09	4.59	4.45	6.52
5	Built area	1.62	1.94	1.99	2.30	2.19	2.01
6	Grassland	6.95	5.54	5.28	8.41	8.18	6.87

Table 10. Calculated mean area of each classes for the period of 5 years from 2017 - 2021

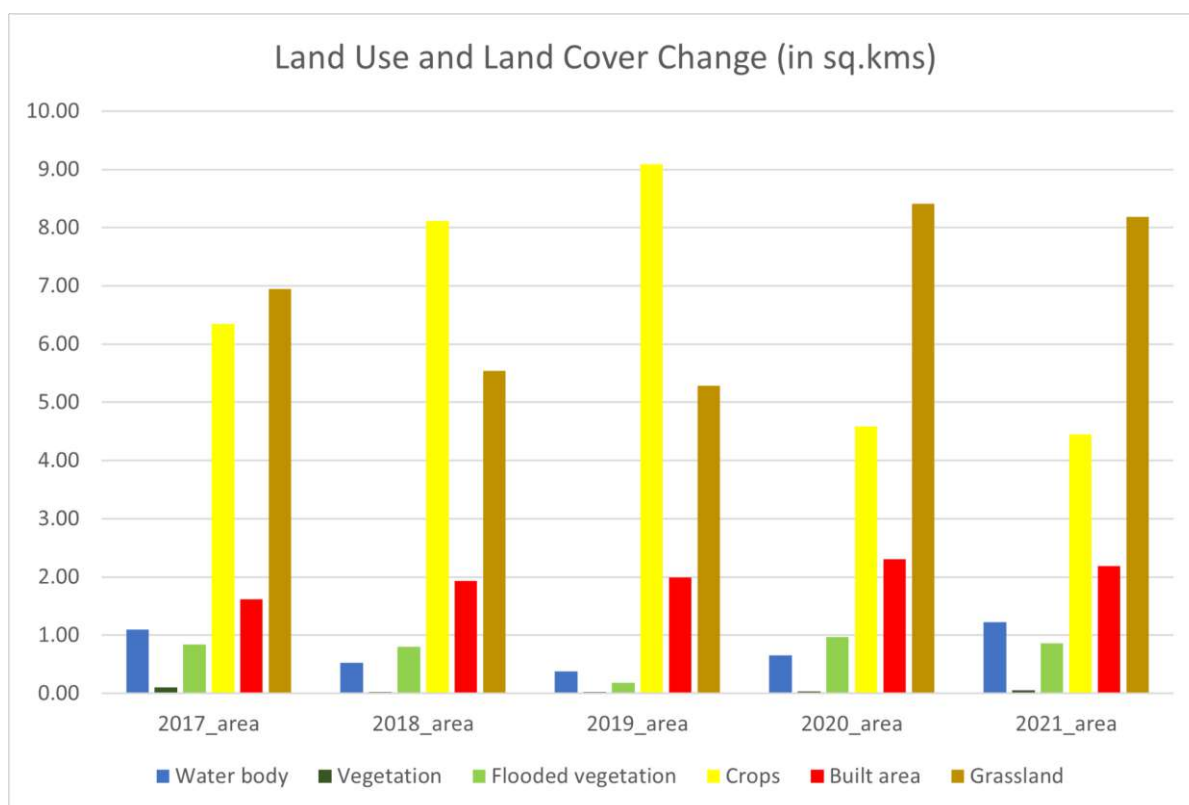


Figure 16. Graph to show Land use and land cover changes over a period of 5 years from 2017 - 2021 for each classes

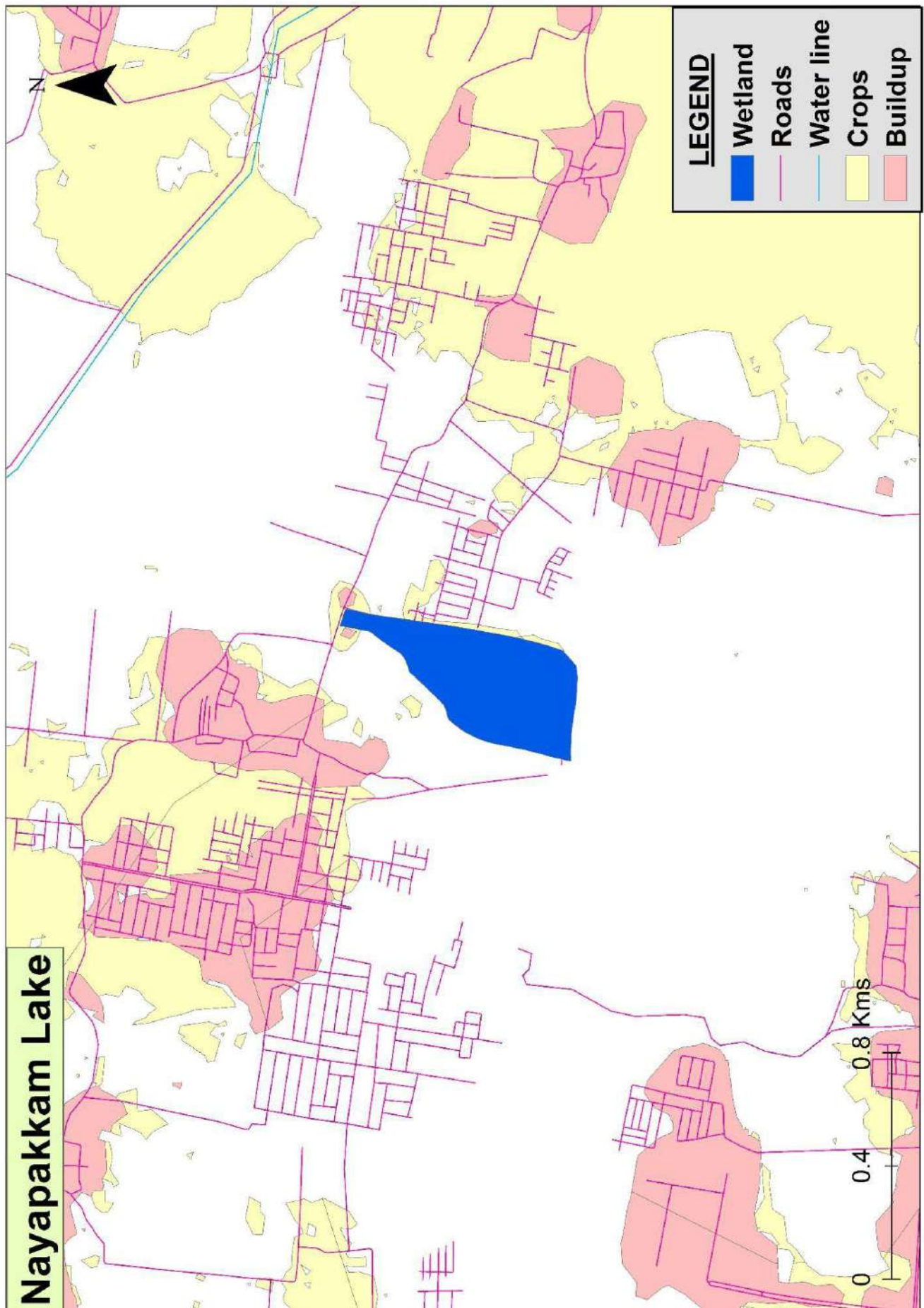


Figure 17. Base map of Nayapakkam Lake

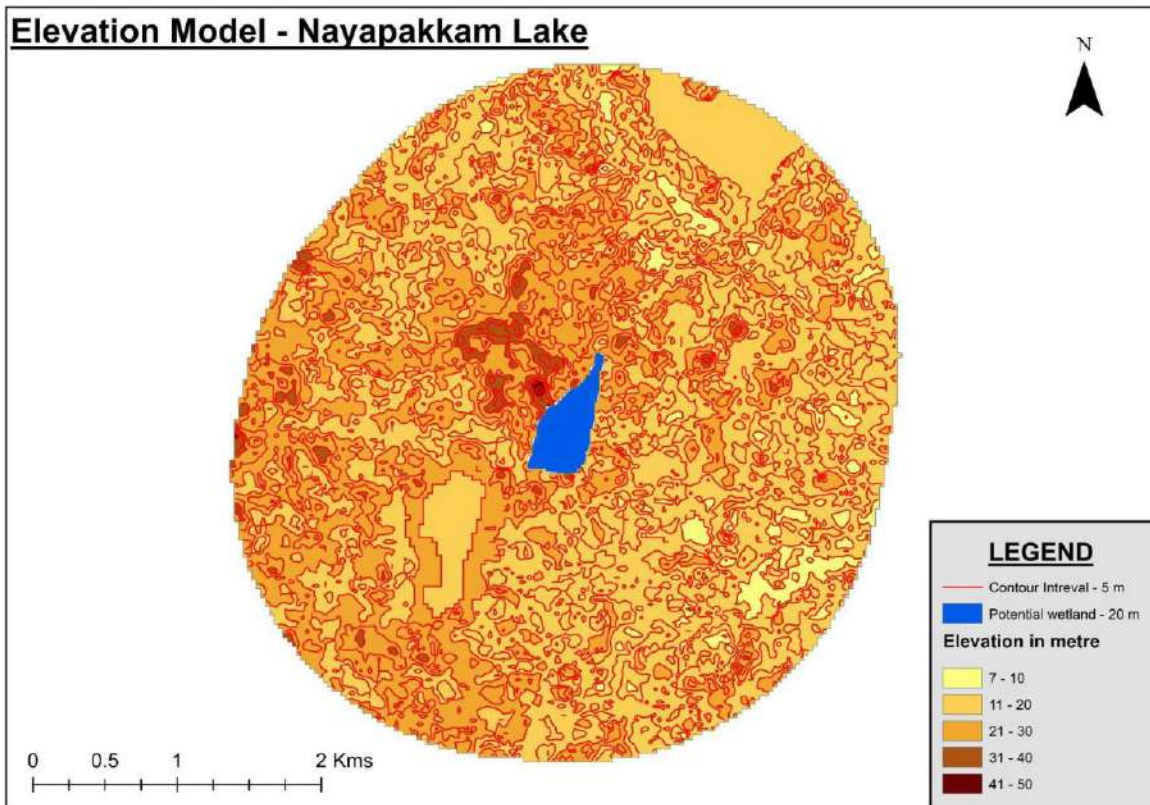


Figure 18. Elevation map of Nayapakkam Lake

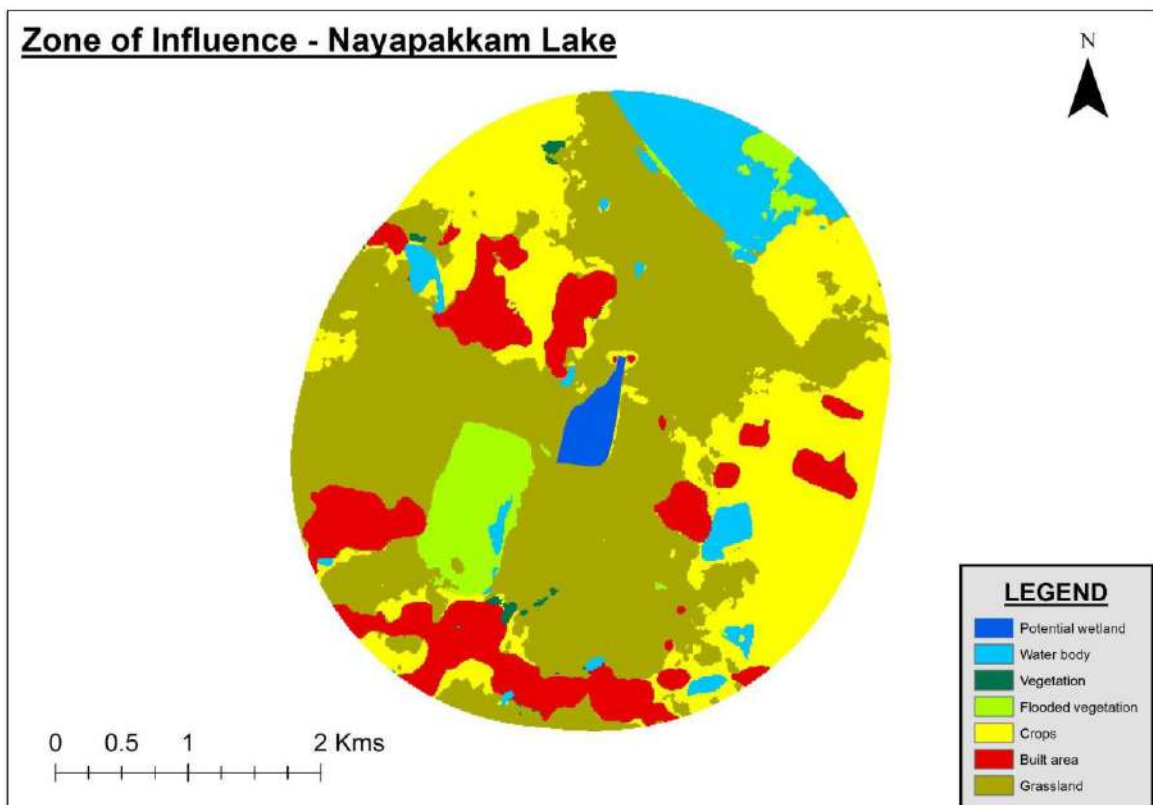


Figure 19. Zone of influence map of Nayapakkam Lake

4. Nochimedu Lake, Thiruvallur:

Nochimedu Lake is located in Poonamallee taluk of Thiruvallur district. The geographical coordinates are 13.0594783 and 80.00113133. It is spread over an area of 5.135 sq. km. A total of 181 bird species have been recorded at Nayapakkam Lake from 2012 to September 2022. The lake is home to a number of a variety of birds with different conservation statuses. Among the near-threatened birds recorded in the wetland are Black-headed Ibis, Black-tailed Godwit, Oriental Darter, Painted Stork, Red-necked Falcon, Pallid Harrier, and Spot-billed Pelican. Additionally, vulnerable birds like the Common pochard, greater spotted eagle, Indian spotted eagle, and river tern were recorded in this wetland. During the months of November, December, and January, the lake attracts around 51 winter visitors including Green sandpipers, Northern shoveler, Caspian tern, and others.

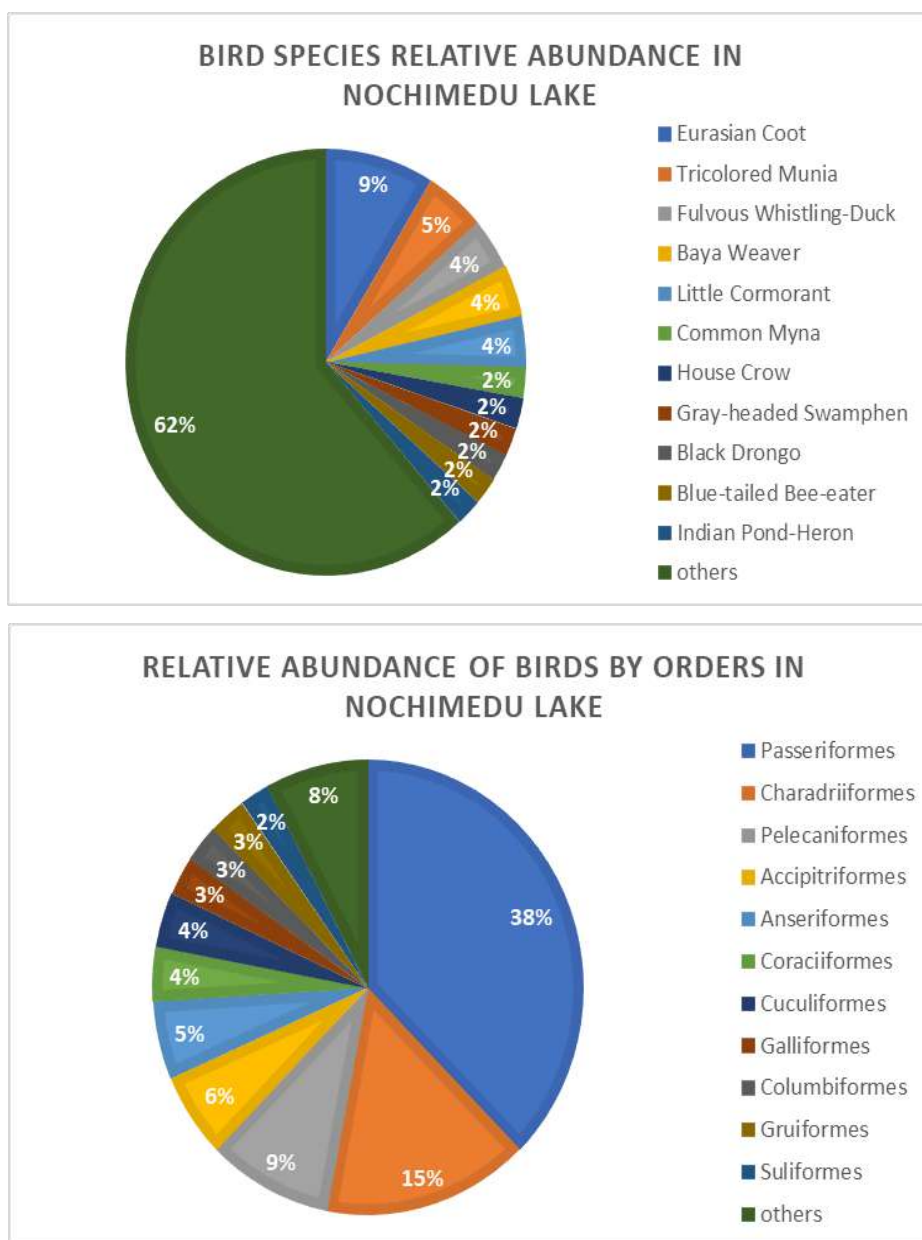


Figure 20. Relative abundance of bird species and orders in Nochimedu Lake

Abundance:

In diverse wetland habitats, several bird species are observed in varying numbers. The Eurasian Coot, with a count of 1599, is a notable presence contributing to the ecosystem. The Fulvous Whistling-Duck also plays a significant role with 722 sightings. Additionally, the Little Cormorant (700) and the striking Gray-headed Swamphen (397) are often encountered, enhancing the richness of wetland areas. Other notable species include the Indian Pond-Heron (377), Cattle Egret (346), and Little Egret (290), each adding to the diverse avian population.

IUCN Category:

Wetland bird species such as the Eurasian Coot, Fulvous Whistling-Duck, and Little Cormorant are commonly classified with an IUCN status of "Least Concern." However, species like the Oriental Darter and Spot-bellied Pelican have been identified as being in a near-threatened category.

Resident/Migratory Behavior:

The Black-winged Stilt, with 288 sightings, might indicate a resident presence, often utilizing wetlands as their habitat. The Indian Spot-billed Duck, observed 249 times, also exhibits a likely resident behavior, with wetlands serving as crucial nesting and foraging grounds. The Asian Openbill, another notable species with 236 sightings, is often seen in wetlands, suggesting a resident status. Species like the Gray Heron (88) and the Black-tailed Godwit (12) could demonstrate either resident or migratory behavior, using wetlands for different purposes depending on the time of year. The Little Stint, with only 5 sightings, might be a migrant species, stopping over at wetlands during its seasonal journeys.

SI No	Common Name	Scientific Name	Types of Migration	IUCN Category
1	Ashy Prinia	<i>Prinia socialis</i>	Resident	Least Concern
2	Ashy Woodswallow	<i>Artamus fuscus</i>	Resident	Least Concern
3	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i>	Resident	Least Concern

Assessment and identification of potential wetlands as bird sanctuaries and conservation strategies for them in Tamil Nadu

4	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	Local Resident & Widespread Winter Visitor	Least Concern
5	Asian Koel	<i>Eudynamys scolopaceus</i>	Resident	Least Concern
6	Asian Openbill	<i>Anastomus oscitans</i>	Resident	Least Concern
7	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Resident	Least Concern
8	Asian Pied Starling	<i>Gracupica contra</i>	Resident	Least Concern
9	Barn Swallow	<i>Hirundo rustica</i>	Widespread Resident & Winter Visitor	Least Concern
10	Barred Buttonquail	<i>Turnix suscitator</i>	Resident	Least Concern
11	Baya Weaver	<i>Ploceus philippinus</i>	Resident	Least Concern
12	Bay-backed Shrike	<i>Lanius vittatus</i>	Resident	Least Concern
13	Black Bittern	<i>Ixobrychus flavicollis</i>	Resident	Least Concern
14	Black Drongo	<i>Dicrurus macrocercus</i>	Resident	Least Concern
15	Black Kite	<i>Milvus migrans</i>	Resident	Least Concern
16	Black-breasted Weaver	<i>Ploceus benghalensis</i>	Resident	Least Concern

Assessment and identification of potential wetlands as bird sanctuaries and conservation strategies for them in Tamil Nadu

17	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Resident	Least Concern
18	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	Resident	Least Concern
19	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Resident	Least Concern
20	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Resident	Near Threatened
21	Black-rumped Flameback	<i>Dinopium benghalense</i>	Resident	Least Concern
22	Black-tailed Godwit	<i>Limosa limosa</i>	Widespread Winter Visitor	Near Threatened
23	Black-winged Kite	<i>Elanus caeruleus</i>	Resident	Least Concern
24	Black-winged Stilt	<i>Himantopus himantopus</i>	Resident	Least Concern
25	Blue-bearded Bee-eater	<i>Nyctyornis athertoni</i>	Resident	Least Concern
26	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	Resident	Least Concern
27	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Resident	Least Concern
28	Blyth's Pipit	<i>Anthus godlewskii</i>	Widespread Winter Visitor	Least Concern

29	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Widespread Winter Visitor	Least Concern
30	Booted Eagle	<i>Hieraaetus pennatus</i>	Widespread Winter Visitor & Resident	Least Concern
31	Booted Warbler	<i>Iduna caligata</i>	Widespread Winter Visitor	Least Concern
32	Brahminy Kite	<i>Haliastur indus</i>	Resident	Least Concern
33	Brahminy Starling	<i>Sturnia pagodarum</i>	Resident	Least Concern
34	Bronze-winged Jacana	<i>Metopidius indicus</i>	Resident	Least Concern
35	Brown Shrike	<i>Lanius cristatus</i>	Widespread Winter Visitor	Least Concern
36	Brown-breasted Flycatcher	<i>Muscicapa muttui</i>	Resident	Least Concern
37	Brown-headed Gull	<i>Chroicocephalus brunnicephalus</i>	Widespread Winter Visitor & Resident	Least Concern
38	Caspian Tern	<i>Hydroprogne caspia</i>	Widespread Winter Visitor	Least Concern
39	Cattle Egret	<i>Bubulcus ibis</i>	Resident	Least Concern
40	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Resident	Least Concern
41	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	Resident	Least Concern

Assessment and identification of potential wetlands as bird sanctuaries and conservation strategies for them in Tamil Nadu

42	Common Cuckoo	<i>Cuculus canorus</i>	Resident	Least Concern
43	Common Greenshank	<i>Tringa nebularia</i>	Widespread Winter Visitor	Least Concern
44	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Resident	Least Concern
45	Common Iora	<i>Aegithina tiphia</i>	Resident	Least Concern
46	Common Kingfisher	<i>Alcedo atthis</i>	Resident	Least Concern
47	Common Myna	<i>Acridotheres tristis</i>	Resident	Least Concern
48	Common Pochard	<i>Aythya ferina</i>	Widespread Winter Visitor	Vulnerable
49	Common Redshank	<i>Tringa totanus</i>	Widespread Winter Visitor & Resident	Least Concern
50	Common Sandpiper	<i>Actitis hypoleucos</i>	Widespread Winter Visitor & Resident	Least Concern
51	Common Snipe	<i>Gallinago gallinago</i>	Widespread Winter Visitor & Resident	Least Concern
52	Common Tailorbird	<i>Orthotomus sutorius</i>	Resident	Least Concern
53	Common Tern	<i>Sterna hirundo</i>	Widespread Winter Visitor & Resident	Least Concern
54	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Resident	Least Concern

55	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Resident	Least Concern
56	Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	Resident	Least Concern
57	Eastern Orphean Warbler	<i>Curruca crassirostris</i>	Migratory	Least Concern
58	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Resident	Least Concern
59	Eurasian Coot	<i>Fulica atra</i>	Local Resident & Widespread Winter Visitor	Least Concern
60	Eurasian Hoopoe	<i>Upupa epops</i>	Resident	Least Concern
61	Eurasian Kestrel	<i>Garrulus glandarius</i>	Resident	Least Concern
62	Eurasian Marsh-Harrier	<i>Pica pica</i>	Resident	Least Concern
63	Eurasian Moorhen	<i>Pica pica</i>	Resident	Least Concern
64	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Widespread Winter Visitor & Resident	Least Concern
65	Eurasian Wigeon	<i>Mareca penelope</i>	Widespread Winter Visitor	Least Concern
66	Fulvous Whistling-Duck	<i>Dendrocygna bicolor</i>	Resident	Least Concern

67	Garganey	<i>Spatula querquedula</i>	Widespread Winter Visitor	Least Concern
68	Glossy Ibis	<i>Plegadis falcinellus</i>	Widespread Winter Visitor & Resident	Least Concern
69	Great Cormorant	<i>Phalacrocorax carbo</i>	Widespread Winter Visitor & Resident	Least Concern
70	Great Egret	<i>Ardea alba</i>	Widespread Resident & Sparse Winter Visitor	Least Concern
71	Greater Coucal	<i>Centropus sinensis</i>	Resident	Least Concern
72	Greater Painted-Snipe	<i>Rostratula benghalensis</i>	Resident	Least Concern
73	Green Bee-eater	<i>Merops orientalis</i>	Resident	Least Concern
74	Green Sandpiper	<i>Tringa ochropus</i>	Widespread Winter Visitor	Least Concern
75	Grey Francolin	<i>Ortygornis pondicerianus</i>	Resident	Least Concern
76	Grey Heron	<i>Ardea cinerea</i>	Widespread Winter Visitor & Resident	Least Concern
77	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	Resident	Least Concern
78	Grey-breasted Prinia	<i>Prinia hodgsonii</i>	Resident	Least Concern

79	Grey-headed Swamphen	<i>Porphyrio poliocephalus</i>	Resident	Not Recognised
80	Gull-billed Tern	<i>Gelochelidon nilotica</i>	Widespread Winter Visitor & Local Resident	Least Concern
81	House Crow	<i>Corvus splendens</i>	Resident	Least Concern
82	House Sparrow	<i>Passer domesticus</i>	Resident	Least Concern
83	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concern
84	Indian Golden Oriole	<i>Oriolus kundoo</i>	Resident	Least Concern
85	Indian Nightjar	<i>Caprimulgus asiaticus</i>	Resident	Least Concern
86	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Resident	Least Concern
87	Indian Peafowl	<i>Pavo cristatus</i>	Resident	Least Concern
88	Indian Pond-Heron	<i>Ardeola grayii</i>	Resident	Least Concern
89	Indian Robin	<i>Copsychus fulicatus</i>	Resident	Least Concern
90	Indian Roller	<i>Coracias benghalensis</i>	Resident	Least Concern
91	Indian Silverbill	<i>Euodice malabarica</i>	Resident	Least Concern

92	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Resident	Least Concern
93	Indian Thick-knee	<i>Burhinus indicus</i>	Resident	Least Concern
94	Intermediate Egret	<i>Ardea intermedia</i>	Resident	Least Concern
95	Jerdon's Bushlark	<i>Mirafra affinis</i>	Resident	Least Concern
96	Jungle Bush-Quail	<i>Perdica asiatica</i>	Resident	Least Concern
97	Jungle Prinia	<i>Prinia sylvatica</i>	Resident	Least Concern
98	Kentish Plover	<i>Charadrius alexandrinus</i>	Widespread Winter Visitor & Resident	Least Concern
99	Knob-billed Duck	<i>Sarkidiornis melanotos</i>	Resident	Least Concern
100	Large Cuckooshrike	<i>Coracina macei</i>	Resident	Least Concern
101	Large Grey Babbler	<i>Argya malcolmi</i>	Resident	Least Concern
102	Large-billed Crow	<i>Corvus macrorhynchos</i>	Resident	Least Concern
103	Laughing Dove	<i>Spilopelia senegalensis</i>	Resident	Least Concern
104	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Resident	Least Concern

105	Lesser Whitethroat	<i>Curruca curruca</i>	Widespread Winter Visitor	Least Concern
106	Little Cormorant	<i>Microcarbo niger</i>	Resident	Least Concern
107	Little Egret	<i>Egretta garzetta</i>	Resident	Least Concern
108	Little Grebe	<i>Tachybaptus ruficollis</i>	Resident	Least Concern
109	Little Ringed Plover	<i>Charadrius dubius</i>	Widespread Winter Visitor & Resident	Least Concern
119	Oriental Darter	<i>Anhinga melanogaster</i>	Resident	Near Threatened
120	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Widespread Winter Visitor & Resident	Least Concern
121	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Resident	Least Concern
122	Oriental Pratincole	<i>Glareola maldivarum</i>	Migratory	Least Concern
123	Oriental Skylark	<i>Alauda gulgula</i>	Resident	Least Concern
124	Oriental Turtle-Dove	<i>Streptopelia orientalis</i>	Widespread Resident & Winter Visitor	Least Concern
125	Osprey	<i>Pandion haliaetus</i>	Widespread Winter Visitor & Local Resident	Least Concern
126	Paddyfield Pipit	<i>Anthus rufulus</i>	Resident	Least Concern

127	Painted Stork	<i>Mycteria leucocephala</i>	Resident	Near Threatened
128	Pallid Harrier	<i>Circus macrourus</i>	Widespread Winter Visitor	Near Threatened
129	Peregrine Falcon	<i>Falco peregrinus</i>	Widespread Winter Visitor & Resident	Least Concern
130	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Resident	Least Concern
131	Pied Bushchat	<i>Saxicola caprata</i>	Resident	Least Concern
132	Pied Cuckoo	<i>Clamator jacobinus</i>	Migratory	Least Concern
133	Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concern
134	Plain Prinia	<i>Prinia inornata</i>	Resident	Least Concern
135	Purple Heron	<i>Ardea purpurea</i>	Widespread Winter Visitor & Resident	Least Concern
136	Purple Sunbird	<i>Cinnyris asiaticus</i>	Resident	Least Concern
137	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Resident	Least Concern
138	Rain Quail	<i>Coturnix coromandelica</i>	Resident	Least Concern
139	Red Avadavat	<i>Coturnix coromandelica</i>	Resident	Least Concern
140	Red-necked Falcon	<i>Falco chicquera</i>	Resident	Near Threatened

141	Red-rumped Swallow	<i>Cecropis daurica</i>	Widespread Resident & Winter Visitor	Least Concern
142	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Resident	Least Concern
143	Red-wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concern
144	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Resident	Least Concern
145	Richard's Pipit	<i>Anthus richardi</i>	Widespread Winter Visitor	Least Concern
146	River Tern	<i>Sterna aurantia</i>	Resident	Vulnerable
147	Rock Pigeon	<i>Columba livia</i>	Resident	Least Concern
148	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Resident	Least Concern
149	Rosy Starling	<i>Pastor roseus</i>	Widespread Winter Visitor & Migrant	Least Concern
150	Ruddy-breasted Crane	<i>Zapornia fusca</i>	Resident	Least Concern
151	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Resident	Least Concern
152	Rufous-tailed Lark	<i>Ammomanes phoenicura</i>	Resident	Least Concern
153	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Resident	Least Concern

154	Shikra	<i>Accipiter badius</i>	Resident	Least Concern
155	Short-eared Owl	<i>Asio flammeus</i>	Winter Visitor	Least Concern
156	Short-toed Snake-Eagle	<i>Circaetus gallicus</i>	Resident	Least Concern
157	Siberian Stonechat	<i>Saxicola maurus</i>	Local Resident & Widespread Winter Visitor	Least Concern
158	Spot-billed Pelican	<i>Pelecanus philippensis</i>	Resident	Near Threatened
159	Spotted Dove	<i>Spilopelia chinensis</i>	Resident	Least Concern
160	Spotted Owlet	<i>Athene brama</i>	Resident	Least Concern
161	Streaked Weaver	<i>Ploceus manyar</i>	Resident	Least Concern
162	Striated Heron	<i>Butorides striata</i>	Resident	Least Concern
163	Sykes's Warbler	<i>Iduna rama</i>	Widespread Winter Visitor	Least Concern
164	Tawny Pipit	<i>Anthus campestris</i>	Widespread Winter Visitor	Least Concern
165	Tricolored Munia	<i>Anthus trivialis</i>	Local Resident & Widespread Winter Visitor	Least Concern
166	Watercock	<i>Gallicrex cinerea</i>	Resident	Least Concern

167	Western Reef-Heron	<i>Egretta gularis</i>	Resident	Least Concern
168	Western Yellow Wagtail	<i>Motacilla flava</i>	Widespread Winter Visitor	Least Concern
169	Whiskered Tern	<i>Chlidonias hybrida</i>	Widespread Winter Visitor & Resident	Least Concern
170	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concern
171	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Resident	Least Concern
172	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Resident	Least Concern
173	White-eyed Buzzard	<i>Butastur teesa</i>	Widespread Resident	Least Concern
174	White-rumped Munia	<i>Lonchura striata</i>	Resident	Least Concern
175	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concern
176	Wire-tailed Swallow	<i>Hirundo smithii</i>	Resident	Least Concern
177	Wood Sandpiper	<i>Tringa glareola</i>	Widespread Winter Visitor	Least Concern
178	Yellow Bittern	<i>Ixobrychus sinensis</i>	Resident	Least Concern
179	Yellow-billed Babbler	<i>Argya affinis</i>	Resident	Least Concern

180	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Resident	Least Concern
181	Zitting Cisticola	<i>Cisticola juncidis</i>	Resident	Least Concern

Table 11. Shows the checklist of birds found in Nochimedu lake, their common name, scientific name, Migratory status, and IUCN category are provided.

