Avian richness of the Basanta Protected Forest, far-western lowland Nepal: Implication for conservation

Hiru Lal Dangaura1 | Naresh Pandey2* | Dhirendra Bahadur Chand3 | Krishna Prasad Bhusal1

1Bird Conservation Nepal, Lazimpat, Kathmandu
2Central Department of Zoology, Institute of Science and Technology, Tribhuvan University, Kathmandu
3Wildlife Research Center, Dhangadhi, Nepal
* Correspondence: pandeynaresh25@gmail.com

Received: 25 September 2020 | Revised: 14 November 2020 | Accepted: 18 November 2020

Abstract

Birds are important components of biodiversity and acts as an indicator of habitat quality, productivity and stability. This study aimed to document species richness and assess the temporal distribution pattern of globally threatened bird species in the Basanta Protected Forest (BPF), one of the largest corridor forests which connects Dudhwa National Park (India) with protected areas of western lowland Nepal. During study period of ten years from 2010 to 2019, a total of 381 bird species from 78 families of 19 orders were recorded. Order Passeriformes had the highest species richness (n=180) followed by order Accipitridae and Charadriiformes. Among the families, the family Muscicapidae had the highest species richness (n=31), followed by Accipitridae and Anatidae. Majority of bird recorded were forest bird followed by wetland and farmland bird species. Fifteen globally threatened species like red-headed vulture (Sarcogyps calvus), white-rumped vulture (Gyps bengalensis), slender-billed vulture (Gyps tenuirostris), steppe eagle (Aquila nipalensis) and Egyptian vulture (Neophron percnopterus) were recorded in the BPF. Extensive avian survey in the BPF is important for further exploration of avian community along with its driving factors, which might play a crucial role in developing baseline information and implementing conservation implications.

Keywords: Bird community; Ghodaghodi; Forest; Vantage points; Passeriformes

1 | Introduction

Birds have been associated with forests as long as there have been birds (Sereno & Chenggang 1992). From the time of origin, birds have occupied diversified habitat and foraging strategies compared to other vertebrates (Naish 2014). Birds are good indicators of habitat quality, productivity and stability (Vallecillo et al. 2016), because they respond quickly to habitat change. Forest being one of the major habitats of bird species provides nesting (Bakermans et al. 2012), wintering sites (Wunderle Jr & Waide 1993, Bauer & Hoye 2014) and thermal refugia (Dawson el al. 2005, Seavy 2006). And most important, forest is the source of shelter and sustenance for majority of bird species (Jordano 1995, Sekercioğlu et al. 2004, Kissling et al. 2012). Highest number of bird species are found in tropical and subtropical forests in Southeast Asia and declines towards the pole (Newton 2003). A large variety of species ranging from least concerned to threatened species are found in the forest. Majority of the threatened bird species are found in forest (BirdLife International 2017). The anthropogenic pressure has negatively affected the forest and ultimately decreases the overall species richness (Reijnen et al. 1995, Halfwerk et al. 2011). Few decades back, it was estimated that if the deforestation and habitat degradation persisted, about 20 percent of the tropical forest by the year 2020 and more than 50 percent of the same by the year 2024 is likely to be lost (Wilson 1989). And recent studies carried on tropical forest of Brazil and Southeast Asia have concluded that biodiversity declines with habitat loss (Barlow et al. 2016, Symes et al. 2018). Studies from around the globe have found that habitat specialist bird species are most susceptible to forest disturbances (Arcilla et al. 2015, Pavlacky Jr et al. 2015, Asefa et al. 2017).

Basanta Protected Forest (BPF) is a part of Terai Arc Landscape (TAL), a Global 200 Ecoregion which is categorized as
critical/endangered (Olson & Dinerstein 2002). Forest corridor link protected areas providing refuge for wildlife population. The BPF link Sukhlapahata National Park and Bardia National Park of Nepal with Dudhwa National Park in India through the forest of Churia foothills and is frequently used by globally important mammalian species like tigers, elephants and rhinoceros. Ghodagodi lake, a globally known Ramsar site lies within Basanta forest, which is one of the major ecological importance of this forest. Having significant ecological value, this forest faces potential threats of excessive grazing, poisoning, encroachment, infrastructure development, eutrophication and Chure degradation (Gurung et al. 2018). Although numerous studies have been done focusing on the Ghodaghodi wetland, proper documentation of species richness in the entire BPF is yet lacks. Knowing the importance of adjacent forest in wetland ecosystem conservation and management. This study aimed to document species richness of entire BPF and assess the temporal distribution pattern of globally threatened species.

2 | Materials and methods

2.1 | Study area

Basantà Protected Forest (BPF) with a total area of 83438.9 hectares lies in Kailali district. It occupies about 25.3 percent of total area of district. Twenty-seven lakes including largest natural lake cluster of Terai region commonly known as Ghodaghodi ramsar site lies within this protected forest. This protected forest area is composed of four different types of forests: Chir-pine forest, Chir-pine broad-leaved forest, Hill sal forest and towards terai plains there is lower tropical sal and mixed broad-leaved forest. Dominant vegetation found are sal (Shorea robusta), asna or saj (Terminalia alata), simal (Bombax ceiba), khair (Acacia catechu) and so on. Along with this, two species- globally vulnerable satisal (Dalbergia latifolia) and nationally threatened vijaysal (Pterocarpus marsupium) were also recorded. Not only flora, this forest is also rich in faunal diversity. Globally threatened species like tiger (Panthera tigris), Asian elephant (Elephas maximus), clouded leopard (Neofelis nebulosa), smooth-coated otter (Lutra perpiscillata), red-crowned roofed turtle (Kachuga kachuga), etc have been recorded (Bista & Shah 2010, Kafle 2009, Shrestha et al. 2014).

2.2 | Bird survey

Different bird observation techniques were employed during study. For wetland birds, point count from vantage point was employed, vantage points were selected to cover maximum sighting distance, but not more than 1km. In each vantage point, 15 to 20 minutes time was spent tending towards as shorter time period as possible to avoid multiple counting of a single individual of the bird species. And for terrestrial birds, point count method (Bibby et al. 2000) was used. Birds observed and heard within 20m radius were recorded from a fixed point. The period of observation for a point varied based on habitat. About 20 minutes in the dense forest to detect rare and inconspicuous species (Dos Anjos & Bocon 1999, Pandey et al. 2020) and 10 minutes in an open area like cultivation/farmland. Bushnell Falcon 10x50 wide-angle binoculars were used. Most of the data were recorded opportunistically by the first author for ten years. Opportunistic
data have been used previously for species occurrence at large geographic and temporal scale (Devictor et al. 2010). Many previous studies from avian taxa have proved similar results found from large volume of opportunistic data to those of formal bird count surveys when examining spatial and temporal patterns of bird occurrences (Munson et al. 2010, Walker & Taylor 2017). For wetland birds and threatened species field surveys were done in summer and winter seasons. The field books ‘Birds of Nepal’ (in Nepali) (Grimmet et al. 2003) and ‘Birds of Nepal’ (Grimmet et al. 2016) were used for the identification of birds.

2.3 | Data analysis

The collected data from the field survey were at first entered into an excel datasheet. Observed birds were classified into four feeding guilds- carnivorous, frugivorous, omnivorous and insectivorous, based on the diet descriptions available in (Sundar & Subramanya 2010, Grimmet et al. 2016). Population trend of globally threatened birds were analysed for last 10 years. All the graphs and plots were drawn using excel.

3 | Results

3.1 | Avian richness of the BPF

A total of 381 bird species was recorded representing 19 orders and 78 families. During study, conservation priority species (i.e. globally threatened species, nationally threatened species and bird species listed on CITES) were also recorded. Passeriformes (180) order was found dominant and least numbers of bird species were recorded from order Podicipediformes (Fig. 2).

In case of family, highest number of species were recorded from family Muscicapidae followed by Accipitridae and lowest was recorded form families- Anhingidae, Burhinidae, Recuvirostridae and so on.

3.2 | Species richness in different habitat types

Among 381 bird species, 76 species of wetland birds and 305 species of terrestrial birds were recorded. In case of terrestrial birds, 46 species of agricultural/farmland birds and 259 species of forest birds were recorded (Fig. 3).

3.3 | Species richness in different feeding guilds

Concerning feeding guilds, highest number of Insectivorous species (192) were recorded followed by Omnivorous (75) and lowest number of Granivorous (6) (Fig. 4).

