Avifaunal diversity and species richness in Dongargaon Lake District Bhandara, (MS) India

**Abstract**

The present study was conducted during a bird race held in Dongargaon Lake, district Bhandara, Maharashtra, India. Dongargaon Lake is located at 20°59'0.20" Nx latitude and 79º49'22.18" E longitude. The purpose of this study was to analyze the avifauna of Lake. The investigation lasted twelve months, from October 2023 to September 2024. Because of the area's geological and ecological complexity, research into the region's bird variety has become essential. It is difficult to make this assessment since the lake is divided into multiple patches by the forest land that runs through it. The lake is surrounded by various villages and agricultural land, resulting in human intrusion and cattle grazing. In the current study, we identified 53 bird species over an extensive survey and accompanied volunteers during a wildlife department-organized census. The observed bird species are divided into 28 families and 10 orders. They also documented their residential and IUCN Red data status. Avifaunal variety has been classified into four groups according on their position in their regular migratory habitat residential: migratory winter travelers, internal migratory visitors, external migratory visitors, and external emigratory visitors.

***Keywords:*** *Avifaunal Diversity, variation in Species Richness, Dongargaon Lake, India.*

**Introduction**

India is one of the top ten countries in the world for the diversity of plants and animals, home to about 10% of all species. It is a mega-diverse country. India contains 26 biotic provinces and 10 biogeographic zones, according to Singh and Kushwaha (2008). 6.5% of the world's animal species and 7% of its plant species are found here. India is home to numerous bird species with two or more distinct geographical races or subspecies, and the diversity of the bird population there reflects the diversity of the nation's ecosystems. As environmental indicators, birds' behavior patterns, populations, reproduction, and migration can all be affected by even little changes in the surrounding environment. (Hosetti and Harisha, 2009). Birds play vital functions in seed dissemination and pollination, making them extremely significant species in the ecosystem (Bibi and Ali, 2013). For this reason, understanding the diversity and structure of birds is essential to characterizing the surrounding environment. Species are becoming extinct at an alarming rate, and conservation has emerged as one of today's most pressing challenges (Hu et al. 2011). Forests provide a safe environment and abundance of food for birds, hence avifauna flock to them. Wildlife sanctuaries, national parks, and biosphere reserves, such as protected areas, serve as supporting systems for biodiversity conservation and play critical roles in preserving ecological balance and thereby mitigating negative climate change (De Fries et al., 2007). Forests cover 24.65% of India's total territory, making it one of the world's most biodiverse countries. Contains 1364 bird species—both living and extinct—(Lepage, Denis, 2021). There are 62952 square kilometers of forest in Maharashtra, the third-largest state geographically (India, State Forest Report, 2021).

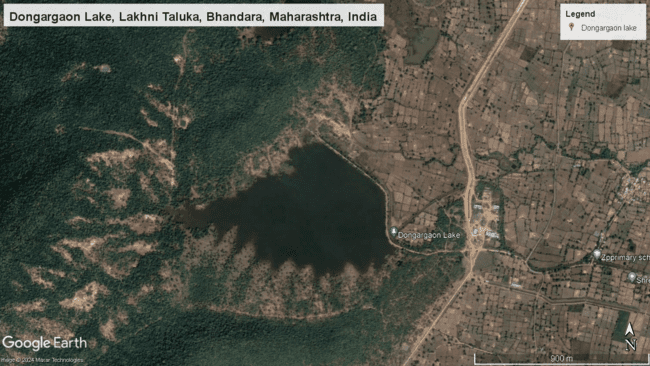
The Maharashtra government announced the Dongargaon Lake in a notification dated December 7, 2000. It has a storage capacity of 1.656 million cubic meters, a length of 1007 meters, and a total catchment area of 7.61 square kilometers. The town of Dongargaon, which is located in the Tehsil of Lakhani, is the name of the Dongargaon Lake. This lake is also a part of the forest-covered land's catchment basin, which offers excellent habitat for aquatic birds.

