

Avian diversity of Mahendri conservation reserve, Warud Tahsil, dist. Amravati, Maharashtra

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Abstract

Birds are versatile and inhabit all kinds of habitat. Maharashtra State supports a wide range of avian diversity, encompassing a variety of bird species across different habitats like wetlands, grasslands, forests, agricultural lands, and urban areas. Numerous studies have highlighted the importance of wild habitats for supporting avian biodiversity and the need for conservation efforts to protect these areas. In this study, focus have been made on the documentation of bird diversity, both local and migratory, from the water bodies, forest and urban areas of Warud tahsil, Dist. Amravati, Maharashtra. During the study, it has been observed that loss of wild habitats, due to human interference, and deforestation is causing serious threats to birds survival and diversity. List of birds, observed during survey, have been made in addition to the earlier check list of Mahendri Reserve Forest, Warud, Amravati.

Keywords: Avian Diversity, Warud, Amravati, Maharashtra

Introduction

Despite rapid decline and deterioration of habitats, the avian diversity in India is quite rich. Large tracts of natural habitats have been converted into industrial, agricultural and urban landscapes impacting the distribution and population of many birds (Ericia *et al.*, 2005; Yahya, 2018) [9, 29]. Loss of natural habitats have forced many bird species to live in urban areas and reproduce there affecting bird species richness, abundance and community structures (Mills *et al.*, 1989; Jokimaki and Huhta, 2000; Cam *et al.*, 2000) [5, 12, 18]. Uncontrolled use of insecticides and pesticides, anthropogenic pressure are adversely affecting the population of common birds residing in and around the human settlements. This loss is more important for countries like India, where the economy is based on the agriculture and horticulture. Birds play an important role as scavengers, pollinators, in dispersal of seeds, and as predators of insect-paste (Nabhan and Buchmann, 1997; Padmavati *et al.*, 2010; Inger *et al.*, 2016; Maas *et al.*, 2016; Martínez and García, 2017; Patode, 2024) [11, 13, 17, 19, 20, 21].

Birds are popular monitoring targets since they can be found in any kind of habitats. Riverine ecosystems are crucial habitats for a wide range of bird species. Monitoring birds diversity can provide information about the quality and health of the ecosystem, ecological resilience and potential impacts on human societies. Consequently, birds serve as excellent indicators of changes and stresses in urban ecosystem (Clereau *et al.*, 1998; Blair, 1999, Savard *et al.*, 2000; Francl and Schnell, 2000) [4, 7, 24]. Water birds occupy several trophic levels in the food chain of wetland ecosystem (Custer and Osborne, 1977) [8]. Riparian zones provide conducive dispersal pathways and sufficient cover for migrating birds supporting higher diversity of bird species (Sinha *et al.*, 2019a; 2019b). Avifauna constitute an important link in the food chain of any ecosystem, and indicates environmental quality of the inhabited area (Bilgramy, 1995).

In India 1353 species of birds are found, which accounts for 13% of the total bird population of the world (Praveen and Jayapal, 2023). Despite protected areas, emerging new threats are threatening the life of birds in India. Nearly 14% of the birds living in human-dominated landscapes and waterscapes are either threatened or near threatened in the world. (Rahmani, 2022) [23].

Birds inventory of Maharashtra state includes 577 species (Mahabal *et al.*, 2005) [15]. 417 bird species have been reported from Vidarbha (Anon, 2009). Wadatkar *et al.* (2016) [1, 28] reported 392 species of birds from the Amravati district of Maharashtra. Study of avian diversity in Amravati district was started hundred years back when Jenkin (DFO) prepared checklist of 33 birds (Nelson, 1925). Sawarkar reported 252 species of birds, Mahabal (2005) [15] recorded 263 birds species and Chaudhari and Wagh (2023) reported 340 species of birds from Melghat forest. Mahajan *et al.* (2012) [16] reported 212 species of birds from Mahendri Reserve Forest of Warud tehsil, dist. Amravati.

