

Avifaunal Diversity of Topchanchi Wildlife Sanctuary (IBA), including Topchanchi Lake and Conservation Threats, District Dhanbad, Jharkhand, India

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Abstract: *The present study was conducted in the Topchanchi Wildlife Sanctuary (TWLS), which includes Topchanchi Lake, identified as an Important Bird and Biodiversity Area (IBA) situated in Dhanbad district, Jharkhand, India. A total of 184 species of birds belonging to 17 orders and 61 families were recorded. Among the recorded species, 121 species (66%) were resident (R), 42 species (23%) were migratory (M), 18 species (10%) were resident and migrant (RM), 2 species (1%) were summer migrants (SM), and 1 species (0.54%) was a passage migrant (PM). Among the total recorded species, 50 species (27%) were water birds (WB), 17 species (9%) were wetland-dependent birds (WDB), and the remaining 117 (64%) species were other birds (O). A total of 22 restricted assemblage species of Biome 11 (Indo-Malayan Tropical Dry Zone), 9 globally threatened (IUCN Red List) species, and 19 Schedule I species, as per The Wildlife (Protection) Act, 1972 (amended, 2022), were documented. Conservation threats include the collection of molluscs by a large number of villagers, unregulated fishing, excess tourism, deforestation, soil erosion, hunting, and poaching. The Sanctuary holds significance due to its rich historical past and the presence of a diverse array of avifauna, as well as other fauna. If protected and groomed, it has the potential to become a "Bird Paradise" and a haven for other wildlife as well.*

Keywords: Avifauna, Diversity, Wildlife, Topchanchi, Sanctuary, Dhanbad

1. Introduction

Jharkhand has eleven wildlife sanctuaries; Topchanchi Wildlife Sanctuary (TWLS) is one of them, blessed with beauty and great aesthetic value and offers scope for wildlife research and education. Topchanchi Lake, also known as Rajdaha Reservoir, is a small water body located in the heart of the Sanctuary. Although it is not part of the Sanctuary itself, it is an important water source for wildlife. Topchanchi Wildlife Sanctuary has been identified as an Important Bird and Biodiversity Area (IBA) by Rahmani *et al.* (2016). The avifauna of the Indian subcontinent comprises approximately 1313 species (Grimmett *et al.*, 2011), accounting for around 12% of the world's bird species. The Zoological Survey of India (ZSI) reported 465 species and subspecies of birds in Bihar and Jharkhand (Editor-Director, 2004).

However, a survey of literature reveals that, apart from ZSI, some work have been done on avifauna of Jharkhand state (Ball, 1874; Ara, 1960; Ara, 1966; Ghosh *et al.*, 1993; Verma, 2011; Prakash *et al.*, 2012; 2014a; 2014b; 2015; 2016; 2018; 2019; 2022; Rahmani *et al.*, 2016; Kumari *et al.*, 2021 & Kumar *et al.*, 2021). Ara, 1960; Ara, 1966, and Kumari *et al.*, 2021, on avifauna of Hazaribag Wildlife Sanctuary. Prakash *et al.*, 2012, on the avifauna of Udhuwa Lake Bird Sanctuary. Rahmani *et al.*, 2016 on birds of Hazaribag

Wildlife Sanctuary, Palamau Tiger Reserve, Udhuwa Lake Bird Sanctuary, Dalma Wildlife Sanctuary, Topchanchi Wildlife Sanctuary, and other areas. Verma, 2011, on birds of Dalma Wildlife Sanctuary. Dwivedi, 2018, on the birds of Bokaro District.

There is very little information available about the bird species in Topchanchi Wildlife Sanctuary. Existing literature indicates that minimal research has been conducted in the past, with the notable exception of Rahmani *et al.* (2016), which focused on identifying Important Bird and Biodiversity Areas (IBAs) by the Bombay Natural History Society (BNHS). This study, conducted by Satya Prakash, one of the authors, is presented in the Jharkhand Chapter, pages 849-874, in Rahmani *et al.* (2016). Furthermore, some studies have been conducted on Topchanchi Lake (Prakash *et al.*, 2010, 2015, 2016, 2018; Kumar *et al.*, 2021). However, apart from Prakash *et al.* (2010), these studies primarily concentrated on wetland birds (Kumar *et al.*, 2021) or were limited to the Asian Waterbird Census (Prakash *et al.*, 2015, 2016, 2018). Given the lack of detailed scientific investigations to date, the current study was initiated to document the current status of the avian fauna in Topchanchi Wildlife Sanctuary, including Topchanchi Lake.

2. Study Area

The study was conducted in the Topchanchi Wildlife Sanctuary (Fig. 2), which includes Topchanchi Lake located in Dhanbad district, Jharkhand (Fig. 3). The Sanctuary is located between 23°50' and 23°56' N, 86°06' and 86°15' E. The sanctuary from East to West is 6.25 Km and from North to South is 3.75 Km. The total area of the Sanctuary is 12.81 Sq. Km. TWLS is also famous for a reservoir called "Topchanchi Lake". Topchanchi Lake (Rajdaha Reservoir) is a small water body in the heart of the Sanctuary (Fig.3). A relatively dense forest of TWLS surrounds the Lake. Its stunning beauty and captivating aesthetic appeal create an ideal setting for wildlife research and educational pursuits. The Lake also serves as a lifeline for the Dhanbad, Jharia, and Katrasgarh townships, providing drinking water. It is about 1.25 km from National Highway No. 2 (Grand Trunk Road). The Topchanchi Lake adds to the richness of the habitat for many resident birds and is also visited by migratory winter birds.

Although Topchanchi Lake is centrally located within the Topchanchi Wildlife Sanctuary, it is not a part of the Sanctuary. The Lake is under the control of the Mineral Area Development Authority (MADA) and Irrigation Department (Dhanbad). The scheduled tribes inhabiting these forests include Munda, Santhals, Kherwars, and Birhors. In the recent days Asian elephants, *Elephas maximus*, have been regularly seen crossing the Sanctuary using the Lake during movement.