The distribution of birds in India is impacted by several natural elements such as temperature, altitude, food availability, nesting sites, and other noteworthy geographic characteristics. These studies now need to include the human element, or the extent to which humans protect or harm birds and their habitats. Because of the complex interactions between natural and artificial factors, the composition and number of birds vary depending on the habitat, with each supporting a unique group of birds. Birds are not limited to the 'natural' surroundings of the country. Approximately thirty percent of the terrestrial area of Earth is covered by grasslands (Blair, 2014). According to Faber-Langendoen and Josses (2010), grasslands offer a variety of ecosystem services, such as grazing and watershed protection, habitat for wildlife, the presence of rare species, and intrinsic ecological features of composition, structure, and function. Because they are often common inhabitants of these habitats, birds have been considered indicator species of settled zones. (Blair, 1999). The chosen area has a diverse range of birds. It is intended to monitor bird variety as part of this area's bird research.

# Birds play a crucial role in maintaining a healthy ecosystem and promoting biodiversity. The quantity of birds in an ecosystem is influenced by its composition, environment, and seasonal fluctuations. Many reservoirs are unique man-made ecosystems that combine lentic and fluviatile environments, as well as their own unique traits. According to Simmons (2009), reservoirs are likely to be teeming with zooplankton, phytoplankton, beetles, snails, flies, midges, and other big larvae, as well as aquatic insects.

# Materials and Methods

## Study area

The study location was Dongargaon Lake in Maharashtra, India's eastern region. Dongargaon Lake is a small inland reservoir in Bhandara district, approximately 51 kilometers southeast of Bhandara. Dongargaon Lake is located at latitude 20°59'0.20" Nx, longitude 79º49'22.18"E. The reservoir has a length of 1007 meters, a catchment area of 7.61 square kilometers, and a storage capacity of 1.656 million cubic meters. Water from Dongargaon Lake is largely used for wildlife drinking, commercial fishing, aquaculture, irrigation, and domestic activities (Figures 1 and 2).

**Figure 1: Satellite image of Dongargaon Lake.**



**Figure 2: Overall view of the Dongargaon Lake.**

# Sample Collection

Notes on the diversity of birds at Dongargaon Lake were conducted in two sessions: one in the morning, from 6.15 am to 01.15 pm, and another in the evening, from 04.30 pm to 07.15 pm, when it was discovered that birds were the most active. Birds were identified for the study by direct observation and, in the case of a select few species, by hearing their sounds. Using the line-transect method, bird surveys were conducted throughout the active hours of both days (Burnham et al., 1980). Field guides were utilized for identification while using Sunagor 30-160 X 70 BCF Mega Zoom binoculars for bird watching. (Grimmetti et al., 2010; and Ali, 2009). The studies also brought attention to other details, like species richness and threats to bird conservation. With the assistance of Kazmierczak et al. (2000), their residential status as well as the findings of the International Union for the Conservation of Nature (IUCN) status were also noted.