Migratory birds connect breeding grounds with the wintering habitats. Conservation of avian species has been deeply rooted in Indian culture and ethos. Many ancient folklores, paintings, sculptures provide illustrative account on watching, eating, taming and even worshiping birds. The Hindu scripture contains several revealing descriptions of birds role in social, religious and cultural ceremony (Yahya, 2018) [29]. In the present era of vanishing forests, home gardens and community parks are providing necessary ecological services to protect the birds diversity. Programs like distribution of bird feeders, nests and water pots; conference, seminar and workshops are creating awareness among the common people.

Study Area

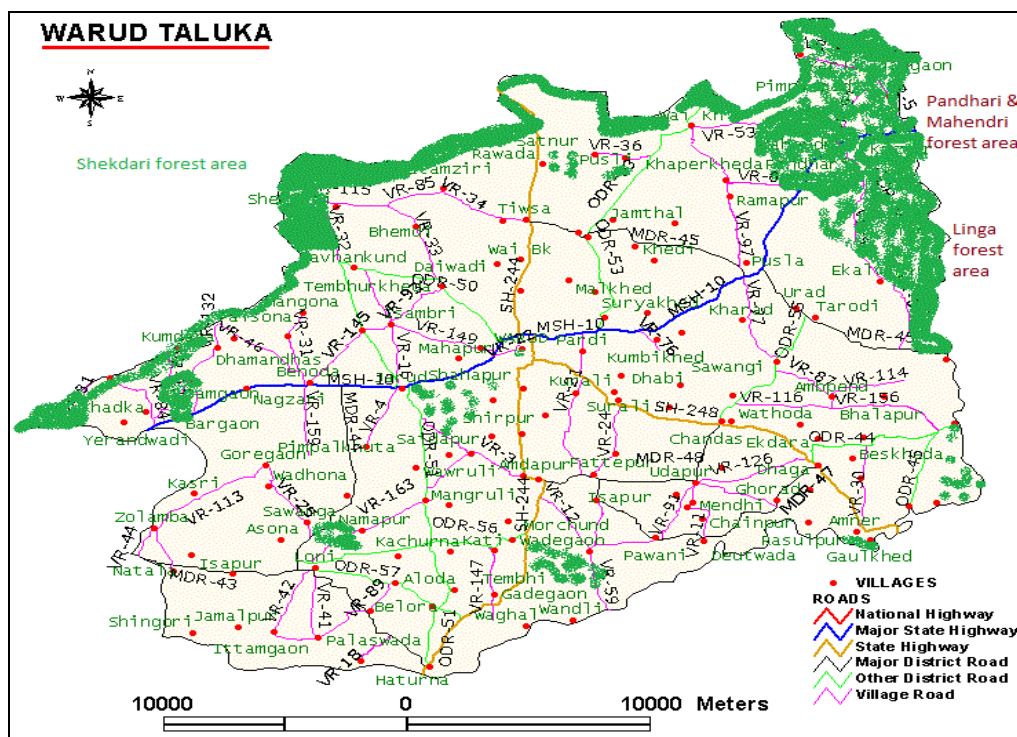
Warud tahsil is the eastern most end of the Amravati district of Maharashtra. It is surrounded by the Hilly Tracts of the Satpuda Ranges along the eastern border adjoining the state of Madhya Pradesh. These Hill Ranges provide a unique

biogeographic habitat for the birds. The river Wardha flows along the Eastern border of the tehsil. The Naldamayanti Sagar Dam constructed on river Wardha provide special habitat for local and migratory birds. The river Chudamani, Bel, Zeera, Jivana, Devana, Hatti, Pak Nala flows through the tahsil. Every year, numerous migratory birds visit these water bodies, which provides an ideal stopover site for goose, ducks and other waders. The Forest of Warud tehsil, Mahendri Conservation Reserve (MCR), serves as a link between Melghat Tiger Project in Amravati district, and Pench Tiger Project of Madhya Pradesh. The tigers have been reported intermittently in the Mahendri Conservation Reserve. The climate of Warud tehsil is hot and dry. Water reservoirs located at Shekhdari, Bhendi, Zatzamziri, Nagthana, Satnur, Pendhoni, Jamgaon, Karli, Ekalvihar, Ganeshpur, Pandhari, Dabhi, Fatehpur, Pusla, Paknala, Lohadra, and Sawanga provide suitable habitat conditions for local and migratory birds. Mahendri Conservation Reserve (MCR) is a biodiversity rich forest area and the 15th conservation reserve in

