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Avian Faunal Diversity of Narmada Valley, Jabalpur Region, Madhya Pradesh

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Abstract

Bird's diversity important for endangered ecosystems because birds are good indicator species and their presence could give clues about the overall health of these systems. In the present study richness, abundance, and flight period of birds have been revealed in the tropical ecosystem of Narmada Valley in Jabalpur, Madhya Pradesh. The avian diversity of Narmada Valley and its surrounding areas at Jabalpur district was studied for a period of two years during June 2014 to May 2016. This area inhabits many residential and migratory bird species. In the present survey reported 86 bird species belonging to 70 genuses, 35 families and 13 orders in which 65 species were prominent resident species of the study area. The great variety of different types of plants, availability of food in different seasons, agricultural land, water availability in surrounding areas were favorable conditions for birds to nesting and survival in this area. The study determines various species of birds which will help in preparing a list for the evaluation and comparison of possible changes regarding the bird fauna in the future and provide measures for their conservation.

Keywords: Avian diversity, Narmada valley, Migratory species, Residential species, conservation.

Introduction

Birds are one of the most populous life form in our planet. Their biodiversity leads to a richness of life and beauty. Birds serve as important component to study any ecosystem as they have the ability to fly away and avoid any obnoxious condition. Hence, they are considered as important health marker as well as indicator of the ecological conditions and productivity of an ecosystem (Newton, 1995; Desai and Shanbhag, 2007; Li and Mundkur, 2007). Bird's population frequently used as an indicator of environment quality and are thought to be a useful proxy for assessing the impact of urbanization, anthropogenic activities and human influence on biodiversity. The avifaunal density (Patterson, 1976; Nilsson and Nilsson, 1978), diversity (Krebs, 1985)and richness (Nilsson and Nilsson, 1978; Weller, 1978; Murphy, et al., 1984) mirrors the diversity and richness of habitat and its favorable conditions which is important parameter to study bird Increasing levels of urban densification, anthropogenic activities and human interference are calling attention to those measures that can mitigate urban area effects (Mazza and Rydin, 1997) or compensate for the overload of pollutants in (urban) air and soil (Mc Pherson et al., 1994).

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The bird diversity affected by various factors like the food availability, the size of the green space (Paracuellos, 2006), vegetation (Able and Noon, 1976; Terbrgh, 1985; Hawkins, 1999; Joshi et al., 2012) and abiotic changes in the habitat (Jaksic, 2004; Lagos et al., 2008). Not only the birds but all the organisms, belonging to the plant and the animal communities, are affected by the physical characteristics of the environment (Wilson and Keddy, 1986).

The great variety of different types of plants also makes Narmada Valley of Jabalpur an attracting place for birds to nesting and living. The greater the variety of habitats regardless of the cause, the more likely is that additional bird species can find suitable habitat (Weller, 1978). Forest ecosystem including trees, shrubs and herbs around the large urban area is making the environment of Narmada valley in Jabalpur region full to green. In this direction, the purpose of this paper presents bird species composition, abundance and species diversity in and around Narmada valley in Jabalpur region and also aims to explore the relationship between the urban forest structure and the abundance of certain bird species.

Material and Methods

Jabalpur is one of the important destinations of the country. It has some of the best places of the country. Jabalpur is located between 23°10'N latitude and 79°56'E longitude. The avian fauna field observations of Narmada Valley Jabalpur region were

carried out since June 2014 to May 2016. The birds were monthly observed during most active period of the day i.e., 6:00 am to 9:00 am. However observations were also made during other timing according to the convenience. This report is based on self-sighting the birds using binocular and snapping photographs and recording the location of bird. Field characteristic and identification was done using field guides of Ali and Ripley (1995, 1996) and Grimmett et al., (2000). The checklist was prepared by using standard common and scientific names of the birds of Indian subcontinent by Manakand and Pittie, (2001).

Table I. Checklist of Birds of Narmada valley, Jabalpur (M.P.)

