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COMMUNICATION

Diversity and species richness of avian fauna in varied habitats of Soraipung range and vicinity in Dehing Patkai National Park, India

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Abstract: Dehing Patkai National Park, nestled in Assam's Upper Brahmaputra valley, features a distinctive lowland forest landscape dominated by *Dipterocarpus* trees, teeming with fauna encompassing reptiles, birds, and mammals. Avian surveys were conducted from October 2021 to September 2023 to document avifaunal diversity within and surrounding the park. Point-transect method was used. One-hundred-and-fifty-one species from 54 families were recorded, including 43 terrestrial and 11 aquatic bird families. One-hundred-and twenty-seven species were residents, 18 winter migrants, five summer migrants, and one was a local migrant. Habitat disturbance was assessed across five transects; undisturbed habitats in T1 and T2 showed the highest Shannon-Wiener diversity index, while moderately and highly disturbed habitats in T3, T4, and T5 exhibited lower diversity. The analysis revealed a significant positive correlation ($p \leq 0.05$) among different transects. A total of seven species (Ashy-headed Green Pigeon, Lesser Adjutant, White-cheeked Partridge, Alexandrine Parakeet, Red-breasted Parakeet, Austen's Brown Hornbill, and Oriental Darter) are classified as 'Near Threatened' in the IUCN Red List of Threatened species; 12 species are in Schedule 1 under the Wildlife (Protection) Act, 1972. This investigation underscores Dehing Patkai National Park's significance as a sanctuary for diverse bird populations, including threatened and near-threatened species. The decline in bird populations in disturbed areas emphasizes the urgency of implementing effective conservation and management strategies within the park, alongside continued research and monitoring to support its unique avian ecosystem.

Keywords: Avian fauna, climate change, community, ecosystem, degradation, forest, migratory, northeastern India, resident, undisturbed.

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Competing interests: The authors declare no competing interests.

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INTRODUCTION

Avian fauna contribute to direct and indirect ecological processes in forest ecosystems. The most significant contributions are pest control and seed dispersal during forest regeneration. Their cosmopolitan nature allows birds to traverse different habitats, from open forests to dense woodlands, deserts to mountains, in search of sustenance, shelter, and reproductive sites (Morrison 1986; Koli 2014; Zakaria et al. 2016). It was reported that 77.9% of threatened bird species are supported by forest habitat (BirdLife International 2017). Among different tropical forests, lowland rainforest has a large variety of species diversity, and it provides all the necessaries to complete the life cycle of birds (Stratford & Şekercioğlu 2015). In India, a total of 942 bird species have been reported in 2023 and based on conservation priority for India, 178 species are under high priority, 323 are moderate priority. and 441 categorize as low priority (SoIB 2023). Sirur (2023) reported approximately 60% of the bird species have decline over a period of 30 year which might be attributed to decreasing ecosystem functionality, limited resource availability, or the decline of habitats. The impacts of climate change, habitat fragmentation, drought, and weather conditions are considered the most severe and widespread threats to declining bird population size that affect directly or indirectly the entire bird community (Janzen 1986; Murphy 1988; Lubchenco et al. 1991; Hannah et al. 1994; Sintayehu 2018). Hence studying the avian diversity, distribution patterns, and their ecological associations holds a significant contribution in relation to comprehend overall conservation of habitat and species diversity.

The northeastern region of India is home to a wide range of ecosystems, such as forests, grasslands, and wetlands, which include marshes, swamps, wetlands, beels, lakes, streams, and rivers. Due to its diverse topography and forest types, the northeastern region of India is home to a vast array of faunal diversity, including mammals, birds, reptiles, and associated species. Amidst the variety of forests in northeastern India, Dehing Patkai National Park, is characterized by lowland tropical forests predominantly dominated by Dipterocarpus in the Upper Brahmaputra valley of Assam, India. The region is considered one of the most species-rich regions in the Indian Subcontinent and is an important part of the Indo Myanmar bio-diversity hotspots (Gogoi et al. 2023). The park encompasses diversity of faunal species and fosters a rich variety of avifaunal species. However, despite the richness in faunal diversity of the national park, comprehensive studies on avian fauna are crucially lacking. While previous studies have been conducted on avian species compositions in various habitats of northeastern India (Ali et al. 1983; Choudhury 1998; Saikia & Saikia 2000; Chatterjee 2006; Mize et al. 2014; Chakdar et al. 2016; Chandra et al. 2021; Mahanta et al. 2022; Rahmani et al. 2023). However, there remains a lack of data regarding the species composition of the avian fauna from Dehing Patkai National Park. Lack of such avian database highlights a research gap in the current knowledge and stresses the necessity for thorough avian studies to better understand and conserve the bird species within the national park. The present study aims to document and analyze the species richness and diversity of avian fauna present within and around the Dehing Patkai National Park. By specifically studying the varied habitats, the study endeavours to unveil if there are any differences in avian species composition in different disturbances gradient.

MATERIALS AND METHODS

Study site

The Dehing Patkai Landscape is situated between the Tinsukia and Dibrugarh districts of Assam. It underwent a significant transformation on 9 June 2021. Formerly recognized as the Dehing Patkai Wildlife Sanctuary, it was officially upgraded to the status of a national park by the forest department of Assam. The present investigation has been carried out in the Soraipung Range and its areas within the Dehing Patkai Landscape, i.e., Digboi- Duliyajan highway passes through the adjacent areas of Soraipung range (Figure 1). The surveys were conducted between October 2021 and September 2023. Located at coordinates 27.299°N and 95.516°E, the entire landscape boasts a vast lowland rainforest dominated by *Dipterocarpus*, covering an approximate area of 231.6 km^2. Being a rainforest, this national park is rich in biodiversity status encompassing different strata providing a great environment for non-human primates like Slow Loris, Assamese Macaque, Stump-tailed Macaque, Pig-tailed Macaque, Rhesus Macaque, Capped Langur, and Hoolock Gibbon. With a tropical climate, the national park experiences an average annual rainfall of around 4,000 mm and forms the largest stretch of tropical lowland rainforest in India (Ahmed 2023). The dominant and essential tree species of the study area are *Dipterocarpus retusus*, *Mesua ferrea*, *Castanopsis indica*, *Vatica lanceaefolia*, *Shorea assamica*, *Delonix regia*, *Shorea robusta*, *Dillenia indica* and *Amoora*

