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Avifaunal Diversity in and Around Katwal Tukum Lake, Tah-Bhadrawati, Chandrapur, Maharashtra

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Abstract: ***The present study aimed to survey avifaunal diversity in and around Katwal Tukum Lake, located in Tah-Bhadrawati, Chandrapur, Maharashtra. Comprehensive field observations were conducted from October 2023 to April 2024 to compile a checklist of bird species, assess their migration patterns, and develop conservation recommendations based on the findings. A total of 92 bird species were recorded, representing 43 families and 16 orders, indicating a thriving and healthy ecosystem. Notable findings include the dominance of the Passeriformes order, which accounted for 33 species, followed by Anseriformes and Charadriiformes with 12 and 9 species, respectively. Additionally, Pelecaniformes, Coraciiformes, and Gruiformes were represented by 10, 6, and 4 species, respectively. Lesser represented orders included Cuculiformes, Suliformes, Accipitriformes, Podicipediformes, Columbiformes, Bucerotiformes, Ciconiiformes, Piciformes, Galliformes, and Stigiformes. The study identified 26 migratory species, 28 resident migratory species and 38 resident species, underscoring the vital role of the surrounding forests in providing essential resources and habitats for a wide range of avian species. This research contributes valuable data to our understanding of bird diversity and seasonal patterns at Katwal Tukum Lake and highlights the need for targeted conservation strategies and habitat management practices to protect this diverse avian community.***
Keywords: Avifauna, Avian Diversity, Migratory Birds, Lake,

I. INTRODUCTION

In the vast canvas of the natural world, avian diversity unfolds with unparalleled richness, offering a breathtaking mosaic of species adapted to diverse habitats and ecological niches. Biodiversity, the intricate web of life sustaining ecosystems, lies at the heart of this spectacle, with avian life playing a vital role in enriching and shaping our planet's ecological tapestry. This project embarks on a comprehensive exploration of avian diversity, delving into the multifaceted factors influencing bird populations across various ecosystems. As global environmental changes continue to unfold, understanding how avian communities respond to these challenges becomes increasingly crucial for sustainable management and conservation strategies. In the symphony of life on Earth, avifaunal diversity emerges as a captivating and integral movement, resonating across ecosystems and shaping the very fabric of biodiversity. This project embarks on a journey to unravel the intricacies of avian life, exploring the diverse adaptations, behaviors, and ecological roles that define the feathered inhabitants of our planet. As global environmental changes continue to unfold, understanding avian diversity becomes paramount for informed conservation strategies, ecosystem management, and the preservation of our natural heritage. Birds, numbering over 10,000 species globally, epitomize nature's penchant for diversity. From the soaring eagles of mountainous terrains to the vibrant plumage of tropical songbirds, avian diversity is a testament to the endless possibilities that evolution has woven into the fabric of life. Each species is uniquely sculpted by the intricate dance of adaptation and selection, resulting in a breathtaking array of forms and functions. Over the past several decades, global biodiversity has faced unprecedented challenges, climate change, pollution, including habitat loss, and other anthropogenic pressures. Birds, as highly responsive indicators of environmental change, serve as vital bioindicators and reflect alterations in ecosystems. Monitoring avian diversity can provide crucial insights into ecosystem health, ecological resilience, and potential impacts on human societies.

Lakes serve as vital components of terrestrial ecosystems, harboring diverse flora and fauna while playing crucial roles in local hydrology, climate regulation, and biodiversity conservation. Among these aquatic habitats, Katwal Tukum Lake emerges as a captivating focal point for ecological exploration and scientific inquiry. Nestled within the verdant expanse of dense forests, this lake epitomizes the harmony between land and water ecosystems, offering a haven for a myriad of aquatic and avian life forms. The unique geographical location of Katwal Tukum Lake, situated in the Tah-Bhadrawati region of Chandrapur, Maharashtra, provides an ideal setting for studying the intricate interplay between wetland habitats and surrounding terrestrial environments. Bordered by lush vegetation and rich biodiversity, the lake serves as a nexus for ecological interactions and ecosystem services crucial for sustaining local ecosystems and human communities alike.

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In the pursuit of understanding and conserving the natural heritage of Katwal Tukum Lake, this study embarks on a comprehensive exploration of its ecological dynamics, with a particular focus on avian diversity. By delving into the abundance, distribution, and behavior of avian species within and around the lake, this research endeavors to unravel the intricacies of the lake's ecosystem while shedding light on the broader ecological significance of wetland habitats in the region. Migratory birds, with their awe-inspiring journeys spanning continents, epitomize the dynamic and captivating dimension of avian diversity. Equipped with an innate sense of navigation, these avian travelers undertake epic migrations, connecting breeding grounds with wintering habitats. Despite their remarkable adaptability and resilience, migratory birds face environmental challenges such as habitat loss and climate change, underscoring the vulnerability of these extraordinary avian species. The convergence of migratory routes at specific geographic locations creates seasonal hotspots of avian diversity, such as wetlands, coastal regions, and mountain ranges. These areas become crucial for migratory birds to rest, feed, and breed, contributing to the rich tapestry of avian life. Understanding avian diversity among migratory birds necessitates a multidisciplinary approach, leveraging cutting-edge technologies and citizen science initiatives to unravel the mysteries of migration and gain insights into broader patterns of avian ecology.