**Table 1: Checklist of Bird Species of Dongargaon Lake.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SN** | **Common Name** | **Scientific name** | **Family** | **Order** | **R/M/W** | **Status** |
| 1 | Wire Tailed Swallow | *Hirundo smithii* | Hirundinidae | Passeriformes | R | LC |
| 2 | Western Yellow Wagtail | *Motacilla flava* | Motacillidae | Passeriformes | W | LC |
| 3 | White Wagtail | *Motacilla alba* | Motacillidae | Passeriformes | W | LC |
| 4 | White-Browed Wagtail | *Motacilla maderaspatensis* | Motacillidae | Passeriformes | R | LC |
| 5 | Small Minivet | *Pericrocotus cinnamomeus* | Campephagidae | Passeriformes | R | LC |
| 6 | Red Vented Bulbul | *Pycnonotus cafer* | Pycnonotidae | Passeriformes | R | LC |
| 7 | Purple-Rumped Sunbird | *Leptocoma zeylonica* | Nectarinidae | Passeriformes | R | LC |
| 8 | Creasted Bunting | *Emberiza lathami* | Emberizidae | Passeriformes | R | LC |
| 9 | House Crow | *Corvus splendens* | Corvidae | Passeriformes | R | LC |
| 10 | Eurasian Golden Oriole | *Oriolus oriolus* | Oriolidae | Passeriformes | R | LC |
| 11 | Scaly Breasted Munia | *Lonchura punctulata* | Estrildidae | Passeriformes | R | LC |
| 12 | Paddy Field Pipit | *Anthus rufulus* | Estrildidae | Passeriformes | R | LC |
| 13 | House Sparrow | *Passer domesticus* | Passeridae | Passeriformes | R | LC |
| 14 | Pied Bushchat | *Saxicola caprata* | Muscicapidae | Passeriformes | R | LC |
| 15 | Yellow-Throated Sparrow | *Gymnoris xanthocollis* | Passiridae | Passeriformes | R | LC |
| 16 | Tawny Pipit | *Anthus campestris* | Estrildidae | Passeriformes | R | LC |
| 17 | Great Thick-Knee | *Esacus recurvirostris* | Burhinidae | Charadriiformes | R | LC |
| 18 | Small Pratincole | *Glareola lactea* | Glareolidae | Charadriiformes | R | LC |
| 19 | River Terns | *Stema aurantia* | Laridae | Charadriiformes | R | NT (U) |
| 20 | Green Sandpiper | *Tringa ochropus* | Scolopacidae | Charadriiformes | W | LC |
| 21 | Wood Sandpiper | *Tringa glareola* | Scolopacidae | Charadriiformes | W | LC |
| 22 | Barred Buttonquail | *Turnix suscitator* | Turnicidae | Charadriiformes | R | LC |
| 23 | Common Snipe | *Gallinago gallinago* | Scolopacidae | Charadriiformes | W | LC |
| 24 | Common Sandpiper | *Actitis hypoleucos* | Scolopacidae | Charadriiformes | W | LC |
| 25 | Common Red Shank | *Tringa totanus* | Scolopacidae | Charadriiformes | W | LC |
| 26 | Little Ring Plover | *Charadrius dubius* | Charadriidae | Charadriiformes | R | LC |
| 27 | Purple Heron | *Ardea purpurea* | Ardeidae | Ciconiiformes | R | LC |
| 28 | Indian Pond Heron | *Ardeola grayii* | Ardeidae | Ciconiiformes | R | LC |
| 29 | Painted Stork | *Mycteria leucocephala* | Ciconiidae | Ciconiiformes | R | NT |
| 30 | Black Headed Ibis | *Threskiornis melanocephalus* | Threskiornithidae | Ciconiiformes | R | NT |
| 31 | Red-Naped Ibis | *Pseudibis papillosa* | Threskiornithidae | Ciconiiformes | R | LC |
| 32 | Eurasian Spoonbill | *Platalea leucorodia* | Threskiornithidae | Ciconiiformes | R | LC |
| 33 | Cattle Egret | *Bubulcus ibis* | Ardeidae | Ciconiiformes | R | LC |
| 34 | Asian Open Bill | *Anastomus oscitans* | Ciconiidae | Ciconiiformes | R | LC |
| 35 | Northern Pintail | *Anas acuta* | Anatidae | Anseriformes | W | LC |
| 36 | Northern Shoveler | *Spatula clypeata* | Anatidae | Anseriformes | W | LC |
| 37 | Common Pochard | *Aythya fuligula* | Anatidae | Anseriformes | W | LC |
| 38 | Comb Duck | *Sarkidiornis sylviola* | Anatidae | Anseriformes | R | LC |
| 39 | Indian Spot-Billed Duck | *Anas poecilorhyncha* | Anatidae | Anseriformes | R | LC |
| 40 | Indian Roller | *Coracias benghalensis* | Coraciidae | Coraciiformes | R | LC |
| 41 | Indian Gray Hornbill | *Ocyceros birostris* | Bucerotidae | Coraciiformes | R | LC |
| 42 | White-Throated Kingfisher | *Halcyon smyrnensis* | Alcedinidae | Coraciiformes | R | LC |
| 43 | Black-Winged Kite | *Elanus caeruleus* | Accipitridae | Falconiformes | R | LC |
| 44 | Black Kite | *Milvus migrans* | Accipitridae | Falconiformes | R | LC |
| 45 | Brahminy Kite | *Hiliastur indus* | Accipitridae | Falconiformes | R | LC |
| 46 | Spotted Dove | *Spilopelia chinensis* | Columbidae | Columbiformes | R | LC |
| 47 | Laughing Dove | *Spilopelia senegalensis* | Columbidae | Columbiformes | R | LC |
| 48 | Cuckoo | *Clamator jacobinus* | Cuculidae | Cuculiformes | M | LC |
| 49 | Asian Koel | *Eudynamys scolopacea* | Cuculidae | Cuculiformes | R | TH |
| 50 | Common Hawk Cuckoo | *Hierococcyx varius* | Cuculidae | Cuculiformes | M | LC |
| 51 | Pallid Harrier | *Circus macrourus* | Accipitridae | Accipitriformes | W | NT |
| 52 | Indian Peafowl | *Pavo cristatus* | Phasianidae | Galliformes | R | LC |
| 53 | Rock Bush Quail | *Perdicula argoondah* | Phasianidae | Galliformes | R | LC |

