SPECIES

Diversity and status of birds in the Bimalnagar, Tanahun, Nepal

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ABSTRACT

Nepal has 892 bird species, making it a birder paradise. The current study was carried out at Bimalnagar, Tanahun, one of Nepal's most popular tourist sites. The area, although a popular tourist attraction, lacks a comprehensive checklist of local species that would be useful to birdwatchers. As a result, the current study was carried out in order to collect data on the diversity of birds from the study region and to recommend some conservation methods for their restoration. The current study used a line transect method and assessed 102 bird species from 14 orders and 36 families during the survey in May and December 2021. The order Passeriformes, which has the most families, had the highest species richness. The majority of the 102 bird species were resident (86.2%), with the insectivorous guild having the most bird species (n = 48). This checklist provides baseline data on the avifauna of the region to help guide future research. Migratory, residential, endemic and endangered bird species in the research region revealed the uniqueness of the bird habitat in the area; hence, a site-specific management plan is required to maintain these bird species.

Keywords: Tanahun, Bird Survey, Bird Diversity, Feeding Guilds, Encounter Rates

1. INTRODUCTION

Birds are the key indicators of habitat quality and the most obvious forms of animal life worldwide, from the poles to the tropical forests, from the deserts to the cores of the oceans and from the highest mountains to the heart of our cities (Tabur et al., 2010). They play a crucial part in the ecological functioning of an area; they also serve as pollution indicators, aid in seed dissemination and act as bug hunters (Bibi & Ali, 2013). In addition to being a vital part of the tourism industry, birds play an important role in the development of various countries' economies (Areaya et al., 2013).

Nepal's geographical location in the central Himalayas lies in a zone of overlap between the Palearctic and Oriental (Indomalayan) realms, making it a suitable home for 3.2% and 1.1% of the world's known flora and fauna, respectively (Inskipp et al., 2020). Altogether 892 species have been recorded in Nepal comprising 99 families and 24 orders, accounting for around 9% of the entire world's bird species (Department of National Parks and Wildlife Conservation and Bird Conservation Nepal, 2022). Around 55% of the world's threatened birds are considered lowland specialists, other types include 25% of wetland birds and 24% of subtropical forest birds (Inskipp et al., 2017).

DISCOVERY SCIENTIFIC SOCIETY

Bandipur is a rapidly rising eco-tourism destination with magnificent features, natural beauty and many tourism-based activities (Sigdel, 2012). Birdwatching can be an attractive tourism activity in the region, although there is no thorough checklist of species for aiding birdwatching in the region and can provide a useful baseline for upcoming studies and conservation of those locally inhabiting birds. Therefore, this study aimed to explore the number of bird species and their abundance in Bimalnagar and also focused on the abundance of bird species in the area.

2. MATERIAL AND METHODS

Study Area

Midway between Kathmandu and Pokhara, the Bimalnagar is located south of the Prithivi Highway, close to where the Marshyagdi River makes a sudden bend to the east before joining the Trisuli River at Mugling. It is located 7 kilometers south of a well-liked pick-up location on Prithvi Highway near Dumbre bazaar (Sigdel, 2012). The study was carried out in Bimalnagar, Bandipur Gaupalika Ward No. 4 of Tanahun District, Gandaki Province (27° 56.893'N & 84° 25.838'E). It has a total size of 101.83 km^2 and a height of around 1000 m above sea level. It has a tropical climate with an average temperature of 8.40°-37°C and an annual precipitation of 1960mm (CBS, 2017). Due to the varied topography, this mid-hill area supports a diverse range of subtropical to temperate vegetation (Kafle et al., 2020). Chilaune (*Schima wallichii*), Simal (*Bombax ceiba*), Saj (*Terminalia elliptica*) and Sissoo (*Dalbergia sissoo*) are among the major plant species in the area.