Scientific inquiry into the world of birds has unlocked countless mysteries, revealing new facets of avian biology with each discovery. Advances in technologies such as GPS tracking, genomics, and citizen science initiatives offer unprecedented opportunities to study birds in their natural habitats, deepening our understanding of the intricate relationships between birds and their environments. As we continue to explore the captivating world of avian diversity, each revelation adds to our appreciation for the remarkable feathered inhabitants that share our planet.

II. LITERATURE REVIEW

Harisha and Hosetti (2009) conducted an in-depth study of avian diversity in the Lakkavalli range forest, part of the Bhadra Wildlife Sanctuary in the Western Ghats of Karnataka, India. Their research, which spanned from April 2007 to March 2008, documented a total of 132 bird species. These species were classified under 34 families and 11 orders, illustrating the rich avian biodiversity of this region. The study identified 112 resident bird species that remain in the area year-round, relying on the forest's resources for their sustenance and breeding needs. In addition to the resident species, the researchers recorded 12 winter migratory species that visit the forest during the colder months, escaping harsher conditions elsewhere. Seven local migratory species were also noted; these birds move within the region in response to seasonal variations and resource availability. Additionally, the study documented one summer migratory species, which visits the area during the warmer months.

Lameed (2011) conducted an extensive survey of avian diversity in the Dagona-Waterfowl Sanctuary, Borno State, Nigeria, documenting a total of 135 bird species across 40 families. This comprehensive study highlighted the sanctuary's rich avian biodiversity and its importance as a habitat for various bird species. The survey was conducted across three distinct sites within the sanctuary, revealing significant variations in species presence. Seventy-four percent of the recorded species were found in site 1, sixty-three percent in site 2, and seventy-one percent in site 3. This distribution underscores the ecological diversity and habitat variability within the sanctuary, which supports a wide range of bird species. Among the observed birds, several notable families and species were identified. The Ardeidae family, comprising resident species, was well-represented in the sanctuary. This family includes various herons and egrets, which are commonly found in wetland environments. Additionally, migratory species from the Accipitridae family were recorded. This family includes birds of prey such as hawks, eagles, and kites, which migrate seasonally to exploit different habitats.

Arya et al. (2014) conducted an in-depth study on the avian diversity of wetland birds, uncovering the presence of 73 distinct species. These species belonged to 18 families and 8 orders, reflecting a diverse and vibrant avian community in the wetland habitat. The study categorized the birds into several groups based on their residency and migration patterns. Out of the 73 species observed, 25 were identified as residents, indicating their year-round presence in the wetland area. Additionally, 29 species were classified as resident migrants, meaning they were present for most of the year but may have had some migratory tendencies within the region. Nineteen species were identified as migrants, indicating their seasonal presence in the wetland, often arriving during specific times of the year.

Chilke (2014) conducted a detailed study on the avian diversity in and around Bamanvada Lake, located in Rajura District, Chandrapur, Maharashtra. The study highlighted the lake's status as a perennial water body, rich in aquatic vegetation, which provides a conducive habitat for a variety of bird species throughout the year. During the course of the study, a total of 58 bird species were recorded, encompassing 9 orders and 29 families. This diversity underscores the ecological significance of Bamanvada Lake as a vital habitat for avian fauna. The presence of rich aquatic vegetation supports the needs of different bird species, offering food resources, nesting sites, and shelter.

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Lad and Patil (2015) conducted an extensive study in the estuarine wetland areas of Bhayander and Naigaon in Thane District, documenting a remarkable 131 species of birds during the study period. The avian community comprised both resident and migratory species, with 68% identified as resident birds and 32% as migratory species. Throughout the study, 45 families of birds were recorded. Among these, the families Scolopacidae and Accipitridae were the most dominant, each represented by 12 species. The family Ardeidae followed with 8 species, while the Sylviidae family had 7 species. Additionally, the families Laridae, Motacillidae, and Rostratulidae were each represented by 6 species.

Harney and Dhamani (2015) conducted a detailed study on the bird diversity of Moharli Lake near Chandrapur, documenting a total of 95 bird species belonging to 13 different orders and families. The study revealed that among the recorded species, 48 were resident birds, indicating their permanent habitation in the area. Additionally, 6 species were identified as resident migrants, showcasing their seasonal movements within the region. Interestingly, one species was classified as a resident migrant common, highlighting its frequent presence and adaptability to the local environment.

Puppalwar and Telkhade (2015) conducted an extensive study on the bird diversity in and around Moharli Lake near Chandrapur spanning from January 2015 to December 2015. During this period, they meticulously recorded a total of 65 bird species, representing a diverse array of avian life in the region. Among the recorded species, 48 were classified as resident birds, indicating their permanent presence and reliance on the habitats surrounding Moharli Lake throughout the year. These resident species play crucial roles in the local ecosystem, contributing to both ecological stability and biodiversity. Additionally, the study identified 12 species as resident migrants. These birds undergo seasonal movements within the region, utilizing Moharli Lake and its environs as important breeding grounds or foraging areas during specific times of the year.

