

## Identifying the lost connections in the migratory patterns of threatened bird species in the Noyyal River Basin

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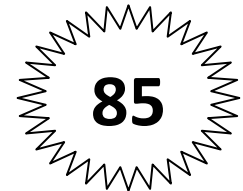
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### Abstract:

The River Noyyal in Tamil Nadu is a vital natural and cultural asset. Emerging from the Vellingiri hills, it covers 3510 sq km and forms part of the Cauvery basin. The historically significant Noyyal River Tanks System, with interconnected tanks and canals, played a crucial role in capturing rainwater overflow, maintaining groundwater levels, and preventing flooding. Unfortunately, urbanization resulted in neglect, reducing operational tanks to only eleven and causing water scarcity, endangering avian biodiversity. A recent Coimbatore Nature Society survey revealed a 65% decline in bird numbers due to wetland disturbances. This research aims to assess bird habitats and connectivity in the Noyyal River basin, identify migratory routes, stopover points and connection of those habitats and create new ones. Community involvement in restoration and maintenance with a focus on improving bird diversity. Preserving and connecting wetland habitats is essential for sustaining lakes, birds, water flow, and biodiversity in the region.

**Keywords:** bird habitats, bird migration, biodiversity, ecological corridor, river Noyyal, wetlands.

### Introduction

Birds are crucial for maintaining ecosystem health and biodiversity, but habitat loss due to human activities has led to declining bird populations worldwide. The Noyyal River basin in Tamil Nadu, India, is no exception. Migratory bird species depend on the wetlands in the basin for breeding and resting during their journey. Unfortunately, these birds face threats like habitat loss, fragmentation, and degradation, causing their numbers to decline. This study aims to assess existing bird habitats and connectivity, identify migratory routes and stopover points. The goal is to link and create habitats in the Noyyal River basin, addressing the challenges faced by migratory birds and enhance their habitat connections. To establish the role of birds in a habitat, this research undertook three questions,

What are the existing bird habitats in the Noyyal River basin and how are they connected?

What are the key migratory routes and stopover points of birds (majorly threatened category) in the Noyyal River basin?

What can be done to create more wetland habitats/ecological corridor based on the migration patterns of birds in the area?

The methods employed in this study include site survey and mapping of existing bird habitats using GIS technology, conducting bird surveys using standardized methods, analysis of bird migration patterns, identifying critical habitat gaps and designing habitat restoration and enhancement measures and development of a blueprint for an ecological corridor for birds.

The findings of this study have important implications for bird conservation and ecological management in the Noyyal River basin, and can also serve as a model for other regions facing similar challenges.

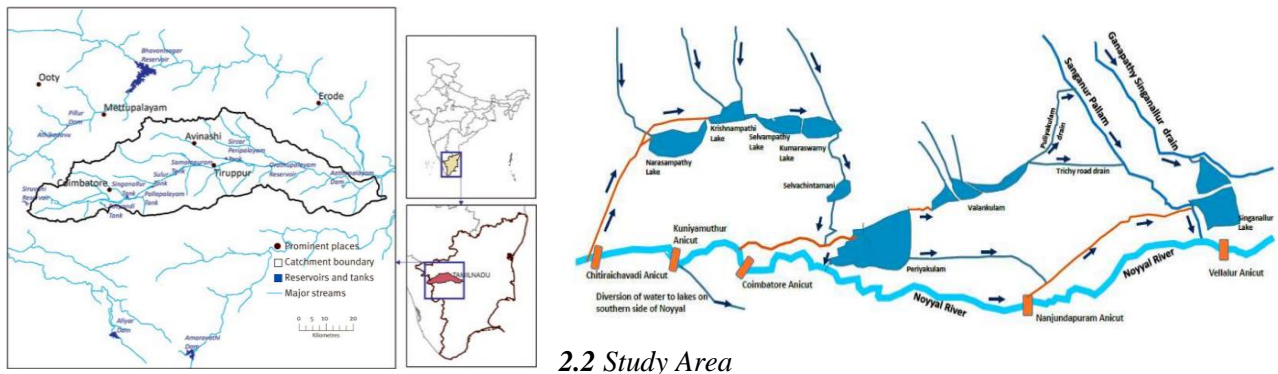
### 1Materials & methods

#### 2.1 Coimbatore and its waterbodies:



Coimbatore, which is made up of a web of lakes and canals, was built within the Noyyal river basin's watershed breadth. There used to be a lot of lakes around here, but most of them got filled up. There are currently 24 lakes situated in the Noyyal river basin in Coimbatore.