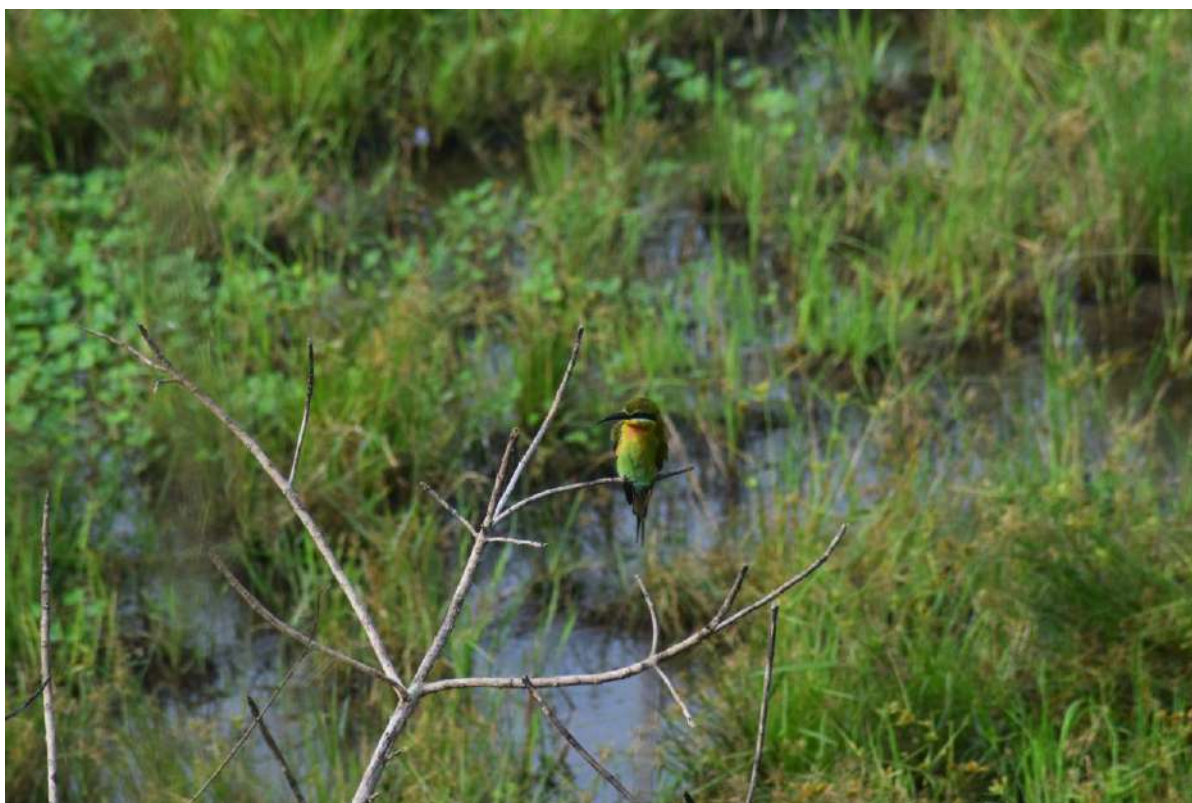


Figure 21. Observation of Blue-tailed-bee-eater in Chettipunniyam Lake during field visit

Land Use and Land Cover Changes:

Land use and land cover changes over a period of 5 years from 2017 – 2021 indicate drastic changes were not observed over these periods of time, the mean average of each class was calculated. For this wetland crops were found to be in higher proportion with the mean value of 21.14 sq.km around the wetland, then built area with the proportion of 5.31 sq. km, grassland with a proportion of 4.21 sq km, followed by less proportion of vegetation with 1.32 sq km, water body with 0.50 sq km, and flooded vegetation with 0.25 sq km.

S.No	Classes	2017_area	2018_area	2019_area	2020_area	2021_area	Mean
1	Water body	0.81	0.30	0.07	0.47	0.86	0.50
2	Vegetation	1.69	1.33	0.96	1.38	1.25	1.32
3	Flooded vegetation	0.10	0.13	0.03	0.20	0.78	0.25
4	Crops	21.47	23.18	22.38	20.26	18.41	21.14
5	Built area	4.25	5.37	5.46	5.62	5.87	5.31
6	Grassland	4.42	2.41	3.85	4.82	5.57	4.21

Table 12: Calculated mean area for each classes for the period of 5 years from 2017 - 2021

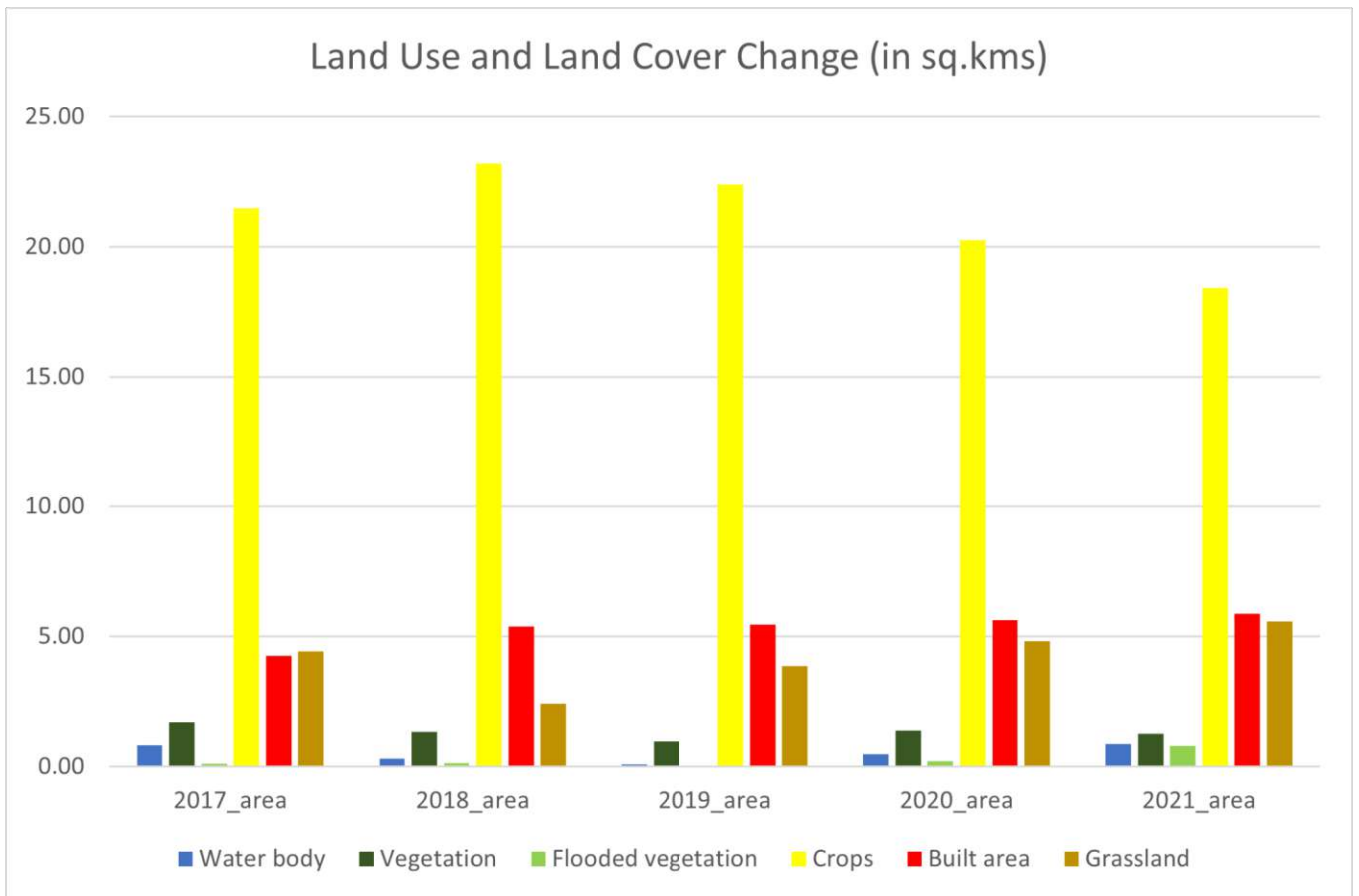


Figure 22. Land use and land cover changes over a period of 5 years from 2017 - 2021 for each classes

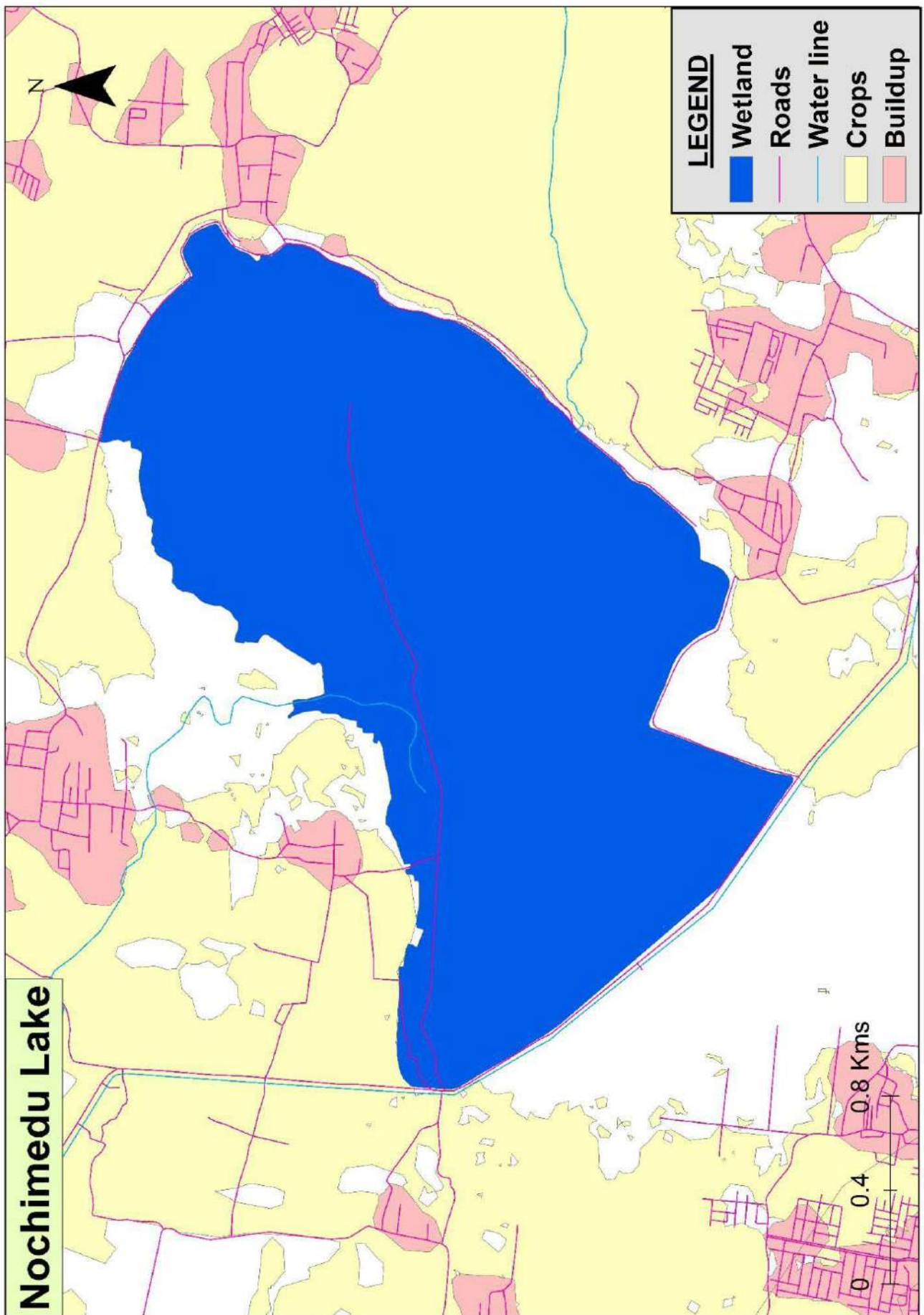


Figure 23. Base map of Nochimedu Lake

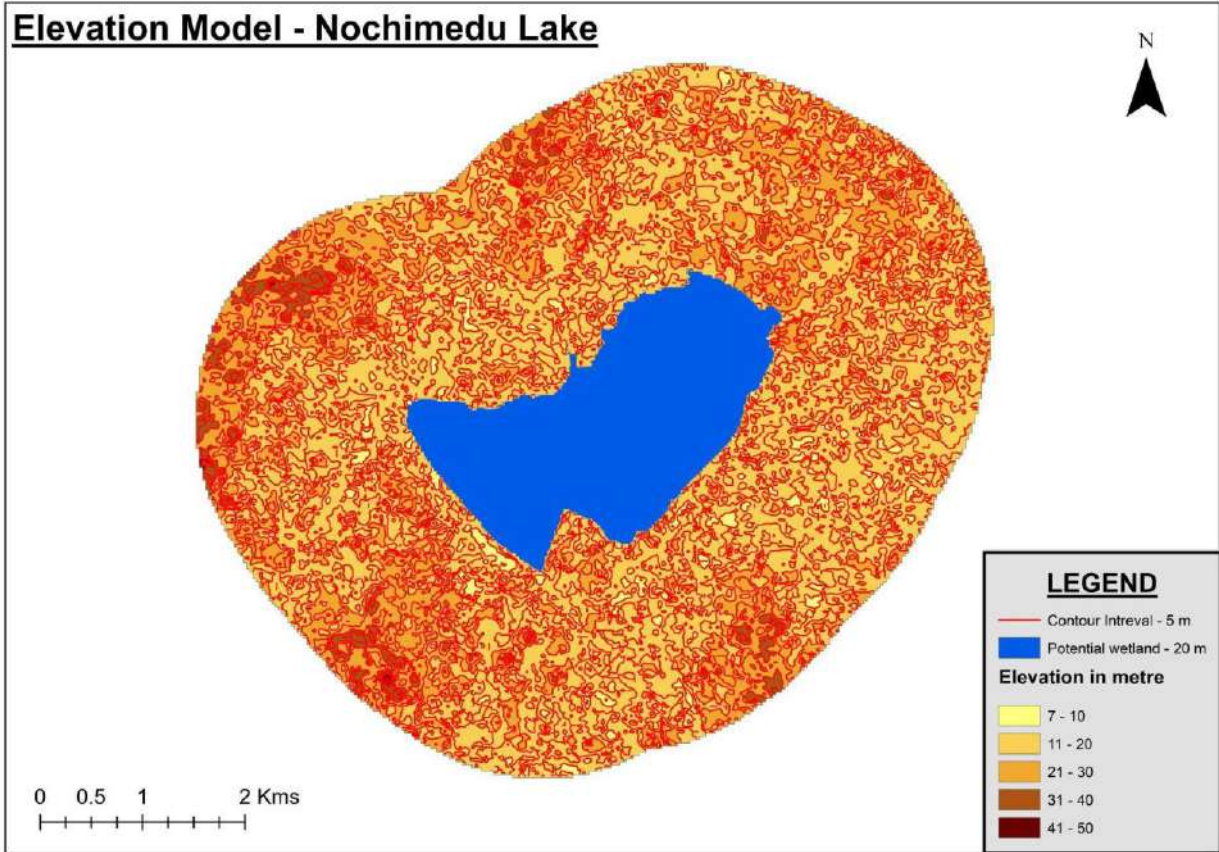


Figure 24. Elevation map of Nochimedu Lake

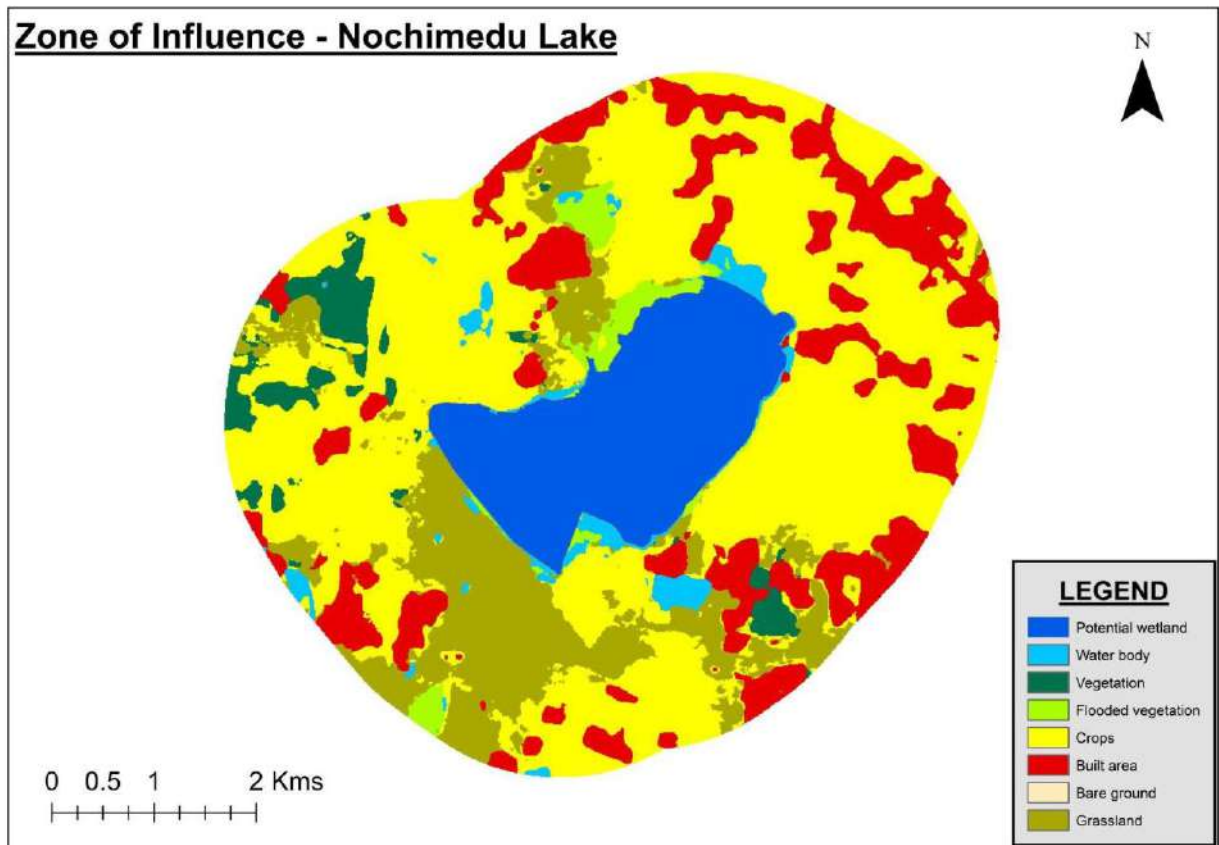


Figure 25. Zone of influence map of Nochimedu Lake

5.Kiliyur lake, Trichy:

Kiliyur Lake is a natural freshwater lake located in Tiruchirapalli. The geographical coordinates are 10.81260936 and 78.84886624. The lake is situated in the Kiliyur Valley of the eastern ghats. It is surrounded by the Kiliyur forest range. It is situated at an altitude approximately 300m above mean sea level and is spread over an area of 0.888 sq km. A total of 178 bird species have been recorded at Kiliyur Lake from 2017 to September 2022.

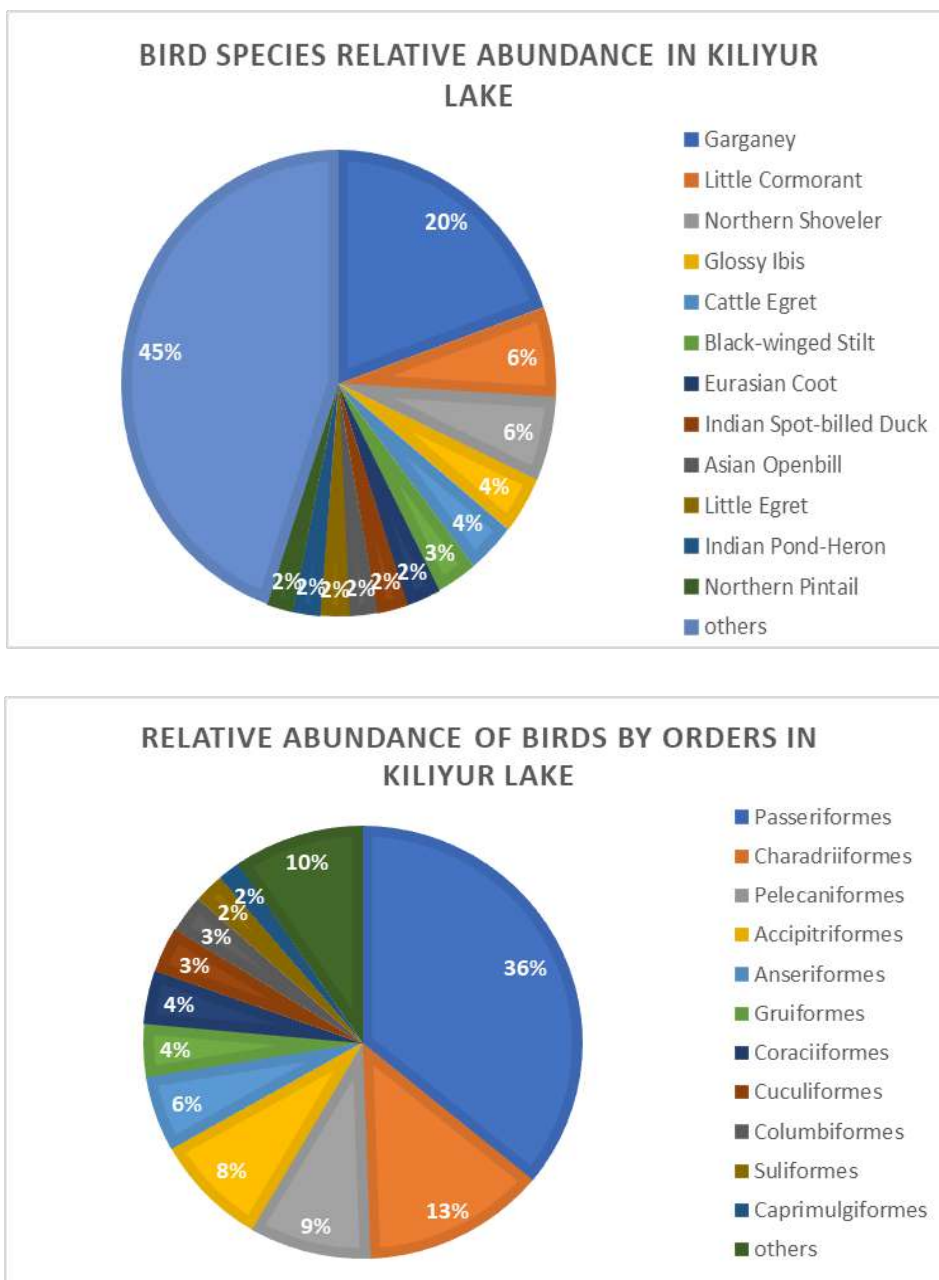


Figure 26. Relative abundance of bird species and orders in Kiliyur Lake

Abundance

Wetland habitats are home to a diverse array of bird species, each contributing to the vibrant ecosystem. Among the notable inhabitants, the Garganey stands out with an impressive count of 11085, highlighting its significant presence in these areas. The Little Cormorant (3529) and Northern Shoveler (3292) also contribute to the richness of wetlands. The elegant Glossy Ibis (2236) and the ubiquitous Cattle Egret (2003) are frequently observed, while the distinctive Black-winged Stilt (1724) adds charm to these environments. Other species like the Eurasian Coot (1430), Indian Spot-billed Duck (1278), and Asian Openbill (1169) also make valuable contributions to the diverse bird community.

IUCN Category

The lake is home to a number of a variety of birds with different conservation statuses. Among the near-threatened birds recorded in the wetland are Black-headed Ibis, Black-tailed Godwit, Oriental Darter, Painted Stork, Pallid Harrier, Spot-billed Pelican, and Woolly-necked stork. Additionally, vulnerable birds like the Greater spotted eagle, Indian spotted eagle, river tern, and Tawny eagle were recorded in this wetland. During the months of November, December, and January the lake attracts many winter visitors including Eastern Marsh Harrier, Little Stint, Marsh Sandpiper, and others.

Resident/Migratory Behavior

The Little Grebe (654) and the Gray-headed Swamphen (446) are often observed in wetlands, suggesting a resident behavior as they rely on these habitats year-round. Similarly, the Little Egret (1166) and Indian Pond-Heron (1163) are likely residents, utilizing wetlands as essential foraging and nesting sites. The Northern Pintail (1090), with its substantial count, might be a migrant species, visiting wetlands during certain seasons. Species such as the Whiskered Tern (975) and Black-tailed Godwit (880) are also often spotted in wetlands, indicating either resident or migratory behavior based on local conditions and availability of resources.

SI No	Common Name	Scientific Name	Type of Migration	IUCN Category
1	Ashy Prinia	<i>Prinia socialis</i>	Resident	Least Concern
2	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i>	Resident	Least Concern
3	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	Local Resident & Widespread Winter Visitor	Least Concern
4	Asian Koel	<i>Eudynamis scolopaceus</i>	Resident	Least Concern

5	Asian Openbill	<i>Anastomus oscitans</i>	Resident	Least Concern
6	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Resident	Least Concern
7	Baillon's Crake	<i>Zapornia pusilla</i>	Common Winter Visitor, Some Resident	Least Concern
8	Bar-headed Goose	<i>Anser indicus</i>	Widespread Winter Visitor & Local Resident	Least Concern
9	Barn Swallow	<i>Hirundo rustica</i>	Widespread Resident & Winter Visitor	Least Concern
10	Baya Weaver	<i>Ploceus philippinus</i>	Resident	Least Concern
11	Bay-backed Shrike	<i>Lanius vittatus</i>	Resident	Least Concern
12	Black Bittern	<i>Ixobrychus flavicollis</i>	Resident	Least Concern
13	Black Drongo	<i>Dicrurus macrocercus</i>	Resident	Least Concern
14	Black Kite	<i>Milvus migrans</i>	Resident	Least Concern
15	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Resident	Least Concern
16	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Resident	Near Threatened
17	Black-rumped Flameback	<i>Dinopium benghalense</i>	Resident	Least Concern
18	Black-tailed Godwit	<i>Limosa limosa</i>	Widespread Winter Visitor	Near Threatened
19	Black-winged Kite	<i>Elanus caeruleus</i>	Resident	Least Concern
20	Black-winged Stilt	<i>Himantopus himantopus</i>	Local Resident & Widespread Winter Visitor	Least Concern
21	Blue-bearded Bee-eater	<i>Nyctyornis athertoni</i>	Resident	Least Concern
22	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	Resident	Least Concern
23	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Resident	Least Concern
24	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Widespread Winter Visitor	Least Concern
25	Booted Eagle	<i>Hieraaetus pennatus</i>	Widespread Winter Visitor & Resident	Least Concern

26	Booted Warbler	<i>Iduna caligata</i>	Widespread Winter Visitor	Least Concern
27	Brahminy Kite	<i>Haliastur indus</i>	Resident	Least Concern
28	Brahminy Starling	<i>Sturnia pagodarum</i>	Resident	Least Concern
29	Brown Shrike	<i>Lanius cristatus</i>	Widespread Winter Visitor	Least Concern
30	Caspian Tern	<i>Hydroprogne caspia</i>	Widespread Winter Visitor	Least Concern
31	Cattle Egret	<i>Bubulcus ibis</i>	Resident	Least Concern
32	Chestnut-bellied Sandgrouse	<i>Pterocles exustus</i>	Resident	Least Concern
33	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	Resident	Least Concern
34	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Resident	Least Concern
35	Citrine Wagtail	<i>Motacilla citreola</i>	Local Resident & Widespread Winter Visitor	Least Concern
36	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	Resident	Least Concern
37	Common Greenshank	<i>Tringa nebularia</i>	Widespread Winter Visitor	Least Concern
38	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Resident	Least Concern
39	Common Iora	<i>Aegithina tiphia</i>	Resident	Least Concern
40	Common Kingfisher	<i>Alcedo atthis</i>	Resident	Least Concern
41	Common Myna	<i>Acridotheres tristis</i>	Resident	Least Concern
42	Common Sandpiper	<i>Actitis hypoleucos</i>	Widespread Winter Visitor & Resident	Least Concern
43	Common Snipe	<i>Gallinago gallinago</i>	Widespread Winter Visitor & Resident	Least Concern
44	Common Tailorbird	<i>Orthotomus sutorius</i>	Resident	Least Concern
45	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Resident	Least Concern
46	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Resident	Least Concern
47	Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	Widespread Resident	Least Concern

48	Eastern Marsh-Harrier	<i>Circus spilonotus</i>	Sparse Winter Visitor	Least Concern
49	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Resident	Least Concern
50	Eurasian Coot	<i>Fulica atra</i>	Local Resident & Widespread Winter Visitor	Least Concern
51	Eurasian Hoopoe	<i>Upupa epops</i>	Widespread Resident & Winter Visitor	Least Concern
52	Eurasian Kestrel	<i>Falco tinnunculus</i>	Resident	Least Concern
53	Eurasian Marsh-Harrier	<i>Circus aeruginosus</i>	Resident	Least Concern
54	Eurasian Moorhen	<i>Gallinula chloropus</i>	Resident	Least Concern
55	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Widespread Winter Visitor & Resident	Least Concern
56	Eurasian Wigeon	<i>Mareca penelope</i>	Widespread Winter Visitor	Least Concern
57	Eurasian Wryneck	<i>Jynx torquilla</i>	Local Resident & Widespread Winter Visitor	Least Concern
58	Fulvous Whistling-Duck	<i>Dendrocygna bicolor</i>	Resident	Least Concern
59	Garganey	<i>Spatula querquedula</i>	Widespread Winter Visitor	Least Concern
60	Glossy Ibis	<i>Plegadis falcinellus</i>	Widespread Winter Visitor & Resident	Least Concern
61	Great Cormorant	<i>Phalacrocorax carbo</i>	Widespread Winter Visitor & Resident	Least Concern
62	Great Egret	<i>Ardea alba</i>	Widespread Resident & Sparse Winter Visitor	Least Concern
63	Greater Coucal	<i>Centropus sinensis</i>	Resident	Least Concern
64	Greater Flamingo	<i>Phoenicopterus roseus</i>	Widespread Winter Visitor & Local Resident	Least Concern
65	Greater Painted-Snipe	<i>Rostratula benghalensis</i>	Resident	Least Concern

66	Greater Spotted Eagle	<i>Clanga clanga</i>	Widespread Winter Visitor & Resident	Vulnerable
67	Green Bee-eater	<i>Merops orientalis</i>	Resident	Least Concern
68	Green Sandpiper	<i>Tringa ochropus</i>	Widespread Winter Visitor	Least Concern
69	Green-winged Teal	<i>Anas crecca</i>	Resident	Least Concern
70	Grey Francolin	<i>Ortygornis pondicerianus</i>	Resident	Least Concern
71	Grey Heron	<i>Ardea cinerea</i>	Widespread Winter Visitor & Resident	Least Concern
72	Grey Wagtail	<i>Motacilla cinerea</i>	Local Resident & Widespread Winter Visitor	Least Concern
73	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	Resident	Least Concern
74	Grey-headed Lapwing	<i>Vanellus cinereus</i>	Widespread Winter Visitor	Least Concern
75	Grey-headed Swamphen	<i>Porphyrio poliocephalus</i>	Not Recognized	Not Recognized
76	Gull-billed Tern	<i>Gelochelidon nilotica</i>	Widespread Winter Visitor & Local Resident	Least Concern
77	House Crow	<i>Corvus splendens</i>	Resident	Least Concern
78	House Sparrow	<i>Passer domesticus</i>	Resident	Least Concern
79	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concern
80	Indian Golden Oriole	<i>Oriolus kundoo</i>	Resident	Least Concern
81	Indian Nightjar	<i>Caprimulgus asiaticus</i>	Resident	Least Concern
82	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Resident	Least Concern
83	Indian Peafowl	<i>Pavo cristatus</i>	Resident	Least Concern
84	Indian Pond-Heron	<i>Ardeola grayii</i>	Widespread Resident	Least Concern
85	Indian Robin	<i>Copsychus fulicatus</i>	Resident	Least Concern
86	Indian Roller	<i>Coracias benghalensis</i>	Resident	Least Concern

87	Indian Silverbill	<i>Euodice malabarica</i>	Resident	Least Concern
88	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Resident	Least Concern
89	Indian Spotted Eagle	<i>Clanga hastata</i>	Resident	Vulnerable
90	Intermediate Egret	<i>Ardea intermedia</i>	Resident	Least Concern
91	Jerdon's Bushlark	<i>Mirafra affinis</i>	Resident	Least Concern
92	Jungle Prinia	<i>Prinia sylvatica</i>	Resident	Least Concern
93	Kentish Plover	<i>Charadrius alexandrinus</i>	Widespread Winter Visitor & Resident	Least Concern
94	Knob-billed Duck	<i>Sarkidiornis melanotos</i>	Resident	Least Concern
95	Large Grey Babbler	<i>Argya malcolmi</i>	Resident	Least Concern
96	Large-billed Crow	<i>Corvus macrorhynchos</i>	Resident	Least Concern
97	Laughing Dove	<i>Spilopelia senegalensis</i>	Resident	Least Concern
98	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Resident	Least Concern
99	Lesser Whitethroat	<i>Curruca curruca</i>	Widespread Winter Visitor	Least Concern
100	Little Cormorant	<i>Microcarbo niger</i>	Resident	Least Concern
101	Little Egret	<i>Egretta garzetta</i>	Resident	Least Concern
102	Little Grebe	<i>Tachybaptus ruficollis</i>	Resident	Least Concern
103	Little Ringed Plover	<i>Charadrius dubius</i>	Widespread Winter Visitor & Resident	Least Concern
104	Little Stint	<i>Calidris minuta</i>	Widespread Winter Visitor	Least Concern
105	Little Swift	<i>Apus affinis</i>	Resident	Least Concern
106	Long-tailed Shrike	<i>Lanius schach</i>	Resident	Least Concern
107	Loten's Sunbird	<i>Cinnyris lotenius</i>	Resident	Least Concern
108	Marsh Sandpiper	<i>Tringa stagnatilis</i>	Widespread Winter Visitor	Least Concern
109	Montagu's Harrier	<i>Circus pygargus</i>	Widespread Winter Visitor	Least Concern