Bawaskar et al. (2016) conducted a comprehensive study on the diversity of birds in Chargaon Dam, located in Warora District, Chandrapur, Maharashtra, India. The study spanned a detailed observation period, resulting in the documentation of a rich avian community comprising 196 species from 64 families and representing 19 orders of class Aves. Among the recorded species, a significant portion, totalling 139 species, were classified as resident birds. These resident species are adapted to the local habitats around Chargaon Dam and are integral components of the ecosystem throughout the year, contributing to the area's biodiversity and ecological stability. In addition to the resident species, the study identified 17 migratory bird species that visit Chargaon Dam during specific seasons. These migratory species include notable birds such as the little grebe, purple heron, Asian openbill, and pond heron. Their presence underscores the importance of Chargaon Dam as a critical habitat and stopover site for migratory birds, providing essential resources such as food and shelter during their journeys.

Puri and Virani (2016) conducted a detailed study on the avian diversity of Bodalkasa Lake, documenting a total of 69 bird species belonging to 33 families. Their study period provided insights into the seasonal dynamics and distribution patterns of various bird species within this important habitat. Of the 69 species recorded, a majority of 52 species (approximately 75%) were classified as resident birds. These species are adapted to the local conditions around Bodalkasa Lake and can be found throughout the year, utilizing the lake and its surroundings for nesting, feeding, and other activities essential for their survival. The study also identified 12 species (about 18%) as winter visitors. These birds migrate to Bodalkasa Lake during the winter months, seeking refuge from colder climates and utilizing the lake's resources for feeding and resting.

Shelekar and Harney (2017) conducted a comprehensive study on bird diversity at Gorja Lake near Bhadrawati, District Chandrapur, focusing on species composition, distribution, and seasonal patterns. During their study, Shelekar and Harney documented a total of 59 bird species representing a diverse array of avian life. These species were classified into 13 different orders and 31 families, showcasing the ecological richness and diversity present at Gorja Lake. In terms of seasonal occurrence, Shelekar and Harney observed that 41 species were residents, indicating that these birds permanently inhabit the area throughout the year. Additionally, 9 species were identified as residential migratory, suggesting they spend part of the year elsewhere before returning to Gorja Lake. Furthermore, 9 species were noted as winter visitors, indicating their seasonal migration to the lake during colder months.

Sinha et al. (2019) conducted a comprehensive study on bird diversity along riverine areas in the Bhagirathi Valley, Uttarakhand, India. Their research focused on documenting species composition, seasonal distribution, and habitat associations of birds over a five-year period from April 2013 to May 2018. During their extensive field surveys, Sinha et al. recorded a remarkable total of 281 bird species belonging to 59 families. This diversity underscores the ecological richness of the Bhagirathi Valley's riverine ecosystems, which provide critical habitats for a wide array of avian species. The study meticulously documented the seasonal distribution patterns of these birds, highlighting their varying presence and activity across different times of the year. This information is crucial for understanding how avian populations utilize riverine habitats throughout the changing seasons, contributing to broader ecological and conservation efforts in the region.

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Bansod and Harney (2021) conducted a comprehensive study on bird diversity in Ghotnibala Lake near Bhadrawati, Chandrapur, over a two-year period from June 2016 to May 2018. Their research aimed to document and analyse the avian species composition in this specific wetland habitat. During their study, Bansod and Harney recorded a total of 45 bird species belonging to 11 orders and 27 families. This diversity highlights the importance of Ghotnibala Lake as a habitat supporting a variety of avian species in the region. Out of the recorded species, 39 were classified as resident birds, indicating that they inhabit the area throughout the year. Additionally, 4 species were identified as resident migrants, which suggests they spend significant portions of their life cycle in the vicinity but may move seasonally within the region. Furthermore, 2 species were observed as winter visitors, indicating their presence during the colder months when conditions may be more favourable for their specific needs.

Harney (2023) conducted a detailed study on the bird diversity of Katwal Tukum Lake, situated 42 km from Chandrapur headquarters in Maharashtra, India. The study spanned from June 2022 to May 2023, capturing a comprehensive snapshot of avian life in this particular habitat. During the study period, Harney documented a total of 45 bird species representing 10 different orders and 25 families. This diversity underscores the ecological richness and varied habitat types present around Katwal Tukum Lake. Among the recorded bird species, 28 were categorized as resident birds, indicating they permanently inhabit the area. Additionally, 9 species were classified as resident migrants, suggesting they spend significant portions of the year in the vicinity but may move within the region seasonally. Furthermore, 8 species were identified as winter visitors, highlighting their presence during the colder months when environmental conditions may be more favourable for their specific needs.