- Achankulam (aka Neelambur Lake)
- Ganganarayananasamudharam Lake
- Irugur Lake
- Kannampalayam Lake
- Kolarampathy Lake
- Krishnampathy
- Kumaraswamy (also known as Muthannakulam)
- Kurichi Lake
- Kuniamuthur small Lake
- Narasampathy
- Pallapalayam Lake (aka Odderpalayam Lake)
- Periyakulam (also known as Ukkadam Big Lake)
- Perur Lake (aka Puttuvikki Lake or Sundakkamuttur Lake)
- Pudhukulam (Vedapatti Lake)
- Selvachinthamani
- Selvampathy
- Sengulam (aka Kuniamuthur Lake)
- Singanallur Lake
- Sottaiyaandi Kuttai Lake
- Sulur Big Lake
- Sulur Small Lake
- Ukkulam Lake
- Valankulam
- Vellalorelake



2.2 Study Area

**Figure 1** : Schematic representation of the Noyyal sub-basin, and it was created by the Ecoinformatics Lab at ATREE.

Originating from Vellingiri hills in the Western Ghats near Kerala border, the Noyyal river passes through numerous villages and urban areas such as Coimbatore, Tiruppur, and Karur before ultimately converging with the R. Kaveri river.

1. All 32 tanks were filled by Noyyal River (kovaikulanal.org). Water from the Noyyal was stored in these connected tanks.

2. The Chalukya Chola rulers constructed the R.Noyyal and its network of interconnecting tanks and canals, which served as an effective system for transporting and storing water and stabilising groundwater levels.

3. The redundant water from the Noyyal swash overflowed into the conduits and was directed towards the tanks, thereby precluding any undesirable flooding.

4. As urbanisation grew, the system was neglected and the number of functional tanks was drastically reduced until only eleven were left. This poses a trouble to Avian Biodiversity.

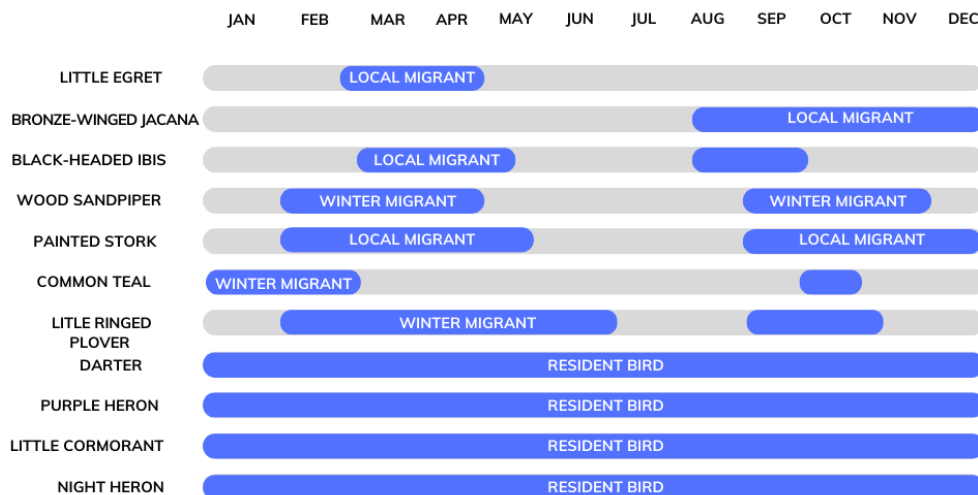
### 2.3 Bird species of Noyyal river basin



**Fig 2 :** Common bird species of Noyyal river basin from SACON. Drawn by : Author

Birds do indicate quality of the ecosystem and they will work as one of the best early warning system for the changes in the terrain. Waterbirds are the excellent pointers of the general health of swamp ecosystems because they are generally at the top of the utmost swamp foodchains or veritably close to it. In Noyyal River basin , the majority of bird observations occur during the day's busiest hour.i.e. Morning from 06:00a.m to 10:00 a.m. **MIGRATION PERIOD - JANUARY TO MARCH**