# Results and Discussion

During the avifaunal survey of Dongargaon Lake, 53 bird species (Table 1) from 28 distinct families (Table 2) and 10 different orders were identified. According to Figure 3, the order Passeriformes, sometimes known as "perching birds," accounts for little more than 30% of birds with 16 species, whereas Charadriiformes accounts for 19% with 10 bird species. Muscicapidae is the largest family of birds in India, with 370 species (Manakadan and Pittie, 2001), but in the present investigation, Anatidae and Scolopacidae (05 species each) showed dominance, followed by Accipitridae (04 species), Cuculidae, Estrildidae, Ardeidae, Motacillidae, and Threskiornithidae (03 species each), Ciconiidae, Columbidae, Passeridae, and Phasianidae. Alcedinidae, Bucerotidae, Burhinidae, Hirundinidae, Campephagidae, Charadriidae, Coraciidae, Corvidae, Emberizidae, Glareolidae, Laridae, Muscicapidae, Nectarinidae, Oriolidae, Pycnonotidae, and Turnicidae. Were poorly represented in the study area, with only one species each (Table 2).The forest type, which includes grassland, water bodies, and mixed tree forests, could be responsible for the highest number of species occurrence. According to IUCN red data (IUCN, 2020), 48 birds have the least concern (LC) rating, four bird species are in the near threat (NT) category, and one bird, the Asian Koel (Eudynamys scolopacea), is in the threatened (TH) category. i.e., Western Yellow Wagtail (*Motacilla flava*), Purple-Rumped Sunbird (*Leptocoma zeylonica*), Wood Sandpiper (*Tringa glareola*), Asian Open Bill (*Anastomus oscitans*) and Common Hawk Cuckoo (*Hierococcyx varius*). birds, viz. and River terns (*Stema aurantia*), Painted Stork (*Mycteria leucocephala*), Black Headed Ibis (*Threskiornis melanocephalus) and* Pallid Harrier (*Circus macrourus )*  were in the Near Threaten Vulnerable (NT (U)) category, and birds sighted during the survey were categorized based on their migratory status as resident (R), migratory (M) and winter migratory (W). It was observed that the 40 birds were residents, 11 birds were found to be winter migratory and 2 birds viz. Pied crested cuckoo (*Clamator jacobinus*) and common hawk cuckoo (*Hierococcyx varius*) were recorded as migratory. Similar studies were also reported by Kumar (2015), Singh (2013) and Thakur (2012).

**Table 2: Reported families of avifaunal diversity in Dongargaon Lake.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SN** | **Family** | **Number of Species** | **SN** | **Family** | **Number of Species** |
| 1. | Accipitridae | 4 | 15. | Estrildidae | 3 |
| 2. | Alcedinidae | 1 | 16. | Glareolidae | 1 |
| 3. | Anatidae | 5 | 17. | Hirundinidae | 1 |
| 4. | Ardeidae | 3 | 18. | Laridae | 1 |
| 5. | Bucerotidae | 1 | 19. | Motacillidae | 3 |
| 6. | Burhinidae | 1 | 20. | Muscicapidae | 1 |
| 7. | Campephagidae | 1 | 21. | Nectarinidae | 1 |
| 8. | Charadriidae | 1 | 22. | Oriolidae | 1 |
| 9. | Ciconiidae | 2 | 23. | Passeridae | 2 |
| 10. | Columbidae | 2 | 24. | Phasianidae | 2 |
| 11. | Coraciidae | 1 | 25. | Pycnonotidae | 1 |
| 12. | Corvidae | 1 | 26. | Scolopacidae | 5 |
| 13. | Cuculidae | 3 | 27. | Threskiornithidae | 3 |
| 14. | Emberizidae | 1 | 28. | Turnicidae | 1 |