110	Northern Pintail	<i>Anas acuta</i>	Vagrant	Least Concern
111	Northern Shoveler	<i>Spatula clypeata</i>	Widespread Winter Visitor	Least Concern
112	Orange-headed Thrush	<i>Geokichla citrina</i>	Resident	Least Concern
113	Oriental Darter	<i>Anhinga melanogaster</i>	Resident	Near Threatened
114	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Widespread Winter Visitor & Resident	Least Concern
115	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Resident	Least Concern
116	Oriental Pratincole	<i>Glareola maldivarum</i>	Resident	Least Concern
117	Oriental Skylark	<i>Alauda gulgula</i>	Resident	Least Concern
118	Osprey	<i>Pandion haliaetus</i>	Widespread Winter Visitor & Local Resident	Least Concern
119	Paddyfield Pipit	<i>Anthus rufulus</i>	Resident	Least Concern
120	Painted Stork	<i>Mycteria leucocephala</i>	Resident	Near Threatened
121	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	Resident	Least Concern
122	Pallid Harrier	<i>Circus macrourus</i>	Widespread Winter Visitor	Near Threatened
123	Peregrine Falcon	<i>Falco peregrinus</i>	Widespread Winter Visitor & Resident	Least Concern
124	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Resident	Least Concern
125	Pied Bushchat	<i>Saxicola caprata</i>	Resident	Least Concern
126	Pied Cuckoo	<i>Clamator jacobinus</i>	Resident	Least Concern
127	Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concern
128	Pin-tailed Snipe	<i>Pterocles alchata</i>	Vagrant	Least Concern
129	Plain Prinia	<i>Prinia inornata</i>	Resident	Least Concern
130	Purple Heron	<i>Ardea purpurea</i>	Widespread Winter Visitor & Resident	Least Concern
131	Purple Sunbird	<i>Cinnyris asiaticus</i>	Resident	Least Concern

132	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Resident	Least Concern
133	Red Avadavat	<i>Coturnix coromandelica</i>	Resident	Least Concern
134	Red Collared-Dove	<i>Streptopelia tranquebarica</i>	Resident	Least Concern
135	Red-naped Ibis	<i>Pseudibis papillosa</i>	Resident	Least Concern
136	Red-rumped Swallow	<i>Cecropis daurica</i>	Resident	Least Concern
137	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Resident	Least Concern
138	Red-wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concern
139	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Resident	Least Concern
140	River Tern	<i>Sterna aurantia</i>	Resident	Vulnerable
141	Rock Pigeon	<i>Columba livia</i>	Resident	Least Concern
142	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Resident	Least Concern
143	Rosy Starling	<i>Pastor roseus</i>	Widespread Winter Visitor & Migrant	Least Concern
144	Ruddy-breasted Crake	<i>Zapornia fusca</i>	Resident	Least Concern
145	Ruff	<i>Calidris pugnax</i>	Sparse Winter Visitor	Least Concern
146	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Resident	Least Concern
147	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Resident	Least Concern
148	Shikra	<i>Accipiter badius</i>	Resident	Least Concern
149	Short-toed Snake-Eagle	<i>Circaetus gallicus</i>	Resident	Least Concern
150	Slaty-breasted Rail	<i>Lewinia striata</i>	Resident	Least Concern
151	Small Minivet	<i>Pericrocotus cinnamomeus</i>	Resident	Least Concern
152	Small Pratincole	<i>Glareola lactea</i>	Resident	Least Concern
153	Spot-billed Pelican	<i>Pelecanus philippensis</i>	Resident	Near Threatened
154	Spotted Dove	<i>Spilopelia chinensis</i>	Resident	Least Concern
155	Spotted Owlet	<i>Athene brama</i>	Resident	Least Concern
156	Streaked Weaver	<i>Ploceus manyar</i>	Resident	Least Concern

157	Streak-throated Swallow	<i>Petrochelidon fluvicola</i>	Resident	Least Concern
158	Sykes's Warbler	<i>Iduna rama</i>	Widespread Winter Visitor	Least Concern
159	Tawny Eagle	<i>Aquila rapax</i>	Resident	Vulnerable
160	Temminck's Stint	<i>Calidris temminckii</i>	Widespread Winter Visitor	Least Concern
161	Tricolored Munia	<i>Anthus trivialis</i>	Local Resident & Widespread Winter Visitor	Least Concern
162	Watercock	<i>Gallicrex cinerea</i>	Resident	Least Concern
163	Western Yellow Wagtail	<i>Motacilla flava</i>	Widespread Winter Visitor	Least Concern
164	Whiskered Tern	<i>Chlidonias hybrida</i>	Widespread Winter Visitor & Resident	Least Concern
165	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concern
166	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Resident	Least Concern
167	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Resident	Least Concern
168	White-eyed Buzzard	<i>Butastur teesa</i>	Resident	Least Concern
169	White-rumped Munia	<i>Lonchura striata</i>	Resident	Least Concern
170	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concern
171	Wire-tailed Swallow	<i>Hirundo smithii</i>	Resident	Least Concern
172	Wood Sandpiper	<i>Tringa glareola</i>	Widespread Winter Visitor	Least Concern
173	Woolly-necked Stork	<i>Ciconia episcopus</i>	Resident	Near Threatened
174	Yellow Bittern	<i>Ixobrychus sinensis</i>	Resident	Least Concern
175	Yellow-billed Babbler	<i>Argya affinis</i>	Resident	Least Concern
176	Yellow-throated Sparrow	<i>Gymnoris xanthocollis</i>	Resident	Least Concern
177	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Resident	Least Concern

178	Zitting Cisticola	<i>Cisticola juncidis</i>	Resident	Least Concern
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Table 13. Shows the checklist of birds found in Kiliyur tank, their common name, scientific name, Migratory status, and IUCN category are provided.



Figure 27. Observation of Plain prinia in Chettipunniyam Lake during field visit

Land Use and Land Cover Changes:

Land use and land cover changes over a period of 5 years from 2017 – 2021 indicate drastic changes were not observed over these periods of time, the mean average of each class was calculated. For this wetland crops were found to be in higher proportion with the mean value of 16.88 sq .kms around the wetland, followed by less proportion of grassland with 1.67 sq km, built area and water body with 0.82 sq km respectively, bare ground with 0.21 sq km, and vegetation with 0.13 sq km.

S No	Classes	2017_area	2018_area	2019_area	2020_area	2021_area	Mean
1	Water body	0.14	0.92	0.78	1.32	0.94	0.82
2	Vegetation	0.04	0.09	0.05	0.20	0.29	0.13
3	Crops	18.07	17.8	14.24	16.72	17.57	16.88
4	Built area	0.80	0.85	0.72	0.86	0.89	0.82

5	Bare ground	0.24	0.16	0.26	0.19	0.22	0.21
6	Grassland	1.25	0.72	4.49	1.24	0.64	1.67

Table 14. Calculated mean area for each classes for the period of 5 years from 2017 - 2021

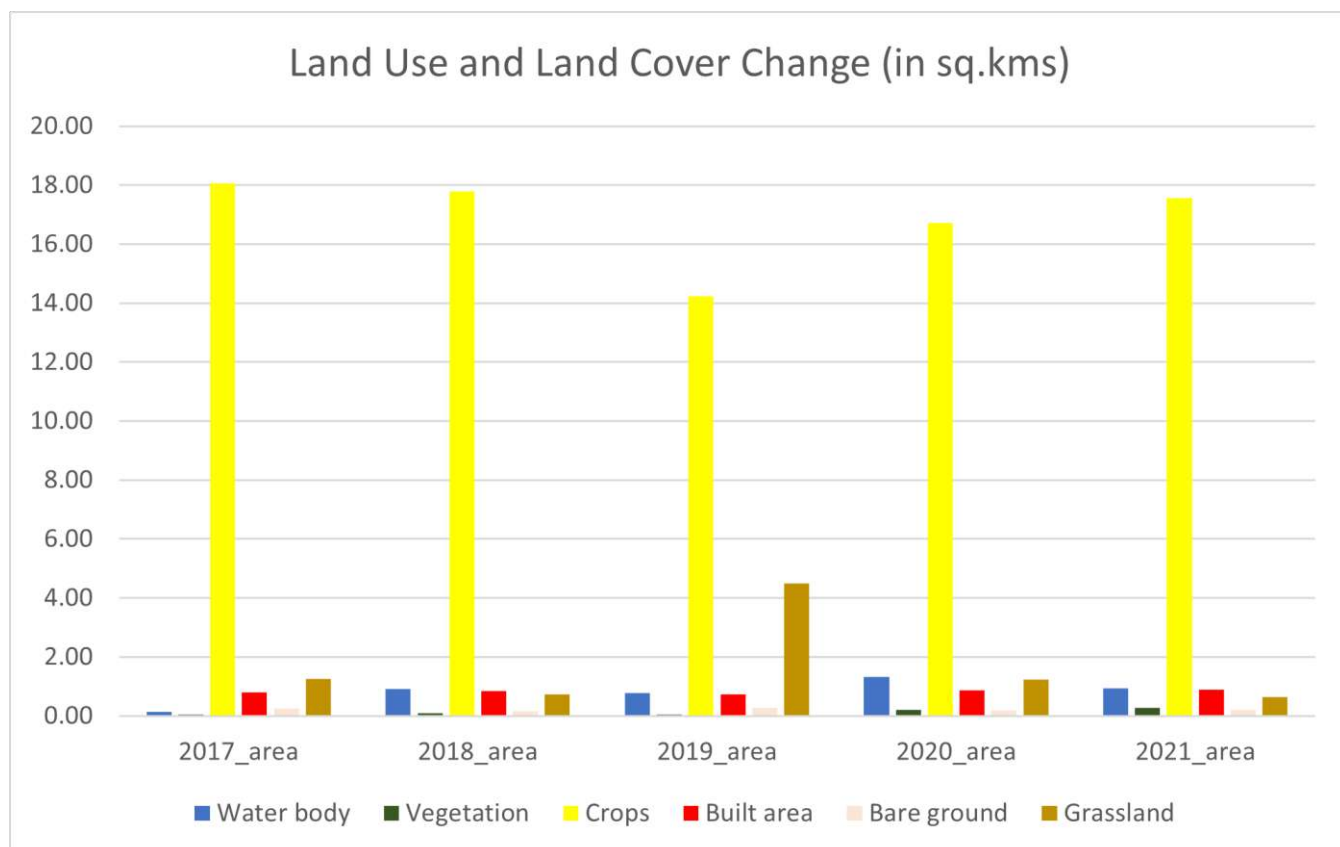


Figure 28. Land use and land cover changes over a period of 5 years from 2017 - 2021 for each classes

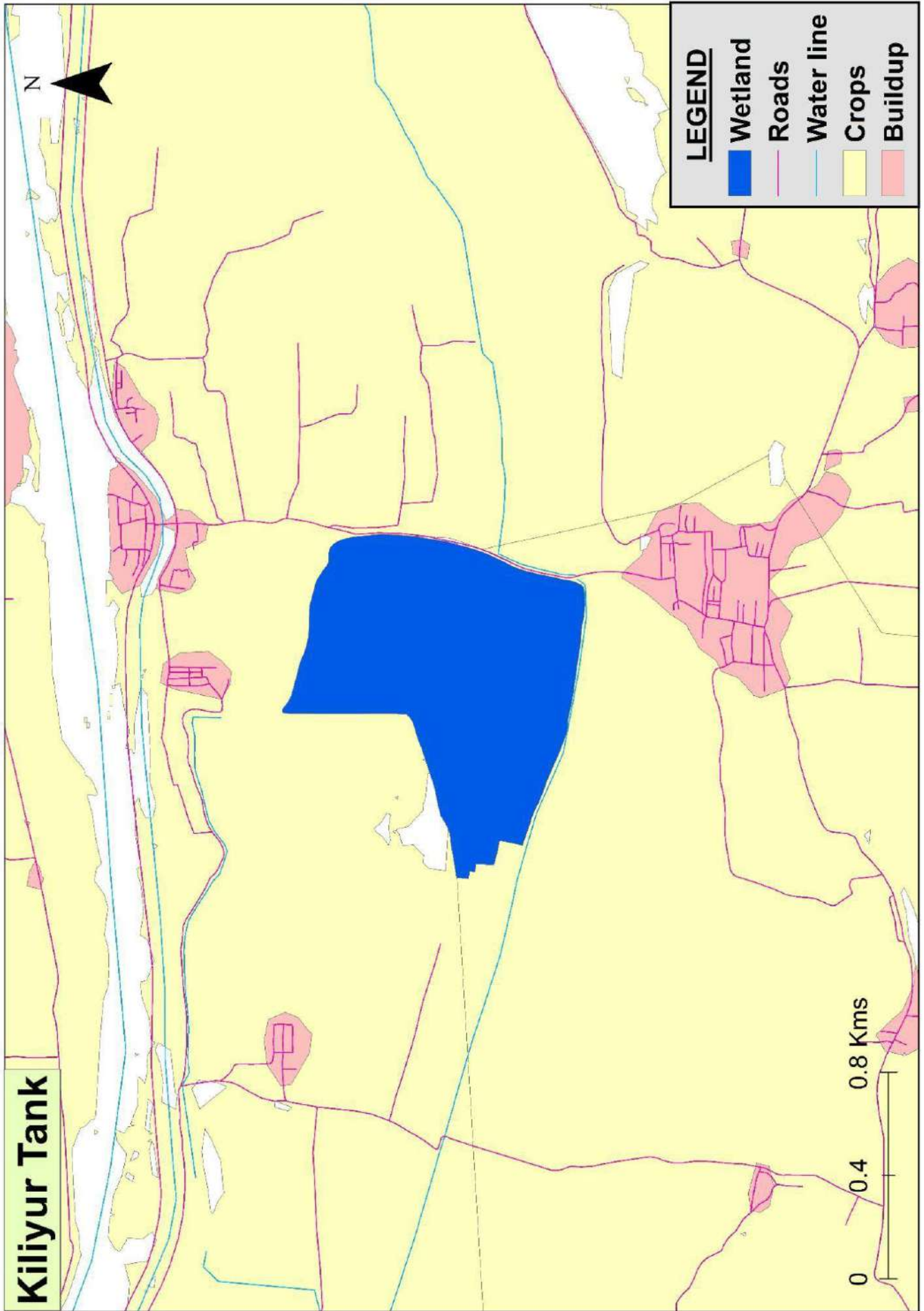


Figure 29. Base map of Kiliyur Tank

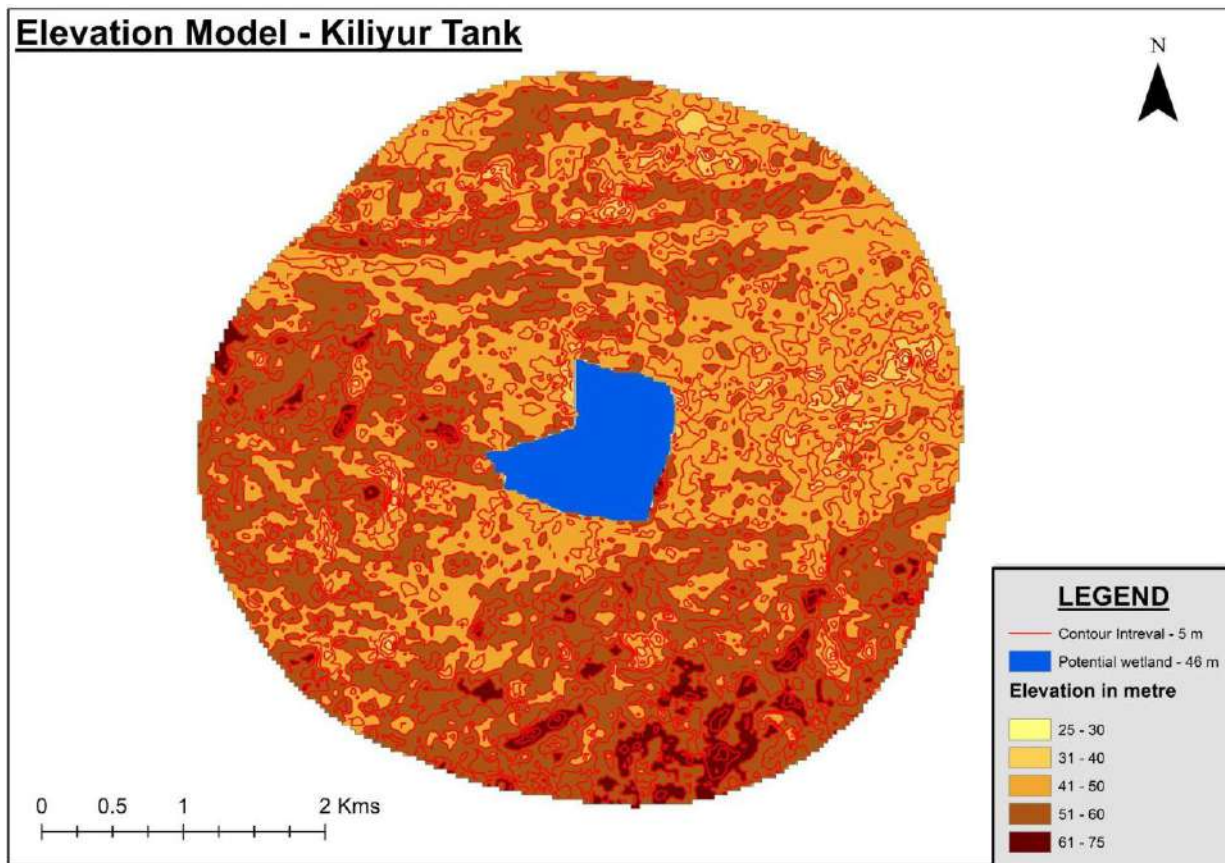


Figure 30. Elevation map of Kiliyur Tank

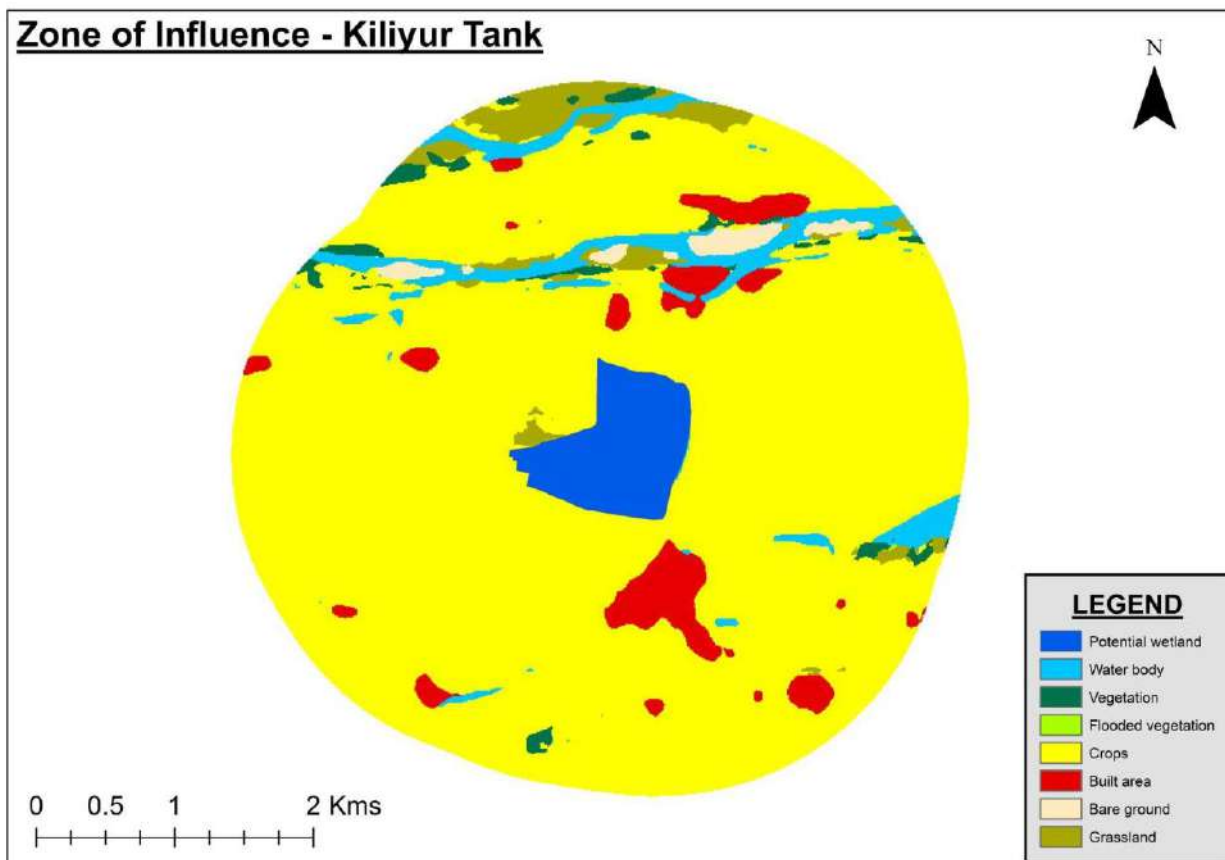


Figure 31. Zone of influence map of Kiliyur Tank

6. Mamandur lake, Tiruvannamalai:

Mamandur Lake or Dusi-Mamandur Tank is located near the Mamandur village of Thiruvannamalai district (Vembakkam). The geographical coordinates are 12.74876895 and 79.65064039 Palar River is situated in close proximity to this tank. The lake is spread over an area of 8.075 Km² with an elevation of 68m above mean sea level. A total of 169 birds have been recorded at Mamandur Lake from 1990 to September 2022.

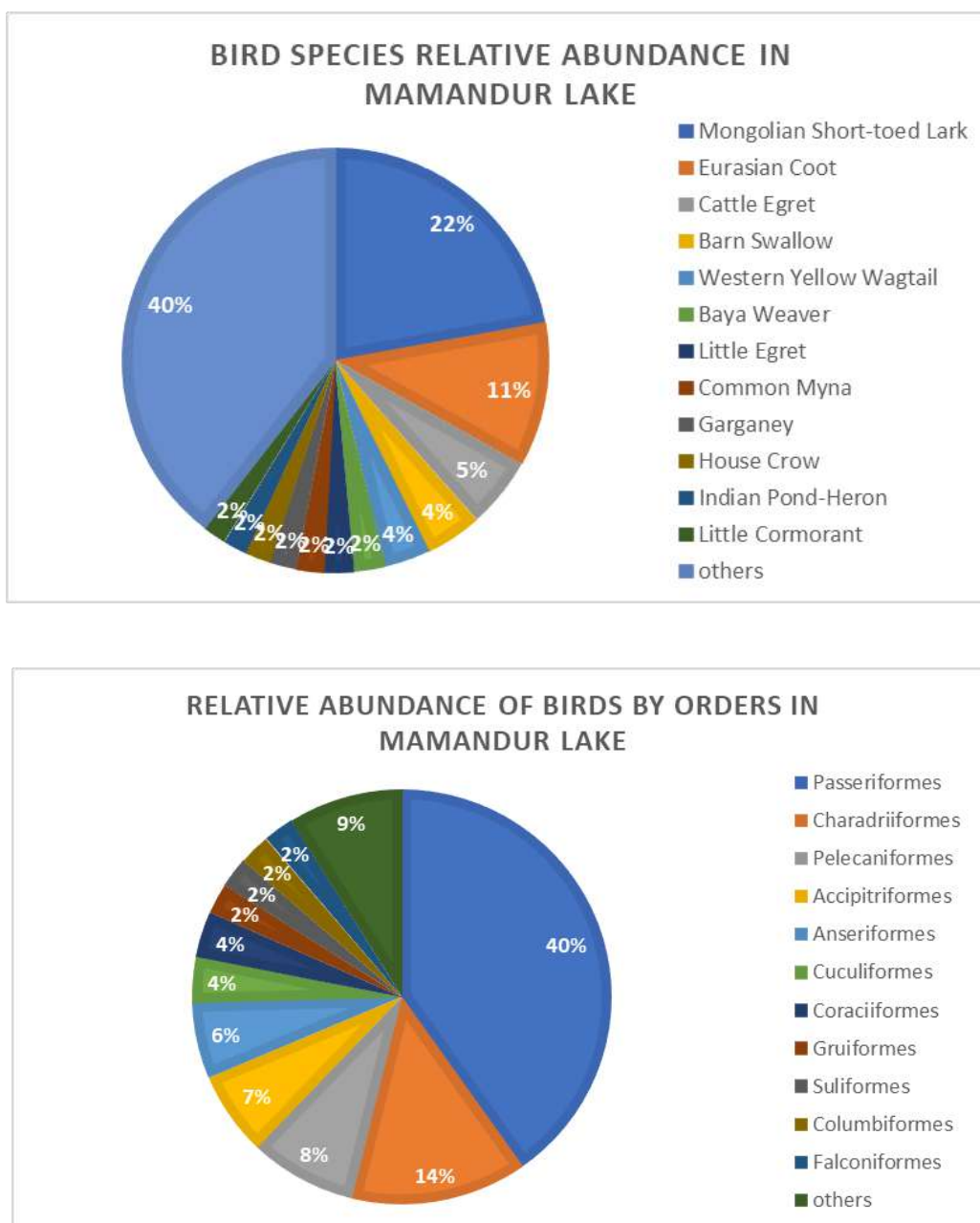


Figure 32. Relative abundance of bird species and orders in Mamandur Lake

Abundance:

The wetlands continue to harbor a diverse array of bird species. The distinctive Asian Openbill (36) and the modest Little Cormorant (38) add character to the surroundings. The

enigmatic Gray Heron (30) and the regal Purple Heron (28) lend an air of grace to the waters. The playful Black-headed Ibis (10) and the sociable Eurasian Coot (21) complete the enchanting scene.

IUCN Category:

The lake is home to a number of a variety of birds with different conservation statuses. Among the near-threatened birds recorded in the wetland are Black-headed Ibis, Laggar Falcon, Oriental Darter, Painted Stork, Pallid Harrier, Red-necked Falcon, Spot-billed Pelican, and Woolly-necked stork. Additionally, vulnerable birds like the Common Pochard and Indian spotted eagle were recorded in this wetland. During the months of November, December, and January the lake attracts around 44 winter visitors including Lesser Kestrel, Rosy Starling, Pallid Harrier, and others.

Resident/Migratory Behavior:

The wetlands host a harmonious blend of resident and migratory species. The diligent Painted Stork (9) and the lively Green Sandpiper (5) signify the presence of migratory visitors. Meanwhile, the tranquil waters are graced by year-round residents like the Eurasian Coot (21), the elusive Indian Cormorant (5), and the captivating Spot-billed Pelican (4). The delicate Cotton Pygmy-Goose (3) and the charming Eurasian Collared-Dove (3) contributes to the picturesque ambiance. Amidst these inhabitants, the stately Black-crowned Night-Heron (1) and the dignified Great Cormorant (1) stand as solitary figures. The interaction of these diverse avian personalities enriches the wetland experience.

SI No	Common Name	Scientific Name	Types of migration	IUCN Category
1	Ashy Drongo	<i>Dicrurus leucophaeus</i>	migrant	Least Concern
2	Ashy Prinia	<i>Prinia socialis</i>	migrant	Least Concern
3	Ashy Woodswallow	<i>Artamus fuscus</i>	migrant	Least Concern
4	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i>	migrant	Least Concern
5	Asian Koel	<i>Eudynamys scolopaceus</i>	migrant	Least Concern
6	Asian Openbill	<i>Anastomus oscitans</i>	migrant	Least Concern
7	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	migrant	Least Concern

8	Bar-headed Goose	<i>Anser indicus</i>	widespread winter visitor & local resident	Least Concern
9	Barn Swallow	<i>Hirundo rustica</i>	widespread resident & winter visitor	Least Concern
10	Barred Buttonquail	<i>Turnix suscitator</i>	migrant	Least Concern
11	Baya Weaver	<i>Ploceus philippinus</i>	migrant	Least Concern
12	Bay-backed Shrike	<i>Lanius vittatus</i>	migrant	Least Concern
13	Black Bittern	<i>Ixobrychus flavicollis</i>	migrant	Least Concern
14	Black Drongo	<i>Dicrurus macrocercus</i>	migrant	Least Concern
15	Black Kite	<i>Milvus migrans</i>	migrant	Least Concern
16	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	migrant	Least Concern
17	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	migrant	Near Threatened
18	Black-rumped Flameback	<i>Dinopium benghalense</i>	migrant	Least Concern
19	Black-winged Kite	<i>Elanus caeruleus</i>	migrant	Least Concern
20	Black-winged Stilt	<i>Himantopus himantopus</i>	local resident & widespread winter visitor	Least Concern
21	Blue Rock-Thrush	<i>Monticola solitarius</i>	local resident & widespread winter visitor	Least Concern
22	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	migrant	Least Concern
23	Blue-tailed Bee-eater	<i>Merops philippinus</i>	migrant	Least Concern
24	Blyth's Pipit	<i>Anthus godlewskii</i>	widespread winter visitor	Least Concern

25	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	widespread winter visitor	Least Concern
26	Booted Eagle	<i>Hieraetus pennatus</i>	widespread winter visitor & local resident	Least Concern
27	Booted Warbler	<i>Iduna caligata</i>	widespread winter visitor	Least Concern
28	Brahminy Kite	<i>Haliastur indus</i>	migrant	Least Concern
29	Brahminy Starling	<i>Sturnia pagodarum</i>	migrant	Least Concern
30	Bronze-winged Jacana	<i>Metopidius indicus</i>	migrant	Least Concern
31	Brown Shrike	<i>Lanius cristatus</i>	widespread winter visitor	Least Concern
32	Cattle Egret	<i>Bubulcus ibis</i>	migrant	Least Concern
33	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	migrant	Least Concern
34	Citrine Wagtail	<i>Motacilla citreola</i>	local resident & widespread winter visitor	Least Concern
35	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	migrant	Least Concern
36	Common Greenshank	<i>Tringa nebularia</i>	widespread winter visitor	Least Concern
37	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	migrant	Least Concern
38	Common Iora	<i>Aegithina tiphia</i>	migrant	Least Concern
39	Common Kingfisher	<i>Alcedo atthis</i>	migrant	Least Concern
40	Common Moorhen	<i>Gallinula chloropus</i>	migrant	Least Concern
41	Common Myna	<i>Acridotheres tristis</i>	migrant	Least Concern
42	Common Pochard	<i>Aythya ferina</i>	widespread winter visitor	Vulnerable

43	Common Sandpiper	<i>Actitis hypoleucos</i>	widespread winter visitor & resident	Least Concern
44	Common Snipe	<i>Gallinago gallinago</i>	widespread winter visitor & local resident	Least Concern
45	Common Tailorbird	<i>Orthotomus sutorius</i>	migrant	Least Concern
46	Common Tern	<i>Sterna hirundo</i>	widespread winter visitor & resident	Least Concern
47	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	migrant	Least Concern
48	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	migrant	Least Concern
49	Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	resident	Least Concern
50	Dusky Crag-Martin	<i>Ptyonoprogne concolor</i>	migrant	Least Concern
51	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	migrant	Least Concern
52	Eurasian Coot	<i>Fulica atra</i>	local resident & widespread winter visitor	Least Concern
53	Eurasian Hoopoe	<i>Upupa epops</i>	widespread resident & winter visitor	Least Concern
54	Eurasian Kestrel	<i>Garrulus glandarius</i>	migrant	Least Concern
55	Eurasian Spoonbill	<i>Platalea leucorodia</i>	widespread winter visitor & resident	Least Concern
56	Eurasian Wigeon	<i>Mareca penelope</i>	migrant	Least Concern
57	Fulvous Whistling-Duck	<i>Dendrocygna bicolor</i>	migrant	Least Concern
58	Garganey	<i>Spatula querquedula</i>	widespread winter visitor	Least Concern

59	Glossy Ibis	<i>Plegadis falcinellus</i>	widespread winter visitor & resident	Least Concern
60	Great Cormorant	<i>Phalacrocorax carbo</i>	widespread winter visitor & resident	Least Concern
61	Great Egret	<i>Ardea alba</i>	Widespread resident & sparse winter visitor	Least Concern
62	Greater Coucal	<i>Centropus sinensis</i>	resident	Least Concern
63	Green Bee-eater	<i>Merops orientalis</i>	resident	Least Concern
64	Green Sandpiper	<i>Tringa ochropus</i>	widespread winter visitor	Least Concern
65	Grey Francolin	<i>Ortygornis pondicerianus</i>	resident	Least Concern
66	Grey Heron	<i>Ardea cinerea</i>	widespread winter visitor & resident	Least Concern
67	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	resident	Least Concern
68	Grey-headed Lapwing	<i>Vanellus cinereus</i>	widespread winter visitor	Least Concern
69	Grey-headed Swamphen	<i>Porphyrio poliocephalus</i>	Not Recognised	Least Concern
70	House Crow	<i>Corvus splendens</i>	resident	Least Concern
71	House Sparrow	<i>Passer domesticus</i>	resident	Least Concern
72	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	resident	Least Concern
73	Indian Courser	<i>Cursorius coromandelicus</i>	resident	Least Concern
74	Indian Golden Oriole	<i>Oriolus kundoo</i>	resident	Least Concern
75	Indian Nightjar	<i>Caprimulgus asiaticus</i>	resident	Least Concern