S.No.	Order	Family	Scientific Name	Common Name	Habit	Abundance
1.	**Anseriformes**	*Anatidae*	*Nettapus coromandelianus*	Cotton Teal	**RM**	**C**
2.	**Apodiformes**	*Apodidae*	*Apus affinis*	House Swift	**R**	**C**
3.	**Charradriiformes**	*Charradridae*	*Vanellus malabarius*	Yellow-Wattled Lapwing	**R**	**R**
4.			*Vanellus indicus*	Red-Wattled Lapwing	**R**	**VC**
5.		*Jacanidae*	*Hydrophasianus chirurgus*	Pheasant-Tailed Jacana	**R**	**C**
6.			*Metopedius indicus*	Bronze Winged Jacana	**R**	**C**
7.		*Recurvirostridae*	*Himantopus himantopus*	Black Winged Stilt	**WV**	**NR**
8.		*Scolopacidae*	*Tringa gareola*	Sand Piper	**M**	**C**
9.			*Tringa solitoria*	Semipal Mated Piper	**M**	**NR**
10.	**Ciconiiformes**	*Ardreidae*	*Bubulcus ibis*	Cattle Egret	**R**	**VC**
11.			*Egretta garzetta*	Little Egret	**RM**	**VC**
12.			*Casmerodius albus*	Large Egret	**RM**	**C**
13.			*Ardeola grayii*	Indian Pond Heron	**R**	**VC**
14.			*Mesophoyx intermedia*	Median Egret	**RM**	**C**
15.			*Nycticorax nycticorax*	Black-crowned Night Heron	**RM**	**R**
16.			*Plegadis falcinellus*	Glossy Ibis	**RM**	**NR**
17.		*Anhingidae*	*Anhinga melanogaster*	Darter or Snake Bird	**RM**	**NR**
18.		*Ciconiidae*	*Anastomus oscitance*	Asian Open bill Stork	**RM**	**C**
19.			*Mycteria leucocephala*	Painted Stork	**R**	**C**
20.			*Ciconia nigra*	Black Stork	**WV**	**NR**
21.		*Threskiornithidae*	*Pseudibis papillosa*	Red-napped Ibis	**R**	**NR**
22.	**Columbiformes**	*Columbidae*	*Streptopelia chinensis*	Spotted Dove	**R**	**C**
23.			*Streptopelia tranquebarica*	Red Collard-Dove	**R**	**NR**
24.			*Columba livia*	Blue Rock Pigeon	**R**	**VC**
25.	**Coraciiformes**	*Alcedinidae*	*Ceryle rudis*	Lesser Pied Kingfisher	**RM**	**C**
26.			*Alcedo atthis*	Small Blue Kingfisher	**R**	**VC**
27.			*Halcyon smyrnensis*	White –Breasted Kingfisher	**R**	**VC**
28.		*Meropidae*	*Merops oriaentalis*	Small Bee-Eater	**R**	**C**
29.			*Merops philippinus*	Blue-Tailed Bee Eater	**RM**	**VC**
30.		*Coraciidae*	*Coracias benghalensis*	Indian Roller	**RM**	**VC**

31.		*Upupidae*	*Upupa epops*	Common Hoopoe	**R**	**VC**
32.		*Bucerotidae*	*Ocyceros birostris*	Indian Grey Hornbill	**R**	**C**
33.	**Cuculiformes**	*Cuculidae*	*Eudynamys scolopaceus*	Asian Koel	**R**	**C**
34.			*Centropus sinesis*	Greater Coucal	**R**	**C**
35.	**Falconiformes**	*Accipitridae*	*Haliastur Indus*	Brahmin Kite	**R**	**R**
36.			*Milvus migrans*	Black Kite	**R**	**NR**
37.			*Elanus careuleus*	Black Shouldered Kite	**R**	**NR**
38.			*Accipiter badius*	Shikra	**R**	**C**
39.			*Aquila rapax*	Tawny Eagle	**R**	**R**
40.	**Gruiformes**	*Rallidae*	*Porphyrio porophyrio*	Purple Moorhen	**R**	**C**
41.			*Fulica atra*	Common Coot	**RM**	**C**
42.			*Gallinule chloropus*	Common Moorhen	**RM**	**C**
43.		*Otididae*	*Ardeotis nigricepts*	Great Indian Bustard	**M**	**NR**
44.	**Passeriformes**	*Alaudidae*	*Galerida deva*	Skykes's Crested Lark	**R**	**NR**
45.			*Eremopterix grisea*	Ashy-crowned Sparrow-Lark	**R**	**C**
46.		*Pittidae*	*Pitta brachyuran*	Indian Pitta	**R**	**R**
47.		*Corvidae*	*Dicrurus macrocercus*	Black Drongo	**R**	**NR**
48.			*Corvus macrorhynchos*	Jungle Crow	**R**	**VC**
49.			*Corvus splendens*	House crow	**R**	**C**
50.		*Motacilliadae*	*Motacilla flava*	Yellow-Wagtail	**WV**	**C**
51.			*Motacilla alba*	White-Wagtail	**R**	**C**
52.			*Motacilla maderaspatensis*	Pied Wagtail	**WV**	**C**
53.			*Anthus rufulus*	Paddy field Pipit	**R**	**C**
54.		*Passeridae*	*Amandava amandava*	Red Munia	**R**	**C**
55.			*Passer domesticus*	House Sparrow	**R**	**VC**
56.			*Petronia xanthocollis*	Yellow-Throated Sparrow	**R**	**C**
57.			*Ploceus megarhynchus*	Finn's Weaver	**R**	**NR**
58.		*Hirundinidae*	*Hirundo rustica*	Common Swallow	**R**	**C**
59.			*Hirundo smithii*	Wire-tailed Swallow	**R**	**NR**
60.		*Laniidae*	*Turdoides striat*	Jungle Babbler	**R**	**C**
61.			*Zoothera citrine cyanotus*	White-Throated Thrush	**R**	**NR**
62.			*Saxicoldies fulicatus*	Indian Robin	**R**	**C**
63.			*Sexicola torquala*	Common Syonechat	**R**	**C**
64.			*Turdoides caudatus*	Common Babbler	**R**	**C**
65.			*Prinia socialis stewarti*	Ashy Prinia	**R**	**NR**
66.			*Rhipidura albicollis*	Whight-throted Fintail Flycatcher	**R**	**NR**
67.			*Orthotomus sutorius*	Common Tailor bird	**R**	**C**
68.			*Saxicola caprata*	Pied Bushchat	**R**	**C**
69.			*Laniusschach*	Rufous-Backed Shrike	**R**	**NR**
70.			*Lanius excubitor*	Great Grey Shrike	**R**	**C**