Maharashtra, officially notified in 2021. MCR is designated to protect critical wildlife corridors between Bor and Melghat Tiger Reserve. It is dry deciduous forest area, hosting tigers, leopards, Hyenas, jackals, Blue Bull, wolves, sloth bears, wild boar, sambar, Chinkara, spotted deer and various other deer species. MCR is home to critically endangered Forest Owlet, and is spread over 67.82 sq. Km.

Study Method

During this study, extensive survey was carried out from 2011-2024 [6]. The water bodies, forest areas and agricultural fields were visited during different seasons of the year for the study. Some birds were sighted in the urban areas also. Observations were made during the morning and evening hours. The main objective of this study was to create an updated list of birds of Warud tahsil. The birds were sighted using a binocular. The photographs were taken in doubtful cases. The birds were identified with the help of available references, books and checklists. Also consulted with the experts for identification.



Results and Analysis

During the survey, in all, 159 birds were observed in the study area. The migratory status, abundance status and conservation status of the listed birds was calculated. It was found that, of these 159 birds, 122 (76.73 %) birds are residential (R), 04 (2.78%) are Local Migratory (LM), 30

(18.87%) are Winter Migratory (WM) and 03 (2.08%) are Breeding Migratory (BM). Regarding abundance status, 16 (10.06%) birds are abundant, 69 (43.40%) are common, 09 (5.66%) are occasional, 10 (6.29%) are rare, 55 (34.59%) are uncommon. The conservation status shows that, 151 (94.97%) birds are Least Conserved (LC), 06 (3.77%) are Near Threatened (NT) and 02 (1.26%) are Vulnerable (VU).

Table 1: List of birds observed during the survey work in study area-

Sr. No.	Common name	Scientific name	Mig. Status	Abundance	Conservation status
1	Little grebe	Trachybaptus ruficolis	R	C	LC
2	Oriental darter	Anhinga melanogaster	LM	U	LC
3	Little cormorant	Phalacrocorax niger	R	C	LC
4	Great cormorant	Phalacrocorax aerbo	LM	O	LC
5	Little egret	Egreta garzetta	R	U	LC
6	Cattle egret	Bubulcus ibis	R	A	LC
7	Great egret	Casmerodius albu	R	U	LC
8	Median egret	Ardea intermedia	R	U	LC