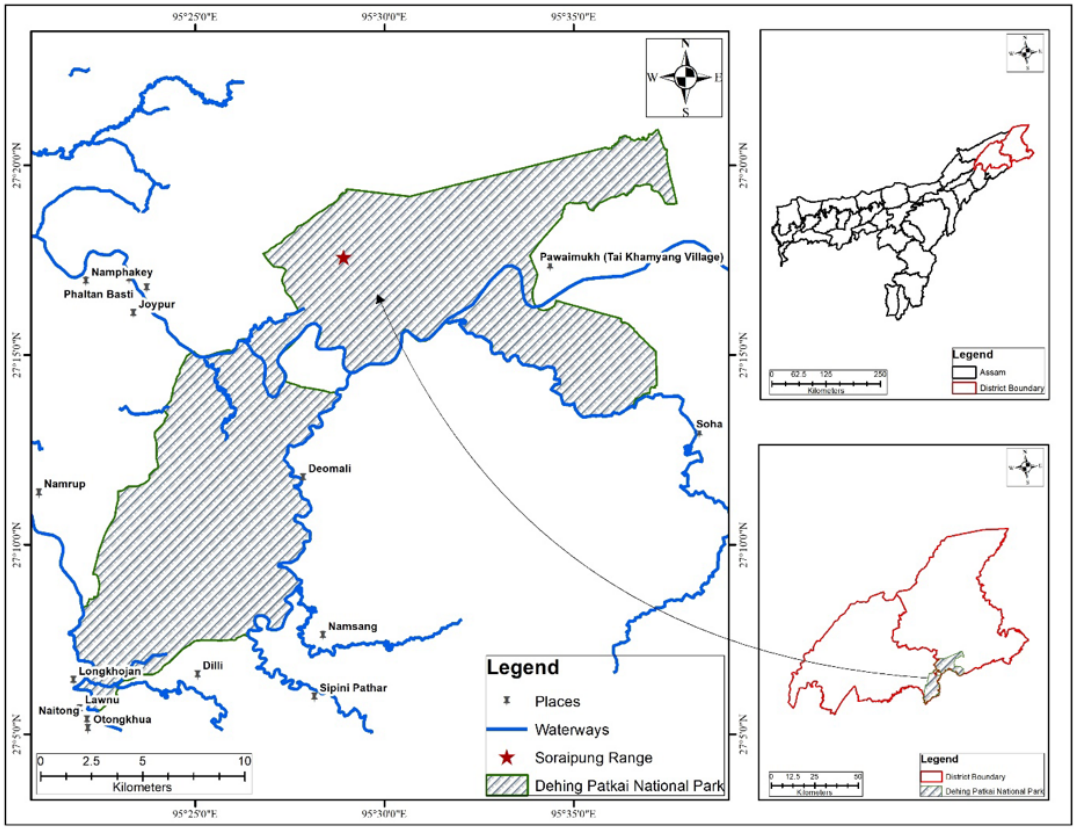

Figure 1. Map showing the Soraipung Range of Dehing Patkai National Park.

wallichii. The shrubs and herbs layers include species such as *Lantana camera*, *Ipomea species*, wild banana, ground and epiphytic ferns and wild pepper.

Methods

The bird surveys were carried out in the selected sites from October 2021 to September 2023 using point-transect method (Kumar & Sahu 2020). Three different habitats were selected for the study based on disturbance gradients which include undisturbed habitat (T1 and T2), moderately disturbed habitat (T3 and T4) and highly disturbed habitat (T5) shown in Table 1. The transects T1, T2, T3, T4, and T5 were randomly established in three different habitats. The transacts T1 and T2 are laid inside the forest of undisturbed natural habitats which are not significantly impacted by anthropogenic pressure. The transects T3 and T4 are in moderately disturbed habitats characterized adjacent to the forest of national park spreading across paddy fields and sporadic vegetation patches that support large number of grassland-dwelling birds. The transect T5 is in highly affected area by human activities like construction of roads, oil pipelines establishment and vehicular movement. In order to determine the species compositions in these habitats a total of 15 sampling points (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, and S15) were established on the transects, each transect with three sampling points and these points were surveyed at bi-monthly intervals. The surveys were carried out during peak periods in the early morning (0500–1030 h) and late evening (1530–1830 h). The birds were observed with the help of field binoculars (10 x 8) and a Nikon D3300 DSLR camera. A global positioning system (GPS) was used to designate the locations and save the tracks (Kazmierczak & Van Perlo 2009; Tiwari 2021). The identification of avian fauna was done consulting field guidebooks (Ali et al. 1983; Grimmett et al. 1999). The recorded avifauna is classified into distinct categories based on their frequency of occurrence (Saikia & Saikia 2000; Devi et al. 2012). During the survey, the species that are frequently observed in each transect are categorized as C-common, with a frequency of eight times out of 10 survey period. On the other hand, species that are encountered less frequently are categorized as r-rare, with a frequency of one or two times out of 10 surveys. The species found within the study area are referred to as R-resident. Additionally, species that are exclusively encountered during the winter season within the habitat are denoted

as WM-winter migratory. Similarly, species that are exclusively encountered in the summer season within the habitat, referred to as SM-summer migratory. Lastly, species that migrate locally within the area are referred as LM-local migratory.

Data analysis

The species richness is determined by the number of species found in each transect.

Shannon diversity index (H'; Shannon & Wiener 1964) was used to determine the species diversity,

$H' = -\Sigma pi * \ln(pi)$

where pi = the proportion of the entire community made up of species i

Species evenness (E; Pielou 1966) was calculated using the formula,

$E = H'/\ln(s)$.

where s = the species richness (total number of species).

Pearson's correlation coefficient was used to statistically assess the correlation between the transects. Pearson's correlation coefficient was carried out in IBM SPSS Statistics 21 and figures were created in Microsoft Excel spreadsheet 2021.

RESULTS

In the Soraipung range and its adjacent area of Dehing Patkai National Park, a total of 3,630 individuals of avian fauna were encountered from 151 species (Appendix 1). The recorded species belonged to 54 different families, of which 43 families are terrestrial and 11 families are aquatic in nature. Out of 151 species, 114 species (1,887 individuals) were recorded from undisturbed habitats (T1 and T2), 106 species (1,382 individuals) from moderately disturbed habitats (T3 and T4), and 59 species (361 individuals) from disturbed habitat (T5). A total 26 species (17.22%) of birds are found common in all the three study sites, undisturbed, moderately disturbed and disturbed habitats. The Shannon-Weiner diversity index (H'), which measures diversity in terms of the number of species range from 3.66 (T5) to 4.25 (T1). Pielou's evenness index also showed a variation in different transects which range from 0.61 to 0.66 (Table 2). When comparing the diversity indices, it was observed that undisturbed habitats in T1 and T2 exhibited higher species diversity compared to the moderately and highly disturbed habitats in T3, T4, and T5 (Figure 2). The Pearson correlation between the transects showed a strong highly significant positive relation ($p \leq 0.05$) (Table 3).