III.RESEARCH OBJECTIVE

1) *Surveying Avian Diversity:* The primary objective of this study is to conduct a thorough survey of avian diversity in and around Katwal Tukum Lake, located in Tah-Bhadrawati, Chandrapur, Maharashtra. This involves systematically documenting the bird species present in the vicinity of the lake.
2) *Compilation of Checklist:* Another objective is to compile a comprehensive checklist of observed bird species in and around Katwal Tukum Lake. This checklist will serve as a valuable reference for future research, conservation efforts, and habitat management initiatives.
3) *Assessment of Migration Patterns:* The study aims to assess the migration patterns of bird species observed in the study area. By understanding the timing and extent of bird migrations, we can determine their precise status, including resident, migratory, or passage visitor species.
4) *Recommendations for Conservation Practices:* Based on the outcomes of the study, the research will develop recommendations for conservation practices and habitat management strategies. These recommendations will be informed by the observed avian diversity, migration patterns, and ecological requirements of the bird species identified in the study area.

IV.STUDY AREA

The Katwal Tukum Lake, located in the village of Katwal (Tukum), is nestled amidst agricultural fields and forested areas. Situated approximately 23 kilometers from Bhadrawati, the lake spans an area of approximately 0.24 square kilometers, with a triangular shape boasting a perimeter of approximately 2.37 kilometers. Enriched by the surrounding forest cover, this pristine lake provides an ideal natural habitat for studying avian diversity.

SOURCE	KATWAL LAKE
Location coordinates	20°16'08'N 79°16'00'E
Plus code address	7798+7QH Katwal Tukum, Maharashtra.
Perimeter	2.37km
Area	$0.24km^2$

V. METHODOLOGY

Comprehensive bird surveys will be conducted to document species composition, abundance, and distribution in selected ecosystems. The study area encompassed diverse habitats, including forests, wetlands, and grasslands, selected based on their potential to support a variety of avian species. Katwal Tukum Lake is ensconced within dense forest cover. Throughout the study period, visits were made to the lake during the serene hours of the morning, from 6:00 AM to 10:00 AM, and during the tranquil evenings, from 3:00 PM to 5:00 PM. These field visits were conducted systematically to capture the diverse activities and behaviors of the avian inhabitants dwelling in and around the lake. The study was conducted between October 2023 and April 2024.

Field observations were conducted using a pair of Nikon Monarch 5 binoculars (8x42) to facilitate accurate identification and behavioral observations of birds from a distance. The birds were observed from safe distance and photographed by using a Nikon D5300 DSLR camera equipped with a telephoto lens (Nikkor 200-500mm).

Photographic documentation was complemented by detailed species identification, to provide comprehensive data on avian diversity. The identification of species was done with the help of standard literature of Woodcock (1980), Ali, Ripley (1995) and Grimmette and Inskipp (1999).

VI. OBSERVATIONS AND RESULTS

Katwal Tukum Lake is adjoining area of Tadoba National Park. This area is good spot for bird community. Like other lakes, Katwal Tukum Lake is rich in avian diversity and survey of avifauna was carried out during present investigation in and around Katwal Tukum Lake and presented in Table 1.1 and 1.2 and Photograph 1.93

In present investigation total 93 species of bird were recorded. During study period maximum species of bird was recorded belong to Passeriformes family and Anseriformes family. Most of the Anseriformes species are winter visitors, Black Ibis and Common Coot were summer visitor and Green Sandpiper species was monsoon visitor. Maximum species were sighted during the winter season followed by summer and monsoon season respectively. Further analysis of relative abundance indicates that Black Drango, Common Myna, Kingfisher, Flycatcher, Bee eater was observed during day time and regularly found on lake. Common Coot, Indian Grey Hornbill, Indian Robin, was noticed many times during the survey period. During study period, out of 92 species of bird, 39 species were residential, 28 species were residential migrant, 26 species was migrant.

Table 1.1 Avifaunal Diversity IN AND AROUND KATWAL TUKUM LAKE DURING 2023-24

SR. No.	SCIENTIFIC NAME	COMMON NAME	ORDER	FAMILY	STATUS
1	*Tadorna ferruginea*	Ruddy Shelduck	Anseriformes	Anatidae	M
2	*Nettapus coromandelianus*	Cotton Pygmy-Goose	Anseriformes	Anatidae	RM
3	*Spatula querquedula*	Garganey	Anseriformes	Anatidae	M
4	*Mareca strepera*	Gadwall	Anseriformes	Anatidae	M
5	*Mareca penelope*	Eurasian Wigeon	Anseriformes	Anatidae	M
6	*Anas carolinensis*	Green-winged Teal	Anseriformes	Anatidae	M
7	*Sarkidiornis melanotos*	Knob-billed duck	Anseriformes	Anatidae	M
8	*Netta rufina*	Red-Crested Pochard	Anseriformes	Anatidae	M
9	*Aythya ferina*	Common Pochard	Anseriformes	Anatidae	M
10	*Dendrocygna javanica*	Lesser Whistling-Duck	Anseriformes	Anatidae	RM
11	*Anas acuta*	Northern Pintail	Anseriformes	Anatidae	M
12	*Anas poecilorhyncha*	Indian Spot-billed duck	Anseriformes	Anatidae	RM
13	*Tachybaptus ruficollis*	Little Grebe	Podicipediformes	Podicipedidae	M
14	*Gallinula chloropus*	Eurasian Moorhen	Gruiformes	Rallidae	M
15	*Amaurornis phoenicurus*	White-breasted Waterhen	Gruiformes	Rallidae	R
16	*Porphyrio poliocephalus*	Gray-headed Swamphen	Gruiformes	Rallidae	RM
17	*Fulica atra*	Eurasian Coot	Gruiformes	Rallidae	M
18	*Tringa ochropus*	Green Sandpiper	Charadriiformes	Scolopacidae	RM
19	*Tringa glareola*	Wood Sandpiper	Charadriiformes	Scolopacidae	RM
20	*Limosa limosa*	Black-tailed Godwit	Charadriiformes	Scolopacidae	M
21	*Himantopus himantopus*	Black-winged Stilt	Charadriiformes	Recurvirostridae	RM