76	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	resident	Least Concern
77	Indian Pond-Heron	<i>Ardeola grayii</i>	widespread resident	Least Concern
78	Indian Robin	<i>Copsychus fulicatus</i>	resident	Least Concern
79	Indian Roller	<i>Coracias benghalensis</i>	resident	Least Concern
80	Indian Silverbill	<i>Euodice malabarica</i>	resident	Least Concern
81	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	resident	Least Concern
82	Indian Spotted Eagle	<i>Clanga hastata</i>	Vulnerable	Vulnerable
83	Intermediate Egret	<i>Ardea intermedia</i>	resident	Least Concern
84	Isabelline Wheatear	<i>Oenanthe isabellina</i>	widespread winter visitor	Least Concern
85	Jerdon's Bushlark	<i>Mirafra affinis</i>	resident	Least Concern
86	Jungle Prinia	<i>Prinia sylvatica</i>	resident	Least Concern
87	Kentish Plover	<i>Charadrius alexandrinus</i>	widespread winter visitor & resident	Least Concern
62	Greater Coucal	<i>Centropus sinensis</i>	Resident	Least Concern
63	Green Bee-eater	<i>Merops orientalis</i>	Resident	Least Concern
67	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	Resident	Least Concern
77	House Crow	<i>Corvus splendens</i>	Resident	Least Concern
78	House Sparrow	<i>Passer domesticus</i>	Resident	Least Concern
82	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concern

84	Isabelline Wheatear	<i>Oenanthe isabellina</i>	Widespread winter visitor	Least Concern
87	Kentish Plover	<i>Charadrius alexandrinus</i>	Resident & Widespread winter visitor	Least Concern
88	Laggar Falcon	<i>Falco jugger</i>	Resident	Near Threatened
95	Little Cormorant	<i>Microcarbo niger</i>	Resident	Least Concern
96	Little Egret	<i>Egretta garzetta</i>	Resident	Least Concern
97	Little Grebe	<i>Tachybaptus ruficollis</i>	Resident	Least Concern
100	Little Swift	<i>Apus affinis</i>	Resident	Least Concern
106	Montagu's Harrier	<i>Circus pygargus</i>	Resident	Least Concern
109	Oriental Darter	<i>Anhinga melanogaster</i>	Resident	Near Threatened
110	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Resident	Least Concern
111	Oriental Pratincole	<i>Glareola maldivarum</i>	Migrant	Least Concern
112	Oriental Skylark	<i>Alauda gulgula</i>	Migrant	Least Concern
118	Pallid Harrier	<i>Circus macrourus</i>	Migrant	Near Threatened
119	Peregrine Falcon	<i>Falco peregrinus</i>	Resident & Widespread winter visitor	Least Concern
120	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Resident	Least Concern
121	Pied Bushchat	<i>Saxicola caprata</i>	Resident	Least Concern
122	Pied Cuckoo	<i>Clamator jacobinus</i>	Resident	Least Concern
123	Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concern

124	Plain Prinia	<i>Prinia inornata</i>	Resident	Least Concern
125	Purple Heron	<i>Ardea purpurea</i>	Widespread winter visitor & resident	Least Concern
126	Purple Sunbird	<i>Cinnyris asiaticus</i>	Resident	Least Concern
127	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Resident	Least Concern
128	Rain Quail	<i>Coturnix coromandelica</i>	Resident	Least Concern
129	Red Avadavat	<i>Coturnix coromandelica</i>	Resident	Least Concern
130	Red-necked Falcon	<i>Falco chicquera</i>	Resident	Near Threatened
131	Red-rumped Swallow	<i>Cecropis daurica</i>	Resident & Widespread winter visitor	Least Concern
132	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Resident	Least Concern
133	Red-wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concern
134	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Resident	Least Concern
135	Richard's Pipit	<i>Anthus richardi</i>	Widespread winter visitor	Least Concern
136	Rock Pigeon	<i>Columba livia</i>	Resident	Least Concern
137	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Resident	Least Concern
138	Rosy Starling	<i>Pastor roseus</i>	Widespread winter visitor & migrant	Least Concern
139	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Resident	Least Concern
140	Rufous-tailed Lark	<i>Ammomanes phoenicura</i>	Resident	Least Concern

141	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Resident	Least Concern
142	Shikra	<i>Accipiter badius</i>	Resident	Least Concern
143	Short-toed Snake-Eagle	<i>Circaetus gallicus</i>	Resident	Least Concern
144	Siberian Stonechat	<i>Saxicola maurus</i>	Local resident & widespread winter visitor	Least Concern
145	Small Pratincole	<i>Glareola lactea</i>	Resident	Least Concern
146	Spot-billed Pelican	<i>Pelecanus philippensis</i>	Near Threatened	Least Concern
147	Spotted Dove	<i>Spilopelia chinensis</i>	Resident	Least Concern
148	Spotted Owlet	<i>Athene brama</i>	Resident	Least Concern
149	Sykes's Warbler	<i>Iduna rama</i>	Widespread winter visitor	Least Concern
148	Spotted Owlet	<i>Athene brama</i>	Resident	Least Concern
149	Sykes's Warbler	<i>Iduna rama</i>	Widespread winter visitor	Least Concern
150	Tawny Pipit	<i>Anthus campestris</i>	Widespread winter visitor	Least Concern
151	tern sp.	<i>Xenus cinereus</i>	Widespread winter visitor	Least Concern
152	Tree Pipit	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
153	Tricolored Munia	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
154	Western Marsh-Harrier	<i>Circus aeruginosus</i>	Widespread winter visitor	Least Concern
155	Western Yellow Wagtail	<i>Motacilla flava</i>	Widespread winter visitor	Least Concern

156	Whiskered Tern	<i>Chlidonias hybrida</i>	Widespread winter visitor & resident	Least Concern
157	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concern
158	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Resident	Least Concern
159	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Resident	Least Concern
160	White-eyed Buzzard	<i>Butastur teesa</i>	Widespread resident	Least Concern
161	White-rumped Munia	<i>Lonchura striata</i>	Resident	Least Concern
162	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concern
163	Wood Sandpiper	<i>Tringa glareola</i>	Widespread winter visitor	Least Concern
164	Woolly-necked Stork	<i>Ciconia episcopus</i>	Resident	Near Threatened
165	Yellow Bittern	<i>Ixobrychus sinensis</i>	Resident	Least Concern
166	Yellow-billed Babbler	<i>Argya affinis</i>	Resident	Least Concern
167	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	Resident	Least Concern
168	Yellow-throated Sparrow	<i>Gymnoris xanthocollis</i>	Resident	Least Concern
169	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Resident	Least Concern
170	Zitting Cisticola	<i>Cisticola juncidis</i>	Resident	Least Concern

Table 15. Shows the checklist of birds found in Mamandur lake, their common name, scientific name, Migratory status, and IUCN category are provided.

Land Use and Land Cover Changes:

Land use and land cover changes over a period of 5 years from 2017 – 2021 indicates drastic changes were not observed over these periods of time, the mean average of each

The class was calculated. For this wetland crops were found to be in higher proportion with the mean value of 32.39 sq km around the wetland, built area with a proportion of 5.82 sq km, followed by less proportion of water body with 1.81 sq km, grassland with the proportion of 1.40 sq km respectively, flooded vegetation with 0.05 sq km, and vegetation with 0.01 sq km.

S.No	Classes	2017_area	2018_area	2019_area	2020_area	2021_area	Mean
1	Water body	0.85	0.11	3.93	0.20	3.93	1.81
2	Vegetation	0.01	0.00	0.03	0.01	0.03	0.01
3	Flooded vegetation	0.11	0.00	0.07	0.00	0.07	0.05
4	Crops	34.84	34.03	29.50	34.09	29.50	32.39
5	Built area	4.80	5.50	6.40	6.01	6.40	5.82
7	Grassland	0.87	1.85	1.55	1.18	1.55	1.40

Table 16: Calculated mean area for each classes for the period of 5 years from 2017 - 2021

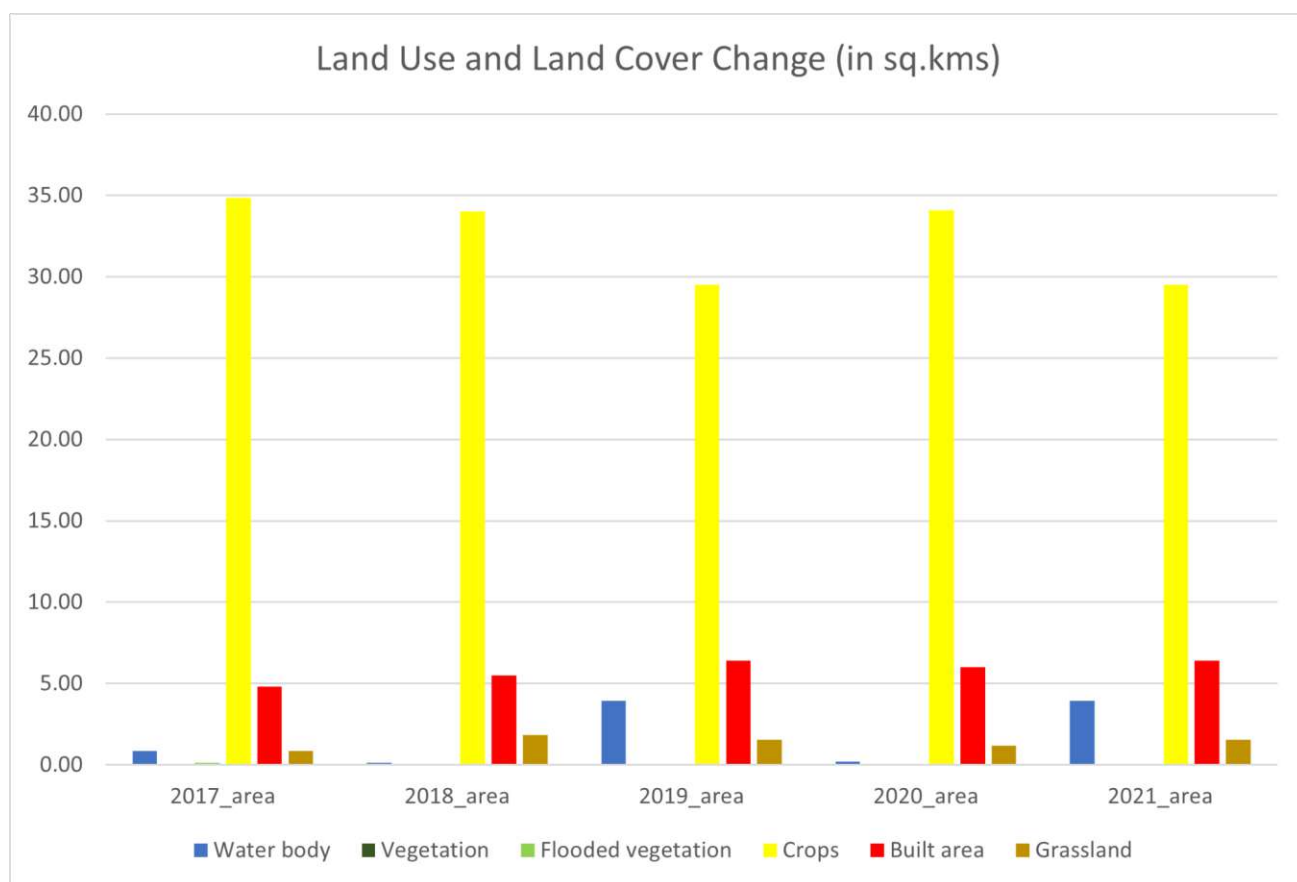


Figure 33. Land use and land cover changes over a period of 5 years from 2017 - 2021 for each classes

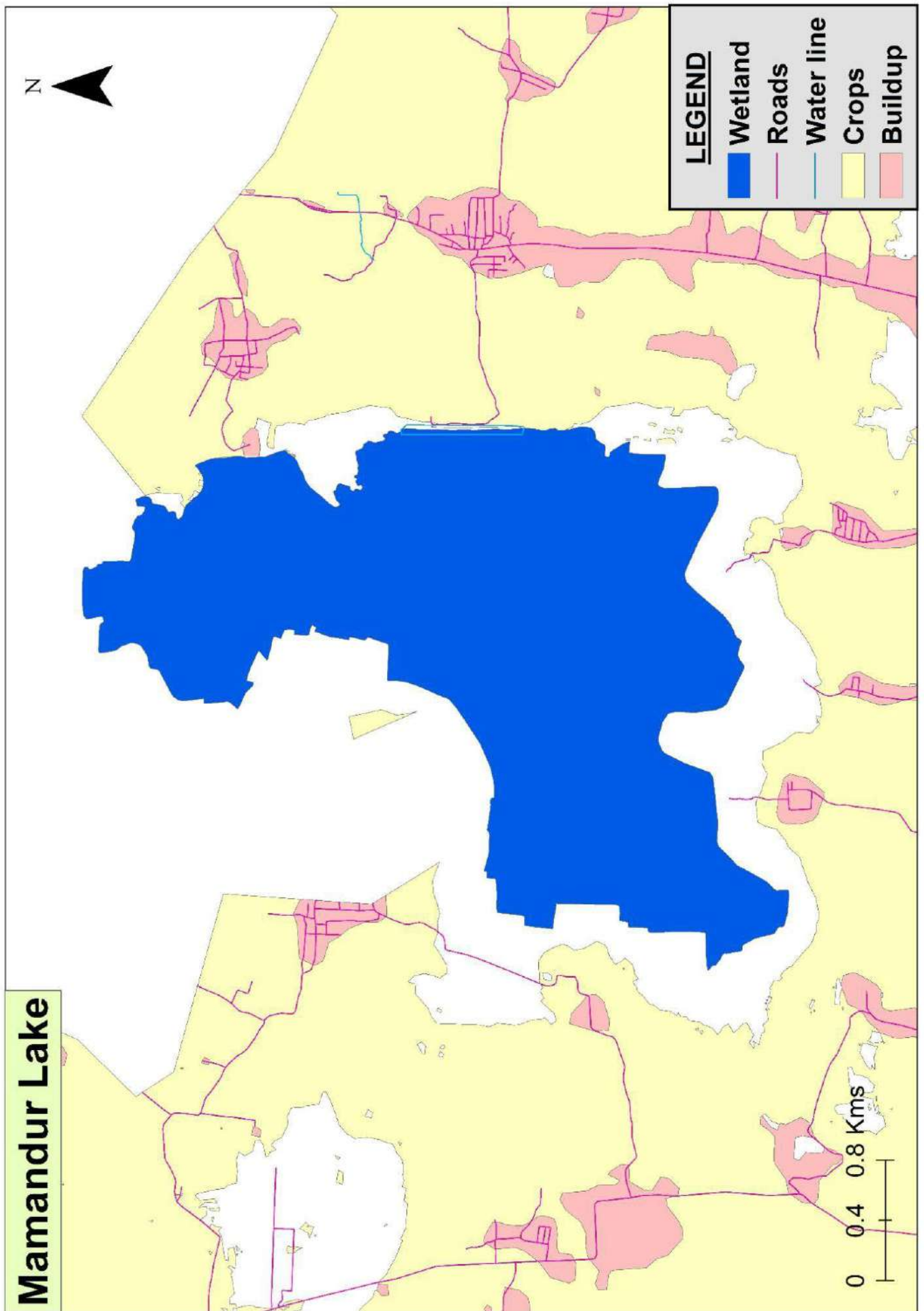


Figure 34. Base map of Mamandur Lake

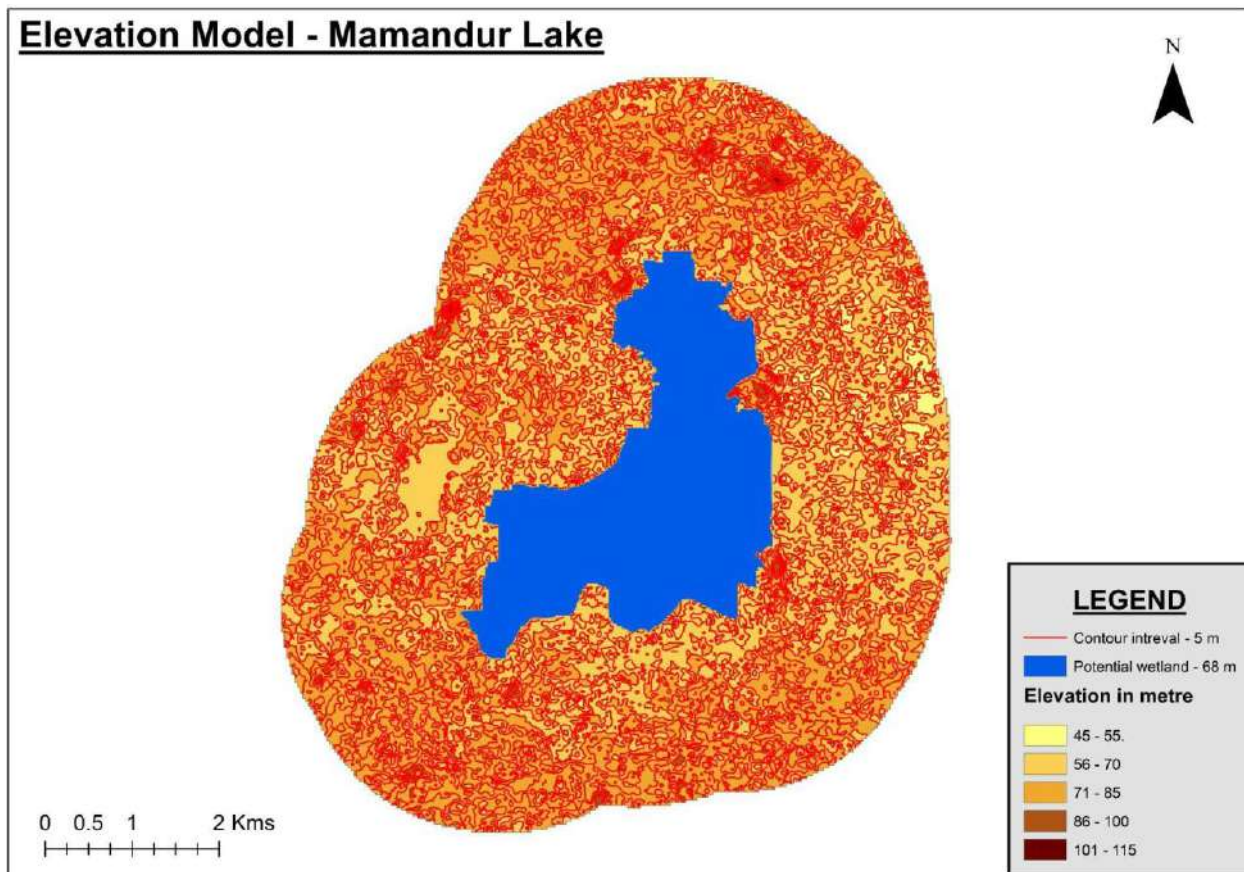


Figure 35. Elevation map of Mamandur Lake

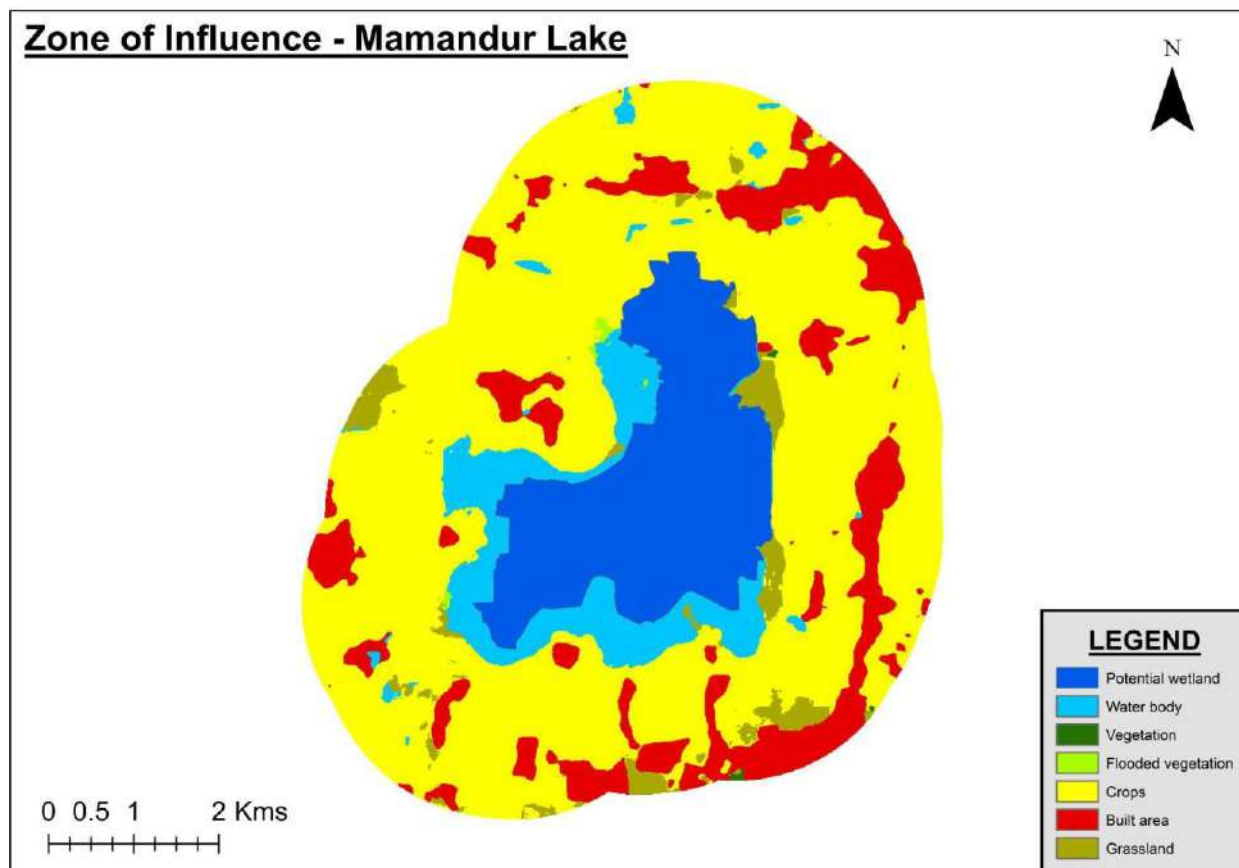


Figure 36. Zone of influence map of Mamandur Lake

7.Kolarampathy lake, Coimbatore:

Kolarampathy is a man-made lake situated in Coimbatore. The lake is spread over an area of 0.197 sq. km. The geographical coordinates of the lake are 10.9865048 and 76.9065299. A total of 185 bird species have been recorded at Kolarampathy Lake from 2011 to September 2022.

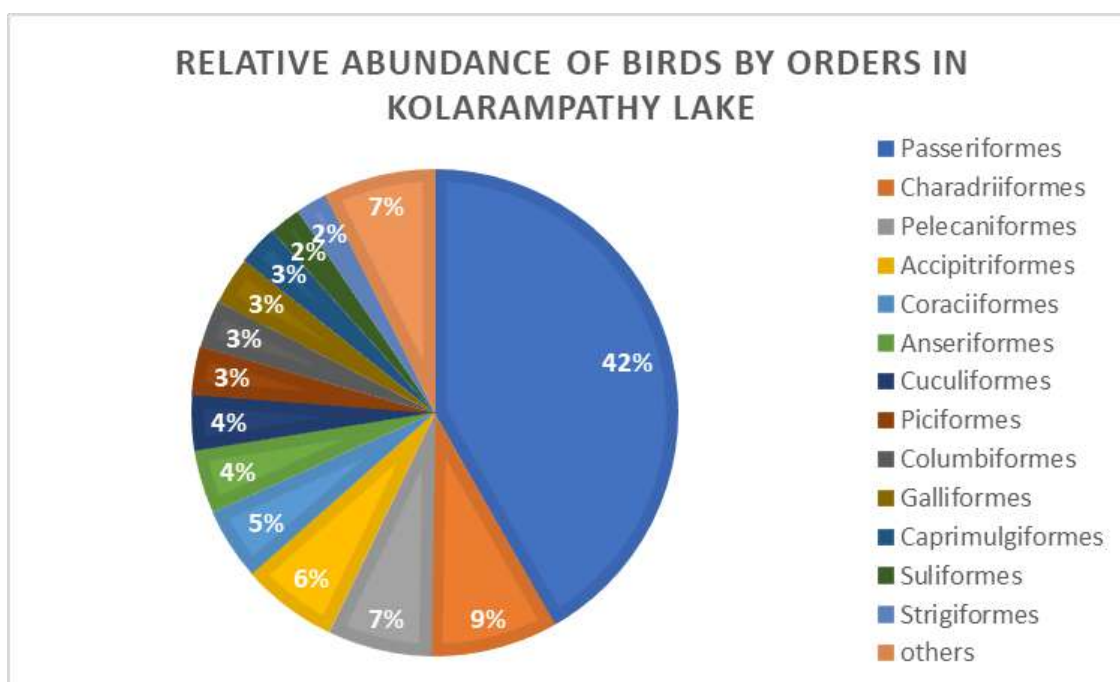
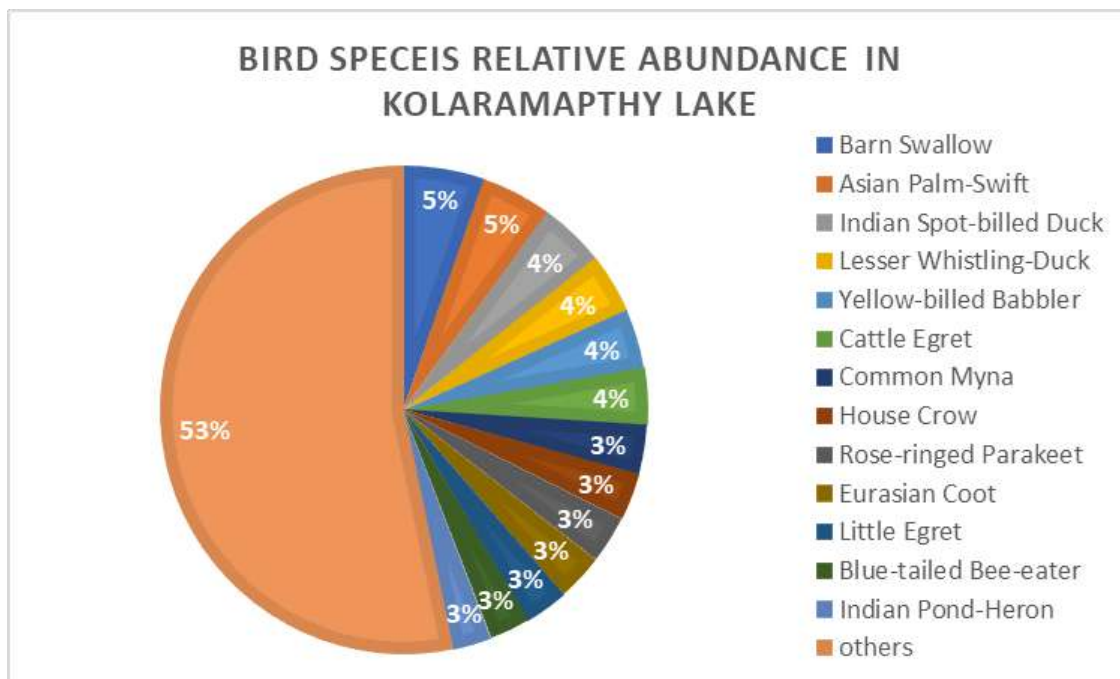


Figure 37. Relative abundance of species and orders of birds in Kolarampathy Lake

Abundance:

In the dynamic realm of wetland environments, several bird species demonstrate varying levels of abundance. The graceful Black-winged Stilt (12) is a less common sight, while the Cattle Egret (163) showcases a more substantial presence, often observed foraging near water bodies. The Eurasian Coot (176) is moderately abundant, while the Indian Spot-billed Duck (186) and Northern Pintail (71) contribute their unique charm to the wetland landscape. The Northern Shoveler (66) and Western Yellow Wagtail (68) are also observed in moderate numbers, enhancing the diversity of these ecosystems.

IUCN Category:

The lake is home to a number of a variety of birds with different conservation statuses. Among the near-threatened birds recorded in the wetland are Black-headed Ibis, Lesser Fish- Eagle, Oriental Darter, Painted Stork, Red-necked Falcon, Spot-billed Pelican, and Woolly-necked stork. During the months of November, December, and January the lake attracts around 32 winter visitors including Common Greenshank, Common Sandpiper, Tufted duck, and others.

Resident/Migratory Behavior:

The Oriental Darter (109), often seen in wetland areas, is an indicator of the rich aquatic biodiversity. Similarly, the distinctive Painted Stork (12) and the captivating Pheasant-tailed Jacana (5) can be observed, likely engaging in resident behaviors. The majestic Spot-billed Pelican (2) adds a touch of grandeur to wetlands, though its presence might be less frequent. The White-breasted Waterhen (108), with its notable count, and the Yellow-billed Babbler (224) are also common residents of these habitats, often heard calling and foraging amidst the reeds. The Yellow-wattled Lapwing (3), while less abundant, contributes to the wetland's acoustic diversity with its characteristic calls.

Si No	Common Name	Scientific Name	Type of migration	IUCN Category
1	Ashy Drongo	<i>Dicrurus leucophaeus</i>	Resident	Least Concern
2	Ashy Prinia	<i>Prinia socialis</i>	Resident	Least Concern
3	Ashy Woodswallow	<i>Artamus fuscus</i>	Resident	Least Concern

4	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i>	Resident	Least Concern
5	Asian Koel	<i>Eudynamys scolopaceus</i>	Resident	Least Concern
6	Asian Openbill	<i>Anastomus oscitans</i>	Resident	Least Concern
7	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Resident	Least Concern
8	Barn Swallow	<i>Hirundo rustica</i>	Widespread resident & winter visitor	Least Concern
9	Baya Weaver	<i>Ploceus philippinus</i>	Resident	Least Concern
10	Bay-backed Shrike	<i>Lanius vittatus</i>	Resident	Least Concern
11	Black Bittern	<i>Ixobrychus flavicollis</i>	Resident	Least Concern
12	Black Drongo	<i>Dicrurus macrocercus</i>	Resident	Least Concern
13	Black Kite	<i>Milvus migrans</i>	Resident	Least Concern
14	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Resident	Least Concern
15	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	Resident	Least Concern

16	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Resident	Least Concern
17	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Resident	Near Threatened
18	Black-rumped Flameback	<i>Dinopium benghalense</i>	Resident	Least Concern
19	Black-winged Kite	<i>Elanus caeruleus</i>	Resident	Least Concern
20	Black-winged Stilt	<i>Himantopus himantopus</i>	Local resident & widespread winter visitor	Least Concern
21	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	Resident	Least Concern
22	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Migrant	Least Concern
23	Blyth's Pipit	<i>Anthus godlewskii</i>	Widespread winter visitor	Least Concern
24	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Widespread winter visitor	Least Concern
25	Bonelli's Eagle	<i>Aquila fasciata</i>	Resident	Least Concern
26	Booted Eagle	<i>Hieraaetus pennatus</i>	Widespread winter visitor & local resident	Least Concern
27	Booted Warbler	<i>Iduna caligata</i>	Widespread winter visitor	Least Concern

28	Brahminy Starling	<i>Sturnia pagodarum</i>	Resident	Least Concern
29	Bronze-winged Jacana	<i>Metopidius indicus</i>	Resident	Least Concern
30	Brown Shrike	<i>Lanius cristatus</i>	Widespread winter visitor	Least Concern
31	Caspian Tern	<i>Hydroprogne caspia</i>	Widespread winter visitor	Least Concern
32	Cattle Egret	<i>Bubulcus ibis</i>	Resident	Least Concern
33	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	Resident	Least Concern
34	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Resident	Least Concern
35	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	Resident	Least Concern
36	Common Greenshank	<i>Tringa nebularia</i>	Widespread winter visitor	Least Concern
37	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Resident	Least Concern
38	Common Iora	<i>Aegithina tiphia</i>	Resident	Least Concern
39	Common Kingfisher	<i>Alcedo atthis</i>	Resident	Least Concern
40	Common Moorhen	<i>Gallinula chloropus</i>	Resident	Least Concern

41	Common Myna	<i>Acridotheres tristis</i>	Resident	Least Concern
42	Common Pochard	<i>Aythya ferina</i>	Widespread winter visitor	Vulnerable
43	Common Redshank	<i>Tringa totanus</i>	Widespread winter visitor & resident	Least Concern
44	Common Sandpiper	<i>Actitis hypoleucos</i>	Widespread winter visitor & resident	Least Concern
45	Common Snipe	<i>Gallinago gallinago</i>	Widespread winter visitor & local resident	Least Concern
46	Common Tailorbird	<i>Orthotomus sutorius</i>	Resident	Least Concern
47	Common Tern	<i>Sterna hirundo</i>	Widespread winter visitor & resident	Least Concern
48	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Resident	Least Concern
49	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Resident	Least Concern
50	Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	Resident	Least Concern
51	Dusky Crag-Martin	<i>Ptyonoprogne concolor</i>	Resident	Least Concern
52	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Resident	Least Concern

53	Eurasian Coot	<i>Fulica atra</i>	Local resident & widespread winter visitor	Least Concern
54	Eurasian Curlew	<i>Numenius arquata</i>	Widespread winter visitor	Near Threatened
55	Eurasian Hoopoe	<i>Upupa epops</i>	Widespread resident & winter visitor	Least Concern
56	Eurasian Kestrel	<i>Garrulus glandarius</i>	Resident	Least Concern
57	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Widespread winter visitor & resident	Least Concern
58	Eurasian Wigeon	<i>Mareca penelope</i>	Widespread winter visitor	Least Concern
59	Fulvous Whistling-Duck	<i>Dendrocygna bicolor</i>	Resident	Least Concern
60	Garganey	<i>Spatula querquedula</i>	Widespread winter visitor	Least Concern
61	Glossy Ibis	<i>Plegadis falcinellus</i>	Widespread winter visitor & resident	Least Concern
62	Great Cormorant	<i>Phalacrocorax carbo</i>	Widespread winter visitor & resident	Least Concern
63	Great Egret	<i>Ardea alba</i>	Widespread resident & sparse winter visitor	Least Concern
64	Great Thick-knee	<i>Esacus recurvirostris</i>	Resident	Near Threatened