3.4 | Conservation priority birds of the BPF

During the study, number of conservation priority species were found. A total of 15 globally threatened species, 53 nationally threatened species and 58 CITES enlisted bird species were recorded from study area (Fig. 5) (Annex 1). Globally threatened species like red-headed vulture (Sarcogyps calvus), white-rumped vulture (Gyps bengalensis), slender-billed vulture (Gyps tenuirostris), Asian woolly neck (Ciconia episcopus) and so on were recorded (Table 1) (Fig. 6).
To assess the change in temporal pattern of globally threatened species, most frequently recorded GTS were plotted year wise (Fig. 7). The irregular temporal distribution pattern might be due to inconsistent time, season and survey effort for some globally threatened species. Globally threatened species like, swamp francolin, lesser adjutant, red-headed vulture, slender-billed vulture, steppe eagle, grey-crowned prinia and Finn’s weaver were recorded once in study period of 10 years. Vulnerable species-sarus crane has irregular temporal distribution patterns, it was recorded in year 2010-11 and did not record for 7 years. Later, it was again recorded in year 2019-20.

4 | Discussion

Basanta forest is one of ecologically important forest of western Terai, which have a globally important Ghodagodi Ramsar site within. Climatic zonation, diverse habitat and connectivity with Dudhwa National Park of India might be the reason behind supporting a high diversity of flora and fauna. However, the avian community of entire Basanta forest is still unexplored. Therefore, this study aimed to document species richness of entire forest and assess the temporal distribution pattern of globally threatened species in Basanta forest.

### Table 1. List of globally threatened bird species recorded in the BPF, Kailali

| SN | English name       | Scientific name          | IUCN Categories         |
|----|--------------------|--------------------------|-------------------------|
| 1  | Red-headed Vulture | Sarcogyps calvus         | Critically Endangered   |
| 2  | White-rumped Vulture | Gyps bengalensis         | Endangered              |
| 3  | Slender-billed Vulture | Gyps tenuirostris       | Endangered              |
| 4  | Steppe Eagle       | Aquila nipalensis        | Endangered              |
| 5  | Egyptian Vulture   | Neophron percnopterus    | Vulnerable              |
| 6  | Swamp Francolin    | Francolinus gularis      |                        |
| 7  | Common Pochard     | Aythya ferina            |                        |
| 8  | Sarus Crane        | Antigone Antigone        |                        |
| 9  | Lesser Adjutant    | Leptoptilos javanicus    |                        |
| 10 | Asian Woollyneck   | Ciconia episcopus        |                        |
| 11 | Indian Spotted Eagle | Clanga hastate         |                        |
| 12 | Great Hornbill     | Buceros bicornis         |                        |
| 13 | Great Slaty Woodpecker | Mulleripicus pulvarulentus |                        |
| 14 | Grey-crowned Prinia | Prinia cinereocalpa     |                        |
| 15 | Finn's Weaver      | Ploceus megarynchus      |                        |

This study recorded a total of 381 species of birds belonging to 19 orders representing 78 families. Order Passeriformes and family Muscicapidae was found dominant among the avian community, which is similar to other studies in birds (Inskipp & Inskipp 2003, Adhikari et al. 2019, Pandey et al. 2020). We observed that insectivorous form is the most species-rich feeding guild in the Basanta forest, which is consistent with many other studies in birds (Katuwal et al. 2016, Pandey et al. 2020). Highly diverse avian community of the study area might be due to greater habitat complexity (Pan et al. 2016, Hu et al. 2018). Lakes complex, riverine habitat, forest habitat with different forest types like chir-pine forest, chir-pine broad-leaved forest, Hill sal forest, and tropical sal and mixed broadleaved forest have created habitat heterogeneity. Along with that, different land-use types include agricultural land, human settlement area, shrublands, grasslands and some barren area have supported wide habitat,
shelter and resources to the species (Canterbury et al. 2000, Schaub et al. 2010, Ferger et al. 2014, Crosby et al. 2015). In agricultural land, bare ground has been observed to be an important component of habitat for especially ground foraging insectivorous bird (Schaub et al. 2010), and some granivorous species (Moorcroft et al. 2002).

4.2 | Globally threatened birds in the BPF

Altogether 38 bird species from Nepal were declared as globally threatened species (BirdLife International 2020). Among that, we recorded 15 globally threatened (three Critically Endangered, two Endangered and ten Vulnerable) species in BPF alone. In national context, 168 bird species were assessed as nationally threatened species which includes 68 Critically Endangered species, 38 Endangered species and 62 Vulnerable species (Inskipp et al. 2017). A total of 53 nationally threatened (thirteen Critically Endangered, fourteen Endangered and twenty-six Vulnerable) species were recorded from this forest.

In global scenario, risk of extinction of birds is increasing day by day (White & Bennett 2015). With an increase in population, stress on forest increases and ultimately results in habitat destruction and degradation. Encroachment of forest area by local inhabitants, poaching and expansion of Mahendra highway are examples of anthropogenic actions found in the study area. Alteration of vegetation structure and habitat fragmentation through forest degradation and deforestation are among the main threats affecting biodiversity (Sekercioglu 2002, Heikkinen et al. 2004, Chace & Walsh 2006). In many previous studies, it was found many forest specialist species are negatively affected by forest disturbance and have disappeared from some heavily transformed forests (Sekercioglu 2002, Gove et al. 2008). And, in contrast, habitat generalist species can positively exploit habitat changes induced by disturbance and better adapted to open habitats (Sekercioglu 2002, Chace & Walsh 2006).

4.3 | Conservation implication

Basanta forest is one of the largest corridor forests which connects Dudhwa National Park (India) with western lowland protected areas of Nepal. Movement of flagship species like tiger (Panthera tigris) and elephant (Elephas maximus) occurs in this forest. Corridors are designed to maintain connectivity among fragmented resources and are modern approaches for heterogeneous landscape conservation. Connectivity among habitat patches are crucial for conservation and to facilitate movements between fragmented resources (Taylor et al. 1993, Hess & Fischer 2001).

Another important aspect of this forest is Ghodaghodi Ramsar site, largest natural wetland of terai lies within this forest. It is one of IBAs which harbours many wetland birds. The values of wetland ecosystem service ranks
first among all kinds of ecosystem (Costanza et al. 1997) and it is due to irreplaceable role in maintaining the global hydrological cycle, regulating the global climate, safeguarding human welfare and protecting the ecosystem diversity (Bureau 2006, Hu et al. 2017). Numbers of globally and nationally threatened species along with other bird species were found in this forest. Not only for avian fauna, it is equally important for other taxia too. So, conservation of this entire forest area is very important. Numerous studies were conducted focusing on Ghodaghodi Ramsar site. Despite being ecologically important, very few extensive surveys in the entire forest is carried till date. Anthropogenic factors were found affecting forest area and ultimately bird community. Therefore, regular monitoring of habitat change and bird community should be done to counter anthropogenic changes.

5 | Conclusions

The study found that entire BPF has diverse avian community and is home for large number of bird species including globally and nationally threatened species. High diverse community is due to habitat heterogeneity, diverse forest and landuse types and connectivity between protected areas. Declined occurrence of globally threatened species such as red-headed vulture, white-rumped vulture, steppe eagle, swamp francolin, Asian woollyneck etc, might be due to anthropogenic factors like encroachment, road expansion, poaching and eutrophication. Therefore, a detailed study assessing the factors affecting the avian richness in BPF is warranted.

Acknowledgements

We would like to acknowledge Mr. Daya Ram Chaudhary, Bird Conservation Network; Mr Puskal Bahadur Bam, Basanta Protected Forest Council; Bijay Raj Shrestha and Sunita Chaudhary for their support during field work. We would also like to thank Mr. Rajiv Chaudhary, Division Forest Office, Pahalmanpur for providing information during manuscript preparation.

Authors’ contributions

Dangaura, H. L. performed field data collection. Pandey, N., Chand, D. B. and Bhusal, K. P. analysed the data and prepared manuscript. All authors contributed in manuscript improvements and approved for submission.

Conflicts of interest

Authors declare no conflict of interest.