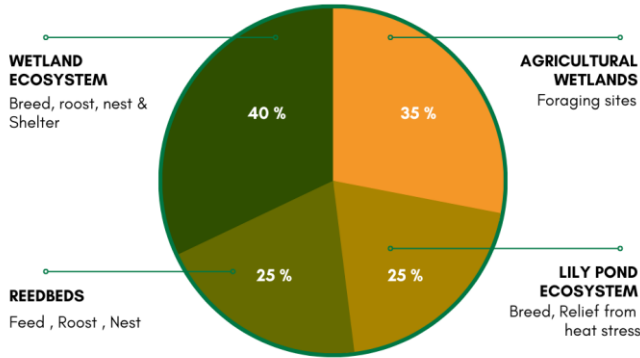
### 4 Bird Distribution in Noyyal river & its associated lakes



**Figure 3 :** Bird distribution data by SACON , Did by: Author

Species Richness = 10% Migratory species and 90% Resident  
 Species numbers = 28% Migratory species and 72% Resident  
 The average migration period is Feb - Apr and Sep - Nov. So special attention needs to be given for this time period. Where there are more fish diversity, and more vegetation, birds tend to be more.

## 2.5 Bird Types in Noyyal river & its associated lakes

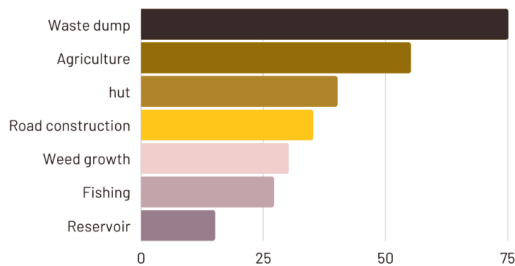


**Figure 4:** Common Bird habitats Did by : Author

## 2.6 Encroachment categories of the lakes of Noyyal river

Swamp-dependent birds face population losses due to niche loss in breeding areas. Dislocation to unsuitable territories leads to decreased reproduction and higher mortality. Suboptimal habitats hinder long-term sustainability. Disruption or destruction of wetlands breaks regional connectivity. Birds rely on native plants on bunds for food, shelter, and nesting. Pollution, traffic, grazing, weeds,

encroachment, and sewage pose cumulative threats to bird populations and waterbody biodiversity.



**Figure 5 :** Encroachments type and % scale . Source: Author

### 2.7.1 Site Observation 1

Perur Lake - Heavy cattle grazing in the lake bunds which disturbs the foraging birds.

Both resident & migratory.