22	*Metopidius indicus*	Bronze-winged Jacana	Charadriiformes	Jacanidae	R
23	*Hydrophasianus chirurgus*	Pheasant tailed Jacana	Charadriiformes	Jacanidae	R
24	*Sterna aurantia*	River Tern	Charadriiformes	Laridae	R
25	*Vanellus indicus*	Red-wattled Lapwing	Charadriiformes	Charadriidae	R
26	*Rostratula benghalensis*	Greater painted-snipe	Charadriiformes	Rostratulidae	M
27	*Anastomus oscitans*	Asian Openbill Stork	Ciconiiformes	Ciconiidae	RM
28	*Plegadis falcinellus*	Glossy Ibis	Pelecaniformes	Threskiornithidae	RM
29	*Pseudibis papillosa*	Red-naped Ibis	Pelecaniformes	Threskiornithidae	RM
30	*Threskiornis melanocephalus*	Black-headed Ibis	Pelecaniformes	Threskiornithidae	RM
31	*Ardeola grayii*	Indian Pond Heron	Pelecaniformes	Ardeidae	R
32	*Ardea pupurea*	Purple Heron	Pelecaniformes	Ardeidae	RM
33	*Ardea cinerea*	Gray Heron	Pelecaniformes	Ardeidae	RM
34	*Egretta garzetta*	Little Egret	Pelecaniformes	Ardeidae	RM
35	*Bubulcus*	Cattle Egret	Pelecaniformes	Ardeidae	RM
36	*Ardea intermedia*	Medium Egret	Pelecaniformes	Ardeidae	RM
37	*Ardea alba*	Great Egret	Pelecaniformes	Ardeidae	RM
38	*Anhinga melanogaster*	Oriental Darter	Suliformes	Anhingidae	RM
39	*Phalacrocorax carbo*	Great Cormorant	Suliformes	Phalacrocoracidae	M
40	*Microcarbo niger*	Little Cormorant	Suliformes	Phalacrocoracidae	RM
41	*Halcyon smyrnensis*	White-throated Kingfisher	Coraciiformes	Alcedinidae	R
42	*Ceryle rudis*	Pied Kingfisher	Coraciiformes	Alcedinidae	R
43	*Alcedo atthis*	Common Kingfisher	Coraciiformes	Alcedinidae	R
44	*Pelargopsis capensis*	Stork-billed Kingfisher	Coraciiformes	Alcedinidae	R
45	*Merops orientalis*	Asian green bee-eater	Coraciiformes	Meopidae	R
46	*Coracias benghalensis*	Indian Roller	Coraciiformes	Coraciidae	R
47	*Elanus caeruleus*	Black-winged Kite	Accipitriformes	Accipitridae	R
48	*Spilornis cheela*	Creasted Surpent Eagle	Accipitriformes	Accipitridae	R
49	*Glaucidium radiatum*	Jungle owlet	Stigiformes	Strigidae	R
50	*Upupa epops*	Eurasian Hoopoe	Bucerotiformes	Upupidae	M
51	*Ocyceros birostris*	Indian Gray Hornbill	Bucerotiformes	Bucerotidae	R
52	*Dinopium benghalense*	Black-rumped Flameback	Piciformes	Picidae	R
53	*Ortygornis pondicerianus*	Grey francolin	Galliformes	Phasianidae	R
54	*Lanius cristatus*	Brown Shrike	Passeriformes	Laniidae	M
55	*Lanius schach*	Long-tailed Shrike	Passeriformes	Laniidae	RM
56	*Lanius vittatus*	Bay-backed Shrike	Passeriformes	Laniidae	RM
57	*Acridotheres tristis*	common myna	Passeriformes	Sturnidae	R