ORCID

Hiru Lal Dangaura https://orcid.org/0000-0003-3394-5978
Naresh Pandey https://orcid.org/0000-0002-0599-648X
Dhirendra Bahadur Chand https://orcid.org/0000-0003-0474-9716
Krishna Prasad Bhusal https://orcid.org/0000-0002-2259-1513

References

Adhikari, J. N., Bhattarai, B. P. and Thapa, T. B. 2019. Factors affecting diversity and distribution of threatened birds in Chitwan National Park, Nepal. Journal of Threatened Taxa 11:13511–13522. https://doi.org/10.11609/jott.4137.11.5.13511-13522
Arcilla, N., Holbech, L. H. and O’Donnell, S. 2015. Severe declines of understory birds follow illegal logging in Upper Guinea forests of Ghana, West Africa. Biological Conservation 188:41–49. https://doi.org/10.1016/j.biocon.2015.02.010
Asefa, A., Davies, A. B., McKechnie, A. E., Kinahan, A. A. and van Rensburg, B. J. 2017. Effects of anthropogenic disturbance on bird diversity in Ethiopian montane forests. The Condor: Ornithological Applications 119:416–430. https://doi.org/10.1650/CONDOR-16-81.1
Bakermans, M. H., Rodewald, A. D. and Vitz, A. C. 2012. Influence of forest structure on density and nest success of mature forest birds in managed landscapes. The Journal of Wildlife Management 76:1225–1234. https://doi.org/10.1002/jwmg.349
Barlow, J., Lennox, G. D., Ferreira, J., Berenguer, E., Lees, A. C., Mac Nally, R., et al. 2016. Anthropogenic disturbance in tropical forests can double biodiversity loss from deforestation. nature 535:144-147. https://doi.org/10.1038/nature18326
Bauer, S. and Hoye, B. J. 2014. Migratory animals couple biodiversity and ecosystem functioning worldwide. Science 344. https://doi.org/10.1126/science.1242552
Bibby, C. J., Burgess, N. D., Hill, D. A. and Mustoe, S. 2000. Bird census techniques. Academic Press, USA, p. 302.

BirdLife International 2017. Threatened birds occur in all habitats, but the majority are found in forest. Retrieved 25 September 2020, Retrieved from http://www.birdlife.org.

BirdLife International 2020. Country profile: Nepal. Retrieved 25 September 2020, Retrieved from: http://www.birdlife.org/datazone/country/nepal.

Bista, D. and Shah, K. 2010. Diversity and Status of the Turtles in Ghodaghodi Lake Area, Kailali district, Far West Nepal. Journal of Natural History Museum 25:366–373.
Bureau, R. C. 2006. The Ramsar Convention Manual: A Guide to the Convention on Wetlands, Ramsar, Iran, 1971. Ramsar Convention Bureau.

Canterbury, G. E., Martin, T. E., Petit, D. R., Petit, L. J. and Bradford, D. F. 2000. Bird communities and habitat as ecological indicators of forest condition in regional monitoring. Conservation Biology 14:544–558. https://doi.org/10.1046/j.1523-1739.2000.98235.x

Chace, J. F. and Walsh, J. 2006. Urban effect on native avifauna: a review. Landscape and Urban Planning 74:46–69. https://doi.org/10.1016/j.landurbplan.2004.08.007

Costanza, R., d’Arge, R., De Groot, R., Farber, S., Grasso, M., Hannon, B., et al. 1997. The value of the world’s ecosystem services and natural capital. Nature 387:253–260. https://doi.org/10.1038/387253a0

Crosby, A. D., Elmore, R. D., Leslie Jr, D. M. and Will, R. E. 2015. Looking beyond rare species as umbrella species: Northern Bobwhites (Colinus virginianus) and conservation of grassland and shrubland birds. Biological Conservation 186:233–240. https://doi.org/10.1016/j.biocon.2015.03.018

Dawson, R. D., Lawrie, C. C. and O’Brien, E. L. 2005. The importance of microclimate variation in determining size, growth and survival of avian offspring: experimental evidence from a cavity nesting passerine. Oecologia 144:499–507. https://doi.org/10.1007/s00442-005-0775-7

Devictor, V., Whittaker, R. J. and Beltrame, C. 2010. Beyond scarcity: citizen science programmes as useful tools for conservation biogeography. Diversity and Distributions 16:354–362. https://doi.org/10.1111/j.1472-4642.2009.00615.x

os Anjos, L. and Bocon, R. 1999. Bird communities in natural forest patches in southern Brazil. The Wilson Bulletin 111:397–414. https://doi.org/10.2307/4164105.

Ferger, S. W., Schleuning, M., Hemp, A., Howell, K. M. and Böhning-Gaese, K. 2014. Food resources and vegetation structure mediate climatic effects on species richness of birds. Global Ecology and Biogeography 23:541–549. https://doi.org/10.1111/ggeb.12151.

Gove, A. D., Hylander, K., Nemomisa, S. and Shimelis, A. 2008. Ethiopian coffee cultivation—Implications for bird conservation and environmental certification. Conservation Letters 1:208–216. https://doi.org/10.1111/j.1755-263X.2008.00033.x.

Grimmet, R., Inskipp, C., Inskipp, T. and Baral, H. S. 2003. Nepalika charaharu. Bird Conservation Nepal.

Grimmett, R., Inskipp, C., Inskipp, T. and Baral, H. S. 2016. Birds of Nepal. Bloomsbury Publishing, UK, p 386.

Gurung, B., Janwali, S. R., Dhakal, T., Bhattachari, B., Thapa, G. J. and Wikramanayake, E. 2018. Participatory threat assessment of two major wildlife corridors in the terai arc landscape. Parks 24:97. https://doi.org/10.2305/IUCN.CH.2018.PARKS-24-1.en

Halfwerk, W., Holleman, L. J., Lessells, C. M. and Slabbeekorn, H. 2011. Negative impact of traffic noise on avian reproductive success. Journal of Applied Ecology 48:210–219. https://doi.org/10.1111/j.1365-2664.2010.01914.x

Heikkinen, R. K., Luoto, M., Virkkala, R. and Rainio, K. 2004. Effects of habitat cover, landscape structure and spatial variables on the abundance of birds in an agricultural–forest mosaic. Journal of Applied Ecology 41:824–835. https://doi.org/10.1111/j.0021-8901.2004.00938.x

Hess, G. R. and Fischer, R. A. 2001. Communicating clearly about conservation corridors. Landscape and Urban Planning 55:195–208. https://doi.org/10.1016/S0169-2046(01)00155-4

Hu, S., Niu, Z., Chen, Y., Li, L. and Zhang, H. 2017. Global wetlands: Potential distribution, wetland loss, and status. Science of the Total Environment 586:319–327. https://doi.org/10.1016/j.scitotenv.2017.02.001

Hu, Y., Ding, Z., Jiang, Z., Quan, Q., Guo, K., Tian, L., et al. 2018. Birds in the Himalayas: What drives beta diversity patterns along an elevational gradient? Ecology and evolution 8:11704–11716. https://doi.org/10.1002/ece3.4622

Inskipp, C., Baral, H. S., Inskipp, T., Khatiwada, A. P., Khatiwada, M. P., Poudyal, L. P., et al. 2017. Nepal’s National Red List of Birds. Journal of Threatened Taxa 9:9700. https://doi.org/10.11609/jott.2855.9.1.9700-9722

Inskipp, C. and Inskipp, T. 2003. Bird conservation priorities of the Annapurna Conservation Area. Report submitted to UNEP-WCMC/King Mahendra Trust for Nature Conservation / Annapurna Conservation Area Project.

Jordano, P. 1995. Angiosperm fleshy fruits and seed dispersers: a comparative analysis of adaptation and constraints in plant-animal interactions. The American Naturalist 145:163–191. https://doi.org/10.1086/285735.

Kafle, G. 2009. A review on Research and Conservation of Otters in Nepal. IUCN Otter Specialist Group Bulletin 26:32–43.

Katuwal, H. B., Basnet, K., Khanal, B., Devkota, S., Rai, S. K., Gajurel, J. P., et al. 2016. Seasonal changes in bird species and feeding guilds along elevational gradients of the Central Himalayas, Nepal. PLoS One 11:e0158362. https://doi.org/10.1371/journal.pone.0158362

Kissling, W. D., Sekercioglu, C. H. and Jetz, W. 2012. Bird dietary guilds along elevational gradients of the Central Himalayas, Nepal. Biological Conservation 150:362–362.

Kissling, W. D., Sekercioglu, C. H. and Jetz, W. 2012. Bird dietary guild richness across latitudes, environments and biogeographic regions. Global Ecology and Biogeography 21:328–340. https://doi.org/10.1111/j.1466-8238.2011.00679.x

Moorcroft, D., Whittingham, M., Bradbury, R. and Wilson, J. 2002. The selection of stubble fields by wintering granivorous birds reflects
vegetation cover and food abundance. Journal of Applied Ecology 535–547.
https://doi.org/10.1046/j.1365-2664.2002.00730.x

Munson, M. A., Caruana, R., Fink, D., Hochachka, W. M., iliff, M., Rosenberg, K. V., et al. 2010. A method for measuring the relative information content of data from different monitoring protocols. Methods in Ecology and Evolution 1:263–273.
https://doi.org/10.1111/j.2041-210X.2010.00035.x

Naish, D. 2014. The fossil record of bird behaviour. Journal of Zoology 292:268-280. https://doi.org/10.1111/jzo.12113

Newton, I. 2003. Speciation and biogeography of birds. Academic Press, USA, p 656.