65	Greater Coucal	<i>Centropus sinensis</i>	Resident	Least Concern
66	Greater Flamingo	<i>Phoenicopterus roseus</i>	Widespread winter visitor & local resident	Least Concern
67	Greater Painted-Snipe	<i>Rostratula benghalensis</i>	Resident	Least Concern
68	Green Bee-eater	<i>Merops orientalis</i>	Resident	Least Concern
69	Green Sandpiper	<i>Tringa ochropus</i>	Widespread winter visitor	Least Concern
70	Green-winged Teal	<i>Aethopyga nipalensis</i>	Resident	Least Concern
71	Grey Francolin	<i>Ortygornis pondicerianus</i>	Resident	Least Concern
72	Grey Heron	<i>Ardea cinerea</i>	Widespread winter visitor & resident	Least Concern
73	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	Resident	Least Concern
74	Grey-headed Swamphen	<i>Porphyrio poliocephalus</i>	Resident	Not Recognised
75	Gull-billed Tern	<i>Gelochelidon nilotica</i>	Widespread winter visitor & local resident	Least Concern
76	House Crow	<i>Corvus splendens</i>	Resident	Least Concern

77	House Sparrow	<i>Passer domesticus</i>	Resident	Least Concern
78	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concern
79	Indian Golden Oriole	<i>Oriolus kundoo</i>	Resident	Least Concern
80	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Resident	Least Concern
81	Indian Peafowl	<i>Pavo cristatus</i>	Resident	Least Concern
82	Indian Pitta	<i>Pitta brachyura</i>	Resident	Least Concern
83	Indian Pond-Heron	<i>Ardeola grayii</i>	Widespread resident	Least Concern
84	Indian Robin	<i>Copsychus fulicatus</i>	Resident	Least Concern
85	Indian Roller	<i>Coracias benghalensis</i>	Resident	Least Concern
86	Indian Silverbill	<i>Euodice malabarica</i>	Resident	Least Concern
87	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Resident	Least Concern
88	Intermediate Egret	<i>Ardea intermedia</i>	Resident	Least Concern
89	Jerdon's Bushlark	<i>Mirafra affinis</i>	Resident	Least Concern

90	Jungle Prinia	<i>Prinia sylvatica</i>	Resident	Least Concern
91	Kentish Plover	<i>Charadrius alexandrinus</i>	Widespread winter visitor & resident	Least Concern
92	Large Grey Babbler	<i>Argya malcolmi</i>	Resident	Least Concern
93	Large-billed Crow	<i>Corvus macrorhynchos</i>	Resident	Least Concern
94	Laughing Dove	<i>Spilopelia senegalensis</i>	Resident	Least Concern
95	Lesser Sand-Plover	<i>Charadrius mongolus</i>	Resident	Least Concern
96	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Resident	Least Concern
97	Little Cormorant	<i>Microcarbo niger</i>	Resident	Least Concern
98	Little Egret	<i>Egretta garzetta</i>	Resident	Least Concern
99	Little Grebe	<i>Tachybaptus ruficollis</i>	Resident	Least Concern
100	Little Ringed Plover	<i>Charadrius dubius</i>	Widespread winter visitor & resident	Least Concern
101	Little Stint	<i>Calidris minuta</i>	Widespread winter visitor	Least Concern
102	Long-tailed Shrike	<i>Lanius schach</i>	Resident	Least Concern

103	Loten's Sunbird	<i>Cinnyris lotenius</i>	Resident	Least Concern
104	Mongolian Short-toed Lark	<i>Calandrella dukhunensis</i>	Resident	Least Concern
105	Northern Pintail	<i>Anas acuta</i>	Vagrant	Least Concern
106	Northern Shoveler	<i>Spatula clypeata</i>	Widespread winter visitor	Least Concern
107	Oriental Darter	<i>Anhinga melanogaster</i>	Resident	Near Threatened
108	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Widespread winter visitor & resident	Least Concern
109	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Resident	Least Concern
110	Oriental Skylark	<i>Alauda gulgula</i>	Resident	Least Concern
111	Osprey	<i>Pandion haliaetus</i>	Widespread winter visitor & local resident	Least Concern
112	Pacific Golden-Plover	<i>Pluvialis fulva</i>	Widespread winter visitor	Least Concern
113	Paddyfield Pipit	<i>Anthus rufulus</i>	Resident	Least Concern
114	Paddyfield Warbler	<i>Acrocephalus agricola</i>	Widespread winter visitor	Least Concern
115	Painted Stork	<i>Mycteria leucocephala</i>	Widespread resident	Near Threatened

116	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	Resident	Least Concern
117	Pallid Harrier	<i>Circus macrourus</i>	Widespread winter visitor	Near Threatened
118	Peregrine Falcon	<i>Falco peregrinus</i>	Widespread winter visitor & resident	Least Concern
119	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Resident	Least Concern
120	Pied Bushchat	<i>Saxicola caprata</i>	Resident	Least Concern
121	Pied Cuckoo	<i>Clamator jacobinus</i>	Resident	Least Concern
122	Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concern
123	Plain Prinia	<i>Prinia inornata</i>	Resident	Least Concern
124	Purple Heron	<i>Ardea purpurea</i>	Widespread winter visitor & resident	Least Concern
125	Purple Sunbird	<i>Cinnyris asiaticus</i>	Resident	Least Concern
126	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Resident	Least Concern
127	Red Avadavat	<i>Coturnix coromandelica</i>	Resident	Least Concern

128	Red-rumped Swallow	<i>Cecropis daurica</i>	Widespread resident & winter visitor	Least Concern
129	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Resident	Least Concern
130	Red-wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concern
131	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Resident	Least Concern
132	Richard's Pipit	<i>Anthus richardi</i>	Widespread winter visitor	Least Concern
133	Rock Pigeon	<i>Columba livia</i>	Resident	Least Concern
134	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Resident	Least Concern
135	Rosy Starling	<i>Pastor roseus</i>	Widespread winter visitor & migrant	Least Concern
136	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Resident	Least Concern
137	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Resident	Least Concern
138	Shikra	<i>Accipiter badius</i>	Resident	Least Concern
139	Short-toed Snake-Eagle	<i>Circaetus gallicus</i>	Resident	Least Concern
140	Spot-billed Pelican	<i>Pelecanus philippensis</i>	Resident	Near Threatened

141	Spotted Dove	<i>Spilopelia chinensis</i>	Resident	Least Concern
142	Tawny Pipit	<i>Anthus campestris</i>	Widespread winter visitor	Least Concern
143	Temminck's Stint	<i>Calidris temminckii</i>	Widespread winter visitor	Least Concern
144	Tree Pipit	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
145	Tricolored Munia	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
146	Tufted Duck	<i>Aythya fuligula</i>	Widespread winter visitor	Least Concern
147	Watercock	<i>Gallicrex cinerea</i>	Resident	Least Concern
148	Western Marsh-Harrier	<i>Circus aeruginosus</i>	Widespread winter visitor	Least Concern
149	Western Yellow Wagtail	<i>Motacilla flava</i>	Widespread winter visitor	Least Concern
150	Whiskered Tern	<i>Chlidonias hybrida</i>	Widespread winter visitor & resident	Least Concern
151	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concern
152	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Resident	Least Concern

153	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Resident	Least Concern
154	White-eyed Buzzard	<i>Butastur teesa</i>	Widespread resident	Least Concern
155	White-rumped Munia	<i>Lonchura striata</i>	Resident	Least Concern
156	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concern
157	Wood Sandpiper	<i>Tringa glareola</i>	Widespread winter visitor	Least Concern
158	Woolly-necked Stork	<i>Ciconia episcopus</i>	Resident	Near Threatened
159	Yellow Bittern	<i>Ixobrychus sinensis</i>	Resident	Least Concern
160	Yellow-billed Babbler	<i>Argya affinis</i>	Resident	Least Concern
161	Yellow-throated Sparrow	<i>Gymnoris xanthocollis</i>	Resident	Least Concern
162	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Resident	Least Concern
163	Zitting Cisticola	<i>Cisticola juncidis</i>	Resident	Least Concern

Table 17. Shows the checklist of birds found in Kolarampathy lake, their common name, scientific name, Migratory status, and IUCN category are provided.

Land Use and Land Cover Changes:

Land use and land cover changes over a period of 5 years from 2017 – 2021 indicate drastic changes were not observed over these periods of time, the mean average of each class was calculated. For this wetland crops were found to be in higher proportion with

The mean value of 11.42 sq km around the wetland, built area with the proportion of 4.53 sq km, followed by less proportion of vegetation with 0.57 sq km and water body with the proportion of 0.38 sq km

S.No	Classes	2017_area	2018_area	2019_area	2020_area	2021_area	Mean
1	Water body	0.00	0.18	0.14	0.81	0.76	0.38
2	Vegetation	0.77	0.73	0.35	0.53	0.49	0.57
3	Crops	11.46	11.73	11.99	10.90	11.01	11.42
4	Built area	4.38	4.38	4.41	4.76	4.74	4.53

Table 18. Calculated mean area for each classes for the period of 5 years from 2017 - 2021

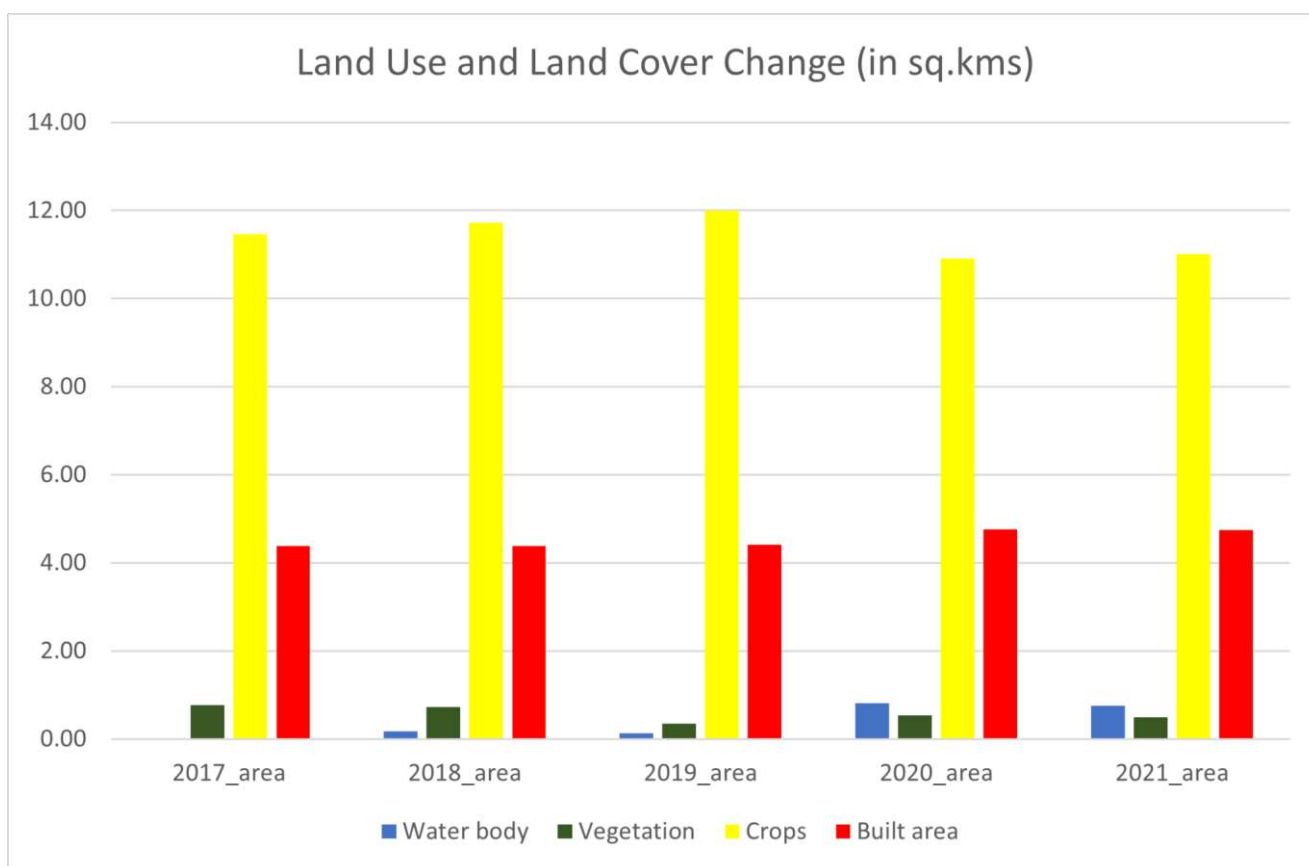


Figure 38. Land use and land cover changes over a period of 5 years from 2017 - 2021 for each classes

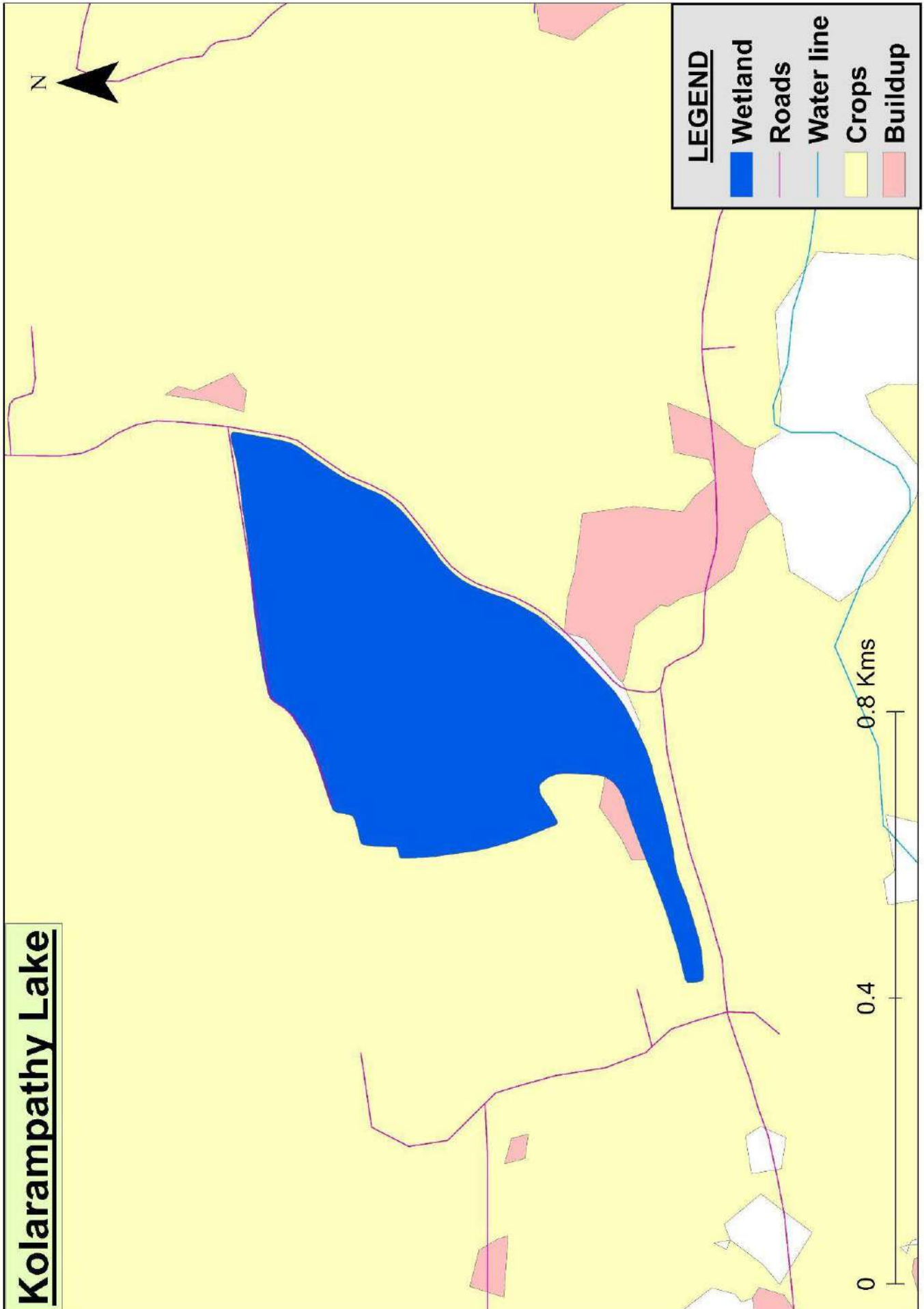


Figure 39. Base map of Kolarampathy lake

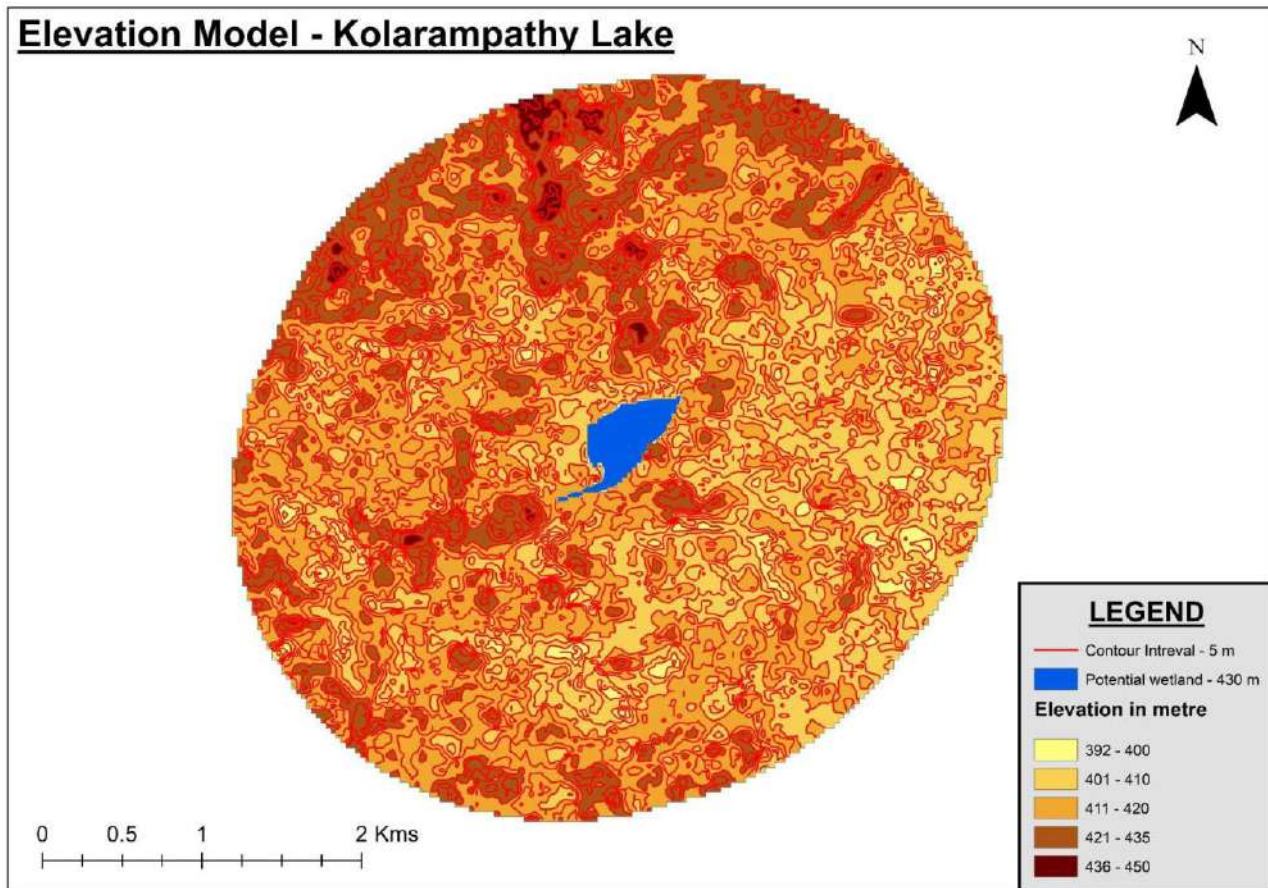


Figure 40. Elevation map of Kolarampathy Lake

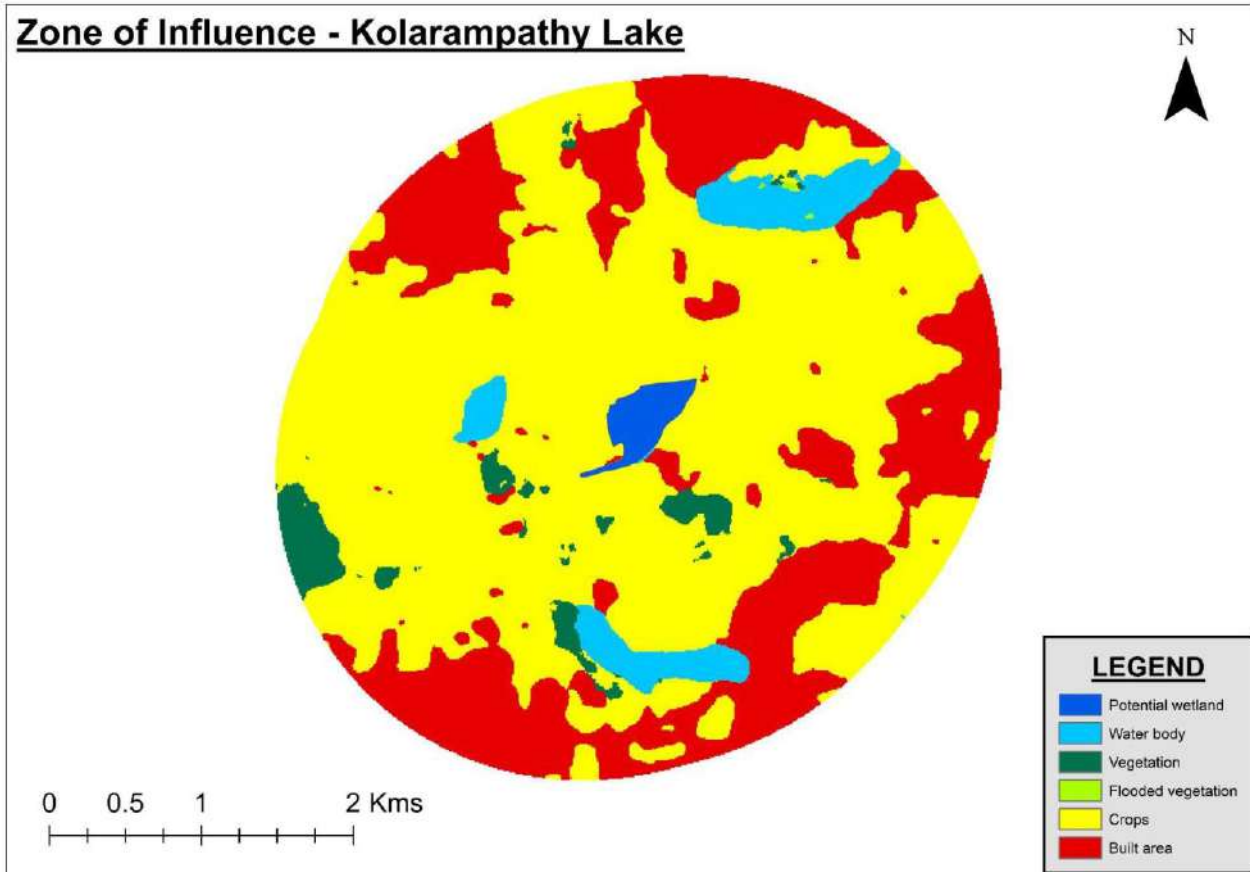


Figure 41. Zone of influence map of Kolarampathy Lake

8. Thaiyur lake, Chengalpattu:

Thaiyur Lake is located near the Thiruporur town in Chengalpattu district. The geographical coordinates of the lake are 12.7754623 and 80.1854539 The lake is spread over an area of 1.688 Km² with an elevation of 2m above mean sea level. A total of 163 Bird species have been recorded at Thaiyur Lake from 2013 to September 2022.

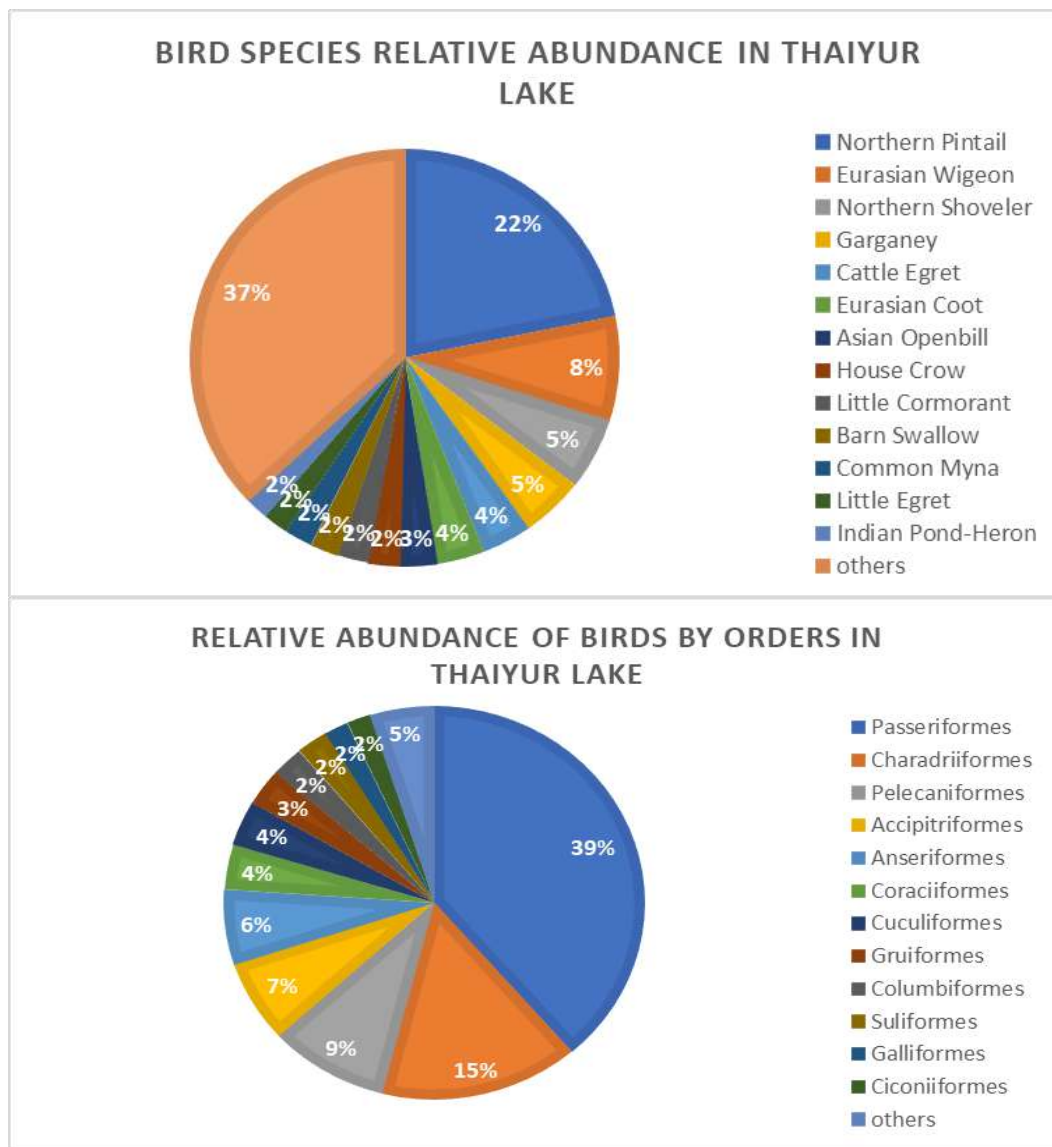


Figure 42. Relative abundance of species and orders of birds in Thaiyur Lake

Abundance

Within the vibrant tapestry of wetland ecosystems, a diverse assembly of bird species thrives in varying numbers. The captivating Northern Pintail (4657) graces these waters with its elegance, while the Eurasian Wigeon (1733) and Northern Shoveler (1183)

contribute their unique flair. The Garganey (1029) adds a touch of vibrancy, while the Cattle Egret (804) and Eurasian Coot (768) form an essential part of the avian community. The striking Asian Openbill (585) and modestly abundant Little Cormorant (499) grace the wetlands, alongside the distinctive silhouette of the Spot-billed Pelican (311). The melodic calls of the Red-wattled Lapwing (287) resonate across the water bodies, and the Indian Pond-Heron (372) is often found patrolling the shores. Meanwhile, the Gray Heron (94) stands as a sentinel, adding a sense of tranquility to the scene.

IUCN Category

The lake is home to a number of a variety of birds with different conservation statuses. Among the near-threatened birds recorded in the wetland are Black-headed Ibis, Eurasian Curlew, Oriental Darter, Painted Stork, Pallid Harrier, Spot-billed Pelican, and Woolly-necked stork. Additionally, vulnerable birds like the Common Pochard were recorded in this wetland. During the months of November, December, and January the lake attracts around 42 winter visitors including Common Greenshank, Common Sandpiper, Rosy Starling, and others.

Resident/Migratory Behavior

The wetland inhabitants' behaviors are as diverse as their numbers. The regal Gray Heron (94) and the busy Yellow-billed Babbler (214) are often seen engaging in resident activities within these aquatic havens. The Glossy Ibis (212) and Black-headed Ibis (209) add their unique presence, while the iconic Indian Spot-billed Duck (208) contributes to the symphony of wetland life. The serene Cotton Pygmy-Goose (99) and the elegant Intermediate Egret (143) exhibit their beauty in these tranquil surroundings. Meanwhile, the mellifluous songs of the Common Myna (446) and the spirited caws of the House Crow (513) resonate across the waters, adding their unique melodies to the wetland soundscape. The diligent Little Egret (412) and the agile Pied Bushchat (118) are common residents, while the grandeur of the Great Egret (230) and the enchanting presence of the Pied Kingfisher (116) offer moments of awe and wonder.