**Figure 6:** Perur lake bund, Source : Author

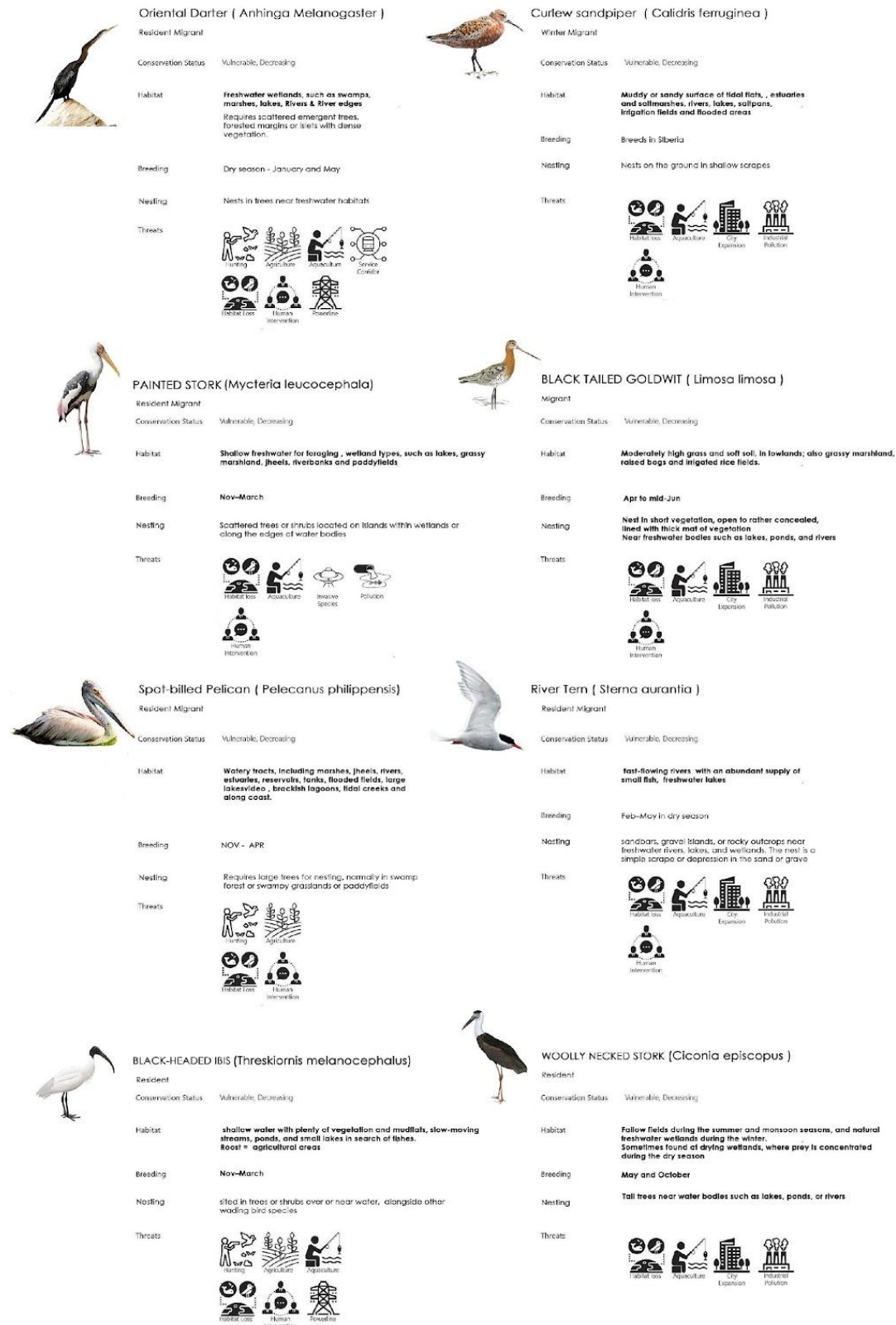
### 2.7.2 Site Observation 2

All the wetlands has active religious structures crucially similar as temples, church or mosque on the banks.. Lot of religious activities used to happen around the lake. Even just deities, local people also had myths. This is one way of Lake conservation by our ancestors.





**Figure 7: Sri Pongkalamman Temple on the banks of Kuruchi Kula2.8 Threatened WaterBird species**



**Figure 8: Threatened water bird habitats .Source: BNHS,Did by: Author**

### 3.FINDINGS

Bird connectivity becomes a problem in highly fragmented metropolitan environments like this because birds are reluctant to cross wide gaps. Noyyal river basin has these potential habitat connectivity elements :

Vegetation strips & wooded streets as connectivity elements.

Multiple canopy layers of vegetation

Restore, regenerate and connect fractured forests and surroundings able of supporting sustainable populations of native and rare bird species..

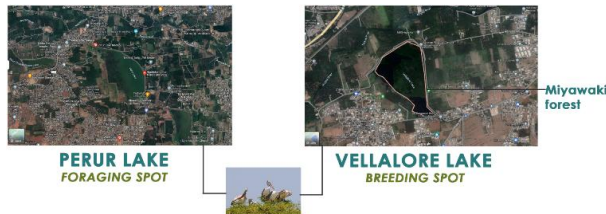
One major approach can be to establishing an Ecological Corridor based on the natural trail by connecting the dots( green patches ) around the Noyyal River.

#### 3.1 PELICANRIES

PELICANRIES - a breeding place of Pelicans

The majority of the tanks in Coimbatore serve as foraging grounds for pelicans, while Vellalore tank has been identified as a nesting and breeding site. Spot-billed pelicans migrate to Vellalore lake during breeding season from their foraging locations.









Indigenous migratory species, such as pelicans, rely on expansive and undisturbed wetlands with sufficient prey resources to raise their offspring. These birds take approximately four years to reach reproductive maturity, and their breeding season in southern India spans six months from November to April. These lakes were dry for over 15 years and was cleaned up just two years ago. The cleaning of water channels and the the Miyawaki forests in the vicinity also helped.pelicans find their breeding grounds. For successful long-term conservation of nesting Spot-billed Pelican, it is crucial that the existing colonies are protected with people participation and raising of fast growing adequate nesting trees.