The families of Accipitridae, Columbidae, Ardeidae, Dicruridae, Pycnonotidae, Sturnidae, Corvidae, and Megalaimidae (Figure 3) which comprised the vast majority of the resident birds observed in the study area. Among the total 151 species, 127 species are recorded as resident birds (R). In addition, the study also recorded 18 species as winter migratory (WM), five species of birds are summer migratory (SM), and one species is categorized as a local migratory (LM) bird (Figure 4). From 151 bird species, it was found that 128 species were common, followed by 14 species as rare, five species as most common, and four species as occasional (sporadically encountered). Similarly, the migratory birds that visit the study area during both the winter and summer seasons were classified as rare (R), occasional (O) and common (C) species. The winter and summer migrant species were identified from the families of Muscicapidae, Cuculidae, Laniidae, Motacillidae, Scolopacidae, Bucerotidae, Phylloscopidae, Turdidae, Cettiidae, and Pittidae. While, there is just one species of Muscicapidae family among local migrants in the study area. Overall, from the studied habitats, Muscicapidae family exhibits the highest species (11), followed by Cuculidae, which is the second largest family with nine species, the Columbidae with eight species represents the third largest family, and Accipitridae the fourth largest family with seven species.

As per the IUCN Red List of Threatened Species, seven species (Ashy-headed Green Pigeon *Treron phayrei*, Lesser Adjutant *Leptoptilos javanicus*, White-cheeked Partridge *Arborophila atrogularis*, Alexandrine Parakeet *Psittacula eupatria*, Red-breasted Parakeet *Psittacula alexandri*, Austen's Brown Hornbill *Anorrhinus austeni*, and Oriental Darter *Anhinha melanogaster*) are 'Near Threatened'; the rest are 'Least Concern' (Appendix 1). Twelve species are recorded in Schedule 1 under the Indian Wildlife (Protection) Act, 1972.

DISCUSSION

The present study was carried out in Dehing Patkai National Park, which exhibits a significant richness of avian species in terms of diversity status. A comprehensive understanding of avian fauna in these habitats, particularly in and around the Soraipung range of the national park provides crucial insights into the diversity and population status of avian species. It has been asserted that biodiversity of the rainforest is relatively higher than that of the other protected areas

Table 1. Descriptions of transect lines used during the survey of avian fauna in Dehing Patkai National Park, Assam.

Transect	Descriptions	Dominant vegetation
Transect 1 (T1): Undisturbed and natural forest	Hollong-dominated landscape with woodland, streams, open land, and shrublands.	*Dipterocarpus retusus*, *Mesua ferrea*, *Castanopsis indica*, *Shorea assamica*, *Vatica lanceaefolia*, *Shorea robusta*, and *Dillenia indica*.
Transect 2 (T2): Undisturbed and natural Forest	Hollong-dominated landscape with woodland, scrublands, and streams.	*Dipterocarpus retusus*, *Castanopsis indica*, and *Vatica lanceaefolia*
Transect 3 (T3): Moderately disturbed	Human-dominated landscape with agricultural land, scrubland, and a few small ponds and cannels.	*Dipterocarpus retusus*, *Dipterocarpus macrocarpus, Ficus religiosa*, and *Ficus rumphii*
Transect 4 (T4): Moderately disturbed	Human-dominated landscape with water and a few small ponds.	*Dipterocarpus retusus*, *Mesua ferrea*, *Delonix regia*, *Shorea robusta*, and *Dillenia indica*.
Transect 5 (T5): Highly disturbed human-dominated	Landscape along the national highway.	*Dipterocarpus macrocarpus*, *Mesua ferrea*, *Shorea assamica*, *Delonix regia*, *Shorea robusta*, and *Dillenia indica*.

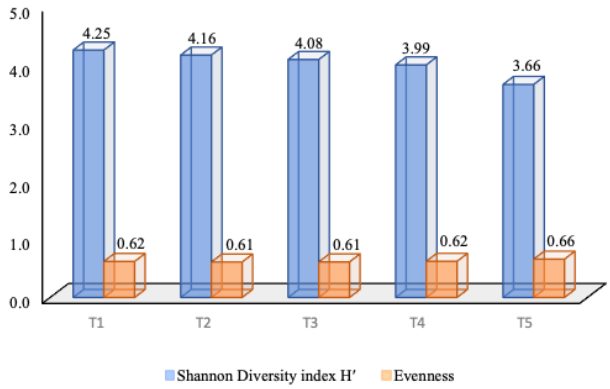

Figure 2. Diversity indices of birds recorded along different transect within Dehing Patkai National Park.

Table 2. Shannon diversity index and species evenness of birds recorded from the study sites with a 5% level of significance.

Transects	Shannon diversity index H'	Lower 95%	Upper 95%	Evenness
T1	4.25	4.17	4.26	0.62
T2	4.16	4.08	4.18	0.61
T3	4.08	4.03	4.13	0.61
T4	3.99	3.91	4.03	0.62
T5	3.66	3.56	3.74	0.66

Table 3. Correlation between different transect studied in Dehing Patkai National Park.

Habitat	T1	T2	T3	T4
T2	0.872**			
T3	0.266**	0.316**		
T4	0.325**	0.424**	0.827**	
T5	0.196*	0.223*	0.582**	0.597**

(Beehler et al. 1987). The study reveals that the family Muscicapidae is more abundant than other bird families which is similar to the findings of Rai et al. (2017), wherein the Muscicapidae family contributed the most species of terrestrial birds to the Basai wetlands in Haryana. Similarly, Mize et al. (2014), reported that the family Muscicapidae was dominant in Dehing-Dibang Biosphere Reserve. This prevalence of Muscicapidae family could be attributed to their wide adaptability across various habitats including forests, grassland, and agricultural fields, making them primarily dependent on small insectivores. The findings of the present study indicates that the highest species diversity exists in the least disturbed areas (T1 and T2), followed by the moderately disturbed (T3 and T4) and severely disturbed areas (T5). Similar trends were reported by Devi et al. (2012) at the Gauhati University Campus, and Nidup & Gyeltshen (2021) in the disturbed and undisturbed winter forests of Gogona Forest Management Unit of Bhutan. A significant positive correlation was observed among transects in different habitats, potentially due to the coexistence of closely related species across the transect lines. The presence of 26 'common' species in all the three studied habitats can be attributed to their adaptability to diverse conditions including, adequate food sources, suitable shelter, favourable climate, and essential resources. The varied strata within the national park, encompassing natural woodlands, grasslands, shrublands, water bodies, and diverse climatic conditions, contribute to its overall diversity. Large trees within the habitat provide nesting locations and abundant food sources, particularly in undisturbed areas. Notably, forest degradation and habitat loss impact species distribution leading to 'rare' occurrences of species, such as the Asian Koel, Cuckoo, Kingfishers, and Rollers. These remote bird species are quite comparable to those reported from earlier research in northeastern region of India (Saikia & Saikia 2000; Choudhury 2000).