71.			*Phoenicurus ochruros*	Black Redstart	**R**	**C**
72.		*Pyconotidae*	*Pycnonotus cafer*	Red-Vented Bulbul	**R**	**C**
73.			*Pycnonotus melanicterus*	Black-crested Bulbul	**R**	**R**
74.		*Nectariniidae*	*Nectarini azeylonica*	Purple-Ramped Sunbird	**R**	**R**
75.		*Zoosteropidae*	*Zosterops palpebrosus*	Oriental White-eyed	**R**	**C**
76.		*Muscicapidae*	*Myiophonus horsfieldii*	Malabar Whistling-Thrush	**R**	**C**
77.			*Sturnus pagodarum*	Brahminy Starling	**R**	**C**
78.			*Acridotheres trisits*	Common Myna	**R**	**VC**
79.			*Sturnus contra*	Asian Pied Starling	**R**	**C**
80.		*Dicruridae*	*Dicrurus macrocercus*	Black Drongo	**R**	**VC**
81.			*Dicrurus caerulescens*	White-bellied Drongo	**R**	**C**
82.			*Dicrurus paradiseus*	Greater Racket-tailed Drongo	**R**	**NR**
83.	**Pelecaniformes**	*Phalacrocoracidae*	*Phalacrocorox niger*	Little Cormorant	**R**	**VC**
84.	**Psittaciformes**	*Psittacidae*	*Psittacula krameri*	Parakeet	**RM**	**NR**
85.			*Psittacula eupatria*	Alexendrin Parakeet	**R**	**R**
86.	**Strigiformes**	*Strigidae*	*Gluacidium radiatum*	Jungle owlet	**R**	**R**

Flight period of birds was classified as: R- Resident; M- Migrant; RM- Resident Migrant; WV- Winter Visitor. Abundance of birds was classified as: VC- Very Common; C- Common; NR- Not Rare; R- Rare.

Table II. Summarization of collected data of birds in Narmada valley, Jabalpur (M.P.)

S. No.	Name of Order	No. of Families	No. of Genus	No. of Species	Flight Period				Abundance Status			
					R	RM	M	WV	VC	C	R	NR
1.	Anseriformes	1	1	1	-	1	-	-	-	1	-	-
2.	Apodiformes	1	1	1	1	-	-	-	-	1	-	-
3.	Charradriiformes	4	5	7	4	-	2	1	1	3	1	2
4.	Ciconiformes	4	12	12	4	7	-	1	3	4	1	4
5.	Columbiformes	1	2	3	3	-	-	-	1	1	-	1
6.	Coraciiformes	5	7	8	5	3	-	-	5	3	-	-
7.	Cuculiformes	1	2	2	2	-	-	-	-	2	-	-
8.	Falconiformes	1	5	5	5	-	-	-	-	1	2	2
9.	Gruiformes	2	4	4	1	2	1	-	-	3	-	1
10.	Passeriformes	12	28	39	37	-	-	2	4	23	3	9
11.	Pelecaniformes	1	1	1	1	-	-	-	1	-	-	-
12.	Psitariformes	1	1	2	1	1	-	-	-	-	1	1
13.	Strigiformes	1	1	1	1	-	-	-	-	-	1	-
	Grand Total	**35**	**70**	**86**	**65**	**14**	**3**	**4**	**15**	**42**	**9**	**20**