Si No	English Name	Scientific Name	Type of migration	IUCN category
1	Ashy Drongo	<i>Dicrurus leucophaeus</i>	Resident	Least Concern
2	Ashy Prinia	<i>Prinia socialis</i>	Resident	Least Concern
3	Ashy Woodswallow	<i>Artamus fuscus</i>	Resident	Least Concern
4	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i>	Resident	Least Concern
5	Asian Koel	<i>Eudynamys scolopaceus</i>	Resident	Least Concern

6	Asian Openbill	<i>Anastomus oscitans</i>	Resident	Least Concern
7	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Resident	Least Concern
8	Barn Swallow	<i>Hirundo rustica</i>	Widespread resident & winter visitor	Least Concern
9	Baya Weaver	<i>Ploceus philippinus</i>	Resident	Least Concern
10	Bay-backed Shrike	<i>Lanius vittatus</i>	Resident	Least Concern
11	Black Bittern	<i>Ixobrychus flavicollis</i>	Resident	Least Concern
12	Black Drongo	<i>Dicrurus macrocercus</i>	Resident	Least Concern
13	Black Kite	<i>Milvus migrans</i>	Resident	Least Concern
14	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Resident	Least Concern
15	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	Resident	Least Concern
16	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Resident	Least Concern
17	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Resident	Near Threatened
18	Black-rumped Flameback	<i>Dinopium benghalense</i>	Resident	Least Concern
19	Black-winged Kite	<i>Elanus caeruleus</i>	Resident	Least Concern
20	Black-winged Stilt	<i>Himantopus himantopus</i>	Local resident & widespread winter visitor	Least Concern
21	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	Resident	Least Concern
22	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Resident	Least Concern
23	Blyth's Pipit	<i>Anthus godlewskii</i>	Widespread winter visitor	Least Concern
24	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Widespread winter visitor	Least Concern
25	Bonelli's Eagle	<i>Aquila fasciata</i>	Resident	Least Concern
26	Booted Eagle	<i>Hieraaetus pennatus</i>	Widespread winter visitor & local resident	Least Concern

27	Booted Warbler	<i>Iduna caligata</i>	Widespread winter visitor	Least Concern
28	Brahminy Starling	<i>Sturnia pagodarum</i>	Resident	Least Concern
29	Bronze-winged Jacana	<i>Metopidius indicus</i>	Resident	Least Concern
30	Brown Shrike	<i>Lanius cristatus</i>	Widespread winter visitor	Least Concern
31	Caspian Tern	<i>Hydroprogne caspia</i>	Widespread winter visitor	Least Concern
32	Cattle Egret	<i>Bubulcus ibis</i>	Resident	Least Concern
33	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	Resident	Least Concern
34	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Resident	Least Concern
35	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	Resident	Least Concern
36	Common Greenshank	<i>Tringa nebularia</i>	Widespread winter visitor	Least Concern
37	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Resident	Least Concern
38	Common Iora	<i>Aegithina tiphia</i>	Resident	Least Concern
39	Common Kingfisher	<i>Alcedo atthis</i>	Resident	Least Concern
40	Common Moorhen	<i>Gallinula chloropus</i>	Resident	Least Concern
41	Common Myna	<i>Acridotheres tristis</i>	Resident	Least Concern
42	Common Pochard	<i>Aythya ferina</i>	Widespread winter visitor	Vulnerable
43	Common Redshank	<i>Tringa totanus</i>	Widespread winter visitor & resident	Least Concern
44	Common Sandpiper	<i>Actitis hypoleucos</i>	Widespread winter visitor & resident	Least Concern
45	Common Snipe	<i>Gallinago gallinago</i>	Widespread winter visitor & local resident	Least Concern
46	Common Tailorbird	<i>Orthotomus sutorius</i>	Resident	Least Concern
47	Common Tern	<i>Sterna hirundo</i>	Widespread winter visitor & resident	Least Concern

48	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Resident	Least Concern
49	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Resident	Least Concern
50	Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	Resident	Least Concern
51	Dusky Crag-Martin	<i>Ptyonoprogne concolor</i>	Resident	Least Concern
52	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Resident	Least Concern
53	Eurasian Coot	<i>Fulica atra</i>	Local resident & widespread winter visitor	Least Concern
54	Eurasian Curlew	<i>Numenius arquata</i>	Widespread winter visitor	Near Threatened
55	Eurasian Hoopoe	<i>Upupa epops</i>	Widespread resident & winter visitor	Least Concern
56	Eurasian Kestrel	<i>Garrulus glandarius</i>	Resident	Least Concern
57	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Widespread winter visitor & resident	Least Concern
58	Eurasian Wigeon	<i>Mareca penelope</i>	Widespread winter visitor	Least Concern
59	Fulvous Whistling-Duck	<i>Dendrocygna bicolor</i>	Resident	Least Concern
60	Garganey	<i>Spatula querquedula</i>	Widespread winter visitor	Least Concern
61	Glossy Ibis	<i>Plegadis falcinellus</i>	Widespread winter visitor & resident	Least Concern
62	Great Cormorant	<i>Phalacrocorax carbo</i>	Widespread winter visitor & resident	Least Concern
63	Great Egret	<i>Ardea alba</i>	Widespread resident & sparse winter visitor	Least Concern
64	Great Thick-knee	<i>Esacus recurvirostris</i>	Resident	Near Threatened
65	Greater Coucal	<i>Centropus sinensis</i>	Resident	Least Concern
66	Greater Flamingo	<i>Phoenicopterus roseus</i>	Widespread winter visitor & local resident	Least Concern

67	Greater Painted-Snipe	<i>Rostratula benghalensis</i>	Resident	Least Concern
68	Green Bee-eater	<i>Merops orientalis</i>	Resident	Least Concern
69	Green Sandpiper	<i>Tringa ochropus</i>	Widespread winter visitor	Least Concern
70	Green-winged Teal	<i>Aethopyga nipalensis</i>	Resident	Least Concern
71	Grey Francolin	<i>Ortygornis pondicerianus</i>	Resident	Least Concern
72	Grey Heron	<i>Ardea cinerea</i>	Widespread winter visitor & resident	Least Concern
73	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	Resident	Least Concern
74	Grey-headed Swamphen	<i>Porphyrio poliocephalus</i>	Resident	Not Recognised
75	Gull-billed Tern	<i>Gelochelidon nilotica</i>	Widespread winter visitor & local resident	Least Concern
76	House Crow	<i>Corvus splendens</i>	Resident	Least Concern
77	House Sparrow	<i>Passer domesticus</i>	Resident	Least Concern
78	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concern
79	Indian Golden Oriole	<i>Oriolus kundoo</i>	Resident	Least Concern
80	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Resident	Least Concern
81	Indian Peafowl	<i>Pavo cristatus</i>	Resident	Least Concern
82	Indian Pitta	<i>Pitta brachyura</i>	Resident	Least Concern
83	Indian Pond-Heron	<i>Ardeola grayii</i>	Widespread resident	Least Concern
84	Indian Robin	<i>Copsychus fulicatus</i>	Resident	Least Concern
85	Indian Roller	<i>Coracias benghalensis</i>	Resident	Least Concern
86	Indian Silverbill	<i>Euodice malabarica</i>	Resident	Least Concern
87	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Resident	Least Concern

88	Intermediate Egret	<i>Ardea intermedia</i>	Resident	Least Concern
89	Jerdon's Bushlark	<i>Mirafra affinis</i>	Resident	Least Concern
90	Jungle Prinia	<i>Prinia sylvatica</i>	Resident	Least Concern
91	Kentish Plover	<i>Charadrius alexandrinus</i>	Widespread winter visitor & resident	Least Concern
92	Large Grey Babbler	<i>Argya malcolmi</i>	Resident	Least Concern
93	Large-billed Crow	<i>Corvus macrorhynchos</i>	Resident	Least Concern
94	Laughing Dove	<i>Spilopelia senegalensis</i>	Resident	Least Concern
95	Lesser Sand-Plover	<i>Charadrius mongolus</i>	Resident	Least Concern
96	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Resident	Least Concern
97	Little Cormorant	<i>Microcarbo niger</i>	Resident	Least Concern
98	Little Egret	<i>Egretta garzetta</i>	Resident	Least Concern
99	Little Grebe	<i>Tachybaptus ruficollis</i>	Resident	Least Concern
100	Little Ringed Plover	<i>Charadrius dubius</i>	Widespread winter visitor & resident	Least Concern
101	Little Stint	<i>Calidris minuta</i>	Widespread winter visitor	Least Concern
102	Little Swift	<i>Apus affinis</i>	Resident	Least Concern
103	Little Tern	<i>Sternula albifrons</i>	Widespread resident	Least Concern
102	Little Swift	<i>Apus affinis</i>	Resident	Least Concern
103	Little Tern	<i>Sternula albifrons</i>	Widespread resident	Least Concern
104	Long-tailed Shrike	<i>Lanius schach</i>	Resident	Least Concern
105	Loten's Sunbird	<i>Cinnyris lotenius</i>	Resident	Least Concern
106	Mongolian Short-toed Lark	<i>Calandrella dukhunensis</i>	Resident	Least Concern
107	Northern Pintail	<i>Anas acuta</i>	Vagrant	Least Concern

108	Northern Shoveler	<i>Spatula clypeata</i>	Widespread winter visitor	Least Concern
109	Oriental Darter	<i>Anhinga melanogaster</i>	Resident	Near Threatened
110	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Widespread winter visitor & resident	Least Concern
111	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Resident	Least Concern
112	Oriental Skylark	<i>Alauda gulgula</i>	Resident	Least Concern
113	Osprey	<i>Pandion haliaetus</i>	Widespread winter visitor & local resident	Least Concern
114	Pacific Golden-Plover	<i>Pluvialis fulva</i>	Widespread winter visitor	Least Concern
115	Paddyfield Pipit	<i>Anthus rufulus</i>	Resident	Least Concern
116	Paddyfield Warbler	<i>Acrocephalus agricola</i>	Widespread winter visitor	Least Concern
117	Painted Stork	<i>Mycteria leucocephala</i>	Widespread resident	Near Threatened
118	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	Resident	Least Concern
119	Pallid Harrier	<i>Circus macrourus</i>	Widespread winter visitor	Near Threatened
120	Peregrine Falcon	<i>Falco peregrinus</i>	Widespread winter visitor & resident	Least Concern
121	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Resident	Least Concern
122	Pied Bushchat	<i>Saxicola caprata</i>	Resident	Least Concern
123	Pied Cuckoo	<i>Clamator jacobinus</i>	Resident	Least Concern
124	Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concern
125	Plain Prinia	<i>Prinia inornata</i>	Resident	Least Concern
126	Purple Heron	<i>Ardea purpurea</i>	Widespread winter visitor & resident	Least Concern
127	Purple Sunbird	<i>Cinnyris asiaticus</i>	Resident	Least Concern

128	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Resident	Least Concern
129	Red Avadavat	<i>Coturnix coromandelica</i>	Resident	Least Concern
130	Red-rumped Swallow	<i>Cecropis daurica</i>	Widespread resident & winter visitor	Least Concern
131	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Resident	Least Concern
132	Red-wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concern
133	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Resident	Least Concern
134	Richard's Pipit	<i>Anthus richardi</i>	Widespread winter visitor	Least Concern
135	Rock Pigeon	<i>Columba livia</i>	Resident	Least Concern
136	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Resident	Least Concern
137	Rosy Starling	<i>Pastor roseus</i>	Widespread winter visitor & migrant	Least Concern
138	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Resident	Least Concern
139	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Resident	Least Concern
140	Spot-billed Pelican	<i>Pelecanus philippensis</i>	Resident	Near Threatened
141	Spotted Dove	<i>Spilopelia chinensis</i>	Resident	Least Concern
142	Tawny Pipit	<i>Anthus campestris</i>	Widespread winter visitor	Least Concern
143	Temminck's Stint	<i>Calidris temminckii</i>	Widespread winter visitor	Least Concern
144	Tree Pipit	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
145	Tricolored Munia	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
146	Tufted Duck	<i>Aythya fuligula</i>	Widespread winter visitor	Least Concern
147	Watercock	<i>Gallix cinerea</i>	Resident	Least Concern

148	Western Marsh-Harrier	<i>Circus aeruginosus</i>	Widespread winter visitor	Least Concern
149	Western Yellow Wagtail	<i>Motacilla flava</i>	Widespread winter visitor	Least Concern
150	Whiskered Tern	<i>Chlidonias hybrida</i>	Widespread winter visitor & resident	Least Concern
151	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concern
152	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Resident	Least Concern
153	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Resident	Least Concern
154	White-eyed Buzzard	<i>Butastur teesa</i>	Widespread resident	Least Concern
155	White-rumped Munia	<i>Lonchura striata</i>	Resident	Least Concern
156	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concern
157	Wood Sandpiper	<i>Tringa glareola</i>	Widespread winter visitor	Least Concern
158	Woolly-necked Stork	<i>Ciconia episcopus</i>	Resident	Near Threatened
159	Yellow Bittern	<i>Ixobrychus sinensis</i>	Resident	Least Concern
160	Yellow-billed Babbler	<i>Argya affinis</i>	Resident	Least Concern
161	Yellow-throated Sparrow	<i>Gymnoris xanthocollis</i>	Resident	Least Concern
162	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Resident	Least Concern
163	Zitting Cisticola	<i>Cisticola juncidis</i>	Resident	Least Concern

Table 19. Shows the checklist of birds found in Thaiyur lake, their common name, scientific name, Migratory status, and IUCN category are provided.

Land Use and Land Cover Changes:

Land use and land cover changes over a period of 5 years from 2017 – 2021 indicate drastic changes were not observed over these periods of time, the mean average of each class was calculated. For this wetland crops were found to be in higher proportion with the mean value of 10.96 sq km around the wetland, grassland with the proportion of

7.80 sq km, followed by less proportion of built area with 4.42 sq km, vegetation with the proportion of 1.29 sq km and water body with the proportion of 0.31

S.No	Classes	2017_area	2018_area	2019_area	2020_area	2021_area	Mean
1	Water body	0.39	0.32	0.06	0.33	0.46	0.31
2	Vegetation	1.11	1.13	1.22	1.28	1.71	1.29
3	Crops	14.26	10.69	10.02	9.32	10.53	10.96
4	Built area	3.67	4.11	4.62	4.76	4.96	4.42
5	Grassland	5.30	8.56	8.87	9.13	7.15	7.80

Table 20. Calculated mean area for each classes for the period of 5 years from 2017 - 2021

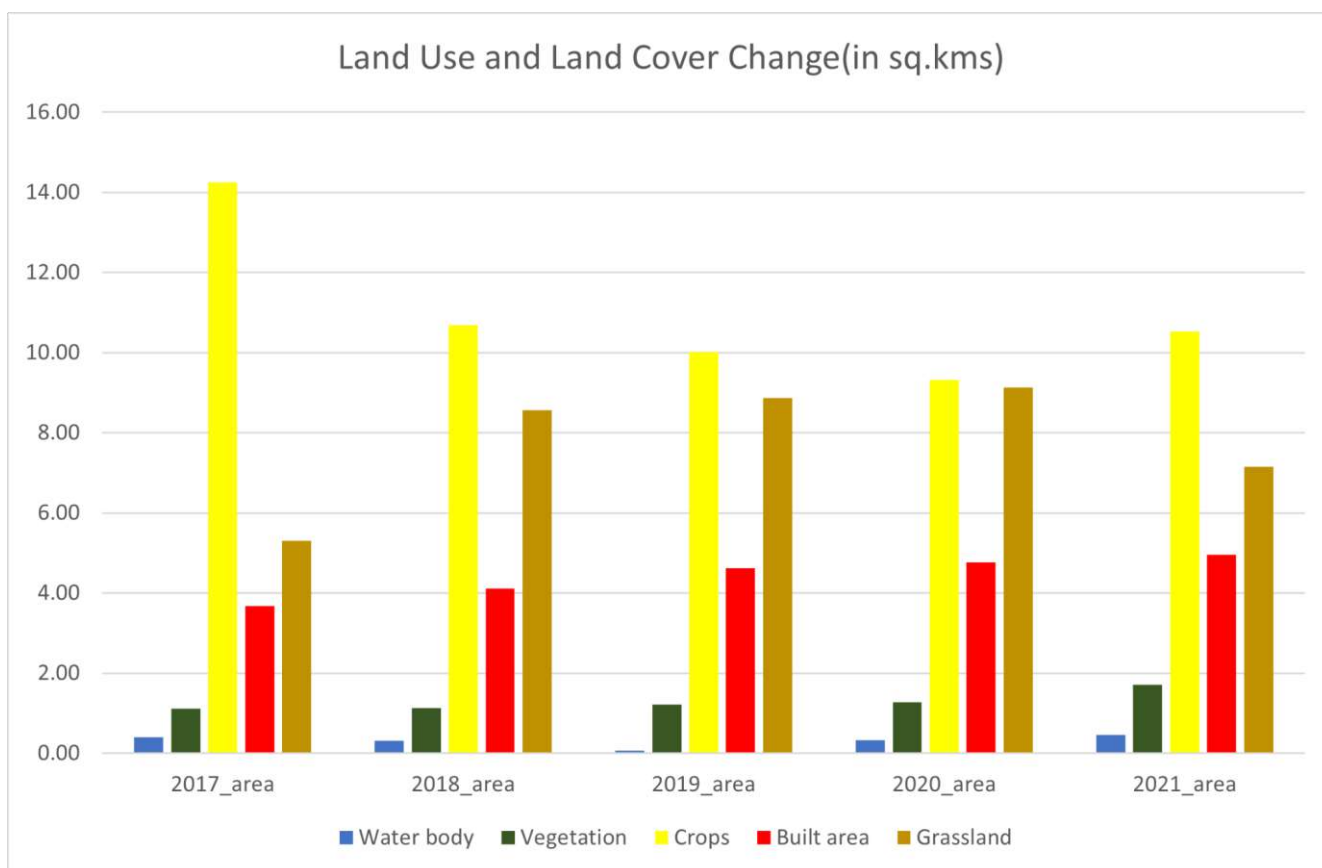


Figure 43. Land use and land cover changes over a period of 5 years from 2017 - 2021 for each classes

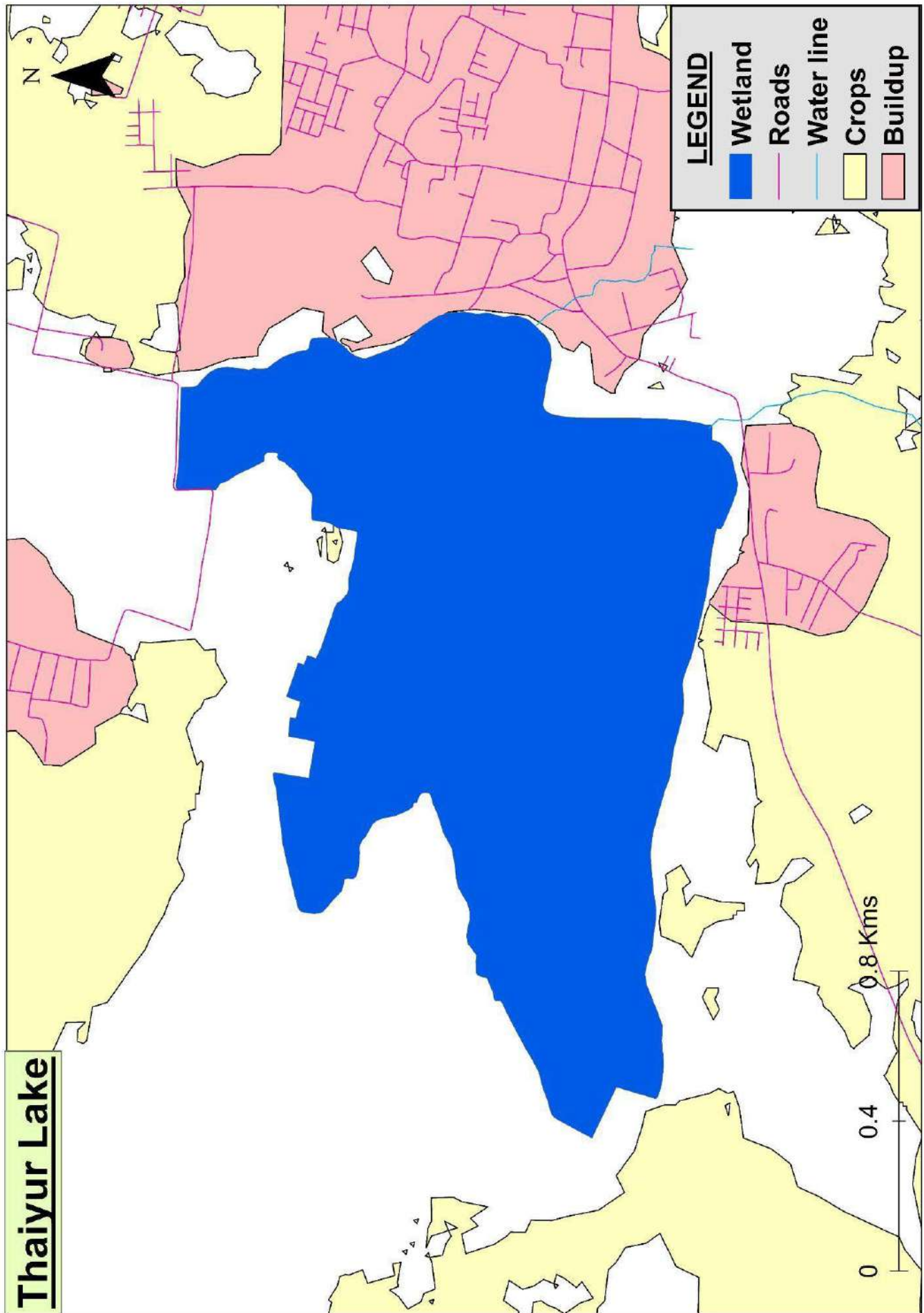


Figure 44.. Base map of Thaiyur Lake

Elevation Model - Thaiyur Lake

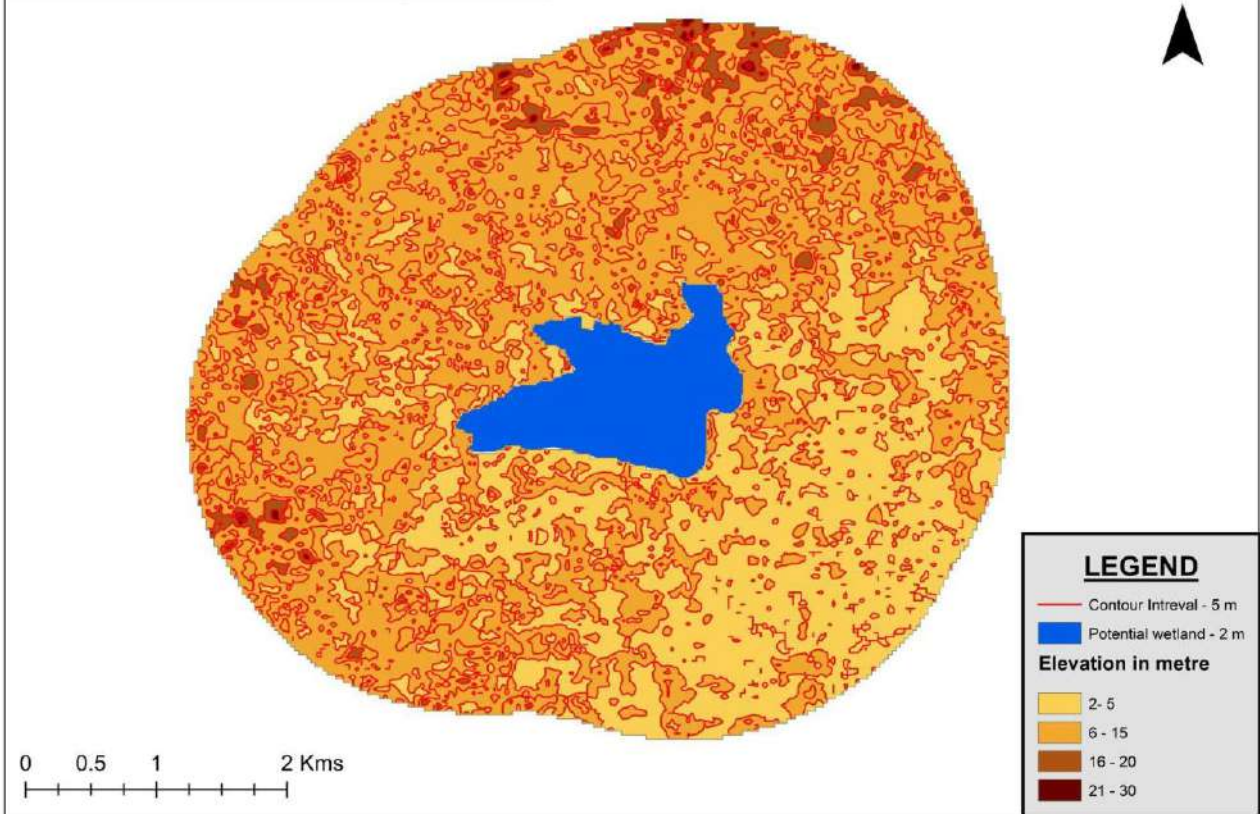


Figure 45. Elevation map of Thaiyur Lake

Zone of Influence - Thaiyur Lake

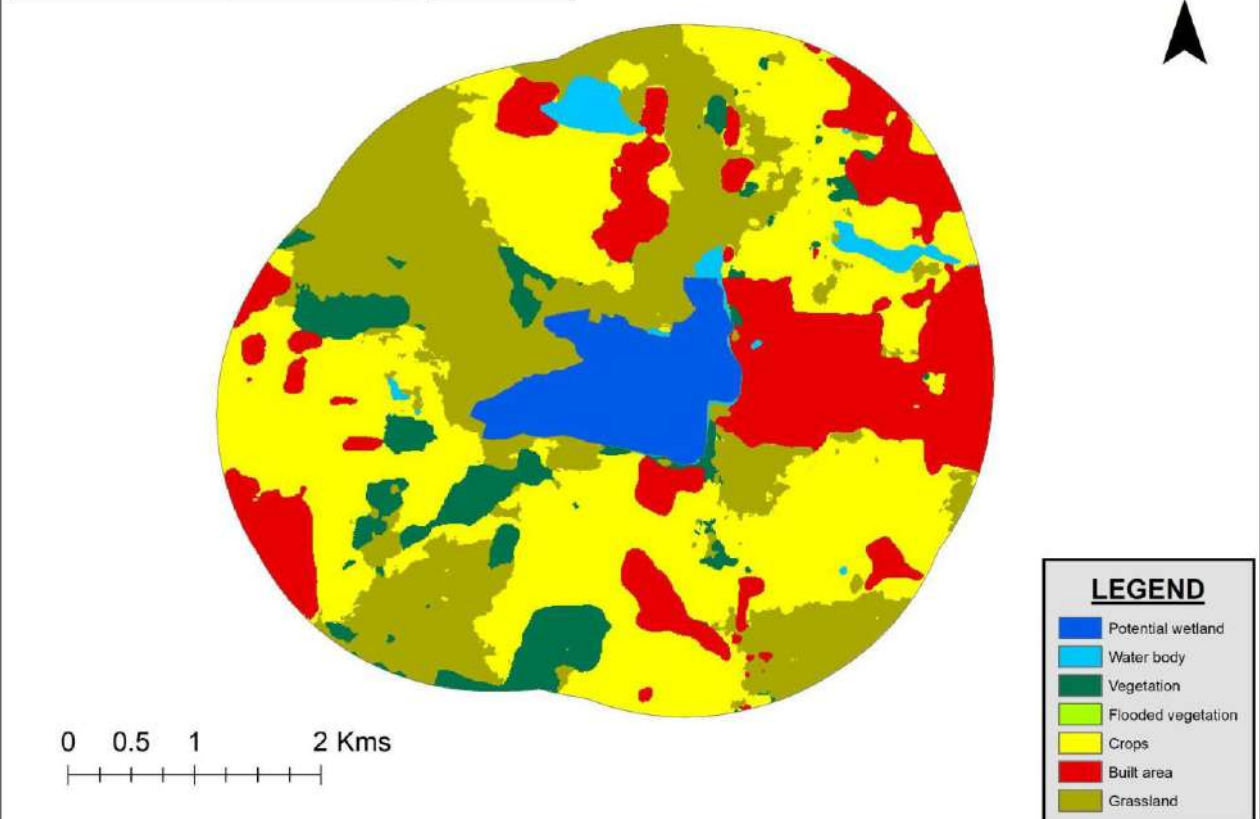


Figure 46. Zone of influence map of Thaiyur Lake

9.Sengulam Kanmai, Madurai:

Sengulam Kanmaai is located near Kalligudi town in Madurai district. The lake is spread over an area of 0.924 sq. km. The geographical coordinates of the lake are 9.6937476 and 77.9472745. A total of 155 bird species have been recorded at sengulam kanmai from 2013 to September 2022.

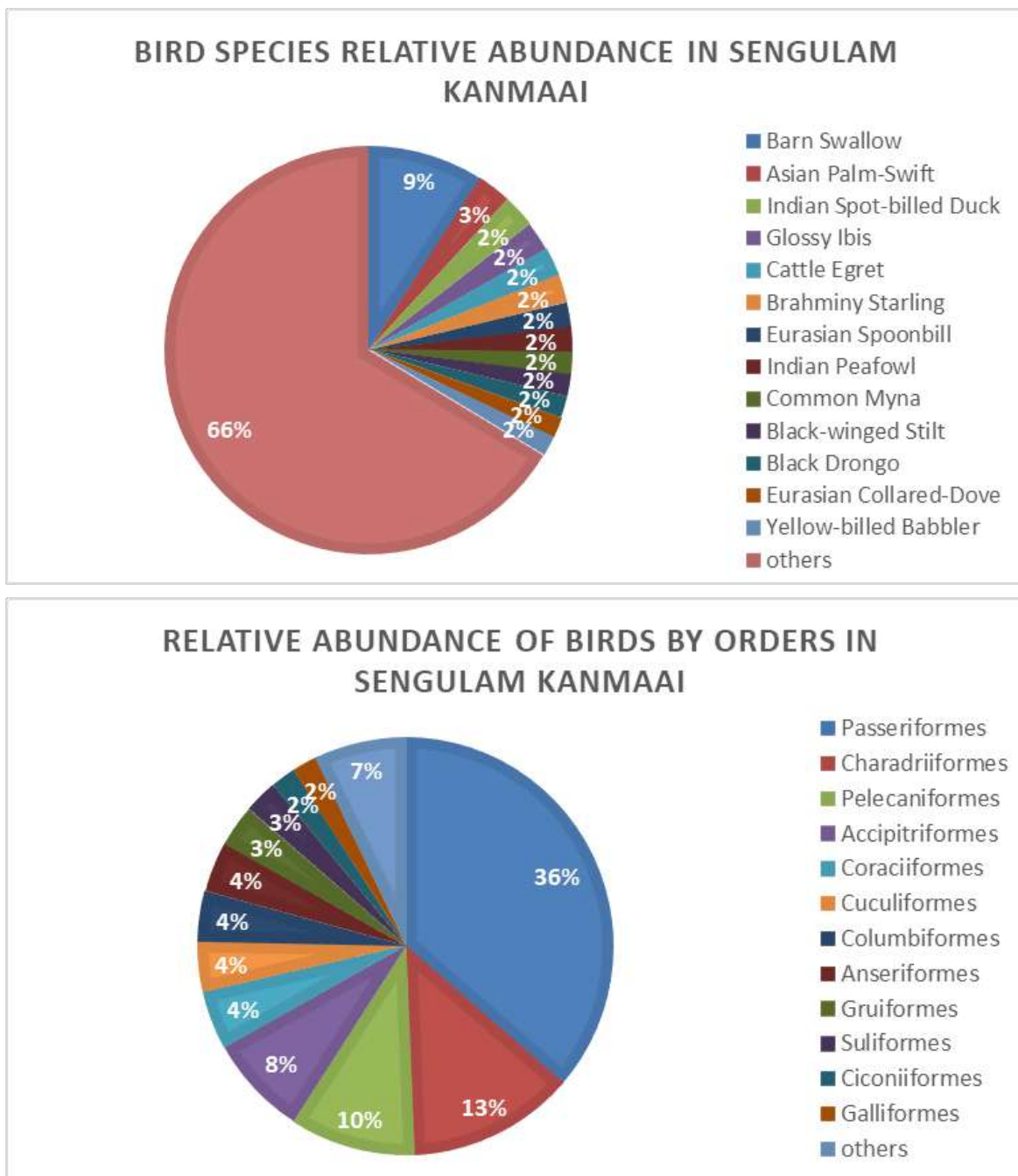


Figure 47. Relative Abundance of species and orders of birds in Sengulam Kanmaai

Abundance:

The wetlands come alive with an impressive array of bird species, each contributing its own unique presence. Among the residents, the Indian Spot-billed Duck (214) and the charming Knob-billed Duck (122) grace the waters. The elegant Eurasian Coot (122) and the majestic Spot-billed Pelican (63) make their presence felt. The delicate Paddyfield Pipit (58) and the vibrant Northern Shoveler (22) complete this enchanting ensemble.

IUCN Category:

Between 2013 and 2022, 155 species of birds A number of a variety of birds with different conservation statuses have been recorded in the kanmai. Among the near-threatened birds recorded in the wetland are Black-headed Ibis, Black-tailed Godwit, Oriental Darter, Painted Stork, Pallid Harrier, Red-necked Falcon, Spot-billed Pelican, and Woolly-necked stork. Additionally, vulnerable birds like the Greater Spotted Eagle, Indian Spotted Eagle, and River Tern were recorded in this wetland. During the months of November, December, and January the lake attracts around 23 winter visitors including Common Greenshank, Marsh Sandpiper, Rosy Starling, and others.

Resident/Migratory Behavior:

The wetlands host a dynamic mix of resident and migratory species. The resonating calls of the Paddyfield Pipit (58) and the intricate patterns of the Green Sandpiper (35) mark the presence of migratory visitors. Meanwhile, the tranquil waters are frequented by resident birds like the Eurasian Coot (122), the dignified Gray Heron (77), and the diminutive Little Grebe (79). The charismatic Asian Openbill (73) and the resplendent Indian Roller (67) add their vibrant hues to the resident population. Each species contributes to the thriving ecosystem that these wetlands provide.