Olson, D. M. and Dinerstein, E. 2002. The Global 200: Priority ecoregions for global conservation. Annals of the Missouri Botanical Garden 199-224. https://doi.org/10.2307/3298564

Pan, X., Ding, Z., Hu, Y., Liang, J., Wu, Y., Si, X., et al. 2016. Elevational pattern of bird species richness and its causes along a central Himalaya gradient, China. PeerJ 4:e2636.
https://doi.org/10.7717/peerj.2636

Pandey, N., Khanal, L. and Chalise, M. K. 2020. Correlates of avifaunal diversity along the elevational gradient of Mardi Himal in Annapurna Conservation Area, Central Nepal. Avian Research 11. https://doi.org/10.1186/s40657-020-00217-6

Pavlacky Jr, D. C., Possingham, H. P. and Goldizen, A. W. 2015. Integrating life history traits and forest structure to evaluate the vulnerability of rainforest birds along gradients of deforestation and fragmentation in eastern Australia. Biological Conservation 188:89–99. https://doi.org/10.1016/j.biocon.2014.10.020

Reijnen, R., Foppen, R., Braak, C. T. and Thissen, J. 1995. The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to the proximity of main roads. Journal of Applied Ecology 187–202.
https://doi.org/10.2307/2404428

Schaub, M., Martinez, N., Tagmann-loset, A., Weishaupt, N., Maurer, M. L., Reichlin, T. S., et al. 2010. Patches of bare ground as a staple commodity for declining ground-foraging insectivorous farmland birds. PLoS One 5:e13115.
https://doi.org/10.1371/journal.pone.0013115

Seavy, N. 2006. Physiological correlates of habitat association in East African sunbirds (Nectariniidae). Journal of Zoology 270:290–297. https://doi.org/10.1111/j.1469-7998.2006.00138.x

Sekercioglu, C. H. 2002. Effects of forestry practices on vegetation structure and bird community of Kibale National Park, Uganda. Biological Conservation 107:229–240.
https://doi.org/10.1016/S0006-3207(02)00097-6

Cite this article as:
Dangaura, H. L., Pandey, N., Chand, D. B. and Bhusal, K. P. 2020. Avian richness of the Basanta Protected Forest, far-western lowland Nepal: Implication for conservation. Nepalese Journal of Zoology 4(2):68–84. https://doi.org/10.3126/njz.v4i2.33886
Annex 1: List of bird species from Basanta forest and their taxonomic position, feeding guild category and conservation priority.

Note: GTC: Globally Threatened Category, NTC: Nationally Threatened Category, CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora (O: Omnivores, H: Herbivores, I: Insectivores, P: Piscivores, G: Granivores, C: Carnivores, F: Frugivores)