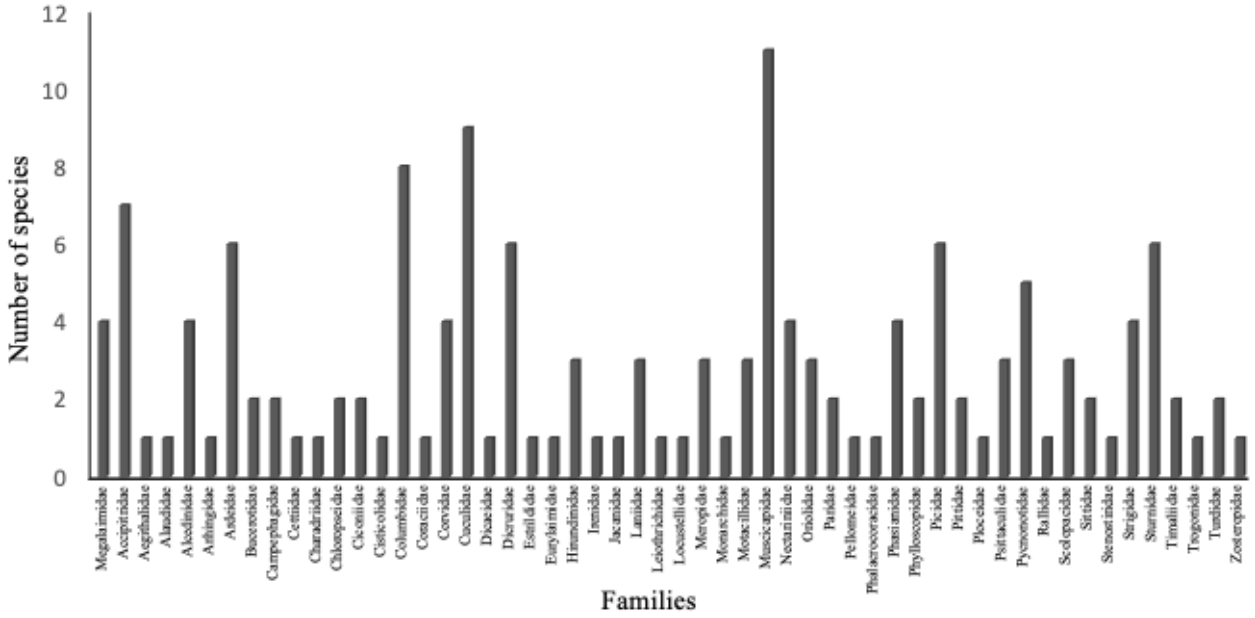

Figure 3. Bar diagram representing the distribution of avian fauna in different families.

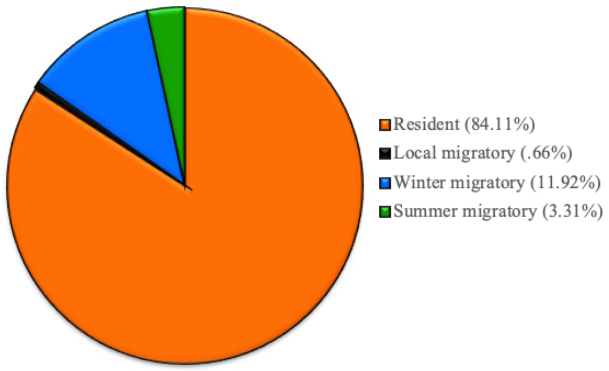

Figure 4. Pie chart showing the current residential status of avian species.

The findings were also reported by Sauvajot et al. (1998) and Jain et al. (2005) where they found that birds are sensitive to their surroundings, and changes in the local vegetation can have an impact on the bird population. The presence of Oriental Magpie-robin, Jungle Myna, Common Myna, Red-vented Bulbul, Spotted Dove, Cattle Egret, Large-billed Crow, Black-hooded Oriole, Cinereous Tit, Little Cormorant, Black Kite, Fulvous-breasted Woodpecker, Barn Swallow, and Asian Koel in human-dominated and disturbed habitats (T3, T4, and T5) is attributed to their remarkable adaptability to urban and peri-urban landscapes.

However, it is concerning that disturbed areas display a significant decline in diversity, with direct human disturbance and expanding urbanization identified as major factors. Habitat fragmentation, road construction, oil mining, and increased vehicle traffic along the national highway may contribute to the observed decline. Human activities, including hunting and fishing, also pose threats to the natural habitat of avian fauna. The noise and disturbance activities have the potential to disrupt the behaviour of birds, leading to alterations in their breeding, feeding, and communication patterns. Shahabuddin & Kumar (2006), Morris (2010), and Prabhakar et al. (2020) also noted that factors such as rapidly changing demography and changes in traditional natural resource management practises are areas of concern and large-scale development projects affects the composition of avian diversity.

CONCLUSION

The study has exhibited that the diversity of avian fauna in Dehing Patkai National Park varies with its habitat and is influenced by the characteristics of its environment. The documentation of 151 species including seven 'Near Threatened' species, highlights the park's crucial role as an ecosystem supporting a broad spectrum of bird species. Despite the park's capacity to support a variety of avian fauna including migratory birds, there is noticeable decline in their numbers particularly in areas characterised by high disturbance levels. The main factors contributing to declination of bird species are excessive human activity and habitat deterioration.

Hence, the disparity in species diversity between disturbed and undisturbed areas poses a substantial threat to the potential extinction of certain species in the future. As a result of decrease of avian diversity, the physical characteristics of natural ecosystems in the present study area may change. Therefore, it is imperative to established effective management strategies in order to safeguard the conservation of the habitats and overall biodiversity of the national park. The implementation of long-term management plans integrating the indigenous knowledge of local community and encouraging their participation in habitat restoration practices, is crucial in formulating sustainable conservation strategies. Also, monitoring on the population status, resilience, and behavioural changes will aid in conservation of threatened and vulnerable species.