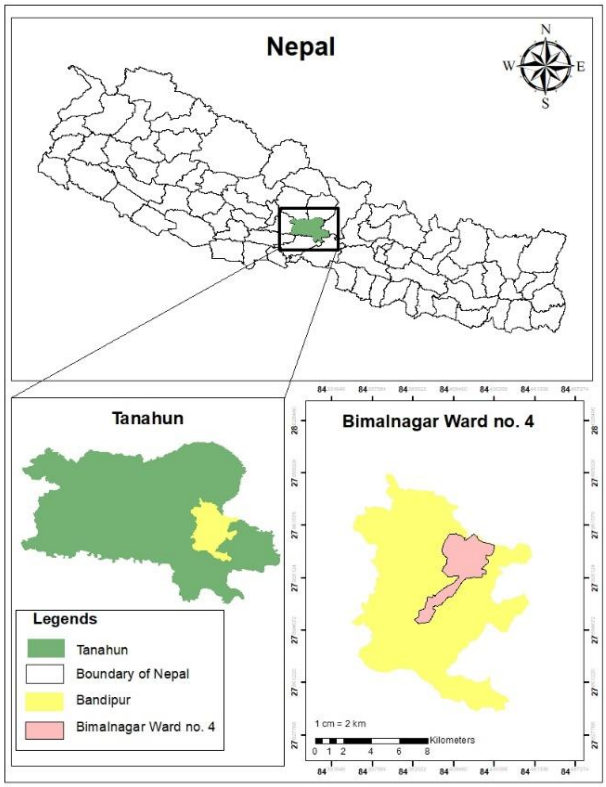

Figure 1 Study Area Map

Methods

A regular survey of 15 days each in both months May 2021 and December 2021 was done by walking on fixed routes in the existing trails. Surveys were often conducted in the mornings (06.00 hrs. – 10.00 hrs.) and evenings (15.00 hrs. – 17.30 hrs.), however, nocturnal birds were also regularly surveyed for 15 days each in two months at night. The line transect approach was used to collect data. The bird species were observed using a Nikon Acculon binocular 8*42 and identified using the field guide "Birds of Nepal" by Grimmet et al., (2016). The birds were photographed with a Nikon D7000 and the geographical coordinates were collected with a Garmin eTrex10 Worldwide Handheld GPS navigator. According to Inskipp et al., (2016) birds spotted during the study were classified as resident ®, passage migrant (PM), altitudinal migrant (AM), winter visitor (WV) and summer visitor (SV) (2016). The avifauna's name, taxonomy listing, and conservation status were determined using the Inskipp et al., (2016) and IUCN Red List of Threatened species (2022). The relative abundance of bird species was calculated using encounter rates, resulting in

crude ordinal abundance scales (abundant, common, frequent, uncommon and rare) (Bibby et al., 1992). The encounter rate for each species was computed by dividing the number of birds reported by the number of hours spent searching, yielding a figure of birds per hour for each species. These were classified as follows on rudimentary ordinal measures of abundance (Table 1).

Table 1 Using encounter rates to give a crude ordinal scale of abundance (from Lowen et al., 1996).

Abundance category (Number of individuals per 100 field hours)	Abundance category (Number of individuals per 100 field hours)	Ordinal scale
< 0.1	1	Rare
0.1–2.0	2	Uncommon
2.1–10.0	3	Frequent
10.1–40.0	4	Common
40.0+	5	Abundant

3. RESULT AND DISCUSSION

In the present study, 779 individuals of 102 bird species from 14 orders and 36 families were identified in the current research from Bimalnagar, Bandipur (Figures 2 & 3). Amongst the order, Passeriformes had the most species (59), followed by Accipitriformes (8) and Piciformes (8) (Figure 2). The Strigiformes, Apodiformes and Pelecaniformes orders have the fewest species (1 each) (Figure 2). The Passeriformes order has the most families (22), followed by Piciformes (2) and Coraciiformes (2) (Figure 3). The family Muscicapidae (10) has the most species, followed by Accipitridae (8) (Table 2). Compared with other studies Passeriformes has been known to be the most dominant order.

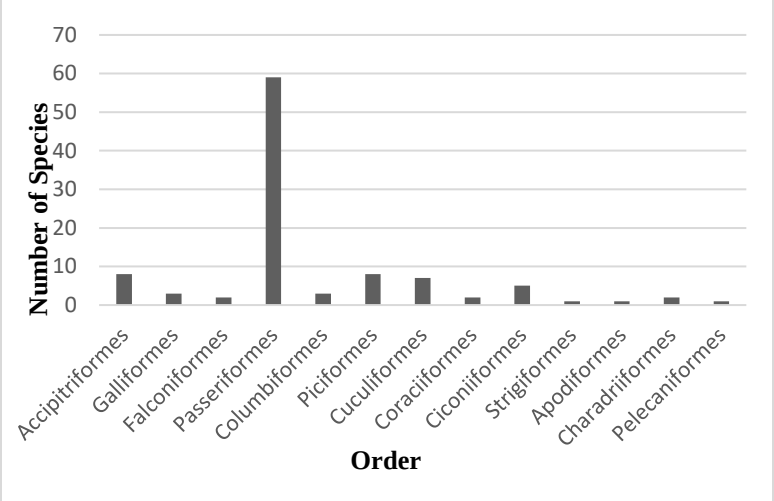

Figure 2 Bird species composition based on Order

Among these, 88 (86.2%) were resident birds, 2 (1.9%) were passage migrants, 7 (6.9%) were winter visitors and 5 (4.9%) were summer visitors (Figure 4). Since the study region is part of the Central Asian Flyway, it has caused the area be home to a diverse range of migrating species (Karmacharya et al., 2015). The presence of both resident and migratory birds in this area implies adequate habitat quality. The majority of bird species discovered were resident and frequent in the study region.