9	Indian pond heron	<i>Ardiola greyii</i>	R	C	LC
10	Grey heron	<i>Ardea cinerea</i>	LM	U	LC
11	Purple heron	<i>Ardea purpurea</i>	LM	U	LC
12	Black crowned night heron	<i>Nycticorax nycticorax</i>	R	U	LC
13	Black ibis	<i>Pseudibis papillosa</i>	R	U	LC
14	Eurasian spoonbill	<i>Platalea leucorodia</i>	R	U	LC
15	Painted stork	<i>Mycteria leucocephala</i>	R	O	LC
16	Oriental white ibis	<i>Threskiornis melanocephalus</i>	R	U	LC
17	Asian Openbill	<i>Anastomus oscitans</i>	R	U	LC
18	White necked stork	<i>Ciconia episcopus</i>	R	U	NT
19	Black stork	<i>Ciconia nigra</i>	WM	R	LC
20	Lesser whistling duck	<i>Dendrocygna javanica</i>	R	C	LC
21	Greylag goose	<i>Anser anser</i>	WM	R	LC
22	Bar headed goose	<i>Anser indicus</i>	WM	R	LC
23	Ruddy shelduck	<i>Tadorna ferrugins</i>	WM	U	LC
24	Comb duck	<i>Sarkidiornis sylvicola</i>	R	U	LC
25	Cotton teal	<i>Nettapus coromandelianus</i>	R	C	LC
26	Spot billed duck	<i>Anas poecilorhyncha</i>	R	C	LC
27	Nothern pintail	<i>Anas acuta</i>	WM	C	LC
28	Red crested pochard	<i>Rhodonessa ruffina</i>	WM	C	LC
29	Black shoulder kite	<i>Elanus caeruleus</i>	R	C	LC
30	Short toed snake eagle	<i>Circaetus galitus</i>	R	U	LC
31	Crested serpent eagle	<i>Spilornis cheela</i>	R	O	LC
32	Shikra	<i>Accipiter badius</i>	R	C	LC
33	Eurasian sparrow hawk	<i>Accipiter nisus</i>	WM	R	LC
34	Tawny eagle	<i>Aquila rapax</i>	R	R	VU
35	Painted francolin	<i>Francolinus pictus</i>	R	C	LC
36	Gray francolin	<i>Ortygornis pondicerianus</i>	R	C	LC
37	Gray junglefowl	<i>Gallus sonneratii</i>	R	O	LC
38	Indian pea fowl	<i>Pavo cristatus</i>	R	C	LC
39	White breasted waterhen	<i>Amaurornis phoenicurus</i>	R	C	LC
40	Purple moorhen	<i>Porphyrio porphyrio</i>	R	C	LC
41	Common moorhen	<i>Gallinula chloropus</i>	R	C	LC
42	Common coot	<i>Fullca atra</i>	R	C	LC
43	Pheasant tailed jacana	<i>Hydrophasianus chirurgus</i>	R	U	LC
44	Bronze winged jacana	<i>Metopidius indicus</i>	R	U	LC
45	greater painted snipe	<i>Rostratula benghalensis</i>	R	U	LC
46	Little ringed plover	<i>Charadrius dubius</i>	R	C	LC
47	Yellow wattled lapwing	<i>Vanellus malabaricus</i>	R	C	LC
48	Red wattled lapwing	<i>Vanellus indicus</i>	R	C	LC
49	Common redshank	<i>Tringa totanus</i>	WM	U	LC
50	Wood sandpiper	<i>Tringa glariola</i>	WM	C	LC
51	Common sandpiper	<i>Actitis hypoleucos</i>	WM	C	LC
52	Black winged stilt	<i>Himantopus himantopus</i>	R	C	LC
53	Stone curlew	<i>Burhinus indicus</i>	R	U	LC
54	River tern	<i>Sterna aurantia</i>	R	C	NT
55	Blue rock pigeon	<i>Columba livia</i>	R	C	LC
56	Oriental turtle dove	<i>Streptopelia orientalis</i>	R	C	LC
57	Laughing dove	<i>Streptopelia senegalensis</i>	R	C	LC
58	Spotted dove	<i>Spilopelia chinensis</i>	R	C	LC
59	Red collared dove	<i>Streptopelia tranquebarica</i>	R	C	LC
60	Eurasian collared dove	<i>Streptopelia decaocto</i>	R	C	LC
61	Yellow footed green pigeon	<i>Treeron phoenicopterus</i>	R	U	LC
62	Alexandrine parakeet	<i>Psittacula eupatria</i>	R	U	NT
63	Rosed ringed parakeet	<i>Psittacula krameri</i>	R	A	LC
64	Plum headed parakeet	<i>Psittacula cyanocephala</i>	R	C	LC
65	Pied cuckoo	<i>Clamator jacobinus</i>	BM	C	LC
66	Common hawk cuckoo	<i>Hierococcyx varius</i>	R	C	LC
67	Grey bellied cuckoo	<i>Cacomantis passerinus</i>	R	U	LC
68	Asian koel	<i>Eudynamis scolopaceus</i>	R	A	LC
69	Greater coucal	<i>Centropus sinensis</i>	R	C	LC
70	Barn owl	<i>Tyto alba</i>	R	C	LC
71	Eurasian eagle owl	<i>Bubo bubo bengarensis</i>	R	U	LC
72	Jungle owlet	<i>Glaucidium radiatum</i>	R	U	LC
73	Spotted owlet	<i>Athene brama</i>	R	C	LC
74	Forest owlet	<i>Athene blewitti</i>	R	R	LC
75	Indian nightjar	<i>Caprimulgus asiaticus</i>	R	C	LC
76	Asian palm swift	<i>Cypsiurus balasiensis</i>	R	C	LC