| SN | Order          | Family          | English name     | Scientific name          | Feeding Guilds | GTC/NTC/CITES |
|----|----------------|-----------------|------------------|--------------------------|----------------|--------------|
| 1  | Galliformes    | Phasianidae     | hill partridge   | Arborophila torqueola    | O              |              |
| 2  | Galliformes    | Phasianidae     | common quail     | Coturnix coturnix        | O              |              |
| 3  | Galliformes    | Phasianidae     | rain quail       | Coturnix coronandela     | O              |              |
| 4  | Galliformes    | Phasianidae     | black francolin  | Francolinus francolinus  | O              |              |
| 5  | Galliformes    | Phasianidae     | grey francolin   | Francolinus pondicerinus | O              | ../VU/..    |
| 6  | Galliformes    | Phasianidae     | swamp francolin  | Francolinus gularis      | O              | VU/EN/..    |
| 7  | Galliformes    | Phasianidae     | Indian peafowl   | Pavo cristatus           | O              | ../I/III    |
| 8  | Galliformes    | Phasianidae     | red junglefowl   | Gallus gullus            | O              |              |
| 9  | Galliformes    | Phasianidae     | kalij pheasant   | Lophura leucomelanus     | O              | ../I/III    |
| 10 | Anseriformes   | Anatidae        | lesser whistling duck | Dendrocygna javanica   | H              |              |
| 11 | Anseriformes   | Anatidae        | greylag goose    | Anser anser             | H              |              |
| 12 | Anseriformes   | Anatidae        | goosander        | Mergus merganser        | P              |              |
| 13 | Anseriformes   | Anatidae        | ruddy shelduck   | Tadorna ferruginea      | H              |              |
| 14 | Anseriformes   | Anatidae        | common shelduck  | Tadorna tadoina          | I              |              |
| 15 | Anseriformes   | Anatidae        | African comb duck | Sarkidiornis melanotos  | H              | ../EN/III  |
| 16 | Anseriformes   | Anatidae        | cotton pygmy-goose | Nettapus coromandelianus | H              | ../VU/..   |
| 17 | Anseriformes   | Anatidae        | red-crested pochard | Netta rufina             | H              |              |
| 18 | Anseriformes   | Anatidae        | common pochard   | Aythya ferina           | O              | VU/../III  |
| 19 | Anseriformes   | Anatidae        | ferruginous duck | Aythya nyroca           | O              | ../VU/..   |
| 20 | Anseriformes   | Anatidae        | tufted duck      | Aythya fulgula          | C              |              |
| 21 | Anseriformes   | Anatidae        | garganey         | Spatula querquedula    | O              | ../VU/..   |
| 22 | Anseriformes   | Anatidae        | northern shoveler | Spatula clypeata        | O              |              |
| 23 | Anseriformes   | Anatidae        | falcated duck    | Mareca falcata          | H              | ../CR/..   |
| 24 | Anseriformes   | Anatidae        | gadwall          | Mareca strepera         | H              |              |
| 25 | Anseriformes   | Anatidae        | Eurasian wigeon  | Anas penelope           | H              |              |
| 26 | Anseriformes   | Anatidae        | Indian spot-billed duck | Anas poecilorhyncha | O              |              |
| 27 | Anseriformes   | Anatidae        | mallard          | Anas platyrhynchos      | O              |              |
| 28 | Anseriformes   | Anatidae        | northern pintail | Anas acuta              | O              | ../EN/III  |
| 29 | Anseriformes   | Anatidae        | common teal      | Anas crecca             | O              |              |
| 30 | Podicipediformes | Podicipedidae   | little grebe     | Tachybaptus ruficollis  | P              |              |
| 31 | Podicipediformes | Podicipedidae   | great crested grebe | Podiceps cristatus      | P              |              |
| 32 | Columbiformes  | Columbidae      | rock dove        | Columba livia           | G              |              |
| 33 | Columbiformes  | Columbidae      | Oriental turtle-dove | Streptopelia orientalis | G              |              |
| 34 | Columbiformes  | Columbidae      | Eurasian collared-dove | Streptopelia decaocto | G              |              |
| 35 | Columbiformes  | Columbidae      | red turtle-dove  | Streptopelia tranquebarica | G              |              |
| 36 | Columbiformes  | Columbidae      | western spotted dove | Spalopelia suratensis | G              |              |
| 37 | Columbiformes  | Columbidae      | grey-capped emerald dove | Chalcophaps indica | G              |              |
| 38 | Columbiformes  | Columbidae      | orange-breasted green-pigeon | Treron bicinctus | F              |              |
| Page | Family | Genus | Scientific Name | Common Name | IUCN Status |
|------|--------|-------|-----------------|-------------|-------------|
| 39   | Columbiformes | Columbidae | Ashy-headed green-pigeon | Treron phayrei | F |
| 40   | Columbiformes | Columbidae | Yellow-footed green-pigeon | Treron phoenicopterus | F |
| 41   | Caprimulgiformes | Caprimulgidae | Grey nightjar | Caprimulgus jotaka | I |
| 42   | Caprimulgiformes | Caprimulgidae | Large-tailed nightjar | Caprimulgus macrurus | I |
| 43   | Caprimulgiformes | Caprimulgidae | Indian nightjar | Caprimulgus asiaticus | I / EN |
| 44   | Caprimulgiformes | Caprimulgidae | Savanna nightjar | Caprimulgus affinis | I |
| 45   | Caprimulgiformes | Apodidae | White-rumped spinetail | Zoonavena sylvatica | I |
| 46   | Caprimulgiformes | Apodidae | White-throated needletail | Hirundapus caudacutus | I |
| 47   | Caprimulgiformes | Apodidae | Himalayan swiftlet | Aerodramus brevirostris | I |
| 48   | Caprimulgiformes | Apodidae | Alpine swift | Tachymarptis melba | I |
| 49   | Caprimulgiformes | Apodidae | House swift | Apus nipalensis | I |
| 50   | Cuculiformes | Cuculidae | Greater coucal | Centropus sinensis | C |
| 51   | Cuculiformes | Cuculidae | Lesser coucal | Centropus bengalensis | I |
| 52   | Cuculiformes | Cuculidae | Sirkeer malkoha | Taccoca leucoschis | I |
| 53   | Cuculiformes | Cuculidae | Green-billed malkoha | Phaenicophaeus tristis | I |
| 54   | Cuculiformes | Cuculidae | Jacobin cuckoo | Clamator jacobinus | I |
| 55   | Cuculiformes | Cuculidae | Western koel | Eudynamys scolopaceus | F |
| 56   | Cuculiformes | Cuculidae | Grey-bellied cuckoo | Cacomantis passerinus | I |
| 57   | Cuculiformes | Cuculidae | Common hawk-cuckoo | Hierococcyx varius | I |
| 58   | Cuculiformes | Cuculidae | Indian cuckoo | Cuculus micropterus | I |
| 59   | Cuculiformes | Cuculidae | Common cuckoo | Cuculus canorus | I |
| 60   | Gruiformes | Rallidae | Ruddy-breasted crake | Zapomia fusca | O |
| 61   | Gruiformes | Rallidae | Brown crake | Zapomia akool | O |
| 62   | Gruiformes | Rallidae | White-breasted waterhen | Amaurornis phoenicurus | I |
| 63   | Gruiformes | Rallidae | Purple swamp hen | Porphyrio porphyrio | O |
| 64   | Gruiformes | Rallidae | Common moorhen | Gallinula chloropus | O |
| 65   | Gruiformes | Rallidae | Common coot | Fulica atra | O |
| 66   | Gruiformes | Gruidae | Sarus crane | Antigone antigone | O / VU / VU / III |
| 67   | Gruiformes | Gruidae | Demoiselle crane | Anthropoides virgo | O / VU / III |
| 68   | Otidae | Ciconiidae | Lesser adjutant | Leptoptilos javanicus | C / VU / VU / .. |
| 69   | Otidae | Ciconiidae | Painted stork | Mycteria leucocephala | P / EN / .. |
| 70   | Otidae | Ciconiidae | Asian openbill | Anastomus oscitans | C / VU / .. |
| 71   | Otidae | Ciconiidae | Black stork | Ciconia nigra | C / VU / .. |
| 72   | Otidae | Ciconiidae | Asian woollyneck | Ciconia episcopus | C / VU / .. |
| 73   | Otidae | Ciconiidae | Black-necked stork | Ephippiorhynchus asiaticus | C / IUCN / .. |
| 74   | Otidae | Threskiornithidae | Black-headed ibis | Threskiornis melanocephalus | I |
| 75   | Otidae | Threskiornithidae | Red-naped ibis | Pseudibis papillosa | I |
| 76   | Pelecaniformes | Ardeidae | Eurasian bittern | Botaurus stellaris | C / EN / .. |
| 77   | Pelecaniformes | Ardeidae | Yellow bittern | Ixobrychus sinensis | C |
| 78   | Pelecaniformes | Ardeidae | Cinnamon bittern | Ixobrychus cinnamomeus | C |
| 79   | Pelecaniformes | Ardeidae | Black bittern | Ixobrychus flavicollis | C / EN / .. |
| 80   | Pelecaniformes | Ardeidae | Black-crowned night-heron | Nycticorax nycticorax | C |
| 81   | Pelecaniformes | Ardeidae | Green-backed heron | Butorides striata | C |
| 82   | Pelecaniformes | Ardeidae | Indian pond-heron | Ardeola grayii | C |
| 83   | Pelecaniformes | Ardeidae | Cattle egret | Bubulcus ibis | C |
| 84   | Pelecaniformes | Ardeidae | Grey heron | Ardea cinerea | C |
| 85   | Pelecaniformes | Ardeidae | Purple heron | Ardea purpurea | C |
86 Pelecaniformes Ardeidae great white egret Ardea alba C
87 Pelecaniformes Ardeidae intermediate egret Ardea intermedia C
88 Pelecaniformes Ardeidae little egret Egretta garzetta C
89 Suliformes Phalacrocoracidae little cormorant Microcarbo niger P
90 Suliformes Phalacrocoracidae great cormorant Phalacrocorax carbo P
91 Suliformes Anhingidae Oriental darter Anhinga melanogaster P