Result and Discussion

A list of recorded birds has been prepared from that area in the present study. All together 86 species of birds belonging to 70 genuses, 35 families and 13 orders were recorded from the study area during study period. Most of the birds fauna are resident and out of these, 65 species were Resident (R), 14 species Resident Migrant (RM), 3 Migratory (M) and 4 were Winter Visitor (WV) species. The recorded data of study has shown that Passeriformes was very rich with 39 species followed by *Ciconiiformes* with 12 species, *Coraciiformes* with 8 species, *Charradriiformes* with 7 species, *Falconiformes* with 5 species, *Gruiformes* with 4 species, *Columbiformes* with 3 species, *Cuculiformes* and *Psittariformes* with 2 species each and *Anseriformes*, *Apodiformes*, *Pelecaniformes* and *Strigiformes* with 1 species each shown in figure I and figure II below.

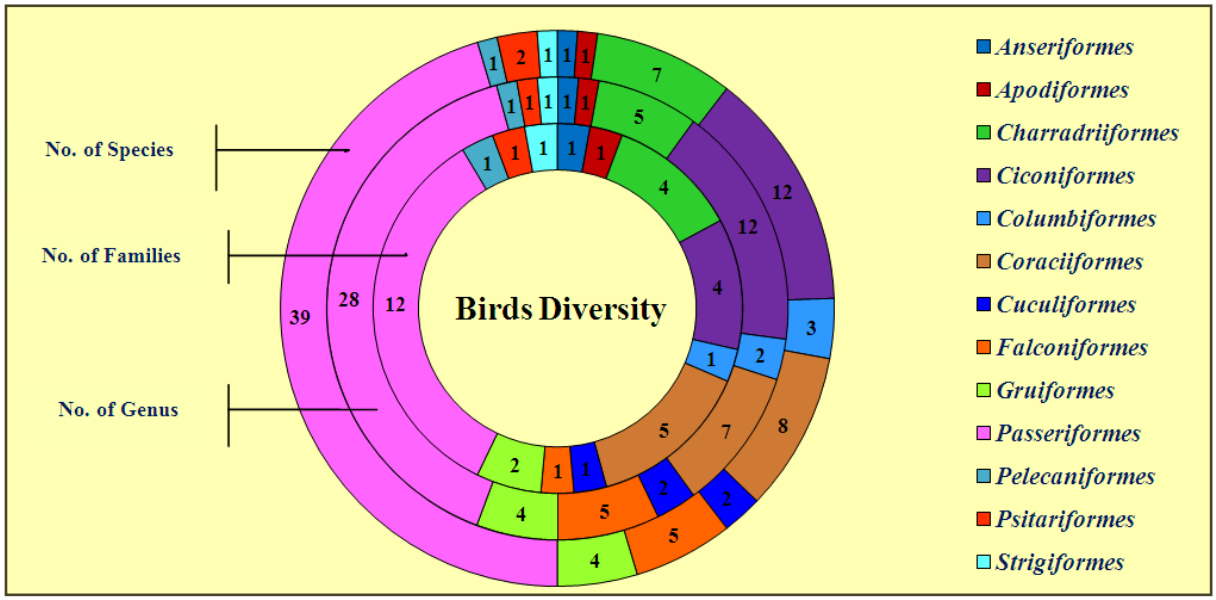

Figure I. Order wise birds diversity in Narmada valley at Jabalpur region, M.P.