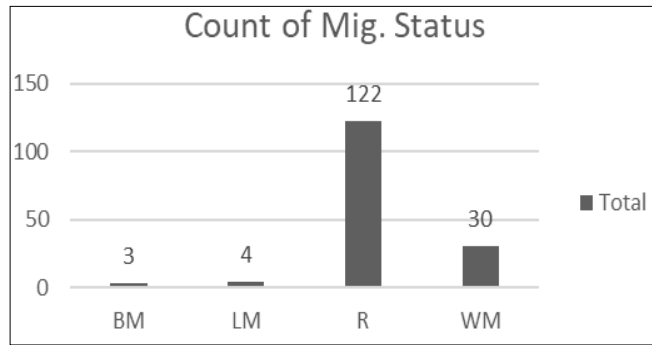
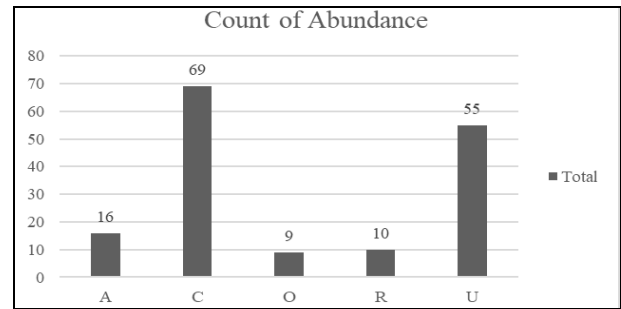
77	House swift	<i>Apus affinis</i>	R	A	LC
78	Common kingfisher	<i>Alcedo atthis</i>	R	C	LC
79	White throated kingfisher	<i>Halcyon smymensis</i>	R	C	LC
80	Pied kingfisher	<i>Ceryx rudis</i>	R	C	LC
81	Green bee eater	<i>Merops orientalis</i>	R	A	LC
82	Indian Roller	<i>Coracias benghalensis</i>	R	C	LC
83	Common hoopoe	<i>Upupa epops</i>	R	U	LC
84	Indian grey hornbill	<i>Ocyrocus birostris</i>	R	U	LC
85	Coppersmith barbet	<i>Psilopogon haemacephalus</i>	R	C	LC
86	Lesser flameback	<i>Dinopium benghalense</i>	R	C	LC
87	Indian pitta	<i>Pitta brachyuran</i>	BM	U	LC
88	Rufous Tailed lark	<i>Ammomanes phoenicura</i>	R	C	LC
89	Ashy crowned sparrow lark	<i>Eremopterix griseus</i>	R	C	LC
90	Dusky crag martin	<i>Hirundo concolor</i>	R	C	LC
91	Wire tailed swallow	<i>Hirundo smithii</i>	R	A	LC
92	Red rumped swallow	<i>Hirundo daurica</i>	R	A	LC
93	White wagtail	<i>Motacilla alba</i>	WM	C	LC
94	White browed wagtail	<i>Motacilla maderaspatensis</i>	R	C	LC
95	Citrine wagtail	<i>Motacilla citreola</i>	WM	U	LC
96	Yellow wagtail	<i>Motacilla flava</i>	WM	U	LC
97	Paddyfield pipit	<i>Anthus rufulus</i>	R	C	LC
98	Small minivet	<i>Pericrocotus cinnamomeus</i>	R	U	LC
99	Red wented bulbul	<i>Pycnonotus cafer</i>	R	A	LC
100	White browed bulbul	<i>Pycnonotus luteolus</i>	R	U	LC
101	Common iora	<i>Aegithina tiphia</i>	R	C	LC
102	Bay backed shrike	<i>Lanius vittatus</i>	R	C	LC
103	Long tailed shrike	<i>Lanius schach</i>	R	C	LC
104	Oriental magpie robbin	<i>Copsychus saularis</i>	R	C	LC
105	Indian robin	<i>Copsychus fulicatus</i>	R	C	LC
106	Pied bushchat	<i>Saxicola caprata</i>	R	U	LC
107	Yellow eyed babbler	<i>Chrysomma sinense</i>	R	U	LC
108	Common babbler	<i>Argya caudata</i>	R	U	LC
109	Large grey babbler	<i>Argya malcolmi</i>	R	C	LC
110	Jungle babbler	<i>Turdoides striata</i>	R	C	LC