92 Charadriiformes Burhinidae Indian thick-knee Burhinus indicus I
93 Charadriiformes Recurvirostridae black-winged stilt Himantopus himantopus I
94 Charadriiformes Charadriidae little ringed plover Charadrius dubius I
95 Charadriiformes Charadriidae river lapwing Vanellus duvaucelii I
96 Charadriiformes Charadriidae yellow-wattled lapwing Vanellus malabaricus I ..VUI..
97 Charadriiformes Charadriidae grey-headed lapwing Vanellus cinereus I
98 Charadriiformes Charadriidae red-wattled lapwing Vanellus indicus I
99 Charadriiformes Rostratulidae greater painted-snipe Rostratula benghalensis O
100 Charadriiformes Jacanidae pheasant-tailed jacana Hydrophasianus chirugus I ..VUI..
101 Charadriiformes Jacanidae bronze-winged jacana Metopidius indicus I
102 Charadriiformes Scolopacidae little stint Calidris minuta I
103 Charadriiformes Scolopacidae pintail snipe Gallinago stenura I
104 Charadriiformes Scolopacidae common snipe Gallinago gallinago I
105 Charadriiformes Scolopacidae common sandpiper Actitis hypoleucos I
106 Charadriiformes Scolopacidae green sandpiper Tringa ochropus I
107 Charadriiformes Scolopacidae common greenshank Tringa nebularia I
108 Charadriiformes Scolopacidae common redshank Tringa totanus I
109 Charadriiformes Scolopacidae wood sandpiper Tringa glareola I
110 Charadriiformes Scolopacidae marsh sandpiper Tringa stagnatilis I
111 Charadriiformes Turnicidae common buttonquail Turnix sylvaticus O
112 Charadriiformes Glareolidae oriental pratincole Glareola maldivarum I
113 Charadriiformes Glareolidae little pratincole Glareola lactea I
114 Charadriiformes Laridae brown-headed gull Larus brunnicephalus P ..VUI..
115 Charadriiformes Laridae Pallas's gull Larus ichthyaetus P
116 Charadriiformes Laridae whiskered tern Chlidonias hybridus P
117 Charadriiformes Laridae river tern Sterna aurantia P ..CR/II
118 Strigiformes Tytonidae common barn-owl Tyto alba C ..VUII
119 Strigiformes Strigidae Asian barred owlet Glaucidium cuculoides C ..I/II
120 Strigiformes Strigidae jungle owlet Glaucidium radiatum C ..I/II
121 Strigiformes Strigidae spotted owlet Athene brama C ..I/II
122 Strigiformes Strigidae collared scops-owl Otus lettia I ..I/II
123 Strigiformes Strigidae Indian scops-owl Otus bakkamoena I ..I/II
124 Strigiformes Strigidae mountain scops-owl Otus spilochephalus C ..I/II
125 Strigiformes Strigidae Oriental scops-owl Otus sunia C ..I/II
126 Strigiformes Strigidae brown wood-owl Strix leptogrammica C ..VUII
127 Strigiformes Strigidae dusky eagle-owl Bubo coromandus C ..CR/II
128 Strigiformes Strigidae brown fish-owl Ketupa zeylonensis C ..VUII
129 Accipitriformes Pandionidae osprey Pandion haliaetus P ..I/II
130 Accipitriformes Accipitridae black-winged kite Elanus caeruleus C ..I/II
131 Accipitriformes Accipitridae Oriental honey-buzzard Pernis ptilorhynchus C ..I/II
132 Accipitriformes Accipitridae crested serpent-eagle Spilornis cheela C ..I/II
| 133 | Accipitriformes | Accipitridae | short-toed snake-eagle | Circaetus gallicus | C | ././II |
| 134 | Accipitriformes | Accipitridae | Egyptian vulture | Neophron percnopterus | C | EN/VU/II |
| 135 | Accipitriformes | Accipitridae | red-headed vulture | Sarcogyps calvus | C | CR/EN/II |
| 136 | Accipitriformes | Accipitridae | Himalayan griffon | Gyps himalayensis | C | ./VU/II |
| 137 | Accipitriformes | Accipitridae | white-rumped vulture | Gyps bengalensis | C | CR/CR/II |
| 138 | Accipitriformes | Accipitridae | slender-billed vulture | Gyps tenuirostris | C | CR/CR/II |
| 139 | Accipitriformes | Accipitridae | griffon vulture | Gyps fulvus | C | ././II |
| 140 | Accipitriformes | Accipitridae | cinereous vulture | Aegypius monachus | C | ./EN/II |
| 141 | Accipitriformes | Accipitridae | mountain hawk-eagle | Nisaetus nipalensis | C | ././II |
| 142 | Accipitriformes | Accipitridae | changeable hawk-eagle | Nisaetus cirrhatus | C | ././II |
| 143 | Accipitriformes | Accipitridae | rufous-bellied eagle | Lophotriorchis kienerii | C | ./CR/II |
| 144 | Accipitriformes | Accipitridae | Indian spotted eagle | Clanga hastata | C | VU/VU/II |
| 145 | Accipitriformes | Accipitridae | steppe eagle | Aquila nipalensis | C | EN/VU/II |
| 146 | Accipitriformes | Accipitridae | hooded eagle | Hieraaetus pennatus | C | ././II |
| 147 | Accipitriformes | Accipitridae | western marsh-harrier | Circus aeruginosus | C | ./VU/II |
| 148 | Accipitriformes | Accipitridae | hen harrier | Circus cyaneus | C | ./VU/II |
| 149 | Accipitriformes | Accipitridae | pied harrier | Circus melanoleucos | C | ./VU/II |
| 150 | Accipitriformes | Accipitridae | shikra | Accipiter badius | C | ././II |
| 151 | Accipitriformes | Accipitridae | besra | Accipiter virgatus | C | ././II |
| 152 | Accipitriformes | Accipitridae | Eurasian sparrow hawk | Accipiter nisus | C | ././II |
| 153 | Accipitriformes | Accipitridae | grey-headed fish-eagle | Ichthyophaga ichthyaeetus | C | ./CR/II |
| 154 | Accipitriformes | Accipitridae | black kite | Milvus migrans | C | ././II |
| 155 | Accipitriformes | Accipitridae | white-eyed buzzard | Butastur teesa | C | ././II |
| 156 | Accipitriformes | Accipitridae | Himalayan buzzard | Buteo reductus | C | ././II |
| 157 | Buceroformes | Bucerotidae | great hornbill | Buceros bicornis | F | VU/EN/I |
| 158 | Buceroformes | Bucerotidae | Indian grey hornbill | Ocyeris birostris | F | |
| 159 | Buceroformes | Bucerotidae | Oriental pied hornbill | Anthracoceros albirostris | F | ././II |
| 160 | Buceroformes | Upupidae | common hoopoe | Upupa epops | I | |
| 161 | Coraciiformes | Meropidae | blue-bearded bee-eater | Nyctornis athertoni | I | |
| 162 | Coraciiformes | Meropidae | Asian green bee-eater | Merops orientalis | I | |
| 163 | Coraciiformes | Meropidae | chestnut-headed bee-eater | Merops leschenaulti | I | |
| 164 | Coraciiformes | Meropidae | blue-tailed bee-eater | Merops philippinus | I | |
| 165 | Coraciiformes | Coraciidae | Indian roller | Coracias benghalensis | C | |
| 166 | Coraciiformes | Alcedinidae | blue-eared kingfisher | Alcedo meninting | C | ./EN/|
| 167 | Coraciiformes | Alcedinidae | common kingfisher | Alcedo atthis | C | |
| 168 | Coraciiformes | Alcedinidae | pied kingfisher | Ceryle rudis | C | |
| 169 | Coraciiformes | Alcedinidae | stork-billed kingfisher | Pelargopsis capensis | C | |
| 170 | Coraciiformes | Alcedinidae | white-breasted kingfisher | Halcyon sphenurus | C | |
| 171 | Piciformes | Megalaimidae | coppersmith barbet | Psilopogon haemacephalus | F | |
| 172 | Piciformes | Megalaimidae | great barbet | Psilopogon virens | F | |
| 173 | Piciformes | Megalaimidae | lineated barbet | Psilopogon lineatus | F | |
| 174 | Piciformes | Megalaimidae | brown-headed barbet | Psilopogon zeylanicus | F | |
| 175 | Piciformes | Megalaimidae | blue-throated barbet | Psilopogon asiaticus | F | |
| 176 | Piciformes | Picidae | Eurasian wryneck | Jynx torquilla | I | |
| 177 | Piciformes | Picidae | speckled piculet | Picumnus inornatus | I | |
| 178 | Piciformes | Picidae | bay woodpecker | Blythipicus pyrrohils | I | |
| 179 | Piciformes | Picidae | greater flameback | Chrysocolaptes guttacristatus | I | |
| 180 | Piciformes | Picidae | Himalayan flameback | Dinopium shorii | I |
| 181 | Piciformes | Picidae | black-rumped flameback | Dinopium benghalense | I |
| 182 | Piciformes | Picidae | rufous woodpecker | Micropterum brachyurus | I |
| 183 | Piciformes | Picidae | lesser yellownape | Picus chlorolophus | I |
| 184 | Piciformes | Picidae | streak-throated woodpecker | Picus xanthopygaeus | I |
| 185 | Piciformes | Picidae | great slaty woodpecker | Mycteropus vulneratus | I |
| 186 | Piciformes | Picidae | grey-capped woodpecker | Picoides canicollis | I |
| 187 | Piciformes | Picidae | Indian pygmy woodpecker | Picoides nanus | I |
| 188 | Piciformes | Picidae | yellow-crowned woodpecker | Leiopterus mahattensis | I |
| 189 | Piciformes | Picidae | brown-fronted woodpecker | Leiopterus aurocapillus | I |
| 190 | Piciformes | Picidae | fulvous-breasted woodpecker | Dendrocopos macei | I |
| 191 | Cariamiformes | Falconidae | lesser kestrel | Falco naumanni | C | /I |
| 192 | Cariamiformes | Falconidae | common kestrel | Falco tinnunculus | C | /I |
| 193 | Cariamiformes | Falconidae | red-headed falcon | Falco chicera | C | /II |
| 194 | Cariamiformes | Falconidae | Eurasian hobby | Falco subbuteo | I | /I |
| 195 | Cariamiformes | Falconidae | Oriental hobby | Falco severus | I | /CRII |
| 196 | Cariamiformes | Falconidae | Peregrine falcon | Falco peregrinus | C | /I |
| 197 | Psittaciformes | Psittacidae | slaty-headed parakeet | Psittacula himalayana | F | /II |
| 198 | Psittaciformes | Psittacidae | plum-headed parakeet | Psittacula cyanoecephala | H | /I |
| 199 | Psittaciformes | Psittacidae | red-breasted parakeet | Psittacula alexandri | F | /VII |
| 200 | Psittaciformes | Psittacidae | alexandrine parakeet | Psittacula eupatria | F | /II |
| 201 | Psittaciformes | Psittacidae | rose-ringed parakeet | Psittacula krameri | F | |
| 202 | Passeriformes | Picidae | Indian pitta | Pitta brachyura | I | |
| 203 | Passeriformes | Oriolidae | maroon oriole | Oriolus tschilii | O | |
| 204 | Passeriformes | Oriolidae | black-hooded oriole | Oriolus xanthornus | O | |