58	*Gracupica contra*	Indian Pied Starling	Passeriformes	Sturnidae	R
59	*Sturnia pagodarum*	Brahminy Starling	Passeriformes	Sturnidae	R
60	*Iduna caligata*	Booted Warbler	Passeriformes	Acrocephalidae	M
61	*Acrocephalus dumetorum*	Blyth's Reed Warbler	Passeriformes	Acrocephalidae	M
62	*Anthus rufulus*	Paddyfield Pipit	Passeriformes	Motacillidae	R
63	*Anthus campestris*	Tawny Pipit	Passeriformes	Motacillidae	RM
64	*Motacilla maderaspatensis*	White-browed Wagtail	Passeriformes	Motacillidae	RM
65	*Motacilla flava*	western yellow wagtail	Passeriformes	Motacillidae	M
66	*Phoenicurus ochruros*	Black Redstart	Passeriformes	Muscicapidae	M
67	*Copsychus fulicatus*	Indian Robin	Passeriformes	Muscicapidae	R
68	*Copsychus saularis*	Oriental Magpie-Robin	Passeriformes	Muscicapidae	R
69	*Saxicola caprata*	Pied Bushchat	Passeriformes	Muscicapidae	R
70	*Pycnonotus cafer*	Red-vented Bulbul	Passeriformes	Pycnonotidae	R
71	*Pycnonotus luteolus*	White-browed bulbul	Passeriformes	Pycnonotidae	R
72	*Passer domesticus*	house sparrow	Passeriformes	Passeridae	R
73	*Gymnoris xanthocollis*	yellow-throated sparrow	Passeriformes	Passeridae	M
74	*Hypothymis azurea*	black-naped monarch	Passeriformes	Monarchidae	RM
75	*Terpsiphone paradisi*	Indian paradise flycatcher	Passeriformes	Monarchidae	RM
76	*Emberiza bruniceps*	Red-headed Bunting	Passeriformes	Emberizidae	M
77	*Cinnyris asiaticus*	Purple Sunbird	Passeriformes	Nectariniidae	R
78	*Prinia inornata*	Plain prinia	Passeriformes	Cisticolidae	R
79	*Prinia socialis*	Ashy Prinia	Passeriformes	Cisticolidae	R
80	*Ammomanes phoenicura*	Rufous-tailed lark	Passeriformes	Alaudidae	R
81	*Dicrurus macrocercus*	Black Drongo	Passeriformes	Dicruridae	R
82	*Argya striata*	Jungle babbler	Passeriformes	Leiothrichidae	R
83	*Argya malcolmi*	large gray babbler	Passeriformes	Leiothrichidae	RM
84	*Euodice malabarica*	indian silverbill	Passeriformes	Estrildidae	RM
85	*Ploceus philippinus*	baya weaver	Passeriformes	Ploceidae	M
86	*Cecropis daurica*	red rumped swallow	Passeriformes	Hirundinidae	M
87	*Chrysomma sinense*	yellow eyed babbler	Passeriformes	Paradoxornithidae	RM
88	*Centropus sinensis*	Greater coucal	Cuculiformes	Cuculidae	R
89	*Eudynamys scolopaceus*	Asian Koel	Cuculiformes	Cuculidae	R
90	*Hierococcyx varius*	common hawk-cuckoo	Cuculiformes	Cuculidae	R
91	*Cacomantis passerinus*	gray bellied cuckoo	Cuculiformes	Cuculidae	M
92	*Spilopelia chinensis*	Spotted Dove	Columbiformes	Columbidae	R
93	*Spilopelia senegalensis*	Laughing Dove	Columbiformes	Columbidae	R

Table 1.2 Showing Common Name, Scientific NAME, ORDER, FAMILY, HABITATS OF THE BIRDS.

1. R- RESIDENT — R - 39
2. RM- RESIDENT & MIGRANT — RM - 28
3. M- MIGRANT — M – 26

TOTAL 93

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VII. DISCUSSION OBSERVATIONS AND RESULTS

The findings of the study reveal a notable avifaunal diversity in and around Katwal Tukum Lake, situated in Tah-Bhadrawati, Chandrapur, Maharashtra. With a total of 93 bird species recorded in the area, the ecosystem can be considered healthy and thriving, indicating the presence of suitable habitats and ecological conditions to support a diverse avian community. The results of the present study unveiled the occurrence of 93 bird species, representing 43 families across 16 different orders within the study area. Notably, the Passeriformes order accounted for 34 species, while Anseriformes and Charadriiformes comprised 12 and 9 species, respectively. Additionally, species belonging to Pelecaniformes, Coraciiformes, and Gruiformes were observed, with 10, 6, and 4 species respectively. Cuculiformes, Suliformes, Accipitriformes, and Podicipediformes each contributed 4, 3, 2, and 1 species, respectively. Columbiformes and Bucerotiformes both contributed 2 species each, while Ciconiiformes, Piciformes, Galliformes and Stigiformes were represented by a single species each. Among the recorded bird families, a single species was identified for Podicipedidae, Laridae, Ciconiidae, Upupidae, Bucerotidae, Recurvirostridae, Meopidae, Coraciidae, Anhingidae, Rostratulidae, Alaudidae, Emberizidae, Picidae, Charadiidae, Strigidae, Nectariniidae, Phasianidae, Hirundinidae, Ploceidae, Estrildidae, Paradoxornithidae and Dicruridae. Meanwhile, two species were classified under Jacanidae, Pycnonotidae, Leiothrichidae, Acrocephalidae, Accipitridae, Monarchidae, Passeridae, Cisticolidae, Phalacrocoracidae, and Columbidae. While three species were categorized under Threskiornithidae, Scolopacidae, Laniidae and Sturnidae. Four species were attributed to Rallidae, Cuculidae, Motacillidae, Alcedinidae and Muscicepidae. Whereas Anatidae was the most diverse family, comprising 12 species.