111	Common tailor bird	<i>Orthotomus sutorius</i>	R	A	LC
112	Ashy prinia	<i>Prinia socialis</i>	R	A	LC
113	Plain prinia	<i>Prinia inornata</i>	R	C	LC
114	Lesser whitethroat	<i>Sylvia curruca</i>	WM	U	LC
115	Tickels blue flycatcher	<i>Cyornis tickelliae</i>	R	O	LC
116	Asian paradise flycatcher	<i>Terpsiphone paradisi</i>	R	U	LC
117	Common woodshrike	<i>Tephrodornis pondicerianus</i>	R	U	LC
118	Whitethroated fantail	<i>Rhipidura albicollis</i>	R	O	LC
119	Whitespotted fantail	<i>Rhipidura albogularis</i>	R	U	LC
120	Cinereous tit	<i>Parus cinereus</i>	R	O	LC
121	Black lored tit	<i>Parus aplonotus</i>	R	U	LC
122	Purple rumped sunbird	<i>Leptocoma zeylonica</i>	R	C	LC
123	Purple sunbird	<i>Cinnyris asiaticus</i>	R	C	LC
124	Indian Silverbill	<i>Lonchura malabarica</i>	R	A	LC
125	Scaly breasted munia	<i>Lonchura punctulata</i>	R	C	LC
126	House sparrow	<i>Passer domesticus</i>	R	A	LC
127	Baya weaver	<i>Ploceus philippinus</i>	R	C	LC
128	Bramhini starling	<i>Sturnia pagodarum</i>	R	A	LC
129	Rosy starling	<i>Pastor roseus</i>	WM	C	LC
130	Asian pied starling	<i>Gracupica contra</i>	R	C	LC
131	Common myna	<i>Acridotheres tristis</i>	R	A	LC
132	Jungle myna	<i>Acridotheres fuscus</i>	R	O	LC
133	Eurasian golden oriole	<i>Oriolus oriolus</i>	R	C	LC
134	Black hooded oriole	<i>Oriolus xanthornus</i>	R	U	LC
135	Black drongo	<i>Dierurus macrocercus</i>	R	A	LC
136	Rufous treepie	<i>Dendrocitta vagabunda</i>	R	U	LC
137	House crow	<i>Corvus splendens</i>	R	A	LC
138	Large billed crow	<i>Corvus macrorhynchos</i>	R	U	LC
139	Indian cuckoo shrike	<i>Coracina macei</i>	R	U	LC
140	Small pratincole	<i>Glareola lactea</i>	R	U	LC
141	Grey headed flycatcher	<i>Culicicapa ceylonensis</i>	BM	U	LC
142	Jungle prinia	<i>Prinia sylvatica</i>	R	U	LC
143	Blyth's reed warbler	<i>Acrocephalus dumetorum</i>	WM	C	LC
144	Brown bush hen	<i>Zapornia akool</i>	R	C	LC