The sanctuary area falls under the broad category of northern tropical dry deciduous forest, which has been sub-classified as Dry Peninsular Sal, Northern Dry Mixed Deciduous Forest, and Dry Bamboo Brake. Dry peninsular sal forest is found in Ganeshpur and Bhawardaha. The crop consists of almost pure sal (*Shorea robusta*) with asan (*Terminalia tomentosa*), Bija Sal (*Pterocarpus marsupium*), and Dhow (*Anogeissus latifolia*) etc. Northern dry mixed deciduous forest is found in almost the entire area. It has tremendous potential to support ecotourism.



Figure 1: Map of Jharkhand



Figure 2: Topchanchi Wildlife Sanctuary, Dhanbad, Jharkhand



Figure 3: Topchanchi Lake (Located within Topchanchi Wildlife Sanctuary)

3. Methodology

Some of the basic methods used in this study are described by Bibby *et al.* (1992) and Javed & Kaul (2002). Random sampling was conducted by walking along known trails at regular intervals to record the presence or absence of birds in the study area for identification of IBA (Rahmani *et al.*,

2016). This study focused on fixed routes that included areas around water bodies, scrub forests, wooded regions, and agricultural fields to identify and document bird species within the Sanctuary. The present work was conducted in and around Topchanchi Lake over a two-year primary observation period from October 2021 to October 2023. Surveys were conducted during daytime hours, specifically from 6:00 to

10:00 in the morning and from 4:00 to sunset in the evening. The survey method involved walking along a road encircling Topchanchi Lake at regular intervals (all season), which covers approximately 6 km. This route encompassed both the water body and the adjacent forest. Furthermore, some observations and documentation were conducted between 2010 and 2020 by one of the authors (Prakash *et al.*, 2010, 2015, 2016, 2018), as well as Rahmani *et al.* (2016), and some opportunistic visits followed a similar methodology.

The direct sighting method was used; the birds that were not sighted, their calls were recorded during the surveys for identification purposes. Bird species were identified based on their calls, physical features, shapes, and habitats, as well as data from the internet. Bird species were further identified using field guidebooks (Ali & Ripley, 1987; Ali, 2002; Grimmett *et al.*, 1999, 2011; Mankadan *et al.*, 2011; Rasmussen & Anderton, 2012). The documentation and enumeration of birds were conducted according to the checklists of Mankadan and Pittie (2001), Kumar *et al.* (2003), Praveen *et al.* (2016), and Praveen and Jayapal (2023). The residential status of birds was listed as described by Ali (2002), Mankadan *et al.* (2011), and Rasmussen and Anderton (2012). The checklist was compiled using information from the current study and secondary data from previous research conducted by Prakash *et al.* (2010, 2015, 2016, 2018) and Rahmani *et al.* (2016), as well as some unpublished findings. The existing and unpublished information was incorporated to create a comprehensive checklist for Topchanchi Wildlife Sanctuary. Additionally, the checklist includes standard English and scientific names, along with details on their habitats and residential status, as well as their status under the IUCN Red List and The Wildlife (Protection) Act, 1972 (GOI, 1972, Amended 2022).

The instruments used were standard-quality binoculars (Olympus), and photographs were taken using a DSLR Camera (Nikon Coolpix P90, 24x), a Sony Cybershot 14x camera, and a GPS Device for proper identification and record-keeping.

4. Result and Discussion

A total of 184 species of birds belonging to 17 orders and 61 families were recorded in TWLS (Table 1). Among the

recorded species, 121 species (66%) were resident (R), 42 species (23%) were migratory (M-winter migrant), 18 species (10%) were resident and migrant (RM), 2 species (1%) were summer migrants (SM), and 1 species (0.54%) passage migrant (PM). Among the total recorded species, 50 species (27%) were water birds (WB), 17 species (9%) were wetland-dependent birds (WDB), and the remaining 117 (64%) species were other birds (O). The other birds include terrestrial birds, such as forest birds, bush birds, and grassland birds. The percentage composition of other birds (64%) is more than that of the wetland birds (36%). The percentage composition of residential and habitat status of avifauna is shown in Figs. 4 and 5, respectively.

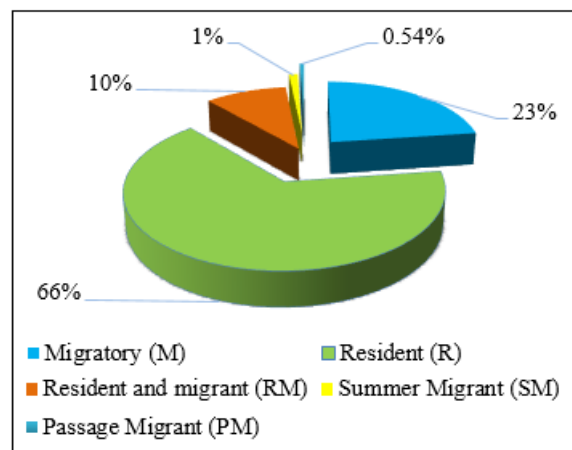


Figure 4: Percentage Composition of Avifauna- Residential status

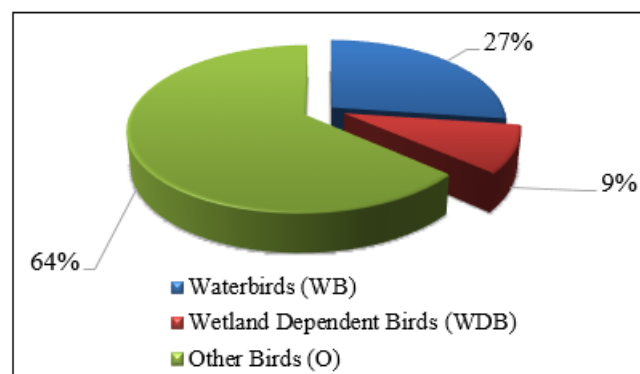


Figure 5: Percentage Composition of Avifauna- Habitat Status

Table 1: Checklist of avifaunal diversity of Topchanchi Wildlife Sanctuary including Topchanchi Lake, Dhanbad, Jharkhand