REFERENCES

Ahmed, S. (2023). Dehing-Patkai (Amazon of East). *Bione E-ZINE of Biological Science*. ISSN: 2456-7264. http://babrone.edu.in/blog/?p=3254

Ali, S. & S.D. Ripley (1983). *Handbook of the Birds of India and Pakistan*. Compact. Oxford University Press, New Delhi & Oxford, 737 pp.

Beehler, B.M., K.S.R.K. Raju & S. Ali (1987). Avian use of man-disturbed forest habitats in the Eastern Ghats, India. *Ibis* 129: 197–211. https://doi.org/10.1111/j.1474-919X.1987.tb03201.x

BirdLife International (2017). Threatened birds occur in all habitats, but the majority are found in forest. From http://www.birdlife.org. Accessed on 25 November 2023.

Chakdar, B., P. Choudhury & H. Singha (2016). Avifaunal diversity in Assam University Campus, Silchar, India. *Journal of Threatened Taxa* 8(1): 8369–8378. https://doi.org/10.11609/jott.2524.8.1.8369-8378

Chandra, K., L., Kosygin, C. Raghunathan & D. Gupta (2021). Faunal Diversity of Biogeographic Zones of India: An Overview. Zoological Survey of india 720 pp.

Chatterjee, S. (2006). *Review of Biodiversity in North East India Biodiversity significance of North East India*. WWF, Delhi, India.

Choudhury, A. (1998). Mammals, birds and reptiles of Dibru-Saikhowa Sanctuary, Assam, India. *Oryx* 32(03): 192. https://doi.org/10.1017/s0030605300029951

Choudhury, A. (2000). *The Birds of Assam*, Sofia Press, Guwahati, Assam, 240 pp.

Devi, O.S., M. Islam, J. Das & P.K. Saikia (2012). Avian-fauna of Gauhati University Campus, Jalukbari, Assam. *The Ecoscan* 6: 165–170.

Grimmett, R., C. Inskipp & T. Inskipp (1999). *A guide to the birds of India, Pakistan, Nepal, Bangladesh, Bhutan, Sri Lanka, and the Maldives*. Princeton University Press Princeton, New Jersey.

Hannah, L., D. Lohse, C., Hutchinson, J.L. Carr & A. Lankerani (1994). A preliminary inventory of human disturbance of world ecosystems. *Ambio* 23(4–5): 246–250. https://doi.org/10.1016/0006-3207(96)83209-5

Jain, N.K., S.N. Patel & M.V. Patel (2005). Birds of Gujarat University campus, Ahmedabad. *Zoos' Print Journal* 20: 2111–2113. https://doi.org/10.11609/jott.zpj.1134a.2111.3

Janzen, D.H. (1986). The Eternal External Threat, pp. 286–303. In: Soule, M.E. (ed.). Conservation Biology: The Science of Scarcity and Diversity. Sinauer, Sunderland, MA.

Kazmierczak, K. & B. Van Perlo (2009). *A Field Guide to the Birds of the Indian Subcontinent*. Bloomsbury Publishing Plc, 352 pp.

Koli, V.K. (2014). Diversity and status of avifauna in Todgarh-Raoli Wildlife Sanctuary, Rajasthan, India. *Journal of Asia-Pacific Biodiversity* 7(4): 401–407. https://doi.org/10.1016/j.japb.2014.10.005

Kumar, P. & S. Sahu (2020). Composition, diversity and foraging guilds of avifauna in agricultural landscapes in Panipat, Haryana, India. *Journal of Threatened Taxa* 12(1): 15140–15153. https://doi.org/10.11609/jott.5267.12.1.15140-15153

Lubchenco, J., A.M. Olson, L.B. Brubaker, S.R. Carpenter, M.M. Holland, S.P. Hubbell, S.A. Levin, J.A. MacMahon, P.A. Matson, J.M. Melillo, H.A. Mooniy, C.H. Peterson, H.R. Pulliam, L.A. Real, P.J. Rigal & P.G. Risser (1991). The sustainable biosphere initiative: an ecological research agenda. *Ecology* 72: 371–412.

Mahanta, N., N. Islam, R. Barman, S. Deka, U. Borkataki, T. Chhetri, S. Basumatary & M. Rahman (2022). A preliminary checklist of avian fauna from Raimona National Park of Assam, India. *Applied Ecology and Environmental Sciences* 10: 652–664. https://doi.org/10.12691/aees-10-11-1

Mize, D., R. Taba & H.N. Sarma (2014). Species diversity of birds in Dihang-Dibang Biosphere Reserve, Arunachal Pradesh. *The Ecoscan* 8(1&2): 77–84.

Morris, R.J. (2010). Anthropogenic impacts on tropical forest biodiversity: a network structure and ecosystem functioning perspective. *Philosophical transitions of The Royal Society* 365: 3709–3718. https://doi.org/10.1098/rstb.2010.0273

Morrison, M.L. (1986). Bird Populations as Indicators of Environmental Change, pp. 429–430. In: Johnston, R.F. (ed.). *Current Ornithology*. Planum Press, New York.

Murphy, D.D. (1988). Challenges to biological diversity in urban areas, p. 71. In: Wilson, E.O. (ed.). *Biodiversity*. National Academy Press Washington, D.C.

Nidup, S. & Gyeltshen (2021). Avifaunal diversity in disturbed and undisturbed winter forests of Gogona Forest Management Unit, Wangdue Phodrang. *Journal of the Bhutan Ecological Society* 4: 56–70.

Pielou E.C. (1966). The measurement of diversity in different types of biological collections. *Journal of Theoretical Biology* 13: 131–144. https://doi.org/10.1016/0022-5193(66)90013-0

Rahmani, A.R., R. Kasambe, A. Choudhury, A Rahman, A. Jha, M. Imran, R. Ali & S. Surve (2023). Annotated checklist of the birds of Kaziranga National Park and surrounding areas, Assam, with taxonomic changes briefly explained. *Journal of the Bombay Natural History Society* 120(1): 1–77.

Rai, D., G. Chopra, R. Gulia & P. Vats (2017). Avian diversity of Basai Wetlands, Haryana (India): an IBA Site. *Journal of Experimental Zoology* 20: 109–117.

Saikia, P.K. & M.K. Saikia (2000). Diversity of bird fauna in North East India. *Journal of the Assam Science Society* 41(4): 379–396.

Sauvajot, R.M., M. Buechner, D.A. Kamradt & C.M. Schonewald (1998). Patterns of human disturbance and response by small mammals and birds in Chaparral near urban development. *Urban Ecosystems* 2: 279–297.