145	Eurasian hobby	Falco subbuteo	WM	U	LC
146	Peregrine falcon	Falco peregrinus peregrinator	WM	U	LC
147	Dunlin	Calidris alpina	WM	U	NT
148	Ruff	Calidris pugnax	WM	C	LC
149	Demosile Crane	Grus virgo	WM	U	LC
150	Common Crane	Grus gru	WM	U	LC
151	Terek Sand Piper	Xenus cinereus	WM	R	LC
152	Bonellis eagle	Hieraaetus fasciatus	R	U	LC
153	Indian Coursur	Cursorius coromandelicus	WM	R	NT
154	Kentish Plover	Anarhynchus alexandrinus	WM	U	LC
155	Common shelduck	Tadorna tadorna	WM	R	LC
156	Curlew sandpiper	Calidris ferruginea	WM	U	VU
157	Brown headed gull	Chroicocephalus brunnicephalus	WM	O	LC
158	Green Shank	Tringa nebularia	WM	C	LC
159	Black necked stork	Ephippiorhynchus asiaticus	WM	R	NT

R: Residential; LM: Local Migrant, WM: Winter Migrant; BM: Breeding Migrant; A: Abundant, C: Common; UN: Uncommon; O: Occasional; Rr: Rare; V: Vagrant; LC: Least Conserved; NT: Near Threatened, VU: Vulnerable.

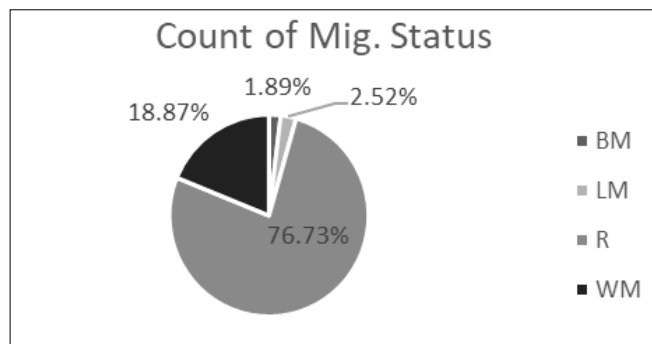
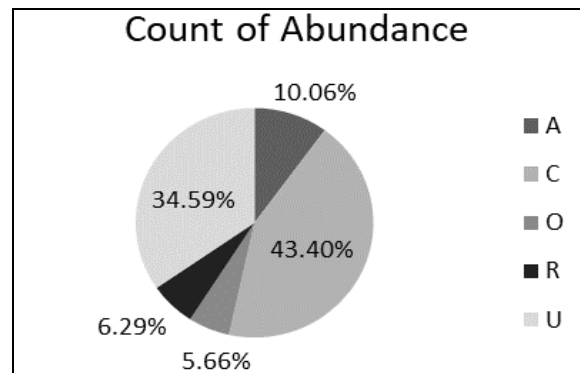
Count of migration status

Mig. Status	Count of Mig. Status
BM	3
LM	4
R	122
WM	30



Abundance	Count of Abundance
A	10.06%
C	43.40%
O	5.66%
R	6.29%
U	34.59%

Mig. Status	Count of Mig. Status
BM	1.89%
LM	2.52%
R	76.73%
WM	18.87%

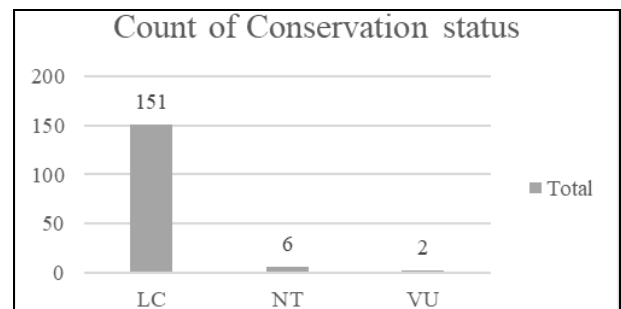


Count of conservation status

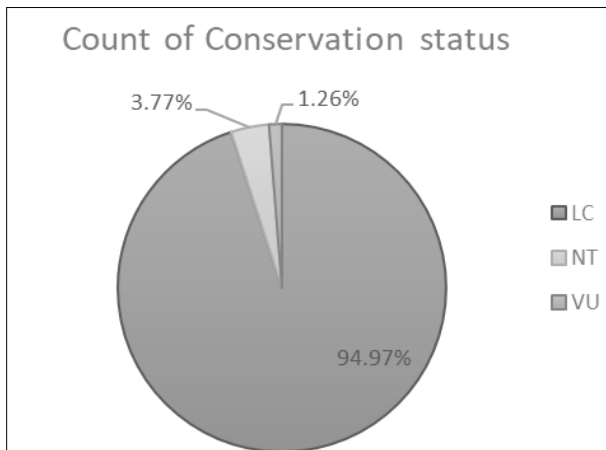
Conservation status	Count of Conservation status
LC	151
NT	6
VU	2