Family *Laniidae* had the highest number of bird species (12 species) followed by *Ardeidae* (7 species), and *Accipitridae* (5 species), *Motacilliadae*, *Passeridae* and *Muscicapidae* (4 species) each, *Columbidae*, *Alcedinidae*, *Rallidae*, *Ciconiidae*, *Corvidae* and *Dicruridae* (3 species) each and *Charradridae*, *Jacanidae*, *Meropidae*, *Cuculidae*, *Alaudidae*, *Hirudinidae*, *Pyconotidae* and *Psittacidae* (2 species) each. Family *Anatidae*, *Apodidae*, *Recurvirostridae*, *Anhingidae*, *Threskiornithidae*, *Coraciidae*, *Upupidae*, *Bucerotidae*, *Otididae*, *Pittidae*, *Nectariniidae*, *Zoosteropidae*, *Phalacrocoracidae* and *Strigidae* had only 1 species each.

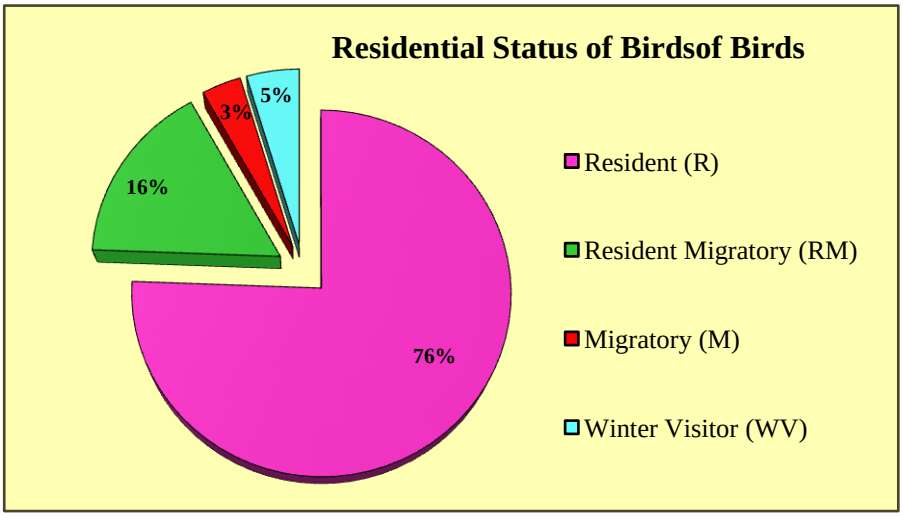

Figure II. Residential Status of Birds in Narmada Valley at Jabalpur region, M.P.

The most of birds observed during this study were resident species. Resident species were 76% (65 species) of total record while resident migratory were 16% (14 species), migratory were 3% (3 species) and winter visitor were 5% (4 species) shown in Figure 2. Lameed (2011) reported that the species that are winter visitor use wetlands for rest and other activities while waiting for the favorable condition of their home range.

Three migratory species *Tringa gareola* (Sand Piper) and *Tringa solitoria* (Semipal Mated Piper) of Scolopacidae family and *Ardeotis nigricepts* (Great Indian Bustard) of Otididae family were spotted from study while four winter visitor species *Himantopus himantopus* (Black Winged Stilt) of *Recurvirostridae* family, *Motacilla maderaspatensis* (Pied Wagtail), *Motacilla flava* (Yellow-Wagtail) of *Motacilliadae* family, *Ciconia nigra* (Black Stork) of *Ciconiidae* family were recorded and these play important role in the maintenance ecosystem.