Shahabuddin, G. & R. Kumar (2006). Influence of anthropogenic disturbance on bird communities in a tropical dry forest: role of vegetation structure. *Animal Conservation* 9: 404–413. https://doi.org/10.1111/j.1469-1795.2006.00051.x

Shannon, C.E. & W. Wiener (1964). The mathematical theory of communication. University of Illinois Press, Urbana

Sintayehu, D.W. (2018). Impact of climate change on biodiversity and associated key ecosystem services in Africa: a systematic review. *Ecosystem Health and Sustainability* 4(9): 225–239. https://doi.org/10.1080/20964129.2018.1530054

Sirur, S. (2023). Declining bird populations are a 'grim' reminder of rapid biodiversity loss, says new report. Mongabay. From https://india.mongabay.com/2023/08/declining-bird-populations-are-a-grim-reminder-of-rapid-biodiversity-loss-says-new-report/#:~:text=Declining%20bird%20populations%20are%20a,biodiversity%20loss%2C%20says%20new%20report&text=Around%2060%20percent%20of%20birds,State%20

Appendix 1. Checklist of avian fauna recorded in the Soraipung range of Dehing Patkai National Park.

	Common name	Scientific name	Family	WPA 1972	IUCN Red List status	Status and abundance	Habitat
1	Black-backed Forktail	*Enicurus immaculatus*	Muscicapidae	Sch II	LC	R, C	RS/SL
2	Black Redstart	*Phoenicurus ochruros*		Sch II	LC	WM, r	CL/ RS
3	Blue Whistling Thrush	*Myophonus caeruleus*		Sch II	LC	R, C	NF
4	Oriental Magpie-robin	*Copsychus saularis*		Sch II	LC	R, MC	RS
5	Pale Blue Flycatcher	*Cyornis unicolor*		Sch II	LC	R, C	NF/SL
6	Pied Bush Chat	*Saxicola caprata*		Sch II	LC	LM, r	CL/ GL
7	Pygmy Flycatcher	*Ficedula hodgsoni*		Sch II	LC	R, C	NF/SL
8	Siberian Stonechat	*Saxicola maurus*		Sch II	LC	WM, C	GL
9	Taiga Flycatcher	*Ficedula albicilla*		Sch II	LC	WM, O	RS/ NF
10	Verditer Flycatcher	*Eumyias thalassinus*		Sch II	LC	WM, r	NF
11	White-rumped Shama	*Copsychus malabaricus*		Sch II	LC	SM, C	SL/ GL
12	Asian Koel	*Eudynamys scolopaceus*	Cuculidae	Sch II	LC	R, C	NF
13	Banded Bay Cuckoo	*Cacomantis sonneratii*		Sch II	LC	R, C	NF
14	Common Cuckoo	*Cuculus canorus*		Sch II	LC	WM, r	NF
15	Common Hawk-cuckoo	*Hierococcyx varius*		Sch II	LC	R, r	NF/ RS
16	Greater Coucal	*Centropus sinensis*		Sch II	LC	R, C	GL
17	Green-billed Malkoha	*Phaenicophaeus tristis*		Sch II	LC	R, C	NF/RS
18	Hodgson's Hawk-cuckoo	*Hierococcyx nisicolor*		Sch II	LC	R, r	NF
19	Lesser Coucal	*Centropus bengalensis*		Sch II	LC	R, C	GL
20	Plaintive Cuckoo	*Cacomantis merulinus*		Sch II	LC	R, C	NF
21	Ashy-headed Green Pigeon	*Treron phayrei*	Columbidae	Sch II	NT	R, r	NF
22	Common Emerald Dove	*Chalcophaps indica*		Sch II	LC	R, r	NF
23	Oriental Turtle Dove	*Streptopelia orientalis*		Sch II	LC	R, C	NF/ RS
24	Pin-tailed Green Pigeon	*Treron apicauda*		Sch II	LC	R, r	NF
25	Red-collared Dove	*Streptopelia tranquebarica*		Sch II	LC	R, C	RS
26	Spotted Dove	*Spilopelia chinensis*		Sch II	LC	R, C	SA/ RS
27	Thick-billed Green Pigeon	*Treron curvirostra*		Sch II	LC	R, r	NF
28	Yellow-footed Green Pigeon	*Treron phoenicopterus*		Sch II	LC	R, C	NF/ RS/ SA
29	Besra	*Accipiter virgatus*	Accipitridae	Sch I	LC	R, C	NF/ SA
30	Black Kite	*Milvus migrans*		Sch II	LC	R, C	RS/ NF
31	Black-winged Kite	*Elanus caeruleus*		Sch II	LC	R, C	RS/ NF
32	Crested Honey Buzzard	*Pernis ptilorhynchus*		Sch II	LC	R, C	NF
33	Crested Serpent Eagle	*Spilornis cheela*		Sch I	LC	R, C	NF
34	Eurasian Sparrowhawk	*Accipiter nisus*		Sch I	LC	R, C	SA
35	Shikra	*Accipiter badius*		Sch I	LC	R, C	RS/ NF
36	Cattle Egret	*Bubulcus ibis*	Ardeidae	Sch II	LC	R, C	WB/RS/SA
37	Cinnamon Bittern	*Ixobrychus cinnamomeus*		Sch I	LC	R, C	SL
38	Indian Pond Heron	*Ardeola grayii*		Sch II	LC	R, C	WB/ RS/CL
39	Intermediate Egret	*Ardea intermedia*		Sch II	LC	R, C	WB/ CL
40	Little Egret	*Egretta garzetta*		Sch II	LC	R, r	WB
41	Purple Heron	*Ardea purpurea*		Sch II	LC	R, C	WB/ CL