In the present investigation, 93 species of Aves were recorded, out of these 39 species were resident, 28 species resident migratory and only 26 species were found to be migratory species. The surrounding forests play a significant role in providing essential resources and habitats for a wide range of bird species. Forested areas are known to offer diverse microhabitats, including dense foliage, water bodies, and varied vegetation types, which attract a plethora of bird species. The availability of food resources, nesting sites, and shelter within the forested environment contributes to the richness of avian diversity observed in the study area. The bird's population fluctuate among sites due to local environmental factor and climatic condition, human activity (Bhat et al., 2009). The predominance of bird species belonging to the orders Passeriformes and Anseriformes underscores the significant contribution of these taxa to the overall avian diversity in the region. Passeriformes, commonly known as perching birds, comprise the largest order of birds and are renowned for their diverse array of species and ecological adaptations. Freshwater lake is one of the important types of wetlands. The abundance of avifauna indicates the healthy status of lakes due to the availability of water, safe habitat and food sources for both adult and nestling (Joshi, 2012). Anseriformes, on the other hand, include waterfowl species such as ducks, goose, and swans, which are often associated with wetland habitats like those found in and around Katwal Tukum Lake. Manikannan (2011) stated that waterbirds are important component of most of the wetland because they occupy several trophic levels in the food web of wetland nutrient cycle. The Katwal Tukum lake is surrounded by trees, herb, shrubs and rich in aquatic and semi aquatic vegetation that provides an adequate food and good habitation for the living of the bird. Now days, avifaunal diversity has been decreasing due to human disturbance. According to Arya et al., (2014), Lad and Patil (2015) decrease the diversity of bird due to construction because they loss their habitat. According to Lameed (2011) wetland provides food for bird in the form of plants, vertebrates and invertebrates. Bird like Red wattle Lapwing (Vanellus indicus), Green sandpiper (Tringa ochropus), Wood Sandpiper (Tringa glareola), Black-winged Stilt (Himantopus Himantopus) occupied the pond only on winter months. Their occurrences depend on availability of the food into the mud. Similar observation was made by Mukherjee (1972) reported water bird on Sunderban. Bhat et al., (2009) reported winter viewer of Karkala. Puri and Virani (2016) reported 69 species of bird and they observed maximum diversity during winter season and minimum diversity during monsoon season of Khajrbandha lake, Gondiya district.

The different species of Kingfisher viz. Common kingfisher (Alcedo atthis), White Breasted kingfisher (Halycon smyrnesis) and Pied kingfisher (Ceryle rudis) and Asian Green bee-eater (Ardea cinerea), White browed wagtail (Motacill maderaspatensis), Greater Coucal (Centropus sinensis), Asian koel (Eudynamys scolopaceus), Indian Robin (Copsychus fulicatus), they are resident species, recorded throughout the study period. Herons and Egrate were found in remarkable number during winter season. The maximum diversity of aves observed during post winter and pre summer season in the month between December to February months. It may be due the abundance availability of food, increased vegetation as well as arrival migratory bird. Saxena (1975) recorded maximum diversity of bird in the month of December, January and February and maximum quantity of bird observed in the month of May June and July due to non-availability of food. Kasambe and Wadatkar (2009) recorded 78 species from Pohara-Malkhed forest reservoir of Amravati district and stated that winter season recorded more species and lowest species recorded during summer due to the high temperature and during monsoon season due to high rain fall. Many researchers in Maharashtra like Chilke (2012) recorded 58 species of bird in Bamanwada lake, Rajura. Puri and Virani (2016) record 86 species of bird in

Chorkhamara lake in Gondia district. Bhandarkar and Paliwal (2014) observed 52 water birds species from Surungbandh lake, Gondia district. Kukde et al., (2011) recorded 68 species from Chatri Lake of Amravati. Chinchkhede and Kedar (2013) recorded 127 species from Navegaon National Park from Gondiya district and stated that density of bird's maximum in winter and minimum during summer and monsoon season. Kedar et al., (2008) recorded 74 species from two freshwater lake of Washim district. Jain (2015) recorded 17 species from Sirpur lake Indore.The findings of this study underscore the importance of conserving and protecting the habitats and ecosystems supporting avian diversity in the Katwal Tukum Lake area. Conservation efforts should prioritize the preservation of forested habitats, wetlands, and other critical ecosystems that provide essential resources for birds. Additionally, measures to mitigate anthropogenic threats such as habitat loss, pollution, and climate change are essential for maintaining the ecological integrity and long-term sustainability of avian populations in the region. The waterbirds of Katwal Tukum Lake are important bio indicators of lake ecosystems. Avifaunal diversity of the Katwal Lake confirm that the site as suitable habitat for the residential and migratory bird. Overall, the study provides valuable insights into the avifaunal diversity of the Katwal Tukum Lake area and emphasizes the importance of preserving these habitats for the conservation of avian biodiversity and ecosystem health.