Sl. No.	ORDER/ Family Common Name	Scientific Name	IUCN Status	WPA, 1972 Status (Amended, 2022)	Biome	Habitat	Residential status (Tilaiya)
1	2	3	4	5	6	7	8
I. ANSERIFORMES/Anatidae							
1	Lesser Whistling-Duck	<i>Dendrocygna javanica</i> (Horsfield, 1821)	LC	II		WB	R
2	Ruddy Shelduck	<i>Tadorna ferruginea</i> (Pallas, 1764)	LC	II		WB	M
3	Red-crested Pochard	<i>Netta rufina</i> (Pallas, 1773)	LC	II		WB	M
4	Common Pochard	<i>Aythya ferina</i> (Linnaeus, 1758)	Vu	I		WB	M
5	Common Merganser	<i>Mergus merganser</i> (Linnaeus, 1758)	LC	II		WB	M
6	Ferruginous Duck	<i>Aythya nyroca</i> (Güldenstädt, 1770)	NT	II		WB	M
7	Tufted Duck	<i>Aythya fuligula</i> (Linnaeus, 1758)	LC	II		WB	M
8	Gadwall	<i>Mareca strepera</i> (Linnaeus, 1758)	LC	II		WB	M
9	Eurasian Wigeon	<i>Mareca penelope</i> (Linnaeus, 1758)	LC	II		WB	M

10	Northern Pintail	<i>Anas acuta</i> (Linnaeus, 1758)	LC	II		WB	M
11	Knob-billed Duck	<i>Sarkidiornis melanotos</i> (Pennant, 1769)	LC	II		WB	R
II. GALLIFORMES/ Phasianidae							
12	Indian Peafowl	<i>Pavo cristatus</i> (Linnaeus, 1758)	LC	I	Biome 11	O	R
13	Common Quail	<i>Coturnix coturnix</i> (Linnaeus, 1758)	LC	II		O	R
14	Jungle Bush Quail	<i>Perdica asiatica</i> (Latham, 1790)	LC	II	Biome 11	O	R
15	Grey Francolin	<i>Francolinus pondicerianus</i> (J.F. Gmelin, 1789)	LC	II		O	R
16	Red Junglefowl	<i>Gallus gallus</i> (Linnaeus, 1758)	LC	II		O	R
III. PODICIPEDIFORMES/ Podicipedidae							
17	Little Grebe	<i>Tachybaptus ruficollis</i> (Pallas, 1764)	LC	II		WB	R
18	Great Crested Grebe	<i>Podiceps cristatus</i> (Linnaeus, 1758)	LC	II		WB	M
IV. COLUMBIFORMES/ Columbidae							
19	Rock Pigeon	<i>Columba livia</i> (Gmelin, 1789)	LC	II		O	R
20	Eurasian Collared-Dove	<i>Streptopelia decaocto</i> (Frisvaldszky, 1838)	LC	II		O	R
21	Spotted Dove	<i>Streptopelia chinensis</i> (Scopoli, 1786)	LC	II		O	R
22	Laughing Dove	<i>Streptopelia senegalensis</i> (Linnaeus, 1766)	LC	II		O	R
23	Yellow-footed Green Pigeon	<i>Treron phoenicopterus</i> (Latham, 1790)	LC	II	Biome 11	O	RM
V. CAPRIMULGIFORMES/ Caprimulgidae							
24	Indian Nightjar	<i>Caprimulgus asiaticus</i> (Latham, 1790)	LC	II	Biome 11	O	R
Apodidae							
25	Asian Palm Swift	<i>Cypsiurus balaisensis</i> (J.E. Gray, 1829)	LC	II		O	R
26	Little Swift	<i>Apus affinis</i> (J.E. Gray, 1830)	LC	II		O	R
Hemiprocidae							
27	Crested Treeswift	<i>Hemiprocne coronata</i> (Tickell, 1833)	LC	I		O	R
VI. CUCULIFORMES/ Cuculidae							
28	Greater Coucal	<i>Centropus sinensis</i> (Stephens, 1815)	LC	II		O	R
29	Asian Koel	<i>Eudynamis scolopacea</i> (Linnaeus, 1758)	LC	II		O	R
30	Common Hawk Cuckoo	<i>Hierococcyx varius</i> (Vahl, 1797)	LC	II		O	R
31	Indian Cuckoo	<i>Cuculus micropterus</i> (Gould, 1838)	LC	II		O	SM
32	Grey-bellied Cuckoo	<i>Cacomantis passerinus</i> (Vahl, 1797)	LC	II		O	SM
33	Green-billed Malkoha	<i>Phaenicophaeus tristis</i> (Lesson, 1830)	LC	II		O	R
VII. GRUIFORMES/ Rallidae							
34	White-breasted Waterhen	<i>Amaurornis phoenicurus</i> (Pennant, 1769)	LC	II		WB	R
35	Common Moorhen	<i>Gallinula chloropus</i> (Linnaeus, 1758)	LC	II		WB	RM
36	Common Coot	<i>Fulica atra</i> (Linnaeus, 1758)	LC	II		WB	M
VIII. PELECANIFORMES/ Ciconiidae							
37	Lesser Adjutant	<i>Leptoptilos javanicus</i> (Horsfield, 1821)	Vu	I		WB	R
38	Asian Openbill	<i>Anastomus oscitans</i> (Boddaert, 1783)	LC	II		WB	R
39	Black-necked Stork	<i>Ephippiorhynchus asiaticus</i> (Latham, 1790)	NT	II		WB	R
40	Woolly-necked Stork	<i>Ciconia episcopus</i> (Boddaert, 1783)	NT	II		WB	R
Ardeidae							
41	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i> (Linnaeus, 1758)	LC	II		WB	R
42	Indian Pond Heron	<i>Ardeola grayii</i> (Sykes, 1832)	LC	II		WB	R
43	Cattle Egret	<i>Bubulcus ibis</i> (Linnaeus, 1758)	LC	II		WB	RM
44	Grey Heron	<i>Ardea cinerea</i> (Linnaeus, 1758)	LC	II		WB	RM
45	Purple Heron	<i>Ardea purpurea</i> (Linnaeus, 1766)	LC	II		WB	RM
46	Great Egret	<i>Ardea alba</i> (Linnaeus, 1758)	LC	II		WB	RM
47	Intermediate Egret	<i>Ardea intermedia</i> (Wagler, 1829)	LC	II		WB	RM
48	Little Egret	<i>Egretta garzetta</i> (Linnaeus, 1766)	LC	II		WB	RM
49	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i> (Gmelin, JF, 1789)	LC	I		WB	R
Threskiornithidae							
50	Black-headed Ibis	<i>Threskiornis melanocephalus</i> (Latham, 1790)	NT	II		WB	R
51	Red-naped Ibis	<i>Pseudibis papillosa</i> (Temminck, 1824)	LC	II	Biome 11	WB	R
Phalacrocoracidae							
52	Little Cormorant	<i>Microcarbo niger</i> (Vieillot, 1817)	LC	II		WB	R
53	Great Cormorant	<i>Phalacrocorax carbo</i> (Linnaeus, 1758)	LC	II		WB	RM
54	Indian Cormorant	<i>Phalacrocorax fuscicollis</i> (Stephens, 1826)	LC	II		WB	R
Anhingidae							