Sl No	English Name	Scientific Name	Type of migration	IUCN category
1	Ashy Prinia	<i>Prinia socialis</i>	Resident	Least Concern
2	Ashy Woodswallow	<i>Artamus fuscus</i>	Resident	Least Concern
3	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i>	Resident	Least Concern
4	Asian Koel	<i>Eudynamys scolopaceus</i>	Resident	Least Concern
5	Asian Openbill	<i>Anastomus oscitans</i>	Resident	Least Concern
6	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Resident	Least Concern

7	Barn Swallow	<i>Hirundo rustica</i>	Widespread resident & winter visitor	Least Concern
8	Barred Buttonquail	<i>Turnix suscitator</i>	Resident	Least Concern
9	Baya Weaver	<i>Ploceus philippinus</i>	Resident	Least Concern
10	Bay-backed Shrike	<i>Lanius vittatus</i>	Resident	Least Concern
11	Black Drongo	<i>Dicrurus macrocercus</i>	Resident	Least Concern
12	Black Kite	<i>Milvus migrans</i>	Resident	Least Concern
13	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Resident	Least Concern
14	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	Resident	Least Concern
15	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Resident	Near Threatened
16	Black-naped Oriole	<i>Oriolus chinensis</i>	Resident	Least Concern
17	Black-rumped Flameback	<i>Dinopium benghalense</i>	Resident	Least Concern
18	Black-tailed Godwit	<i>Limosa limosa</i>	Widespread winter visitor	Near Threatened
19	Black-winged Kite	<i>Elanus caeruleus</i>	Resident	Least Concern
20	Black-winged Stilt	<i>Himantopus himantopus</i>	Local resident & widespread winter visitor	Least Concern
21	Blue-cheeked Bee-eater	<i>Merops persicus</i>	Resident	Least Concern
22	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	Resident	Least Concern
23	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Resident	Least Concern
24	Blyth's Pipit	<i>Anthus godlewskii</i>	Widespread winter visitor	Least Concern
25	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Widespread winter visitor	Least Concern
26	Booted Warbler	<i>Iduna caligata</i>	Widespread winter visitor	Least Concern
27	Brahminy Kite	<i>Haliastur indus</i>	Resident	Least Concern

28	Brahminy Starling	<i>Sturnia pagodarum</i>	Resident	Least Concern
29	Brown Shrike	<i>Lanius cristatus</i>	Widespread winter visitor	Least Concern
30	Brown-headed Gull	<i>Chroicocephalus brunnicephalus</i>	Widespread winter visitor & resident	Least Concern
31	Cattle Egret	<i>Bubulcus ibis</i>	Resident	Least Concern
32	Chestnut-bellied Sandgrouse	<i>Pterocles exustus</i>	Resident	Least Concern
33	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	Resident	Least Concern
34	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	Resident	Least Concern
35	Common Barn Owl	<i>Tyto alba</i>	Resident	Least Concern
36	Common Greenshank	<i>Tringa nebularia</i>	Widespread winter visitor	Least Concern
37	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Resident	Least Concern
38	Common Kingfisher	<i>Alcedo atthis</i>	Resident	Least Concern
39	Common Moorhen	<i>Gallinula chloropus</i>	Resident	Least Concern
40	Common Myna	<i>Acridotheres tristis</i>	Resident	Least Concern
41	Common Sandpiper	<i>Actitis hypoleucos</i>	Widespread winter visitor & resident	Least Concern
42	Common Snipe	<i>Gallinago gallinago</i>	Widespread winter visitor & local resident	Least Concern
43	Common Tailorbird	<i>Orthotomus sutorius</i>	Resident	Least Concern
44	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Resident	Least Concern
45	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Resident	Least Concern
46	Crested Serpent-Eagle	<i>Spilornis cheela</i>	Resident	Least Concern
47	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Resident	Least Concern

48	Eurasian Coot	<i>Fulica atra</i>	Local resident & widespread winter visitor	Least Concern
49	Eurasian Hoopoe	<i>Upupa epops</i>	Widespread resident & winter visitor	Least Concern
50	Eurasian Kestrel	<i>Garrulus glandarius</i>	Resident	Least Concern
51	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Widespread winter visitor & resident	Least Concern
52	Garganey	<i>Spatula querquedula</i>	Widespread winter visitor	Least Concern
53	Glossy Ibis	<i>Plegadis falcinellus</i>	Widespread winter visitor & resident	Least Concern
54	Great Cormorant	<i>Phalacrocorax carbo</i>	Widespread winter visitor & resident	Least Concern
55	Great Egret	<i>Ardea alba</i>	Widespread resident & sparse winter visitor	Least Concern
56	Greater Coucal	<i>Centropus sinensis</i>	Resident	Least Concern
57	Greater Painted-Snipe	<i>Rostratula benghalensis</i>	Resident	Least Concern
58	Greater Spotted Eagle	<i>Clanga clanga</i>	Widespread winter visitor & resident	Vulnerable
59	Green Bee-eater	<i>Merops orientalis</i>	Resident	Least Concern
60	Green Sandpiper	<i>Tringa ochropus</i>	Widespread winter visitor	Least Concern
61	Green-winged Teal	<i>Aethopyga nipalensis</i>	Resident	Least Concern
62	Grey Francolin	<i>Ortygornis pondicerianus</i>	Resident	Least Concern
63	Grey Heron	<i>Ardea cinerea</i>	Widespread winter visitor & resident	Least Concern
64	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	Resident	Least Concern
65	Grey-headed Swamphen	<i>Porphyrio poliocephalus</i>	Resident	Not Recognised

66	House Crow	<i>Corvus splendens</i>	Resident	Least Concern
67	House Sparrow	<i>Passer domesticus</i>	Resident	Least Concern
68	Indian Bushlark	<i>Mirafra erythroptera</i>	Resident	Least Concern
69	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concern
70	Indian Golden Oriole	<i>Oriolus kundoo</i>	Resident	Least Concern
71	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Resident	Least Concern
72	Indian Peafowl	<i>Pavo cristatus</i>	Resident	Least Concern
73	Indian Pond-Heron	<i>Ardeola grayii</i>	Widespread resident	Least Concern
74	Indian Robin	<i>Copsychus fulicatus</i>	Resident	Least Concern
75	Indian Roller	<i>Coracias benghalensis</i>	Resident	Least Concern
76	Indian Silverbill	<i>Euodice malabarica</i>	Resident	Least Concern
77	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Resident	Least Concern
78	Indian Spotted Eagle	<i>Clanga hastata</i>	Widespread winter visitor & resident	Vulnerable
79	Indian Thick-knee	<i>Burhinus indicus</i>	Resident	Least Concern
80	Intermediate Egret	<i>Ardea intermedia</i>	Resident	Least Concern
81	Jerdon's Bushlark	<i>Mirafra affinis</i>	Resident	Least Concern
82	Jungle Bush-Quail	<i>Perdica asiatica</i>	Resident	Least Concern
83	Jungle Prinia	<i>Prinia sylvatica</i>	Resident	Least Concern
84	Knob-billed Duck	<i>Sarkidiornis melanotos</i>	Resident	Least Concern
85	Large Grey Babbler	<i>Argya malcolmi</i>	Resident	Least Concern
86	Large-billed Crow	<i>Corvus macrorhynchos</i>	Resident	Least Concern

87	Laughing Dove	<i>Spilopelia senegalensis</i>	Resident	Least Concern
88	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Resident	Least Concern
89	Little Cormorant	<i>Microcarbo niger</i>	Resident	Least Concern
90	Little Egret	<i>Egretta garzetta</i>	Resident	Least Concern
91	Little Grebe	<i>Tachybaptus ruficollis</i>	Resident	Least Concern
92	Little Ringed Plover	<i>Charadrius dubius</i>	Widespread winter visitor & resident	Least Concern
93	Little Stint	<i>Calidris minuta</i>	Widespread winter visitor	Least Concern
94	Long-tailed Shrike	<i>Lanius schach</i>	Resident	Least Concern
95	Loten's Sunbird	<i>Cinnyris lotenius</i>	Resident	Least Concern
96	Marsh Sandpiper	<i>Tringa stagnatilis</i>	Widespread winter visitor	Least Concern
97	Montagu's Harrier	<i>Circus pygargus</i>	Widespread winter visitor	Least Concern
98	Northern Pintail	<i>Anas acuta</i>	Vagrant	Least Concern
99	Northern Shoveler	<i>Spatula clypeata</i>	Widespread winter visitor	Least Concern
100	Oriental Darter	<i>Anhinga melanogaster</i>	Resident	Near Threatened
101	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Widespread winter visitor & resident	Least Concern
102	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Resident	Least Concern
103	Paddyfield Pipit	<i>Anthus rufulus</i>	Resident	Least Concern
104	Painted Stork	<i>Mycteria leucocephala</i>	Widespread resident	Near Threatened
105	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	Resident	Least Concern
106	Pallid Harrier	<i>Circus macrourus</i>	Widespread winter visitor	Near Threatened
107	Pied Bushchat	<i>Saxicola caprata</i>	Resident	Least Concern

108	Pied Cuckoo	<i>Clamator jacobinus</i>	Migratory	Least Concern
109	Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concern
110	Pin-tailed Snipe	<i>Pterocles alchata</i>	Vagrant	Least Concern
111	Plain Prinia	<i>Prinia inornata</i>	Resident	Least Concern
112	Purple Heron	<i>Ardea purpurea</i>	Widespread winter visitor & resident	Least Concern
113	Purple Sunbird	<i>Cinnyris asiaticus</i>	Resident	Least Concern
114	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Resident	Least Concern
115	Red Collared-Dove	<i>Streptopelia tranquebarica</i>	Resident	Least Concern
116	Red-naped Ibis	<i>Pseudibis papillosa</i>	Resident	Least Concern
117	Red-necked Falcon	<i>Falco chicquera</i>	Resident	Near Threatened
118	Red-rumped Swallow	<i>Cecropis daurica</i>	Widespread resident & winter visitor	Least Concern
119	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Resident	Least Concern
120	Red-wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concern
121	River Tern	<i>Sterna aurantia</i>	Resident	Vulnerable
122	Rock Pigeon	<i>Columba livia</i>	Resident	Least Concern
123	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Resident	Least Concern
124	Rosy Starling	<i>Pastor roseus</i>	Widespread winter visitor & migrant	Least Concern
125	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Resident	Least Concern
126	Rufous-tailed Lark	<i>Ammomanes phoenicura</i>	Resident	Least Concern
127	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Resident	Least Concern
128	Shikra	<i>Accipiter badius</i>	Resident	Least Concern

129	Short-toed Snake-Eagle	<i>Circaetus gallicus</i>	Resident	Least Concern
130	Small Pratincole	<i>Glareola lactea</i>	Migratory	Least Concern
131	Spot-billed Pelican	<i>Pelecanus philippensis</i>	Resident	Near Threatened
132	Spotted Dove	<i>Spilopelia chinensis</i>	Resident	Least Concern
133	Spotted Owlet	<i>Athene brama</i>	Resident	Least Concern
134	Striated Heron	<i>Butorides striata</i>	Widespread resident	Least Concern
135	Tawny Pipit	<i>Anthus campestris</i>	Widespread winter visitor	Least Concern
136	Temminck's Stint	<i>Calidris temminckii</i>	Widespread winter visitor	Least Concern
137	Tickell's Leaf Warbler	<i>Phylloscopus affinis</i>	Widespread winter visitor	Least Concern
138	Tricolored Munia	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
139	Watercock	<i>Gallicrex cinerea</i>	Resident	Least Concern
140	Western Yellow Wagtail	<i>Motacilla flava</i>	Widespread winter visitor	Least Concern
141	Whiskered Tern	<i>Chlidonias hybrida</i>	Widespread winter visitor & resident	Least Concern
142	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concern
143	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Resident	Least Concern
144	White-eyed Buzzard	<i>Butastur teesa</i>	Widespread resident	Least Concern
145	White-rumped Munia	<i>Lonchura striata</i>	Resident	Least Concern
146	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concern
147	Wood Sandpiper	<i>Tringa glareola</i>	Widespread winter visitor	Least Concern
148	Woolly-necked Stork	<i>Ciconia episcopus</i>	Resident	Near Threatened
149	Yellow Bittern	<i>Ixobrychus sinensis</i>	Resident	Least Concern

150	Yellow-billed Babbler	<i>Argya affinis</i>	Resident	Least Concern
151	Yellow-footed Green-Pigeon	<i>Treron phoenicopterus</i>	Resident	Least Concern
152	Yellow-throated Sparrow	<i>Gymnoris xanthocollis</i>	Resident	Least Concern
153	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Resident	Least Concern
154	Zitting Cisticola	<i>Cisticola juncidis</i>	Resident	Least Concern

Table 21. Shows the checklist of birds found in Sengulam kanmai, their common name, scientific name, Migratory status, and IUCN category are provided.



Figure 48. Observation of Painted stork and Great blue heron in Sholinganallur Lake during the field visit

Land Use and Land Cover Changes:

Land use and land cover changes over a period of 5 years from 2017 – 2021 indicate drastic changes were not observed over these periods of time, the mean average of each class was calculated. For this wetland crops were found to be in higher proportion with the mean value of 21.13 sq km around the wetland, built area with the proportion of 1.56 sq km, followed by less proportion of grassland with 0.06 sq km, and water body with a proportion of 0.02 sq km.

S.No	Classes	2017_area	2018_area	2019_area	2020_area	2021_area	Mean
1	Water body	0.01	0.00	0.00	0.01	0.05	0.02
2	Crops	21.36	21.22	21.01	20.96	21.10	21.13
3	Built area	1.35	1.47	1.67	1.73	1.58	1.56
4	Grassland	0.04	0.07	0.08	0.07	0.03	0.06

Table 22. Calculated mean area for each classes for the period of 5 years from 2017 - 2021

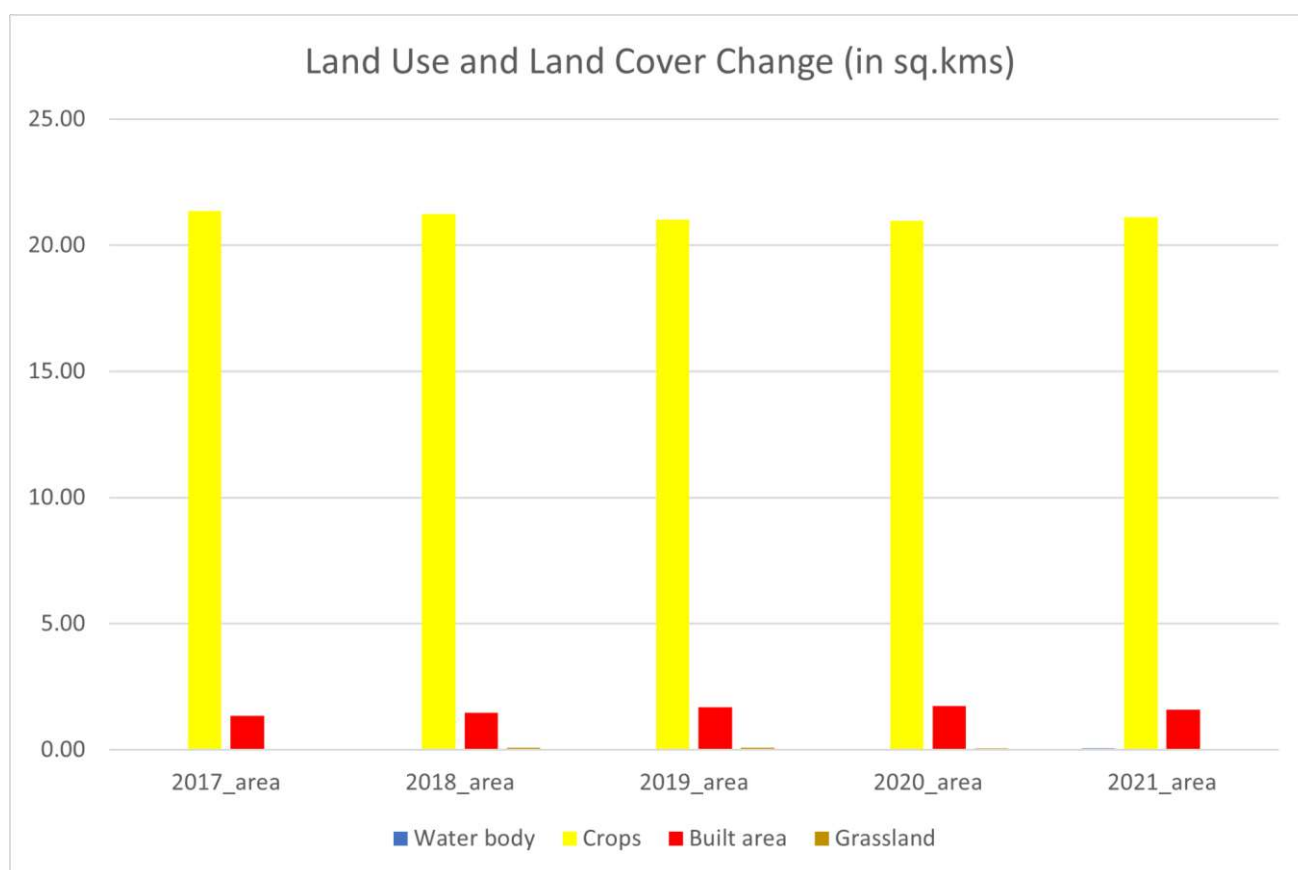


Figure 49. Land use and land cover changes over a period of 5 years from 2017 - 2021 for each classes

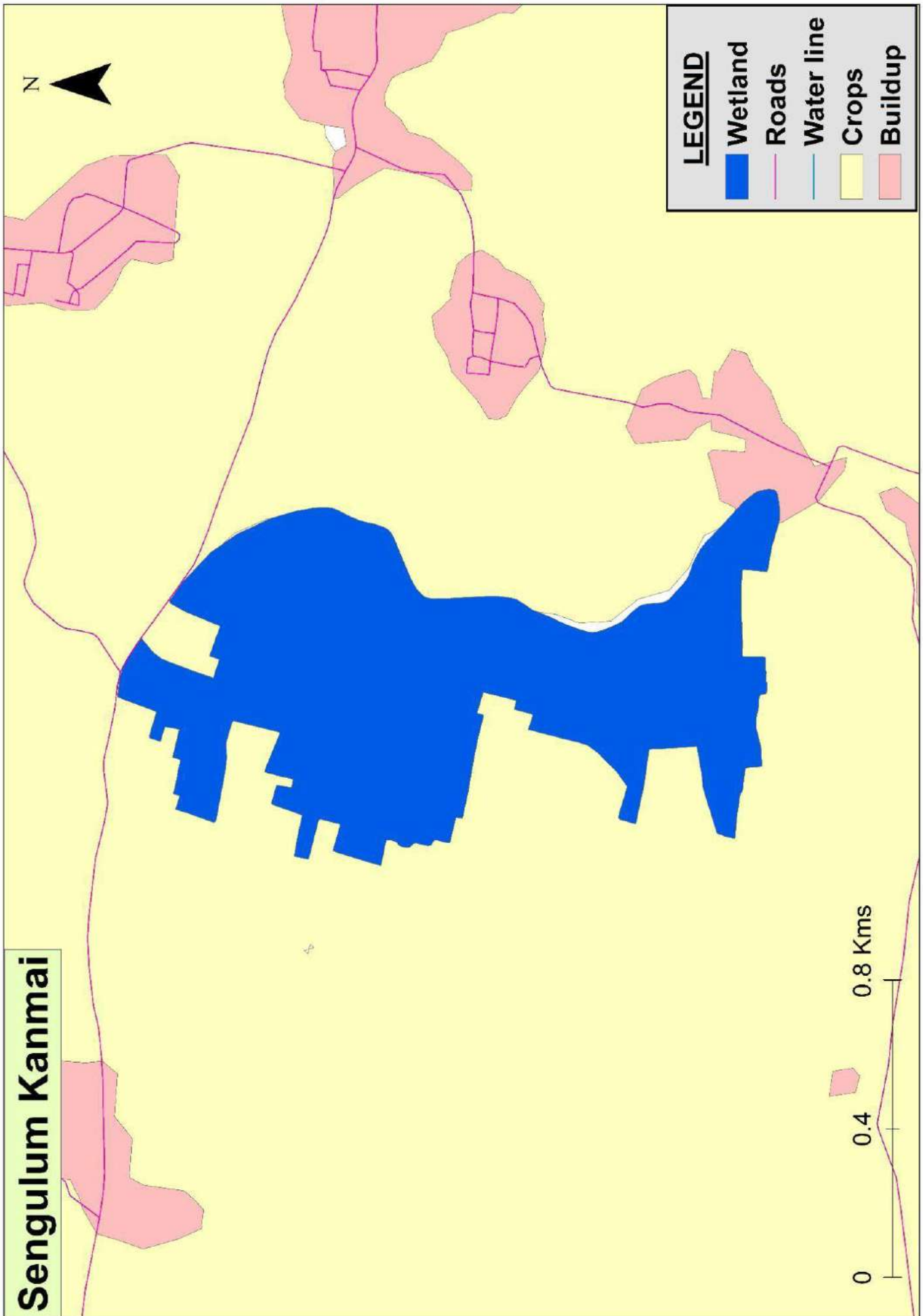


Figure 50. Base map of Sengulam Kanmaai

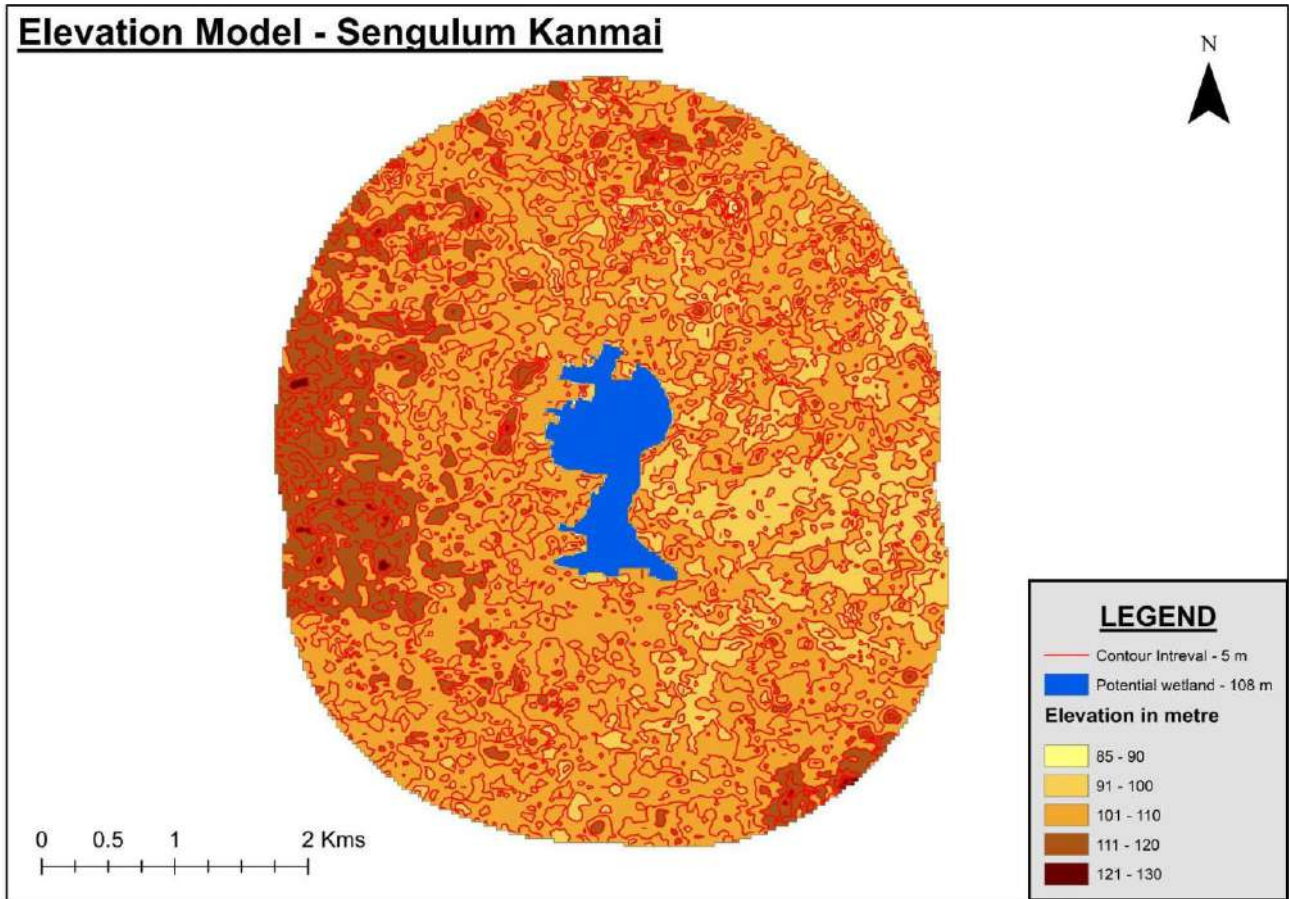


Figure 51. Elevation map of Sengulam Kanmaai

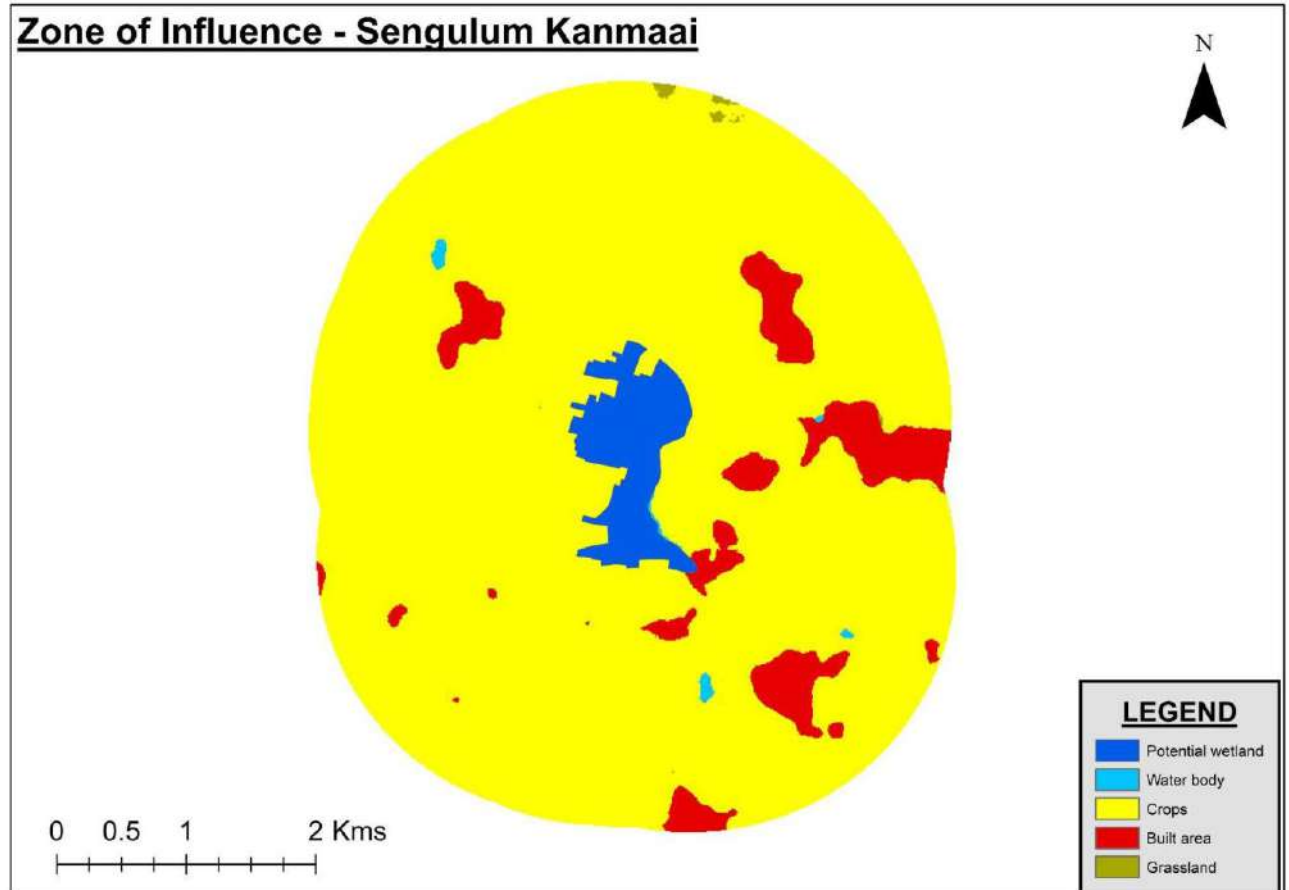


Figure 52. Zone of influence map of Sengulam Kanmaai

10. Kelambakkam backwaters:

The lake is located in Kelambakkam (near Thiruporur) in the district of Chengalpattu which is approximately 35 Km from Chennai city. It is formed by the confluence of Buckingham Canal and the Bay of Bengal. The backwaters are spread over an area of 1.547 sq Km. The area serves as a transitional zone between freshwater and saltwater environment. The wetland ecosystem of Kelambakkam backwaters supports a wide range of aquatic plants. The geo-coordinates are 12.78661736, 80.23548034. One of the nearby water bodies is the Buckingham Canal. Kovalam Beach and Hindusthan University are the two major landmarks near the backwaters. Some of the notable migratory bird species recorded in Kelambakkam backwaters are the Northern shoveler, Great Knot, curlew sandpiper, common greenshank, etc. A total of 195 Bird species have been recorded at Kelambakkam backwaters from 2010 to September 2022.

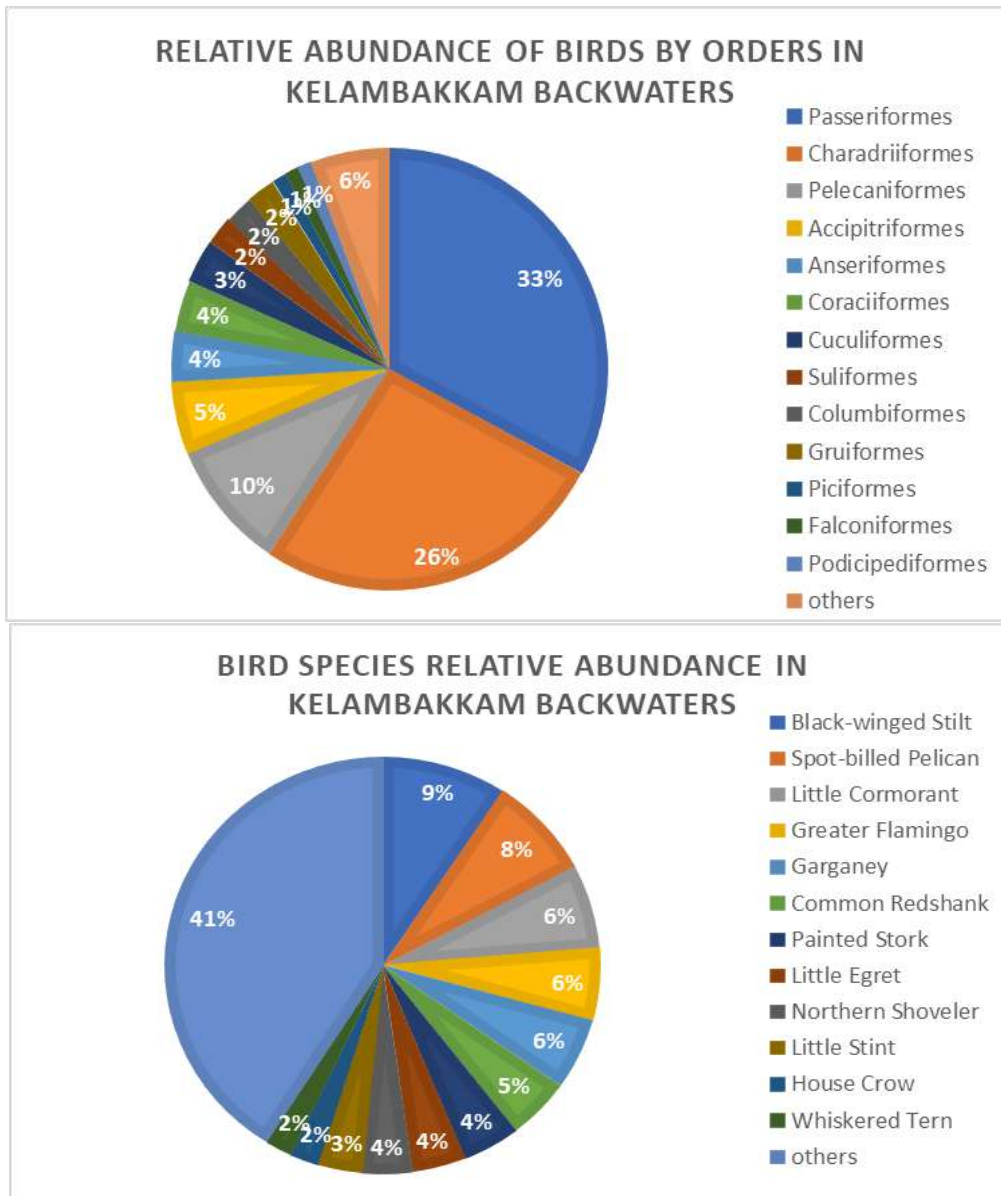


Figure 53. Relative abundance of species and orders of birds in Kelambakkam backwaters

Abundance:

The wetland thrives with an impressive assortment of bird species. The graceful Black-winged Stilt (20439) and the imposing Spot-billed Pelican (17497) grace the waters. The energetic Little Cormorant (14319) and the elegant Greater Flamingo (12297) add to the dynamic scene. The endearing Garganey (12196) and the vivid Common Redshank (10474) complete this vibrant picture.

IUCN Category:

A variety of birds with different conservation statuses have been recorded in the kanmai. Among the near-threatened birds recorded in the wetland are Black-headed Ibis, Black-tailed Godwit, Curlew Sandpiper, Eurasian Curlew, Oriental Darter, Painted Stork, Pallid Harrier, Red-necked Falcon and Spot-billed Pelican. Additionally, vulnerable birds like the Black-capped Kingfisher were recorded in this wetland. Endangered birds recorded in the backwaters include Great Knot. During the months of November, December, and January the lake attracts around 59 winter visitors including Common Greenshank, Marsh Sandpiper, Rosy Starling, and others.

Resident/Migratory Behavior:

The wetlands become a hub of activity with both resident and migratory species. The Common Greenshank and the Caspian Tern mark the presence of migratory visitors. Meanwhile, the serene waters are frequented by resident inhabitants like the Eurasian Coot, the Gray Heron, and the Little Grebe. The Great Egret and the Common Kingfisher add their unique hues to the resident population.