	Common name	Scientific name	Family	WPA 1972	IUCN Red List status	Status and abundance	Habitat
42	Ashy Drongo	*Dicrurus leucophaeus*	Dicruridae	Sch II	LC	R, C	NF
43	Black Drongo	*Dicrurus macrocercus*		Sch II	LC	R, MC	NF/ RS/ SA
44	Bronzed Drongo	*Dicrurus aeneus*		Sch II	LC	R, C	NF
45	Greater Racket-tailed Drongo	*Dicrurus paradiseus*		Sch II	LC	R, r	NF
46	Lesser Racket-tailed Drongo	*Dicrurus remifer*		Sch II	LC	R, r	NF
47	Spangled Drongo	*Dicrurus bracteatus*		Sch II	LC	R, C	NF
48	Chestnut-tailed Starling	*Sturnia malbarica*	Sturnidae	Sch II	LC	R, C	NF/ RS
49	Common Hill Myna	*Gracula religiosa*		Sch I	LC	R, C	NF
50	Common Myna	*Acridotheres tristis*		Sch II	LC	R, MC	RS/SA
51	Great Myna	*Acridotheres grandis*		Sch II	LC	R, C	GL/RS
52	Indian Pied Myna	*Gracupica contra*		Sch II	LC	R, MC	RS/ SA
53	Jungle Myna	*Acridotheres fuscus*		Sch II	LC	R, C	SA/RS
54	Black-rumped Flameback	*Dinopium benghalense*	Picidae	Sch II	LC	R, C	NF/RS
55	Bay Woodpecker	*Blythipicus pyrrhotis*		Sch II	LC	R, r	NF
56	Greater Yellownape	*Chrysophlegma flavinucha*		Sch II	LC	R, C	NF
57	Grey-capped Pygmy Woodpecker	*Yungipicus canicapillus*		Sch II	LC	R, C	NF/RS
58	Fulvous-breasted Woodpecker	*Dendrocopos macei*		Sch II	LC	R, r	NF/RS
59	Speckled Piculet	*Picumnus innominatus*		Sch II	LC	R, C	NF/RS
60	Ashy Bulbul	*Hemixos flavala*	Pycnonotidae	Sch II	LC	R, C	NF
61	Black-crested Bulbul	*Pycnonotus flaviventris*		Sch II	LC	R, C	NF
62	Red-vented Bulbul	*Pycnonotus cafer*		Sch II	LC	R, MC	SA/RS
63	Red-whiskered Bulbul	*Pycnonotus jocosus*		Sch II	LC	R, C	NF
64	White-throated Bulbul	*Alophoixus flaveolus*		Sch II	LC	R, r	NF
65	Blue-eared Kingfisher	*Alcedo meninting*	Alcedinidae	Sch II	LC	R, C	WB/RS
66	Common Kingfisher	*Alcedo atthis*		Sch II	LC	R, C	WB
67	Oriental Dwarf Kingfisher	*Ceyx erithaca*		Sch II	LC	R, r	NF/WB
68	White-throated Kingfisher	*Halcyon smyrnensis*		Sch II	LC	R, MC	SA/WB
69	Common Green Magpie	*Cissa chinensis*	Corvidae	Sch II	LC	R, C	NF/RS
70	Grey Treepie	*Dendrocitta formosae*		Sch II	LC	R, r	NF
71	Large-billed Crow	*Corvus macrorhynchos*		Sch II	LC	R, C	SA/RS
72	Rufous Treepie	*Dendrocitta vagabunda*		Sch II	LC	R, C	NF/RS/SA
73	Blue-eared Barbet	*Psilopogon cyanotis*	Megalaimidae	Sch II	LC	R, r	NF
74	Blue-throated Barbet	*Psilopogon asiaticus*		Sch II	LC	R, C	NF/SA/RS
75	Coppersmith Barbet	*Psilopogon haemacephalus*		Sch II	LC	R, C	NF/SA/RS
76	Lineated Barbet	*Psilopogon lineatus*		Sch II	LC	R, C	NF
77	Crimson Sunbird	*Aethopyga siparaja*	Nectariniidae	Sch II	LC	R, C	SL
78	Little Spiderhunter	*Arachnothera longirostra*		Sch II	LC	R, C	NF
79	Purple Sunbird	*Cinnyris asiaticus*		Sch II	LC	R, C	NF/SL
80	Streaked Spiderhunter	*Arachnothera magna*		Sch II	LC	R, C	NF
81	Grey Peacock-pheasant	*Polyplectron bicalcaratum*	Phasianidae	Sch I	LC	R, r	NF
82	Kalij Pheasant	*Lophura leucomelanos*		Sch I	LC	R, C	NF/RS
83	Red Junglefowl	*Gallus Gallus*		Sch II	LC	R, C	NF/RS
84	White-cheeked Partridge	*Arborophila atrogularis*		Sch II	NT	R, O	NF

	Common name	Scientific name	Family	WPA 1972	IUCN Red List status	Status and abundance	Habitat
85	Asian Barred Owlet	*Glaucidium cuculoides*	Strigidae	Sch II	LC	R, C	NF/RS
86	Brown Hawk-owl	*Ninox scutulata*		Sch II	LC	R, O	NF
87	Collared Owlet	*Taeniopteryx brodiei*		Sch II	LC	R, r	NF
88	Spotted Owlet	*Athene brama*		Sch II	LC	R, C	SA/RS
89	Asian House Martin	*Delichon dasypus*	Hirundinidae	Sch II	LC	R, r	RS
90	Barn Swallow	*Hirundo rustica*		Sch II	LC	R, C	RS/NF
91	Red-rumped Swallow	*Cecropis daurica*		Sch II	LC	R, C	RS
92	Brown Shrike	*Lanius cristatus*	Laniidae	Sch II	LC	WM, C	CL/GL
93	Grey-backed Shrike	*Lanius tephronotus*		Sch II	LC	WM, C	CL
94	Long-tailed Shrike	*Lanius schach*		Sch II	LC	WM, C	SL/GL
95	Asia Green Bee-eater	*Merops orientalis*	Meropidae	Sch II	LC	R, C	NF/RS
96	Blue-tailed Bee-eater	*Merops philippinus*		Sch II	LC	R, C	NF
97	Chestnut-headed Bee-eater	*Merops leschenaulti*		Sch II	LC	R, r	NF
98	Citrine Wagtail	*Motacilla citreola*	Motacillidae	Sch II	LC	WM, C	RS/GL
99	Rosy Pipit	*Anthus roseatus*		Sch II	LC	WM, C	GL
100	White Wagtail	*Motacilla alba*		Sch II	LC	WM, C	RS/GL
101	Black-hooded Oriole	*Oriolus xanthornus*	Oriolidae	Sch II	LC	R, C	NF/SA/RS
102	Indian Golden Oriole	*Oriolus kundoo*		Sch II	LC	R, C	NF
103	Maroon Oriole	*Oriolus traillii*		Sch II	LC	R, C	NF
104	Alexandrine Parakeet	*Psittacula eupatria*	Psittaculidae	Sch II	NT	R, O	NF
105	Red-breasted Parakeet	*Psittacula alexandri*		Sch II	NT	R, C	NF/RS
106	Rose-ringed Parakeet	*Psittacula krameri*		Sch II	LC	R, C	NF/RS
107	Common Sandpiper	*Actitis hypoleucos*	Scolopacidae	Sch II	LC	WM, C	WB/GL
108	Green Sandpaper	*Tringa ochropus*		Sch II	LC	WM, O	WB
109	Wood Sandpiper	*Tringa glareola*		Sch II	LC	WM, r	WB
110	Austen's Brown Hornbill	*Anorrhinus austeni*	Bucerotidae	Sch I	NT	SM, r	NF/RS
111	Oriental Pied Hornbill	*Anthracoceros albirostris*		Sch I	LC	R, O	NF/RS
112	Scarlet Minivet	*Pericrocotus speciosus*	Campephagidae	Sch II	LC	R, C	NF
113	Small Minivet	*Pericrocotus cinnamomeus*		Sch I	LC	R, C	NF
114	Asian Openbill	*Anastomus oscitans*	Ciconiidae	Sch II	LC	R, C	RS/GL/CL
115	Lesser Adjutant	*Leptoptilos javanicus*		Sch I	NT	R, C	CL
116	Golden-fronted Leafbird	*Chloropsis aurifrons*	Chloropseidae	Sch II	LC	R, C	NF
117	Jordon's Leafbird	*Chloropsis jerdoni*		Sch II	LC	R, C	NF
118	Cinereous Tit	*Parus cinereus*	Paridae	Sch II	LC	R, C	SA/RS/NF
119	Sultan Tit	*Melanochlora sultanea*		Sch II	LC	R, r	NF
120	Blyth's Leaf Warbler	*Phylloscopus reguloides*	Phylloscopidae	Sch II	LC	WM, r	NF/SL
121	Greenish Warbler	*Phylloscopus trochiloides*		Sch II	LC	WM, C	SL
122	Blue-naped Pitta	*Hydrornis nipalensis*	Pittidae	Sch II	LC	R, r	NF/SL
123	Hooded Pitta	*Pitta sordida*		Sch II	LC	SM, r	NF/SL
124	Chestnut-bellied Nuthatch	*Sitta cinnamoventris*	Sittidae	Sch II	LC	R, r	NF
125	Velvet-fronted Nuthatch	*Sitta frontalis*		Sch II	LC	R, C	NF
126	Large Scimitar Babbler	*Erythrogenys hypoleucos*	Timaliidae	Sch II	LC	R, O	SL
127	Pin-striped Tit Babbler	*Mixornis gularis*		Sch II	LC	R, r	NF
128	Green Cochoa	*Cochoa viridis*	Turdidae	Sch II	LC	R, C	NF
129	Orange-headed Thrush	*Geokichla citrina*		Sch II	LC	R, C	NF