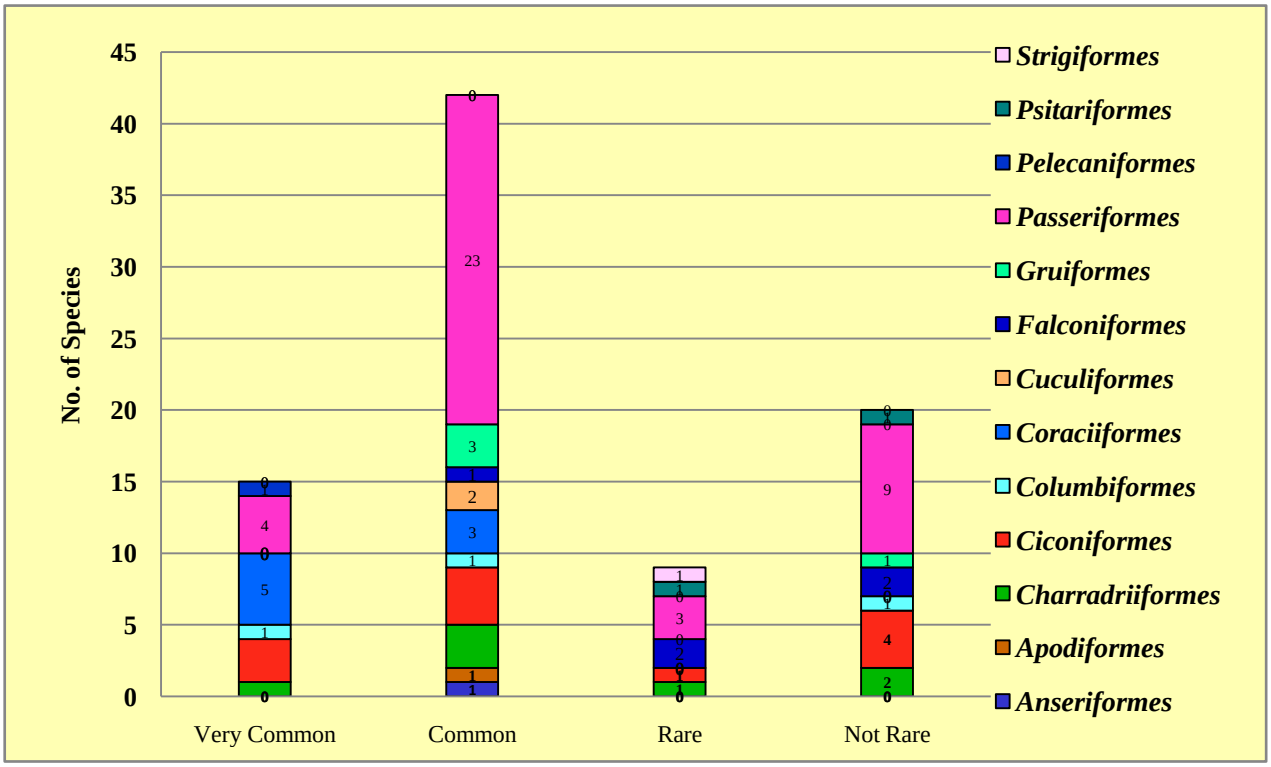

Figure III. Order wise Abundance Status of Birds in Narmada valley at Jabalpur, M.P.

Among 86 recorded species, the analysis on the status of bird's occurrence frequency had shown 9 rare species, 20 not rare species, 42 common species and 15 very common species in the study area (Figure 3). In the same way Talmale et al., (2012) recorded mostly Passeriformes from Singhori Wildlife Sanctuary in Raisen district which shows the abundance of Passeriformes in the locality of central India. Bird's population is frequently used as an indicator of environment quality. They are thought to be a useful proxy for assessing the impact of human influence of on biodiversity. The diversity and richness of avian fauna in a community indicated diversity and richness of other flora and fauna of the habitat. Sharma and Shukla (2015) have surveyed Gwarighat region of river Narmada for two years and observed 77 Species of birds belong to 34 families and 13 orders where order, Passeriformes was diversified group. Urban ecosystem has been largely ignored throughout many decades of ecological research. Dubey (2014) reported 73 bird's species belonging to twenty eight families in and around Chhatarpur district. Shambath et al., (2014) recorded 136 species of bird in Ghati gaon sanctuary, Gwalior belonging to 49 families is the highest rerecorded of M.P. Douglas M. Green and Micheal G. Baker (2002) encountered a total of 118 bird species were significantly correlated to birds diversity variables related to urban development such as house density, road density, and exotic vegetation volume during the census period.

Conclusions and Further Directions for Research

The habitat destruction and pollution caused by constructions and other human activities, such as water pollution, air pollution as well as noise pollution, industrialization and illegal fishing have destroyed the stability of the ecosystem in Narmada valley at Jabalpur region. The areas for activities of birds and their distribution are thus being affected negatively in their lives and nesting. Therefore, awareness is must as well as more strict laws need to be implemented to ban the illegal hunting and deforestation. The forest area in Narmada valley should be kept as isolated as possible to

reduce the disturbance to the birds so as to better protects the habitats of birds.

Besides recommending a more long-term bird survey, we also recommend expanding sites to include other more urbanized areas. By comparing the differences among these habitats, such as vegetation and freshwater areas, we can draw more conclusions and improve the reliability of our research on factors affecting bird diversity and abundance of the same bird populations as well impacts of pollution on bird species. With more area studies it is then more possible to co-relate other variables like weather, the nature of human activities and surrounding land use areas to better inform policy-making concerning sanctuaries for these selected bird populations. There is hence an urgent need to create awareness among local peoples on the importance of the riverine habitat and its fauna and the need to conserve them for future generations.

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