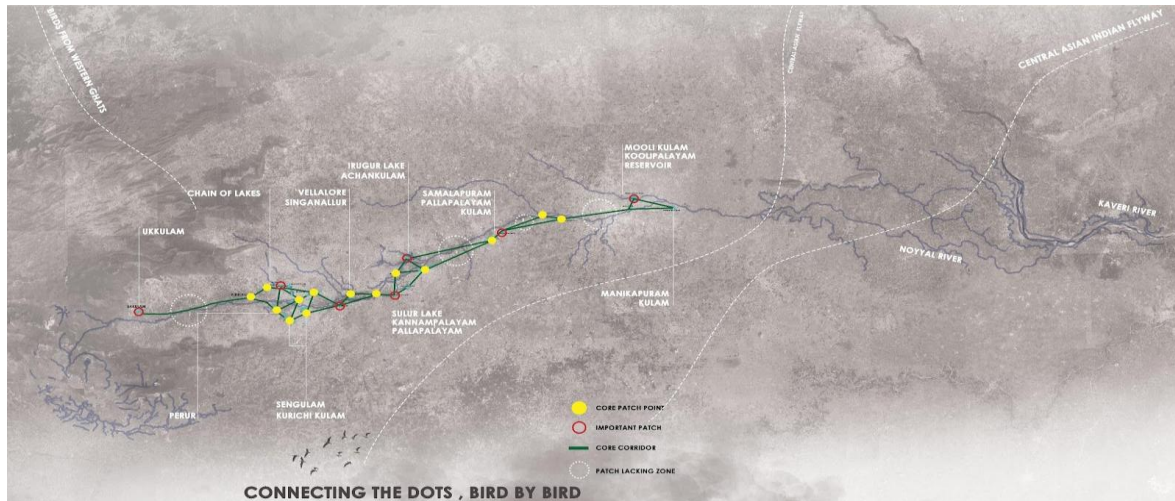
Author

**Figure 10:** Nesting and foraging areas for threatened birds of Noyyal river

**Figure 9:** Pelican Habitats. Source: Google Earth,

	ACHANKULAM	VELLALORE LAKE	IRISHAMPATHY LAKE	UKKADAM	SULUR	SINGANALLUR	KOOLPALAYAM RESERVOIR
 Oriental Darter	●		● ●				
 Cinnamon Bunting	●			● ●	●		●
 PAINTED STORK	●	●	●				
 BLACK WINGED STILT		●	●	●			
 Spot-billed Pelican	●	●		● ●	●		●
 River Tern	●			●			●
 BLACK-HEADED IBIS	●	●	●				
 WOOLLY NECKED STORK	●	●	●				

● NESTING  
● FORAGING



**Figure 11:** Network showing habitat patches, hotspots and gaps. Source: Author

Land birds are seen in Ukkulam lake which is at the origin point of River Noyyal and also because of the Western Ghats biodiversity spillover. Waterbirds and Raptors are seen all over the Noyyal river and fragmented lakes. Waterbird diversity and abundance is more in Achankulam and Koolipalayam reservoir.

#### 4. CONCLUSION

Birds are vital factors of ecosystems, and their decline due to human activities poses a significant trouble to biodiversity. This significant Noyyal River basin clearly is an illustration of the consequences of the habitat/niche loss and fragmentation on bird populations, especially those migrating through the area. This research aims to assess bird habitats, migratory routes, and stopover points in the Noyyal River basin. By using GIS technology, standardized bird surveys, and analysis of migration patterns, the study identified critical habitat gaps and proposed measures for habitat restoration and enhancement. The study emphasizes the importance of identifying and connecting wetland habitats for the survival of lakes and birds, maintaining the water flow and biodiversity of the area. By improving bird diversity and abundance in the region, this research provides a model for other regions facing similar challenges and demonstrates the critical role of ecological corridors in preserving and enhancing natural resources.

#### References

The book "Inland Wetlands of India" by Prasad et al. was published in 2004 and is part of the Conservation Atlas series from the Salim Ali Centre for Ornithology and Natural History in Coimbatore, India.

"Bird Census Techniques" by Bibby et al. is a second edition book published in 2000.

Ratnam wrote a book in Tamil titled "Tamizhnattu Paravaigal" which translates to "Birds of Tamil Nadu". The book was published by Meyappan Thamizhaivagam in Chidambaram, Tamil Nadu.

Salim Ali Centre for Ornithology and Natural History. Coimbatore. Library

GBIF.org is a website that provides access to biodiversity data. The website has a DOI number of <https://doi.org/10.15468/dl.84e22j>.

Reginald, J.L., C. Mahendran, S.S. Kumar & P. Pramod (2007). Birds of Singanallur Lake, Coimbatore, Tamil Nadu. Zoo's Print Journal

[4] Pragatheesh, A. & P. Jain (2013). Environmental degradation of the Coimbatore wetlands in the Noyyal River basin. EIA Resource and Response Centre, Nilgiri, Tamil Nadu, India

Birds of Coimbatore book by CNS

Ebird.org website ArcGIS software, QGIS software