| 205 | Passeriformes | Oriolidae | Indian golden oriole | Oriolus kundoo | O | |
| 206 | Passeriformes | Oriolidae | slender-billed oriole | Oriolus tenuirostris | O | |
| 207 | Passeriformes | Vireonidae | white-browed shrike-babbler | Pteruthius aeralatus | I | |
| 208 | Passeriformes | Vireonidae | white-bellied erpomins | Erpornis zantholeuca | I | |
| 209 | Passeriformes | Campephagidae | small minivet | Pericrocotus cinnamomeus | I | |
| 210 | Passeriformes | Campephagidae | long-tailed minivet | Pericrocotus ethologus | I | |
| 211 | Passeriformes | Campephagidae | scarlet minivet | Pericrocotus flaviceps | I | |
| 212 | Passeriformes | Campephagidae | rosy minivet | Pericrocotus roseus | I | |
| 213 | Passeriformes | Campephagidae | Indian cuckoo-shrike | Coracina maclei | I | |
| 214 | Passeriformes | Campephagidae | black-winged cuckoo-shrike | Lalage macei | I | |
| 215 | Passeriformes | Artamidae | ashy woodswallow | Artamus fuscus | I | |
| 216 | Passeriformes | Vangidae | bar-winged flycatcher-shrike | Hemipus picatus | I | |
| 217 | Passeriformes | Vangidae | large woodshrike | Tephrodornis virgatus | I | |
| 218 | Passeriformes | Vangidae | common woodshrike | Tephrodornis pordicinctus | I | |
| 219 | Passeriformes | Aegithinidae | common iora | Aegithina tiphia | I | |
| 220 | Passeriformes | Rhipiduridae | white-browed fantail | Rhipidura aureola | I | |
| 221 | Passeriformes | Rhipiduridae | white-throated fantail | Rhipidura abicollis | I | |
| 222 | Passeriformes | Dicruridae | black drongo | Dicrurus macrorhynchos | I | |
| 223 | Passeriformes | Dicruridae | ashy drongo | Dicrurus leucolophus | I | |
| 224 | Passeriformes | Dicruridae | white-bellied drongo | Dicrurus caenulescens | I | |
| 225 | Passeriformes | Dicruridae | crow-bellied drongo | Dicrurus aeneus | I | |
| 226 | Passeriformes | Dicruridae | lesser racquet-tailed drongo | Dicrurus remifer | I |
| Page | Taxonomy | Common Name | Scientific Name | Status |
|------|----------|-------------|----------------|--------|
| 227  | Passeriformes | Dicuridae | hair-crested drongo | Dicrurus hottentottus | I |
| 228  | Passeriformes | Dicuridae | greater racquet-tailed drongo | Dicrurus paradiseus | I |
| 229  | Passeriformes | Monarchidae | black-naped monarch | Hypothymis azurea | I |
| 230  | Passeriformes | Monarchidae | Indian paradise-flycatcher | Terpsiphone paradisi | I |
| 231  | Passeriformes | Laniidae | brown shrike | Lanius cristatus | C |
| 232  | Passeriformes | Laniidae | long-tailed shrike | Lanius schach | C |
| 233  | Passeriformes | Laniidae | grey-backed shrike | Lanius tephronotus | C |
| 234  | Passeriformes | Corvidae | rufous treepie | Dendrocitta vagabunda | O |
| 235  | Passeriformes | Corvidae | grey treepie | Dendrocitta formosae | O |
| 236  | Passeriformes | Corvidae | red-billed blue magpie | Urocissa erythrorhyncha | O |
| 237  | Passeriformes | Corvidae | black-headed jay | Garrulus lanceolatus | I |
| 238  | Passeriformes | Corvidae | house crow | Corvus splendens | O |
| 239  | Passeriformes | Corvidae | large-billed crow | Corvus macrorhynchos | O |
| 240  | Passeriformes | Stenostiridae | yellow-bellied fairy-fantail | Chelidophyrs hypoxanthus | I |
| 241  | Passeriformes | Stenostiridae | grey-headed canary-flycatcher | Culicicapa ceylonensis | I |
| 242  | Passeriformes | Paridae | green-backed tit | Parus monticola | I |
| 243  | Passeriformes | Paridae | great tit | Parus major | I |
| 244  | Passeriformes | Paridae | black-crested tit | Machilopterus xanthogenys | I |
| 245  | Passeriformes | Alaudidae | ashy-crowned sparrow-lark | Eremopterix griseus | O |
| 246  | Passeriformes | Alaudidae | Bengal bushlark | Mirafra assamica | O |
| 247  | Passeriformes | Alaudidae | sand lark | Alauda arvensis | O |
| 248  | Passeriformes | Alaudidae | Hume's lark | Calandrella acutirostris | O |
| 249  | Passeriformes | Alaudidae | eastern short-toed lark | Calandrella dukhunensis | O |
| 250  | Passeriformes | Alaudidae | crested lark | Galerida cristata | O |
| 251  | Passeriformes | Cisticolidae | zitting cisticola | Cisticola juncidis | I |
| 252  | Passeriformes | Cisticolidae | golden-headed cisticola | Cisticola exilis | I |
| 253  | Passeriformes | Cisticolidae | striated prinia | Prinia cristata | I |
| 254  | Passeriformes | Cisticolidae | grey-crowned prinia | Prinia cinereocapilla | I |
| 255  | Passeriformes | Cisticolidae | grey-breasted prinia | Prinia hodgsonii | I |
| 256  | Passeriformes | Cisticolidae | graceful prinia | Prinia gracilis | I |
| 257  | Passeriformes | Cisticolidae | jungle prinia | Prinia sylvatica | I |
| 258  | Passeriformes | Cisticolidae | yellow-bellied prinia | Prinia flaviventris | I |
| 259  | Passeriformes | Cisticolidae | ashy prinia | Prinia socialis | I |
| 260  | Passeriformes | Cisticolidae | plain prinia | Prinia inornata | I |
| 261  | Passeriformes | Cisticolidae | common tailorbird | Orthotomus sutorius | I |
| 262  | Passeriformes | Acrocephalidae | booted warbler | Iduna caligata | I |
| 263  | Passeriformes | Locustellidae | striated grassbird | Megalurus palustris | I |
| 264  | Passeriformes | Hirundinidae | Asian house martin | Delichon dasypus | I |
| 265  | Passeriformes | Hirundinidae | Nepal house martin | Delichon nipalense | I |
| 266  | Passeriformes | Hirundinidae | barn swallow | Hirundo rustica | I |
| 267  | Passeriformes | Hirundinidae | Asian plain martin | Riparia chinensis | I |
| 268  | Passeriformes | Hirundinidae | collared sand martin | Riparia riparia | I |
| 269  | Passeriformes | Pycnonotidae | ashy bulbul | Hemixos flavus | O |
| 270  | Passeriformes | Pycnonotidae | black bulbul | Hypsipetes leucocephalus | O |
| 271  | Passeriformes | Pycnonotidae | red-whiskered bulbul | Pycnonotus jocosus | O |
| 272  | Passeriformes | Pycnonotidae | Himalayan bulbul | Pycnonotus leucogenys | O |
| 273  | Passeriformes | Pycnonotidae | red-vented bulbul | Pycnonotus sinensis | O |
| Page   | Taxonomic Group | Scientific Name                                      | Status   |
|--------|-----------------|------------------------------------------------------|----------|
| 274    | Phylloscopidae   | Phylloscopus inornatus                                | I        |
| 275    | Phylloscopidae   | Phylloscopus humei                                    | I        |
| 276    | Phylloscopidae   | Phylloscopus pulcher                                  | I        |
| 277    | Phylloscopidae   | Phylloscopus fuscatus                                 | I        |
| 278    | Phylloscopidae   | Phylloscopus fuliginer                                | I        |
| 279    | Phylloscopidae   | Phylloscopus tristis                                  | I        |
| 280    | Phylloscopidae   | Phylloscopus affinis                                  | I        |
| 281    | Phylloscopidae   | Phylloscopus trochiloides                             | I        |
| 282    | Phylloscopidae   | Phylloscopus reguloides                               | I        |
| 283    | Phylloscopidae   | Phylloscopus occipitalis                              | I        |
| 284    | Phylloscopidae   | Phylloscopus xanthochistos                            | I        |
| 285    | Phylloscopidae   | Tesia cyaniventer                                    | I        |
| 286    | Phylloscopidae   | Cettia brunnifrons                                   | I        |
| 287    | Phylloscopidae   | Hemitesia pallidipes                                 | I        |
| 288    | Aegithalidae     | Aegithalos redalei                                   | I        |
| 289    | Sylviidae        | Sylvia curruca                                       | I        |
| 290    | Zosteropidae     | Zosterops palpebrosus                                | I        |
| 291    | Timaliidae       | Pomatorhinus achiaticeps                              | I        |
| 292    | Timaliidae       | Erythrogenys erythrogenys                             | I        |
| 293    | Timaliidae       | Timalia pileata                                      | I        |
| 294    | Timaliidae       | Mixornis gularis                                     | I        |
| 295    | Timaliidae       | Cyanodroma pyrhops                                   | I        |
| 296    | Pellorneidae     | Pellorneum ruficeps                                  | I        |
| 297    | Leiothrichidae   | Argya earlei                                         | I        |
| 298    | Leiothrichidae   | Acanthoptila nipalensis                              | I        |
| 299    | Leiothrichidae   | Turdoides striata                                    | I        |
| 300    | Leiothrichidae   | Garrulax leucolopus                                  | I        |
| 301    | Leiothrichidae   | Heterophasia capistrata                              | O        |
| 302    | Leiothrichidae   | Leiothrix argentaria                                 | I, EN/II|
| 303    | Certhiidae       | Certhia discolor                                     | I        |
| 304    | Certhiidae       | Certhia himalayana                                   | I        |
| 305    | Sittidae         | Sitta cinnamoventris                                 | I        |