55	Oriental Darter	<i>Anhinga melanogaster</i> (Pennant, 1769)	NT	II		WB	RM
	IX. CHARADRIIFORMES/ Charadriidae						
56	Little Ringed Plover	<i>Charadrius dubius</i> (Scopoli, 1786)	LC	II		WB	RM
57	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i> (Blyth, 1842)	LC	II	Biome 11	WB	R
58	Red-wattled lapwing	<i>Vanellus indicus</i> (Boddaert, 1783)	LC	II		WB	R
	Jacanidae						
59	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i> (Scopoli, 1786)	LC	II		WB	R
60	Bronze-winged Jacana	<i>Metopidius indicus</i> (Latham, 1790)	LC	II		WB	R
	Scolopacidae						
61	Temminck's Stint	<i>Calidris temminckii</i> (Leisler, 1812)	LC	II		WB	M
62	Little Stint	<i>Calidris minuta</i> (Leisler, 1812)	LC	II		WB	M
63	Common Snipe	<i>Gallinago gallinago</i> (Linnaeus, 1758)	LC	II		WB	M
64	Common Sandpiper	<i>Actitis hypoleucos</i> (Linnaeus, 1758)	LC	II		WB	M
65	Green Sandpiper	<i>Tringa ochropus</i> (Linnaeus, 1758)	LC	II		WB	M
66	Common Greenshank	<i>Tringa nebularia</i>	LC	I		WB	M
67	Wood Sandpiper	<i>Tringa glareola</i> (Linnaeus, 1758)	LC	II		WB	M
68	Marsh Sandpiper	<i>Tringa stagnatilis</i> (Bechstein, 1803)	LC	II		WB	M
	Rostratulidae						
69	Greater Painted-snipe	<i>Rostratula benghalensis</i> (Linnaeus, 1758)	LC	II		WB	R
	Turnicidae						
70	Small Buttonquail	<i>Turnix sylvaticus</i> (Desfontaines, 1789)	LC	II		O	R
71	Barred Buttonquail	<i>Turnix suscitator</i> (J.F. Gmelin, 1789)	LC	II		O	R
	Laridae						
72	Brown-headed Gull	<i>Chroicocephalus brunnicephalus</i> (Jerdon, 1840)	LC	II		WB	M
	X. ACCIPITRIFORMES/ Pandionidae						
73	Osprey	<i>Pandion haliaetus</i> (Linnaeus, 1758)	LC	I		WDB	R
	Accipitridae						
74	Black-winged Kite	<i>Elanus caeruleus</i> (Desfontaines, 1789)	LC	II		O	R
75	Oriental Honey Buzzard	<i>Pernis ptilorhynchus</i> (Temminck, 1821)	LC	II		O	R
76	Egyptian Vulture	<i>Neophron percnopterus</i> (Linnaeus, 1758)	En	I		O	R
77	Crested Serpent Eagle	<i>Spilornis cheela</i> (Latham, 1790)	LC	I		O	R
78	Short-toed Snake Eagle	<i>Circaetus gallicus</i> (J.F. Gmelin, 1788)	LC	I		O	R
79	Changeable Hawk Eagle	<i>Nisaetus cirrhatus</i> (J.F. Gmelin, 1788)	LC	I		O	R
80	Black Eagle	<i>Ictinaetus malayensis</i> (Temminck, 1822)	LC	I		O	R
81	Shikra	<i>Accipiter badius</i> (Gmelin, 1788)	LC	I		O	R
82	Brahminy Kite	<i>Haliastur indus</i> (Boddaert, 1783)	LC	I		WDB	RM
83	Black Kite	<i>Milvus migrans</i> (Boddaert, 1783)	LC	II		O	R
	XI. STRIGIFORMES/ Tytonidae						
84	Common Barn Owl	<i>Tyto alba</i> (Scopoli, 1769)	LC	I		O	R
	Strigidae						
85	Jungle Owlet	<i>Glaucidium radiatum</i> (Tickell, 1833)	LC	II		O	R
86	Spotted Owlet	<i>Athene brama</i> (Temminck, 1828)	LC	II		O	R
87	Indian Eagle-owl	<i>Bubo bengalensis</i> (Franklin, 1831)	LC	I		O	R
88	Brown Fish Owl	<i>Ketupa zeylonensis</i> (J.F. Gmelin, 1788)	LC	I		WDB	R
	XII. BUCEROTIFORMES/ Bucerotidae						
89	Indian Grey Hornbill	<i>Ocyrceros birostris</i> (Scopoli, 1786)	LC	II	Biome 11	O	RM
	Upupidae						
90	Common Hoopoe	<i>Upupa epops</i> (Linnaeus, 1758)	LC	II		O	RM
	XIII. PICIFORMES/ Picidae						
91	Black-rumped Flameback	<i>Dinopium benghalense</i> (Linnaeus, 1758)	LC	II	Biome 11	O	R
92	Rufous Woodpecker	<i>Micropternus brachyurus</i> (Vieillot, 1818)	LC	II		O	R
93	Brown-capped Pygmy Woodpecker	<i>Yungipicus nanus</i> (Vigors, 1832)	LC	II		O	R
94	Yellow-crowned Woodpecker*	<i>Leiopicus mahrattensis</i> (Latham, 1801)	LC	I	Biome 11	O	R
	Ramphastidae						
95	Brown-headed Barbet	<i>Psilopogon zeylanicus</i> (J.F. Gmelin, 1788)	LC	II	Biome 11	O	R
96	Coppersmith Barbet	<i>Psilopogon haemacephalus</i> (Statius Muller, 1776)	LC	II		O	R
	XIV. CORACIIFORMES/ Meropidae						