Count of abundance

Abundance	Count of Abundance
A	16
C	69
O	9
R	10
U	55



Conservation status	Count of Conservation status
LC	94.97%
NT	3.77%
VU	1.26%



Discussion

Scientific study of birds has revealed many facets of their life and diversity. Advance technology and new initiatives offer enormous opportunities for their study in natural habitats and to study their interrelationships with physical environment. The availability of forest areas along the Madhya Pradesh border, water reservoirs and riverine ecosystems supports life of large number of residential (84.03%) and migratory (15.97%) birds. Therefore, natural habitats of Warud tahsil provides good opportunities for Ornithological studies. Mahajan *et al.*, (2012) [16] reported 212 bird species from Mahendri Forest of Warud tahsil. During this study, out of 159 bird species, authors have reported 138 bird species already listed in earlier work (Mahajan *et al.*, 2012) [16], and 21 bird species have been reported for the first time from this area.

Birds are known for their long journey to overcome the unfavourable environmental conditions and to reach the suitable feeding and breeding grounds. Thus, birds are constantly exposed to changing environmental factors and human activities. Shifting of rainfall pattern and increase in temperature, due to climate change, is impacting availability of food and water sources to birds. This has also changed the nesting periods of the local birds. Heavy unseasonal rainfall in the month of April and/ or May, for short period, induce early nesting and egg laying in birds like red vented bulbul, magpie robin, etc. This results into death of hatchlings or nestlings. The life of small forest birds has been changed due to deforestation. These birds are shifting towards towns and cities for shelter. Man-made greenery in towns and cities has made this possible for certain birds like white breasted munia, silver billed munia, sunbird, maina, etc. Anthropogenic activities like ecotourism, recreation and brick industry units along the water bodies are disrupting birds breeding grounds and waders areas at most places. Cutting and burning of live fences along the cultivated land, and fencing of steel mesh have also reduced the availability of nesting habitats for birds.

In the study area, threats to avian diversity include loss of habitats, deforestation, urbanization, agricultural intensification, and illegal hunting. Overexploitation of natural resources resulted into habitat changes and altered bird distribution. Orange orchards provide nesting and feeding sites for birds throughout the year. However,

conversion of agricultural land for urban development has reduced nesting and feeding sites for birds. Death of birds in road accidents have been increased due to widening of roads and loss of vegetation in road construction. Increased use of insecticides, and pesticides in the management of orange orchards resulted into contamination of natural resources. This has affected the health of birds. Illegal hunting and trapping of birds, by using fishing nets, for trade and consumption posing a direct threat to migratory birds. Cultivation of land in the back-water area of dam, after decrease in water level of the dam, posing additional threats to migratory birds. While feeding in the waders area, these migratory birds unknowingly enter into cultivated fields and feeds on crop plants e.g. Gram crop. Encounters with farmers results into killing of birds. Stray dogs visiting to water bodies also kill the birds. Migratory birds like Bar Headed Goose, Shelduck, Spot billed duck are usually killed in such encounters. Pintail, dabchick, spot billed duck etc are trapped in fishing nets.

Population of common birds like house sparrows, parakeets, crow, baya weaver birds, etc, are also declining. Reduction in birds population is a global phenomenon. India needs to discuss this issue more seriously as birds play vital role in cleansing the insects and rodent pests from the fields and orchards (Yahya, 2018) [29].

Conclusion

Richness of birds species depends on the characteristics of the area. It includes a network of water bodies which provide feeding grounds for both the local and migratory birds in the winter period. In addition to this, the hilly tracts of forest, river systems provide special habitats and food for the birds.

From conservation point of view, forests of Warud especially Mahendri Conservation Reserve is most important as it serves as a natural corridor for forest animals between the Melghat Tiger Reserve and the Pench National Park, Madhya Pradesh.

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