VIII. CONCLUSION

The presence of a total of 93 bird species in the Katwal Tukum Lake area indicates a healthy and thriving ecosystem. The study area, surrounded by forests, provides ample resources for a diverse range of bird species. The majority of the observed species belong to the orders Passeriformes and Anseriformes, highlighting the rich avifaunal diversity supported by the area. The abundance of food and water sources, facilitated by the adjacent forest, contributes to the attractiveness of the habitat for various bird species. Additionally, the availability of suitable nesting sites further enhances the area's suitability for avian inhabitants. Given the significance of the forest habitat in supporting diverse avifauna, conservation efforts should prioritize the preservation and management of these ecosystems. Implementing conservation measures aimed at safeguarding forest habitats will not only benefit the bird populations but also contribute to the overall biodiversity and ecological integrity of the region. As we embark on this academic journey into the heart of avian diversity, we recognize the urgency of comprehending the complexities inherent in the lives of our feathered counterparts. Through meticulous study and analysis, we aim to contribute to the growing body of knowledge that informs conservation practices and enhances our appreciation for the intricate relationships between birds and their environments. This thesis seeks not only to deepen our understanding of avian diversity but also to advocate for the preservation of the vibrant tapestry that is integral to the symphony of life on our planet.

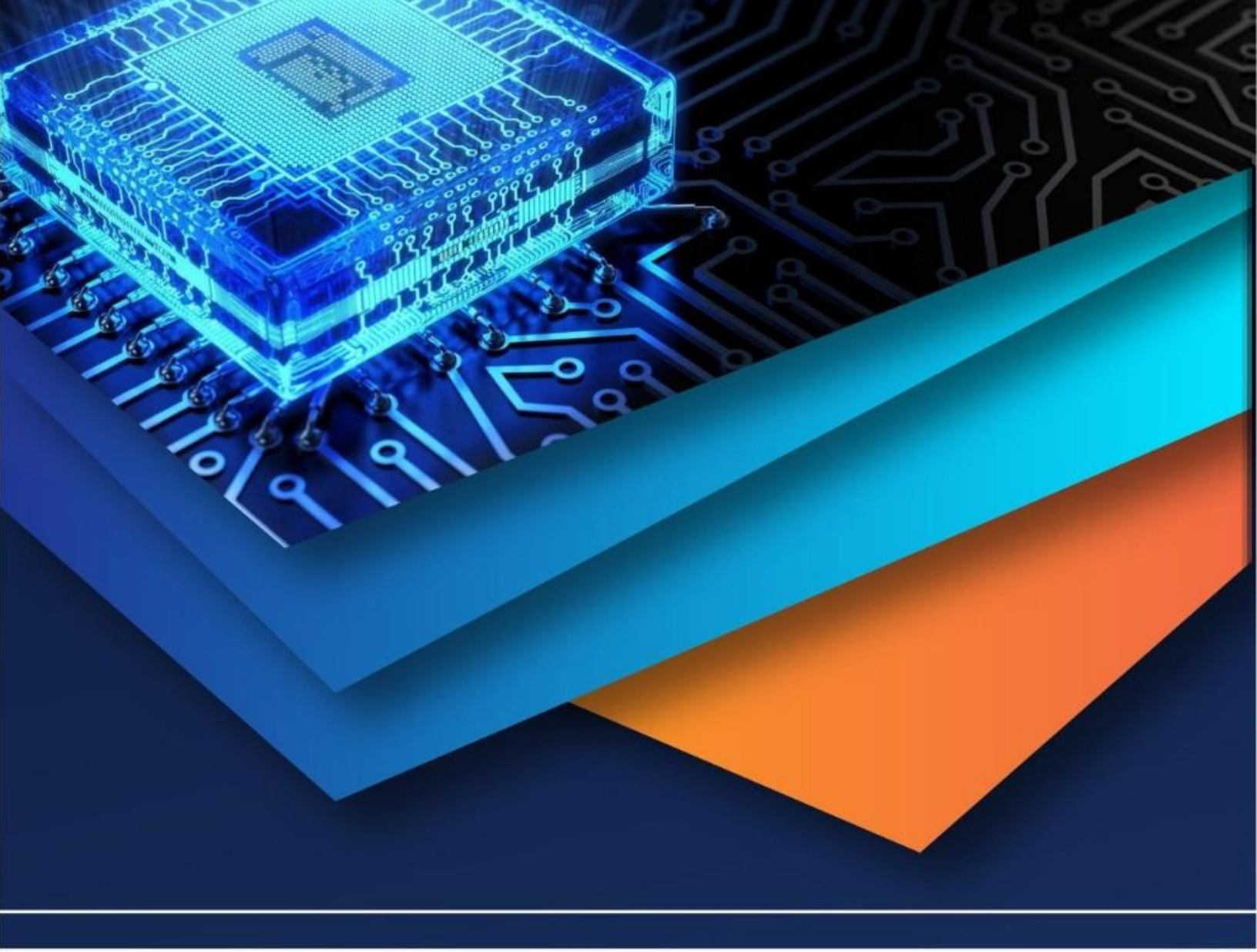
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