97	Green Bee-eater	<i>Merops orientalis</i> (Latham, 1801)	LC	II		O	R
	Coraciidae						
98	Indian Roller	<i>Coracias benghalensis</i> (Linnaeus, 1758)	LC	II		O	R
	Alcedinidae						
99	Common Kingfisher	<i>Alcedo atthis</i> (Linnaeus, 1758)	LC	II		WDB	RM
100	Blue-eared Kingfisher	<i>Alcedo meninting</i> (Horsfield, 1821)	LC	II		WDB	R
101	Pied Kingfisher	<i>Ceryle rudis</i> (Linnaeus, 1758)	LC	II		WDB	R
102	Stork-billed Kingfisher	<i>Pelargopsis capensis</i> (Linnaeus, 1766)	LC	II		WDB	R
103	White-throated Kingfisher	<i>Halcyon smyrnensis</i> (Linnaeus, 1758)	LC	II		WDB	R
	XV. FALCONIFORMES/ Falconidae						
104	Common Kestrel	<i>Falco tinnunculus</i> (Linnaeus, 1758)	LC	II		O	M
	XVI. PSITTACIFORMES/ Pittaculidae						
105	Plum-headed Parakeet	<i>Psittacula cyanocephala</i> (Linnaeus, 1766)	LC	II	Biome 11	O	R
106	Alexandrine Parakeet	<i>Psittacula eupatria</i> (Linnaeus, 1766)	NT	II		O	R
107	Rose-ringed Parakeet	<i>Psittacula krameri</i> (Scopoli, 1769)	LC	II		O	R
	XVII. PASSERIFORMES/ Campephagidae						
108	Small Minivet	<i>Pericrocotus cinnamomeus</i> (Linnaeus, 1766)	LC	I	Biome 11	O	R
109	Scarlet Minivet	<i>Pericrocotus speciosus</i> (Latham, 1790)	LC	II		O	RM
110	Black-headed Cuckooshrike	<i>Lalage melanoptera</i> (Rüppell, 1839)	LC	II	Biome 11	O	PM
111	Large Cuckooshrike	<i>Coracina macei</i> (R. Lesson, 1831)	LC	II		O	R
	Oriolidae						
112	Black-hooded Oriole	<i>Oriolus xanthornus</i> (Linnaeus, 1758)	LC	II		O	R
113	Indian Golden Oriole	<i>Oriolus kundoo</i> (Sykes, 1832)	LC	II		O	RM
	Vangidae						
114	Common Woodshrike	<i>Tephrodornis pondicerianus</i> (J.F. Gmelin, 1789)	LC	II	Biome 11	O	R
	Aegithinidae						
115	Common Iora	<i>Aegithina tiphia</i> (Linnaeus, 1758)	LC	II		O	R
	Dicruridae						
116	Black Drongo	<i>Dicrurus macrocercus</i> (Vieillot, 1817)	LC	II		O	R
117	Ashy Drongo	<i>Dicrurus leucophaeus</i> (Vieillot, 1817)	LC	II		O	M
118	White-bellied Drongo	<i>Dicrurus caerulescens</i> (Linnaeus, 1758)	LC	II	Biome 11	O	R
119	Hair-crested Drongo	<i>Dicrurus hottentottus</i> (Linnaeus, 1766)	LC	II		O	R
120	Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i> (Linnaeus, 1766)	LC	II		O	R
	Rhipiduridae						
121	White-throated Fantail	<i>Rhipidura albicollis</i> (Vieillot, 1818)	LC	II		O	R
	Laniidae						
122	Brown Shrike	<i>Lanius cristatus</i> (Linnaeus, 1758)	LC	II		O	M
123	Long-tailed Shrike	<i>Lanius schach</i> (Linnaeus, 1758)	LC	II		O	R
	Corvidae						
124	Rufous Treepie	<i>Dendrocitta vagabunda</i> (Latham, 1790)	LC	II		O	R
125	House Crow	<i>Corvus splendens</i> (Vieillot, 1817)	LC			O	R
126	Large-billed Crow	<i>Corvus macrorhynchos</i> (Wagler, 1827)	LC	II		O	R
	Monarchidae						
127	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i> (Linnaeus, 1758)	LC	II		O	RM
	Dicaeidae						
128	Thick-billed Flowerpecker	<i>Dicaeum agile</i> (Tickell, 1833)	LC	II		O	R
129	Pale-billed Flowerpecker	<i>Dicaeum erythrorhynchos</i> (Latham, 1790)	LC	II		O	R
	Nectariniidae						
130	Purple Sunbird	<i>Cinnyris asiaticus</i> (Latham, 1790)	LC	II		O	R
	Irenidae						
131	Golden-fronted Leafbird	<i>Chloropsis aurifrons</i> (Temminck, 1829)	LC	II		O	R
	Ploceidae						
132	Baya Weaver	<i>Ploceus philippinus</i> (Linnaeus, 1766)	LC	II		O	R
	Estrildidae						
133	Scaly-breasted Munia	<i>Lonchura punctulata</i> (Linnaeus, 1758)	LC	II		O	R
134	Tricoloured Munia	<i>Lonchura malacca</i> (Linnaeus, 1766)	LC	II		O	R
	Passeridae						
135	House Sparrow	<i>Passer domesticus</i> (Linnaeus, 1758)	LC	II		O	R
136	Yellow-throated Sparrow	<i>Gymnoris xanthocollis</i> (E. Burton, 1838)	LC	II		O	R
	Motacillidae						