| 306    | Sittidae         | Sitta himalayensis                                   | I        |
| 307    | Sittidae         | Sitta frontalis                                      | I        |
| 308    | Sittidae         | Tichodroma muraria                                   | I        |
| 309    | Sturnidae        | Sturnus vulgaris                                     | O        |
| 310    | Sturnidae        | Gracupica contra                                     | O        |
| 311    | Sturnidae        | Sturnia pagodaran                                    | O        |
| 312    | Sturnidae        | Sturnia malabarica                                   | O        |
| 313    | Sturnidae        | Acridotheres tristis                                 | O        |
| 314    | Sturnidae        | Acridotheres gингинianus                             | O        |
| 315    | Sturnidae        | Acridotheres fuscus                                  | O        |
| 316    | Sturnidae        | Saroglossa spilopterus                               | O        |
| 317    | Turdidae         | Zoothera dauma                                       | I        |
| 318    | Turdidae         | Geokichia citrina                                    | I        |
| 319    | Turdidae         | Turdus unicolor                                      | I        |
| 320    | Turdidae         | Turdus unicolor                                      | I        |
| Page | Family           | Species                                             | Scientific Name                      | Status   |
|------|------------------|-----------------------------------------------------|--------------------------------------|----------|
| 321  | Passeriformes    | Turdidae black-throated thrush                      | Turdus atrogularis                   | I        |
| 322  | Passeriformes    | Muscicapaidae Oriental magpie-robin                 | Copsychus saularis                   | I        |
| 323  | Passeriformes    | Muscicapaidae white-rumped shama                     | Kittacincla malabarica               | I        |
| 324  | Passeriformes    | Muscicapaidae dark-sided flycatcher                 | Muscicapra sibirica                  | I        |
| 325  | Passeriformes    | Muscicapaidae small niltava                         | Niltava macgrigorae                  | I        |
| 326  | Passeriformes    | Muscicapaidae verditer flycatcher                   | Eumyias thalassinus                 | I        |
| 327  | Passeriformes    | Muscicapaidae pale blue-flycatcher                  | Cyornis unicolor                    | I        |
| 328  | Passeriformes    | Muscicapaidae pale-chinned flycatcher               | Cyornis polio-genya                 | I        |
| 329  | Passeriformes    | Muscicapaidae Tickell's blue-flycatcher             | Cyornis tickelliae                  | I        |
| 330  | Passeriformes    | Muscicapaidae Siberian blue robin                   | Larvivora cyane                     | I        |
| 331  | Passeriformes    | Muscicapaidae bluethroat                            | Cyanecula svecica                    | I        |
| 332  | Passeriformes    | Muscicapaidae Siberian rubythroat                   | Calliope calliope                   | I        |
| 333  | Passeriformes    | Muscicapaidae Himalayan rubythroat                  | Calliope pectoralis                 | I        |
| 334  | Passeriformes    | Muscicapaidae rufous-gorched flycatcher             | Ficedula strophiata                 | I        |
| 335  | Passeriformes    | Muscicapaidae ultramarine flycatcher                | Ficedula supercilialis               | I        |
| 336  | Passeriformes    | Muscicapaidae little pied flycatcher                | Ficedula westermanni                 | I        |
| 337  | Passeriformes    | Muscicapaidae rusty-tailed flycatcher               | Ficedula ruficaustra                 | I        |
| 338  | Passeriformes    | Muscicapaidae red-throated flycatcher               | Ficedula albicilla                   | I        |
| 339  | Passeriformes    | Muscicapaidae blue-fronted redstart                 | Phoenicurus frontalis               | I        |
| 340  | Passeriformes    | Muscicapaidae blue-capped redstart                  | Phoenicurus coeruleocephala         | I        |
| 341  | Passeriformes    | Muscicapaidae white-throated redstart               | Phoenicurus schisticeps             | I        |
| 342  | Passeriformes    | Muscicapaidae white-capped water-redstart           | Phoenicurus leucocephalus            | I        |
| 343  | Passeriformes    | Muscicapaidae plumbeous water-redstart              | Phoenicurus fuliginosus              | I        |
| 344  | Passeriformes    | Muscicapaidae black redstart                        | Phoenicurus ochruros                 | I        |
| 345  | Passeriformes    | Muscicapaidae white-winged redstart                 | Phoenicurus erythrogastrus           | I        |
| 346  | Passeriformes    | Muscicapaidae Hodgson's redstart                    | Phoenicurus hodgsonii                | I        |
| 347  | Passeriformes    | Muscicapaidae chestnut-bellied rock-thrush          | Monticola rufiventris               | I        |
| 348  | Passeriformes    | Muscicapaidae blue rock-thrush                      | Monticola solitarius                | I        |
| 349  | Passeriformes    | Muscicapaidae grey bushchat                         | Saxicola ferreus                    | I        |
| 350  | Passeriformes    | Muscicapaidae pied bushchat                         | Saxicola caprata                    | I        |
| 351  | Passeriformes    | Muscicapaidae common stonechat                      | Saxicola torquatus                  | I        |
| 352  | Passeriformes    | Muscicapaidae brown rockchat                        | Oenanthe fusca                      | I        |
| 353  | Passeriformes    | Chloropseidae golden-fronted leafbird               | Chloropsis aurifrons                | O        |
| 354  | Passeriformes    | Chloropseidae orange-bellied leafbird               | Chloropsis hardwickii               | O        |
| 355  | Passeriformes    | Dicaeidae thick-billed flowerpecker                 | Dicaeum agile                        | O        |
| 356  | Passeriformes    | Dicaeidae pale-billed flowerpecker                  | Dicaeum erythrophrynychos           | O        |
| 357  | Passeriformes    | Dicaeidae fire-breasted flowerpecker                | Dicaeum ignipuctus                  | O        |
| 358  | Passeriformes    | Nectariniidae purple sunbird                        | Cinnysis asiaticus                  | O        |
| 359  | Passeriformes    | Nectariniidae green-tailed sunbird                  | Aethopyga nipalensis                | O        |
| 360  | Passeriformes    | Nectariniidae crimson sunbird                       | Aethopyga siparaia                  | O        |
| 361  | Passeriformes    | Prunellidae rufous-breasted accentor                | Prunella strophiata                 | I        |
| 362  | Passeriformes    | Ploceidae black-breasted weaver                     | Ploceus benghalensis                | O        |
| 363  | Passeriformes    | Ploceidae streaked weaver                           | Ploceus manyar                       | ..VU/..  |
| 364  | Passeriformes    | Ploceidae Baya weaver                               | Ploceus philippinus                 | O        |
| 365  | Passeriformes    | Ploceidae Finn's weaver                             | Ploceus megarhynchus                | O        |
| 366  | Passeriformes    | Estrildidae red avadavat                            | Amandava amandava                   | O        |
| 367  | Passeriformes    | Estrildidae scaly-breasted munia                    | Lonchura punctulata                 | O        |
|   | Passeriformes | Estrildidae         | tricoloured munia | Lonchura malacca | O |
|---|--------------|---------------------|-------------------|------------------|---|
| 369| Passeriformes | Passeridae          | house sparrow     | Passer domesticus| O |
| 370| Passeriformes | Passeridae          | Eurasian tree sparrow | Passer montanus | O |
| 371| Passeriformes | Passeridae          | chestnut-shouldered bush-sparrow | Gymnoris xanthocollis | O |
| 372| Passeriformes | Motacillidae        | olive-backed pipit | Anthus hodgsoni  | I |
| 373| Passeriformes | Motacillidae        | paddyfield pipit  | Anthus rufulus   | I |
| 374| Passeriformes | Motacillidae        | western yellow wagtail | Motacilla flava  | I |
| 375| Passeriformes | Motacillidae        | grey wagtail      | Motacilla cinerea| I |
| 376| Passeriformes | Motacillidae        | citrine wagtail   | Motacilla citreola| I |
| 377| Passeriformes | Motacillidae        | white-browed wagtail | Motacilla maderaspatensis | I |
| 378| Passeriformes | Motacillidae        | white wagtail     | Motacilla alba   | I |
| 379| Passeriformes | Fringillidae        | common rosefinch  | Carpodacus erythrinus | H |
| 380| Passeriformes | Emberizidae         | crested bunting   | Emberiza lathami  | O |
| 381| Passeriformes | Emberizidae         | black-faced bunting | Emberiza spodocephala | O | ../VUI..