**Figure 3: Graphical representation of different orders of avifauna observed in Dongargaon Lake.**

# Conclusion

# The current study discovered that Dongargaon Lake supports a diverse range of birds. Because of the region's unique geology and ecosystem, research into its bird species is critical. The reservoir hosted 53 different bird species. The study determined that the Lake's high richness of plant fauna provided more food as well as nesting and breeding sites, resulting in a larger diversity of birds within and surrounding it. These plants have an important functional ecological role in ecosystems as high-potential pollinators and scavengers, and they are correctly referred to as bioindicators. They serve an important role in managing the population diversity of diverse pests; the decrease of the water level in this reservoir throughout the hot summer.

**COMPETING INTERESTS DISCLAIMER:**

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

# References

Ali, S. (2009). Birds of India*. Bom. Nat. Hist. Soc*. 1-370.

Bibi, F., & Ali Z. (2013). Measurement of diversity indices of avian communities at Taunsa Barrage Wildlife Sanctuary, Pakistan. *Journal of Animal and Plant Sciences* 23, 469- 474.

Blair, J., Nippert, J., & Briggs, J. (2014). Grassland Ecology. In: Monson R. (eds) *Ecology and the Environment*. The Plant Sciences, vol 8. Springer, New York, NY.

Blair, R.B. (1999). Birds and butterflies along an urban gradient: Surrogate taxa for assessing biodiversity. *Ecol. Appl.*, 9, 164-170.

Burnham, K. P., Anderson, D. J. & Laake, J. L. (1980). Estimation of density from Line Transect sampling of biological populations. *Wildlife Monographs* 72.

The Wildlife Society, Washington D. C.

De Fries, R., Hansen, A., Turner, B. L., *et al*., (2007). Land use change around protected area: management to balance human needs and ecological function. *Ecological Applications* 17, 1031-1038.

Faber-Langendoen, D., & Josse C., (2010). World Grasslands and Biodiversity Patterns. Nature Serve, Arlington, VA. Appendices.

Grimmett R., Inskipp C., & Inskipp T. (2010). Birds of the Indian Subcontinent*. Oxford Univ. Press*.1-384.

Harisha, M. N., & Hosetti, B. B. (2009). Diversity and distribution of avifauna of Lakkavalli range forest, Bhadra Wildlife Sanctuary, Western Ghat, India. *Ecoprint* 16, 21- 27.

Hu, J., Jiang, Z., Zhang, C., *et al*. (2011). Bird diversity and the conservation value of a new Ramsar site: Guandong Haifeng Wetlands, China *Integrative Zoology* 6, 266- 278.

India State of Forest Report (2021), Forest Survey of India, published by Ministry of Environment forest and climate change. (https://fsi.nic.in/forest-report-2021-details)

IUCN. (2020) The IUCN Red List of Threatened Species,. [http://www.iucnredlist.org](http://www.iucnredlist.org/)

Kazmierczak, K., (2000). A field guide to the birds of India, Sri Lanka, Pakistan,Nepal, Bhutan, Bangladesh and the Maldives. 1st ed. New Delhi: Om Book Service. Pp. 1– 352.

Kumar, A., (2015). Migratory Water birds of Himachal Pradesh: *Status & Conservation. Water birds of India*. 258- 267.

Lepage, Denis, (2021). "Checklist of birds of India". Avibase bird checklists of the world.

Manakadan, R., & Pittie, A. (2001). Standardized common and scientific names of the birds of the Indian Subcontinent. *Buceros* 6,1-37.

Simmons K.E. L. (2009). Anting and the problem of Selfstimulation, Journal of Zoology 149 (2).

Singh J.K. & kushwaha S.P. (2008). Forest Biodiversity and its Conservation in India, International Forestry Review, Vol.10, No. 2.

Singh, V., Banyal, H.S., (2013). Avifauna of Khajjiar Lake, District Chamba, Himachal Pradesh, India. *Springer*. 66(2),130-136.

Thakur, M.L., & Paliwal, R., (2012). Avian diversityof Chandigarh (UT*). International Journal of Advanced Biological Research*. 2(1), 103-114.