137	Tree Pipit	<i>Anthus trivialis</i> (Linnaeus, 1758)	LC	II		O	M
138	Olive-backed Pipit	<i>Anthus hodgsoni</i> (Richmond, 1907)	LC	II		O	M
139	Water Pipit	<i>Anthus spinoletta</i> (Linnaeus, 1758)	LC	II		WDB	M
140	Paddyfield Pipit	<i>Anthus rufulus</i> (Vieillot, 1818)	LC	II		O	R
141	Blyth's Pipit	<i>Anthus godlewskii</i> (Taczanowski, 1876)	LC	II		O	M
142	Tawny Pipit	<i>Anthus campestris</i> (Linnaeus, 1758)	LC	II		O	M
143	Western Yellow Wagtail	<i>Motacilla flava</i> (Linnaeus, 1758)	LC	II		WDB	M
144	Grey Wagtail	<i>Motacilla cinerea</i> (Tunstall, 1771)	LC	II		WDB	M
145	White-browed Wagtail	<i>Motacilla maderaspatensis</i> (Gmelin, 1789)	LC	II		WDB	R
146	White Wagtail	<i>Motacilla alba</i> (Linnaeus, 1758)	LC	II		WDB	M
	Paridae						
147	Indian Black-lored Tit	<i>Machlolophus aplonotus</i> (Blyth, 1847)	LC	II		O	R
	Alaudidae						
148	Greater Short-toed Lark	<i>Calandrella brachydactyla</i> (Leisler, 1814)	LC	II		O	M
	Cisticolidae						
149	Zitting Cisticola	<i>Cisticola juncidis</i> (Rafinesque, 1810)	LC	II		O	R
150	Grey-breasted Prinia	<i>Prinia hodgsonii</i> (Blyth, 1844)	LC	II		O	R
151	Ashy Prinia	<i>Prinia socialis</i> (Sykes, 1832)	LC	II	Biome 11	O	R
152	Plain Prinia	<i>Prinia inornata</i> (Sykes, 1832)	LC	II		O	R
153	Common Tailorbird	<i>Orthotomus sutorius</i> (Pennant, 1769)	LC	II		O	R
	Hirundinidae						
154	Streak-throated Swallow	<i>Petrochelidon fluvicola</i> (Blyth, 1855)	LC	II		WDB	R
155	Red-rumped Swallow	<i>Cecropis daurica</i> (Laxmann, 1769)	LC	II		WDB	R
156	Wire-tailed Swallow	<i>Hirundo smithii</i> (Leach, 1818)	LC	II		WDB	R
157	Barn Swallow	<i>Hirundo rustica</i> (Linnaeus, 1758)	LC	II		WDB	M
	Pycnonotidae						
158	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i> (Linnaeus, 1758)	LC	II		O	R
159	Red-vented Bulbul	<i>Pycnonotus cafer</i> (Linnaeus, 1766)	LC	II		O	R
	Phylloscopidae						
160	Green Warbler	<i>Phylloscopus nitidus</i> (Blyth, 1843)	LC	II		O	M
161	Greenish Warbler	<i>Phylloscopus trochiloides</i> (Sundevall, 1837)	LC	II		O	M
	Sylviidae						
162	Yellow-eyed Babbler	<i>Chrysomma sinense</i> (J.F. Gmelin, 1789)	LC	II		O	R
	Zosteropidae						
163	Oriental White-eye	<i>Zosterops palpebrosus</i> (Temminck, 1824)	LC	II		O	R
	Leiothrichidae						
164	Common Babbler	<i>Argya caudata</i> (Dumont, 1823)	LC	II		O	R
165	Jungle Babbler	<i>Turdoides striata</i> (Dumont, 1823)	LC	II	Biome 11	O	R
	Sturnidae						
166	Asian Pied Starling	<i>Gracupica contra</i> (Linnaeus, 1758)	LC	II		O	R
167	Brahminy Starling	<i>Sturnia pagodarum</i> (Gmelin, 1789)	LC	II	Biome 11	O	R
168	Chestnut tailed Starling	<i>Sturnia malabaricus</i> (Gmelin, 1789)	LC	II	Biome 11	O	R
169	Common Myna	<i>Acridotheres tristis</i> (Linnaeus, 1766)	LC	II		O	R
170	Bank Myna	<i>Acridotheres ginginianus</i> (Latham, 1790)	LC	II	Biome 11	O	R
	Muscicapidae						
171	Indian Robin	<i>Saxicoloides fulicatus</i> (Linnaeus, 1766)	LC	II	Biome 11	O	R
172	Oriental Magpie-Robin	<i>Copsychus saularis</i> (Linnaeus, 1758)	LC	II		O	R
173	Asian Brown Flycatcher	<i>Muscicapa dauurica</i> (Pallas, 1811)	LC	II		O	M
174	Grey-headed Canary-flycatcher	<i>Culicicapa ceylonensi</i> (Swainson, 1820)	LC	II		O	R
175	Taiga Flycatcher	<i>Ficedula albicilla</i> (Pallas, 1811)	LC	II		O	M
176	White-rumped Shama	<i>Kittacincla malabarica</i> (Scopoli, 1786)	LC	II		O	R
177	Tickell's Blue Flycatcher	<i>Cyornis tickelliae</i> (Blyth, 1843)	LC	II		O	R
178	Verditer Flycatcher	<i>Eumyias thalassina</i> (Swainson, 1838)	LC	II		O	M
179	Little Pied Flycatcher	<i>Ficedula westermanni</i> (Sharpe, 1888)	LC	II		O	M
180	Ultramarine Flycatcher	<i>Ficedula superciliaris</i> (Jerdon, 1840)	LC	II		O	M
181	Jerdon's Bushchat	<i>Saxicola jerdoni</i> (Blyth, 1867)	LC	II		O	R
182	Black Redstart	<i>Phoenicurus ochruros</i> (S.G. Gmelin, 1774)	LC	II		O	M
183	Brown Rock Chat	<i>Oenanthe fusca</i> (Blyth, 1851)	LC	II	Biome 11	O	R