	Common name	Scientific name	Family	WPA 1972	IUCN Red List status	Status and abundance	Habitat
130	Common Iora	*Aegithina tiphia*	Aegithainidae	Sch II	LC	R, C	NF/ RS
131	Bengal Bushlark	*Mirafra assamica*	Alaudidae	Sch II	LC	R, C	RS/SL
132	Oriental Darter	*Anhinga melanogaster*	Anhingidae	Sch II	NT	R, O	WB/RS
133	Slaty-bellied Tesia	*Tesia olivea*	Cettiidae	Sch II	LC	R, C	NF
134	Red-wattled Lapwing	*Vanellus indicus*	Charadriidae	Sch II	LC	R, C	GL/RS
135	Common Tailorbird	*Orthotomus sutorius*	Cisticolidae	Sch II	LC	R, C	NF/SL
136	Indochinese Roller	*Coracias affinis*	Coraciidae	Sch II	LC	R, C	RS
137	Scarlet-backed Flowerpecker	*Dicaeum cruentatum*	Dicaeidae	Sch II	LC	R, r	NF
138	Scaly-breasted Munia	*Lonchura punctulata*	Estrildidae	Sch II	LC	R, C	CL/SA/SL
139	Silver-breasted Broadbill	*Serilophus lunatus*	Eurylaimidae	Sch II	LC	R, O	NF
140	Asian Fairy-bluebird	*Irena puella*	Irenidae	Sch II	LC	R, C	NF/SL
141	Bronze-winged Jacana	*Metopidius indicus*	Jacanidae	Sch II	LC	R, C	WB/GL
142	Greater Necklaced Laughingthrush	*Pterorhinus pectoralis*	Leiothrichidae	Sch II	LC	R, r	NF/SL
143	Striated Grassbird	*Megalurus palustris*	Locustellidae	Sch II	LC	R, C	GL/SL
144	Black-naped Monarch	*Hypothymis azurea*	Monarchidae	Sch II	LC	R, C	SL/NF
145	Puff-throated Babbler	*Pellorneum ruficeps*	Pellorneidae	Sch II	LC	R, r	SL/NF
146	Little Cormorant	*Microcarbo niger*	Phalacrocoracidae	Sch II	LC	R, C	WB
147	Baya Weaver	*Ploceus philippinus*	Ploceidae	Sch II	LC	R, C	NF/RS
148	White-breasted Waterhen	*Amaurornis phoenicurus*	Rallidae	Sch II	LC	R, C	WB/SA
149	Grey-headed Canary-flycatcher	*Culicicapa ceylonensis*	Stenostiridae	Sch II	LC	R, C	NF
150	Red-headed Trogon	*Harpactes erythrocephalus*	Trogonidae	Sch II	LC	R, r	NF
151	Indian White-eye	*Zosterops palpebrosus*	Zosteropidae	Sch II	LC	R, C	NF/SA/RS

LC—Least Concern | NT—Near Threatened | C—Common | MC—Most common | R—Resident | O—Occasional | r—Rare | WM—Winter migratory | SM—Summer migratory | LM—Local migratory | RS—Roadside | CL—Cultivated land | GL—Grassland | SL—Scrubland | NF—Natural forest | WB—Water body & swamp | SA—Settlement area.

of%20India's%20Birds%20report. Accessed on 25 November 2023.

SoIB (2023). *State of India's Birds, 2023: Range, trends, and conservation status.* The SoIB Partnership, 119 pp.

Stratford, J.A. & Ç.H. Şekercioğlu (2015). Birds in forest ecosystems, pp. 281–296. In: Peh, K.S.H., R.T. Corlett, & Y. Bergeron (eds.). *Handbook of Forest Ecology*. Routledge, London, 656 pp. https://doi.org/10.4324/9781315818290

Tiwari, V.M. (2021). *Joy of Bird Watching*. Books Way, India, 289 pp.

Zakaria, M., M.N. Rajpar, I. Ozdemir & Z. Rosli (2016). Fauna Diversity in Tropical Rainforest: Threats from Land-Use Change, pp. 11–49. In: Blanco, J.A., Y-H. Lo & S.-C. Chang(eds.). *Tropical Forests - The Challenges of Maintaining Ecosystem Services while Managing the Landscape*. IntechOpen, 136 pp. https://doi.org/10.5772/64963

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