SI No	English Name	Scientific Name	Types of migration	IUCN Category
1	Ashy Prinia	<i>Prinia socialis</i>	Resident	Least Concern
2	Ashy Woodswallow	<i>Artamus fuscus</i>	Resident	Least Concern
3	Ashy-crowned Sparrow-Lark	<i>Eremopterix griseus</i>	Resident	Least Concern
4	Asian Koel	<i>Eudynamys scolopaceus</i>	Resident	Least Concern
5	Asian Openbill	<i>Anastomus oscitans</i>	Resident	Least Concern
6	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	Resident	Least Concern
7	Barn Swallow	<i>Hirundo rustica</i>	Widespread resident & winter visitor	Least Concern

8	Bar-tailed Godwit	<i>Limosa lapponica</i>	Widespread winter visitor	Near Threatened
9	Baya Weaver	<i>Ploceus philippinus</i>	Resident	Least Concern
10	Black Bittern	<i>Ixobrychus flavicollis</i>	Resident	Least Concern
11	Black Drongo	<i>Dicrurus macrocercus</i>	Resident	Least Concern
12	Black Kite	<i>Milvus migrans</i>	Resident	Least Concern
13	Black-bellied Plover	<i>Enicurus immaculatus</i>	Resident	Least Concern
14	Black-capped Kingfisher	<i>Halcyon pileata</i>	Resident	Vulnerable
15	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Resident	Least Concern
16	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Resident	Least Concern
17	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Resident	Near Threatened
18	Black-rumped Flameback	<i>Dinopium benghalense</i>	Resident	Least Concern
19	Black-tailed Godwit	<i>Limosa limosa</i>	Widespread winter visitor	Near Threatened
20	Black-winged Kite	<i>Elanus caeruleus</i>	Resident	Least Concern
21	Black-winged Stilt	<i>Himantopus himantopus</i>	Local resident & widespread winter visitor	Least Concern
22	Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>	Resident	Least Concern
23	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Resident	Least Concern
24	Blyth's Pipit	<i>Anthus godlewskii</i>	Widespread winter visitor	Least Concern
25	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Widespread winter visitor	Least Concern
26	Booted Eagle	<i>Hieraaetus pennatus</i>	Widespread winter visitor & local resident	Least Concern
27	Booted Warbler	<i>Iduna caligata</i>	Widespread winter visitor	Least Concern
28	Brahminy Kite	<i>Haliastur indus</i>	Resident	Least Concern

29	Brahminy Starling	<i>Sturnia pagodarum</i>	Resident	Least Concern
30	Bridled Tern	<i>Onychoprion anaethetus</i>	Resident	Least Concern
31	Bronze-winged Jacana	<i>Metopidius indicus</i>	Resident	Least Concern
32	Brown Shrike	<i>Lanius cristatus</i>	Widespread winter visitor	Least Concern
33	Brown-headed Gull	<i>Chroicocephalus brunnicephalus</i>	Widespread winter visitor & resident	Least Concern
34	Caspian Tern	<i>Hydroprogne caspia</i>	Widespread winter visitor	Least Concern
35	Cattle Egret	<i>Bubulcus ibis</i>	Resident	Least Concern
36	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	Resident	Least Concern
37	Chinese Pond-Heron	<i>Ardeola bacchus</i>	Resident	Least Concern
38	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Resident	Least Concern
39	Citrine Wagtail	<i>Motacilla citreola</i>	Local resident & widespread winter visitor	Least Concern
40	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>	Resident	Least Concern
41	Common Greenshank	<i>Tringa nebularia</i>	Widespread winter visitor	Least Concern
42	Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Resident	Least Concern
43	Common Iora	<i>Aegithina tiphia</i>	Resident	Least Concern
44	Common Kingfisher	<i>Alcedo atthis</i>	Resident	Least Concern
45	Common Myna	<i>Acridotheres tristis</i>	Resident	Least Concern
46	Common Redshank	<i>Tringa totanus</i>	Widespread winter visitor & resident	Least Concern
47	Common Ringed Plover	<i>Charadrius hiaticula</i>	Vagrant	Least Concern
48	Common Sandpiper	<i>Actitis hypoleucos</i>	Widespread winter visitor & resident	Least Concern

49	Common Snipe	<i>Gallinago gallinago</i>	Widespread winter visitor & local resident	Least Concern
50	Common Tailorbird	<i>Orthotomus sutorius</i>	Resident	Least Concern
51	Common Tern	<i>Sterna hirundo</i>	Widespread winter visitor & resident	Least Concern
52	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Resident	Least Concern
53	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Resident	Least Concern
54	Curlew Sandpiper	<i>Calidris ferruginea</i>	Widespread winter visitor	Near Threatened
55	Dunlin	<i>Calidris alpina</i>	Sparse winter visitor	Least Concern
56	Eared Grebe	<i>Phylloscopus fuscatus</i>	Widespread winter visitor	Least Concern
57	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Resident	Least Concern
58	Eurasian Coot	<i>Fulica atra</i>	Local resident & widespread winter visitor	Least Concern
59	Eurasian Curlew	<i>Numenius arquata</i>	Widespread winter visitor	Near Threatened
60	Eurasian Hoopoe	<i>Upupa epops</i>	Widespread resident & winter visitor	Least Concern
61	Eurasian Kestrel	<i>Garrulus glandarius</i>	Resident	Least Concern
62	Eurasian Marsh-Harrier	<i>Pica pica</i>	Resident	Least Concern
63	Eurasian Moorhen	<i>Pica pica</i>	Resident	Least Concern
64	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Widespread winter visitor & resident	Least Concern
65	Eurasian Wigeon	<i>Mareca penelope</i>	Widespread winter visitor	Least Concern
66	Fulvous Whistling-Duck	<i>Dendrocygna bicolor</i>	Resident	Least Concern
67	Garganey	<i>Spatula querquedula</i>	Widespread winter visitor	Least Concern

68	Glossy Ibis	<i>Plegadis falcinellus</i>	Widespread winter visitor & resident	Least Concern
69	Great Cormorant	<i>Phalacrocorax carbo</i>	Widespread winter visitor & resident	Least Concern
70	Great Crested Tern	<i>Podiceps cristatus</i>	Local resident & sparse winter visitor	Least Concern
71	Great Egret	<i>Ardea alba</i>	Widespread resident & sparse winter visitor	Least Concern
72	Great Knot	<i>Calidris tenuirostris</i>	Sparse winter visitor	Endangered
73	Greater Coucal	<i>Centropus sinensis</i>	Resident	Least Concern
74	Greater Flamingo	<i>Phoenicopterus roseus</i>	Widespread winter visitor & local resident	Least Concern
75	Greater Sand-Plover	<i>Charadrius leschenaultii</i>	Widespread winter visitor	Least Concern
76	Green Bee-eater	<i>Merops orientalis</i>	Resident	Least Concern
77	Green Sandpiper	<i>Tringa ochropus</i>	Widespread winter visitor	Least Concern
78	Greenish Warbler	<i>Phylloscopus trochiloides</i>	Local resident & widespread winter visitor	Least Concern
79	Grey Francolin	<i>Ortygornis pondicerianus</i>	Resident	Least Concern
80	Grey Heron	<i>Ardea cinerea</i>	Widespread winter visitor & resident	Least Concern
81	Grey Wagtail	<i>Motacilla cinerea</i>	Local resident & widespread winter visitor	Least Concern
82	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i>	Resident	Least Concern
83	Grey-headed Lapwing	<i>Vanellus cinereus</i>	Widespread winter visitor	Least Concern
84	Grey-headed Swamphen	<i>Porphyrio poliocephalus</i>		Not Recognised
85	Gull-billed Tern	<i>Gelochelidon nilotica</i>	Widespread winter visitor & local resident	Least Concern

86	House Crow	<i>Corvus splendens</i>	Resident	Least Concern
87	House Sparrow	<i>Passer domesticus</i>	Resident	Least Concern
88	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Resident	Least Concern
89	Indian Golden Oriole	<i>Oriolus kundoo</i>	Resident	Least Concern
90	Indian Peafowl	<i>Pavo cristatus</i>	Resident	Least Concern
91	Indian Pond-Heron	<i>Ardeola grayii</i>	Widespread resident	Least Concern
92	Indian Robin	<i>Copsychus fulicatus</i>	Resident	Least Concern
93	Indian Roller	<i>Coracias benghalensis</i>	Resident	Least Concern
94	Indian Silverbill	<i>Euodice malabarica</i>	Resident	Least Concern
95	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Resident	Least Concern
96	Indian Thick-knee	<i>Burhinus indicus</i>	Resident	Least Concern
97	Intermediate Egret	<i>Ardea intermedia</i>	Resident	Least Concern
98	Jerdon's Bushlark	<i>Mirafra affinis</i>	Resident	Least Concern
99	Jungle Prinia	<i>Prinia sylvatica</i>	Resident	Least Concern
100	Kentish Plover	<i>Charadrius alexandrinus</i>	Widespread winter visitor & resident	Least Concern
101	Large-billed Crow	<i>Corvus macrorhynchos</i>	Resident	Least Concern
102	Laughing Dove	<i>Spilopelia senegalensis</i>	Resident	Least Concern
103	Lesser Black-backed Gull	<i>Larus fuscus</i>	Resident	Least Concern
104	Lesser Crested Tern	<i>Thalasseus bengalensis</i>	Resident	Least Concern
105	Lesser Sand-Plover	<i>Charadrius mongolus</i>	Resident	Least Concern
106	Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	Resident	Least Concern

107	Little Cormorant	<i>Microcarbo niger</i>	Resident	Least Concern
108	Little Egret	<i>Egretta garzetta</i>	Resident	Least Concern
109	Little Grebe	<i>Tachybaptus ruficollis</i>	Resident	Least Concern
110	Little Ringed Plover	<i>Charadrius dubius</i>	Widespread winter visitor & resident	Least Concern
111	Little Stint	<i>Calidris minuta</i>	Widespread winter visitor	Least Concern
112	Little Swift	<i>Apus affinis</i>	Resident	Least Concern
113	Little Tern	<i>Sternula albifrons</i>	Widespread resident	Least Concern
114	Long-tailed Shrike	<i>Lanius schach</i>	Resident	Least Concern
115	Long-toed Stint	<i>Calidris subminuta</i>	Sparse winter visitor	Least Concern
116	Loten's Sunbird	<i>Cinnyris lotenius</i>	Resident	Least Concern
117	Marsh Sandpiper	<i>Tringa stagnatilis</i>	Widespread winter visitor	Least Concern
118	Montagu's Harrier	<i>Circus pygargus</i>	Widespread winter visitor	Least Concern
119	Northern Pintail	<i>Anas acuta</i>	Vagrant	Least Concern
120	Northern Shoveler	<i>Spatula clypeata</i>	Widespread winter visitor	Least Concern
121	Oriental Darter	<i>Anhinga melanogaster</i>	Resident	Near Threatened
122	Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	Widespread winter visitor & resident	Least Concern
123	Oriental Magpie-Robin	<i>Copsychus saularis</i>	Resident	Least Concern
124	Oriental Pratincole	<i>Glareola maldivarum</i>	Resident	Least Concern
125	Oriental Skylark	<i>Alauda gulgula</i>	Resident	Least Concern
126	Osprey	<i>Pandion haliaetus</i>	Widespread winter visitor & local resident	Least Concern
127	Pacific Golden-Plover	<i>Pluvialis fulva</i>	Widespread winter visitor	Least Concern

128	Paddyfield Pipit	<i>Anthus rufulus</i>	Resident	Least Concern
129	Painted Stork	<i>Mycteria leucocephala</i>	Widespread resident	Near Threatened
130	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>	Resident	Least Concern
131	Pallas's Gull	<i>Ichthyaetus ichthyaetus</i>	Widespread winter visitor	Least Concern
132	Pallid Harrier	<i>Circus macrourus</i>	Widespread winter visitor	Near Threatened
133	Peregrine Falcon	<i>Falco peregrinus</i>	Widespread winter visitor & resident	Least Concern
134	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Resident	Least Concern
135	Pied Avocet	<i>Recurvirostra avosetta</i>	Widespread winter visitor & local resident	Least Concern
136	Pied Bushchat	<i>Saxicola caprata</i>	Resident	Least Concern
137	Pied Cuckoo	<i>Clamator jacobinus</i>	Resident	Least Concern
138	Pied Kingfisher	<i>Ceryle rudis</i>	Resident	Least Concern
139	Pin-tailed Snipe	<i>Pterocles alchata</i>	Vagrant	Least Concern
140	Plain Prinia	<i>Prinia inornata</i>	Resident	Least Concern
141	Purple Heron	<i>Ardea purpurea</i>	Widespread winter visitor & resident	Least Concern
142	Purple Sunbird	<i>Cinnyris asiaticus</i>	Resident	Least Concern
143	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Resident	Least Concern
144	Red-necked Falcon	<i>Falco chicquera</i>	Resident	Near Threatened
145	Red-rumped Swallow	<i>Cecropis daurica</i>	Widespread resident & winter visitor	Least Concern
146	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Resident	Least Concern
147	Red-wattled Lapwing	<i>Vanellus indicus</i>	Resident	Least Concern

148	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Resident	Least Concern
149	Rock Pigeon	<i>Columba livia</i>	Resident	Least Concern
150	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Resident	Least Concern
151	Rosy Starling	<i>Pastor roseus</i>	Widespread winter visitor & migrant	Least Concern
152	Ruddy Turnstone	<i>Arenaria interpres</i>	Widespread winter visitor	Least Concern
153	Ruff	<i>Calidris pugnax</i>	Sparse winter visitor	Least Concern
154	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Resident	Least Concern
155	Rufous-tailed Lark	<i>Ammomanes phoenicura</i>	Resident	Least Concern
156	Sanderling	<i>Calidris alba</i>	Widespread winter visitor	Least Concern
157	Sandwich Tern	<i>Thalasseus sandvicensis</i>	Sparse winter visitor	Least Concern
158	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Resident	Least Concern
159	Shikra	<i>Accipiter badius</i>	Resident	Least Concern
160	Small Minivet	<i>Pericrocotus cinnamomeus</i>	Resident	Least Concern
161	Spot-billed Pelican	<i>Pelecanus philippensis</i>	Resident	Near Threatened
162	Spotted Dove	<i>Spilopelia chinensis</i>	Resident	Least Concern
163	Spotted Owlet	<i>Athene brama</i>	Resident	Least Concern
164	Spotted Redshank	<i>Tringa erythropus</i>	Widespread winter visitor	Least Concern
165	Streak-throated Swallow	<i>Petrochelidon fluvicola</i>	Resident	Least Concern
166	Striated Heron	<i>Butorides striata</i>	Resident	Least Concern
167	Tawny Pipit	<i>Anthus campestris</i>	Widespread winter visitor	Least Concern
168	Temminck's Stint	<i>Calidris temminckii</i>	Widespread winter visitor	Least Concern
169	Terek Sandpiper	<i>Xenus cinereus</i>	Widespread winter visitor	Least Concern

170	Tricolored Munia	<i>Anthus trivialis</i>	Local resident & widespread winter visitor	Least Concern
171	Watercock	<i>Gallicrex cinerea</i>	Resident	Least Concern
172	Western Reef-Heron	<i>Egretta gularis</i>	Resident	Least Concern
173	Western Yellow Wagtail	<i>Motacilla flava</i>	Widespread winter visitor	Least Concern
174	Whimbrel	<i>Numenius phaeopus</i>	Widespread winter visitor	Least Concern
175	Whiskered Tern	<i>Chlidonias hybrida</i>	Widespread winter visitor & resident	Least Concern
176	whistling-duck sp.	<i>Phylloscopus whistleri</i>	Resident	Least Concern
177	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Resident	Least Concern
178	White-browed Bulbul	<i>Pycnonotus luteolus</i>	Resident	Least Concern
179	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Resident	Least Concern
180	White-eyed Buzzard	<i>Butastur teesa</i>	Widespread resident	Least Concern
181	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Resident	Least Concern
182	White-winged Tern	<i>Chlidonias leucopterus</i>	Sparse winter visitor	Least Concern
183	Wire-tailed Swallow	<i>Hirundo smithii</i>	Resident	Least Concern
184	Wood Sandpiper	<i>Tringa glareola</i>	Widespread winter visitor	Least Concern
185	Yellow Bittern	<i>Ixobrychus sinensis</i>	Resident	Least Concern
186	Yellow-billed Babbler	<i>Argya affinis</i>	Resident	Least Concern
187	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	Resident	Least Concern
188	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Resident	Least Concern
189	Zitting Cisticola	<i>Cisticola juncidis</i>	Resident	Least Concern

Table 23. Shows the checklist of birds found in Kelambakkam backwaters their common name, scientific name, Migratory status, and IUCN category are provided.

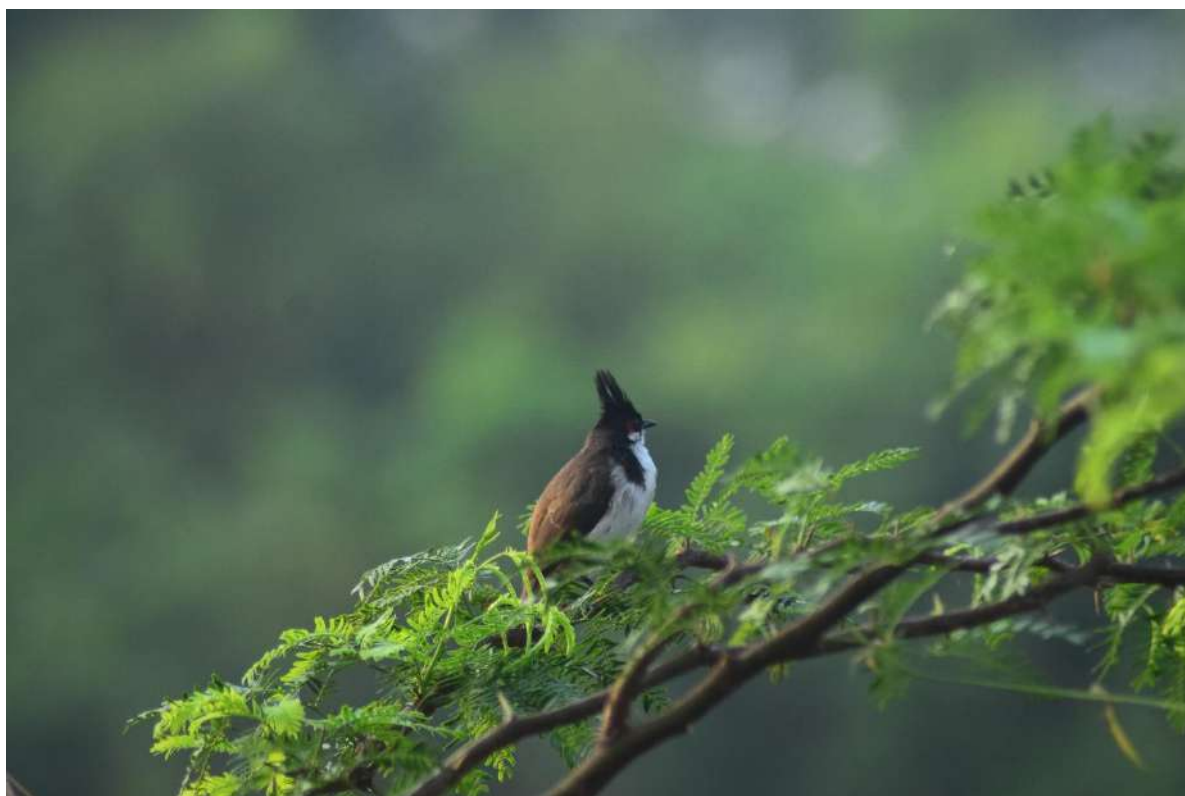


Figure 54. Observation of Red-whiskered bulbul in Adhanur Lake during field visit

Land Use and Land Cover Changes:

Land use and land cover changes over a period of 5 years from 2017 – 2021 indicate drastic changes were not observed over these periods of time, the mean average of each class was calculated. For this wetland built area was found to be in higher proportion with the mean value of 11.11 sq km around the wetland, water body with the proportion of 8.85 sq km, followed by less proportion of crops with 2.56 sq km, grassland with the proportion of 2.39 sq km, vegetation with the proportion of 0.16 sq km and flooded vegetation with the proportion of 0.11 sq km.

S.No	Classes	2017_area	2018_area	2019_area	2020_area	2021_area	Mean
1	Water body	9.85	8.37	8.22	8.75	9.07	8.85
2	Vegetation	0.43	0.07	0.09	0.09	0.13	0.16
3	Flooded vegetation	0.16	0.11	0.11	0.09	0.08	0.11
4	Crops	2.82	2.42	1.74	2.47	3.34	2.56
5	Built area	10.38	11.26	11.23	11.57	11.12	11.11
6	Bare ground	0.07	0.31	0.58	0.14	0.04	0.23
7	Grassland	1.70	2.86	3.44	2.29	1.64	2.39

Table 24. Calculated mean area for each classes for the period of 5 years from 2017 - 2021

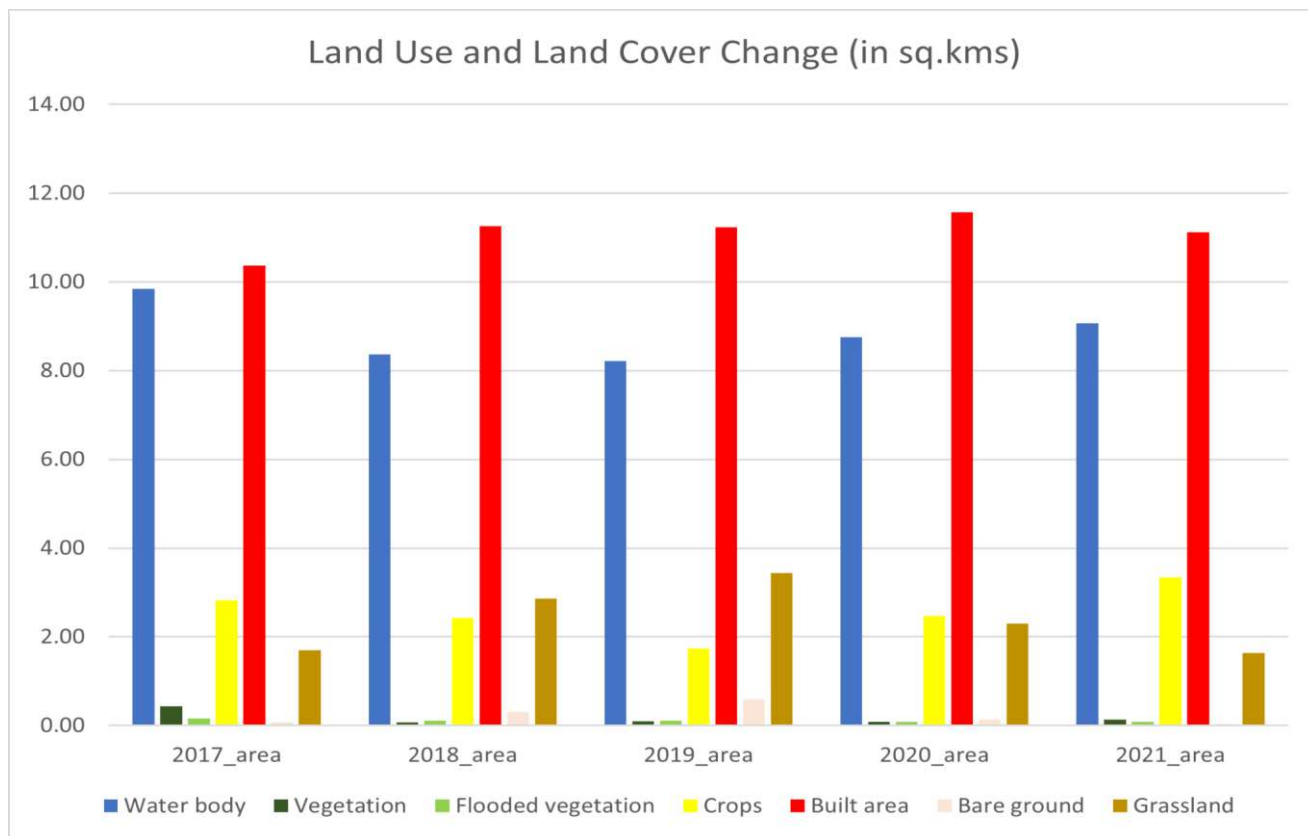


Figure 25. Land use and land cover changes over a period of 5 years from 2017 - 2021 for each classes

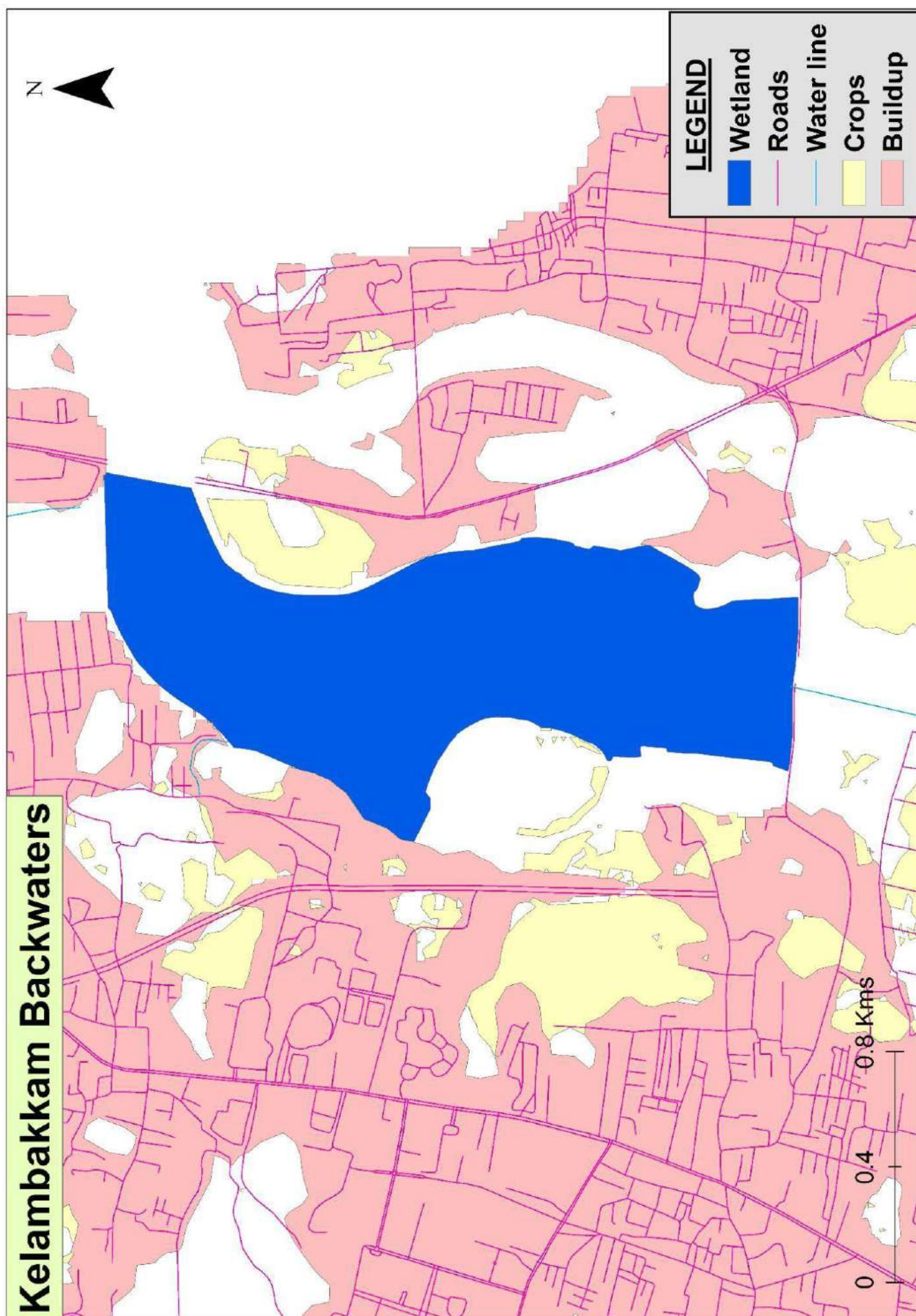


Figure 26. Base map of Kelambakkam backwaters

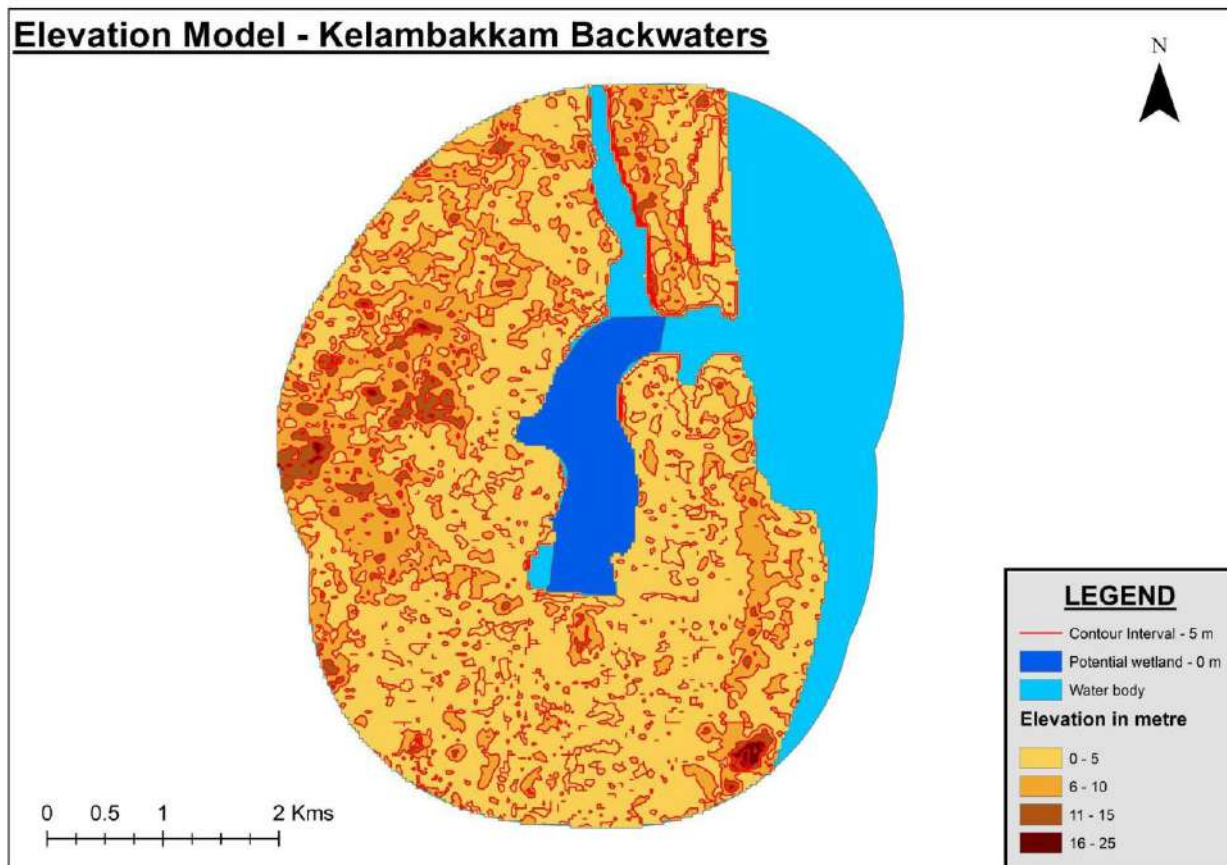


Figure 27. Elevation map of Kelambakkam backwaters

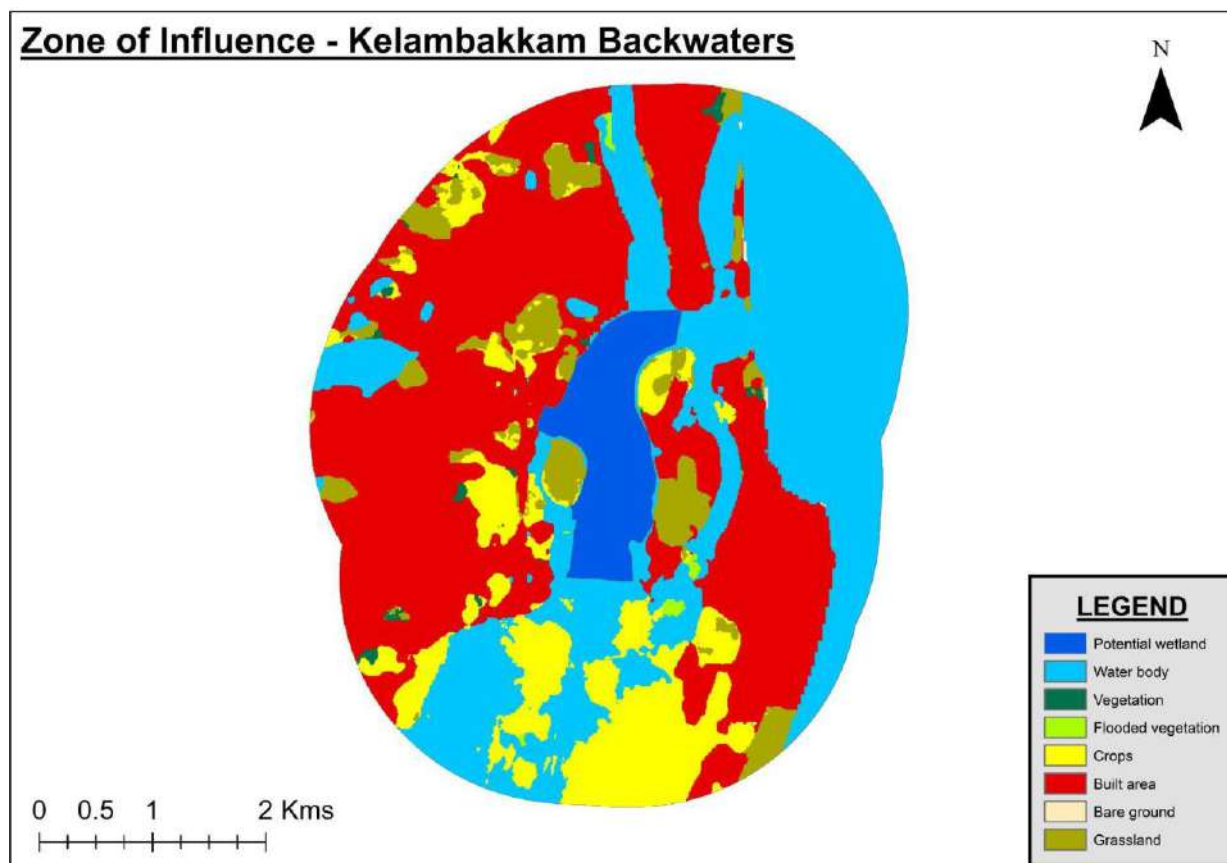


Figure 28. Zone of influence map of Kelambakkam backwaters

Management implications for these wetlands

Effective management of wetlands is crucial for maintaining the ecological integrity of these important ecosystems and ensuring that they continue to provide their valuable services to society. Here are some key management strategies for wetlands:

Protected area designation: The Ramsar Convention on Wetlands is an international treaty that provides a framework for the conservation and wise use of wetlands worldwide (Ramsar Convention on Wetlands, n.d.). Many countries have designated wetlands as protected areas, such as national parks or wildlife sanctuaries, to ensure their conservation and prevent activities that may harm the ecosystem (EPA, n.d.).

Monitoring and research: Monitoring the health of wetlands and conducting research on the ecology and functioning of these ecosystems can provide valuable information for their management and conservation (Wetlands International, n.d.).

Habitat restoration: Restoring degraded wetlands through measures such as reforestation, wetland creation, and control of invasive species can help to improve the health and functioning of these ecosystems (IUCN, n.d.).

Sustainable use practices: Promoting sustainable use practices, such as sustainable fishing or ecotourism, can help to reduce the impact of human activities on wetlands while providing economic benefits for local communities (UNEP, n.d.).

Education and outreach: Educating and engaging with local communities, stakeholders, and decision-makers can help to increase awareness about the importance of wetlands and build support for their conservation (EPA, n.d.).

Collaboration and partnerships: Collaboration and partnerships between government agencies, NGOs, local communities, and other stakeholders can help to promote effective wetland management and conservation efforts (Wetlands International, n.d.).

By implementing these management strategies, we can help to ensure the long-term health and sustainability of wetlands and the dependent avian faunas.



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"BIRDS ARE AN ESSENTIAL PART OF OUR ECOSYSTEM, AND WETLANDS ARE THEIR HOME. WHEN WE PROTECT WETLANDS, WE PROTECT BIRDS. AND WHEN WE PROTECT BIRDS, WE PROTECT OURSELVES."



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