Turnidae						
184	Scaly Thrush	<i>Zoothera dauma</i> (Latham, 1790)	LC	II	O	M

Among the recorded species, 22 bird species were identified as restricted assemblage species of Biome 11 (Indo-Malayan Tropical Dry Zone) based on the biome classification by BirdLife International (Rahmani *et al.*, 2016). Furthermore, 9 globally threatened bird species were recorded, among these, 6 species, namely Ferruginous Duck (*Aythya nyroca*), Black-necked Stork (*Ephippiorhynchus asiaticus*), Woolly-necked Stork (*Ciconia episcopus*), Black-headed Ibis (*Threskiornis melanocephalus*), Oriental Darter (*Anhinga melanogaster*), and Alexandrine Parakeet (*Psittacula eupatria*) are enlisted as near threatened (NT), 2 species Common Pochard (*Aythya ferina*), and Lesser Adjutant (*Leptoptilos javanicus*), are enlisted as vulnerable, whereas 1 species Egyptian Vulture (*Neophron percnopterus*) is enlisted as Endangered (En) as per the IUCN Red List, and the rest are least concern. Furthermore, a total of 19 species are listed in Schedule I, as per the WPA, 1972 (as amended in 2022), and the remaining species are listed in Schedule II, except the House Crow (Table 1). The status of avifauna as per the IUCN Red List, Schedule species (WPA, 1972; Amended 2022), and Biome restricted species of Topchanchi Wildlife Sanctuary, including Topchanchi Lake, are provided in Table 2.

There is perhaps no scientific record of avian study of TWLS, except work done on the identification of IBA (Important Bird and Biodiversity Area), which reports 141 species of birds, including 4 Globally Threatened species and 17 biome-restricted assemblage species (Satya Prakash in Rahmani *et al.*, 2016). The black-necked stork was observed by Arvind Mishra about three decades ago (*personal communication*). The Sanctuary, including the Lake, provides a suitable habitat for Biome 11: Indo-Malayan Tropical Dry Zone species. During the present study, 22 Biome 11 species were recorded from TWLS, including those found at Topchanchi Lake.

Previously, some work on Topchanchi Lake has been conducted by Prakash *et al.* (2010, 2015, 2016, and 2018) and Kumar *et al.* (2021). Notably, Prakash *et al.* (2010) reported a total of 92 bird species. However, other studies have primarily focused on wetland birds (Kumar *et al.*, 2021) or have been limited to data gathered during the Asian Waterbird Census (Prakash *et al.*, 2015, 2016, 2018). This current work provides a comprehensive scientific checklist of 184 bird species, which may inspire other researchers to pursue additional studies in the area.

Table 2: Status of avifauna as per IUCN Red List, Schedule species (WPA,1972), and Biome restricted species of Topchanchi Wildlife Sanctuary, including Topchanchi Lake

Sl. No.	Common Name	Scientific Name	IUCN Status	WPA, 1972 Status (Amended, 2022)	Biome
1	2	3	4	5	6
1	Common Pochard	<i>Aythya ferina</i>	Vu	I	
2	Ferruginous Duck	<i>Aythya nyroca</i>	NT	II	
3	Tufted Duck	<i>Aythya fuligula</i>	LC	II	
4	Indian Peafowl	<i>Pavo cristatus</i>	LC	I	Biome 11
5	Jungle Bush Quail	<i>Perdica asiatica</i>	LC	II	Biome 11
6	Yellow-footed Green Pigeon	<i>Treron phoenicopterus</i>	LC	II	Biome 11
7	Indian Nightjar	<i>Caprimulgus asiaticus</i>	LC	II	Biome 11
8	Crested Treeswift	<i>Hemiprocne coronata</i>	LC	I	
9	Lesser Adjutant	<i>Leptoptilos javanicus</i>	Vu	I	
1	2	3	4	5	6
10	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i> (Gmelin, JF, 1789)	LC	I	
11	Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	NT	II	
12	Woolly-necked Stork	<i>Ciconia episcopus</i>	NT	II	
13	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	NT	II	
14	Red-naped Ibis	<i>Pseudibis papillosa</i>	LC	II	Biome 11
15	Oriental Darter	<i>Anhinga melanogaster</i>	NT	II	
16	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	LC	II	Biome 11
17	Common Greenshank	<i>Tringa nebularia</i>	LC	I	
18	Osprey	<i>Pandion haliaetus</i>	LC	I	
19	Egyptian Vulture	<i>Neophron percnopterus</i>	En	I	
20	Crested Serpent Eagle	<i>Spilornis cheela</i>	LC	I	
21	Short-toed Snake Eagle	<i>Circaetus gallicus</i>	LC	I	
22	Changeable Hawk Eagle	<i>Nisaetus cirrhatus</i>	LC	I	
23	Black Eagle	<i>Ictinaetus malayensis</i>	LC	I	
24	Shikra	<i>Accipiter badius</i>	LC	I	
25	Brahminy Kite	<i>Haliastur indus</i>	LC	I	
26	Common Barn Owl	<i>Tyto alba</i>	LC	I	
27	Indian Eagle-owl	<i>Bubo bengalensis</i>	LC	I	
28	Brown Fish Owl	<i>Ketupa zeylonensis</i>	LC	I	
29	Indian Grey Hornbill	<i>Ocyrceros birostris</i>	LC	II	Biome 11
30	Black-rumped Flameback	<i>Dinopium benghalense</i>	LC	II	Biome 11
31	Yellow-crowned Woodpecker	<i>Leiopicus mahrattensis</i>	LC	I	Biome 11
32	Brown-headed Barbet	<i>Psilopogon zeylanicus</i>	LC	II	Biome 11
33	Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	LC	II	Biome 11
34	Alexandrine Parakeet	<i>Psittacula eupatria</i>	NT	II	

35	Small Minivet	<i>Pericrocotus cinnamomeus</i>	LC	I	Biome 11
36	Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	LC	II	Biome 11
37	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	LC	II	Biome 11
38	White-bellied Drongo	<i>Dicrurus caerulescens</i>	LC	II	Biome 11
39	Ashy Prinia	<i>Prinia socialis</i>	LC	II	Biome 11
40	Jungle Babbler	<i>Turdoides striata</i>	LC	II	Biome 11
41	Brahminy Starling	<i>Sturnia pagodarum</i>	LC	II	Biome 11
42	Chestnut tailed Starling	<i>Sturnia malabaricus</i>	LC	II	Biome 11
43	Bank Myna	<i>Acridotheres ginginianus</i>	LC	II	Biome 11
43	Indian Robin	<i>Saxicoloides fulicatus</i>	LC	II	Biome 11
44	Brown Rock Chat	<i>Oenanthe fusca</i>	LC	II	Biome 11

5. Conservation Threats

Hundreds of villagers, organized in small groups, come from remote areas to collect various species of molluscs. These villagers arrive by the end of February and continue their activities until the onset of the rainy season. The anthropogenic activities associated with molluscs collection disturb the ecosystem in several ways, including creating a food shortage for bird species and causing repeated trampling of the soil substrate. Water birds heavily rely on sand flats, mudflats, and swamps for feeding, resting, and breeding; however, these marshy areas are negatively impacted by constant human activity. Consequently, the water birds that depend on benthic organisms suffer significantly. The trampling disrupts the birds' activity patterns, potentially leading them to relocate or even abandon these habitats altogether.

The problem of soil erosion in the catchment areas surrounding the Nala Dholkatta and Lalki Nala of the Sanctuary is also a concern. Thus, large parts of this wetland become silted up and are subjected to the spread of terrestrial weeds, such as *Lantana camara* and *Ipomoea*. This issue needs to be resolved by creating a series of check dams on these Nalas.

Topchanchi Wildlife Sanctuary is being leased for fishing by MADA. Fishing continues throughout the year. Maximum fishing is done in August and September, with a catch of 100-150kg/day, and the rest of the year, 15kg/day. Boats are frequently used for fishing, and the various types of craft and gear used include different types of boats, sabi jal, khatal jal, and phansa jal. All such activities severely upset the natural biological balance of the Lake, which in turn deters many visiting birds from coming to the Sanctuary and Lake for nesting, roosting, and breeding purposes.

The people residing in surrounding villages are entirely dependent on these forests for fuel and small timber NTFP. The illegal felling of trees can be observed regularly around the Lake, posing a threat to the habitat of birds. Poaching of birds is not very common, but it still occurs, particularly for water birds and other species, especially during the winter season.

Several people visit this place for picnics and recreational activities, as Topchanchi Lake is a significant tourist destination. The movement of vehicles, the sound of loudspeakers they bring along, and littering disturb migratory birds, as well as other birds. There is a need to create awareness about the concept of ecotourism among tourists and locals. A Nature Interpretation Center can be established

to raise awareness among the masses. In addition to this, the pond is also regularly used by locals for washing and bathing purposes, which adds detergent and other chemicals that alter the physicochemical nature of the Lake.

Immediate action is essential to promote advocacy and raise awareness among stakeholders and local communities. This initiative will assist authorities in controlling illegal activities such as bird trapping, fishing, and mollusk collection. Given that Topchanchi Lake is centrally located within the Sanctuary and only 1.5 km from the National Highway, careful consideration must be taken before establishing ecotourism programs in and around the lake. Ecotourism has the potential to provide a significant seasonal income for local residents of neighboring villages. Gaining their trust and support is vital in the current conservation context. This support is crucial for preserving bird habitats and protecting the biodiversity of other species, including benthic organisms.

6. Conclusion

A total of 184 bird species belonging to 17 orders and 61 families were documented during the present study. Among these a total of 22 restricted assemblage species of Biome 11 (Indo-Malayan Tropical Dry Zone), 9 globally threatened (IUCN Red List) species, and 19 Schedule I species, as per The Wildlife (Protection) Act, 1972 (amended, 2022), were documented. The conservation threats include anthropogenic activities such as the collection of molluscs by a large number of villagers, unregulated fishing, excessive tourism, illegal tree felling, hunting, and poaching. The present yearlong study and documentation revealed that Topchanchi Wildlife Sanctuary (IBA), including Topchanchi Lake, is rich in avifaunal diversity, supporting a variety of species of both resident and migratory birds, which provides good scope for birders and conservationists. Furthermore, TWLS is rich in floral and faunal diversity. The present work, accompanied by a comprehensive checklist, will provide and encourage other workers. If protected and groomed, Lake has the potential to become a "Bird Paradise" and other wildlife, too.

Acknowledgement

We extend our sincere gratitude to the PCCF Wildlife and Chief Wildlife Warden of Jharkhand for granting permission and providing invaluable support. We would also like to thank all the DFOs of the Wildlife Division in Hazaribag for their ongoing assistance throughout their tenures over the years. Special appreciation goes to the Range Forest Officer for his consistent support during the study, as well as to the Sub-beat Officers for their valuable time dedicated to the survey.

We are also grateful to Mr. Amit Jain and Mr. Sunil Kumar Mahato for taking the photographs of the birds, which facilitated their proper identification. Additionally, we would like to thank Mr. Ravi Shankar Kumar, Mr. Parikshit Kumar Mahato, and Chanchala Kumari for their unconditional support throughout the study. Furthermore, we extend our appreciation to the members of BNHS/IBCN and NHF/AFNC, as well as the volunteers, forest staff, and local personnel whose names are not listed, for their invaluable support in various ways.

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