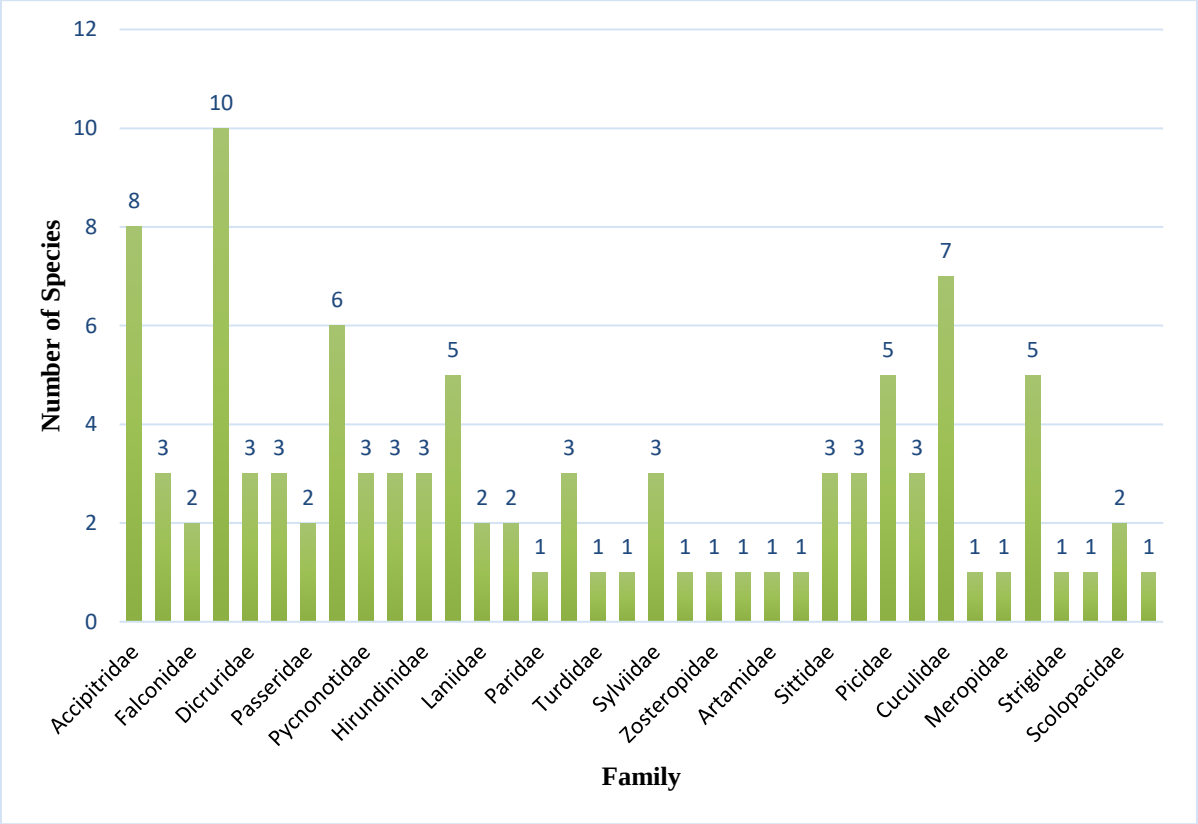

Figure 3 Bird Species composition based on Family

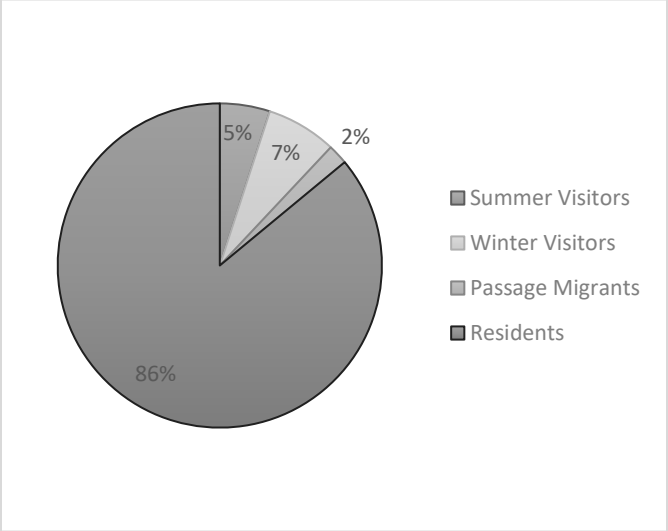

Figure 4 Migratory status of Birds Species

According to the feeding guilds, the 102 bird species recorded were classified into six foraging guilds. The insectivorous guild has the most bird species (n = 48), followed by carnivorous (n = 23), omnivorous (n = 17), granivorous (n = 8), frugivorous (n = 4) and nectarivores (n = 2) (Figure 5). This finding implies that the location supplies a variety of food items for the birds.

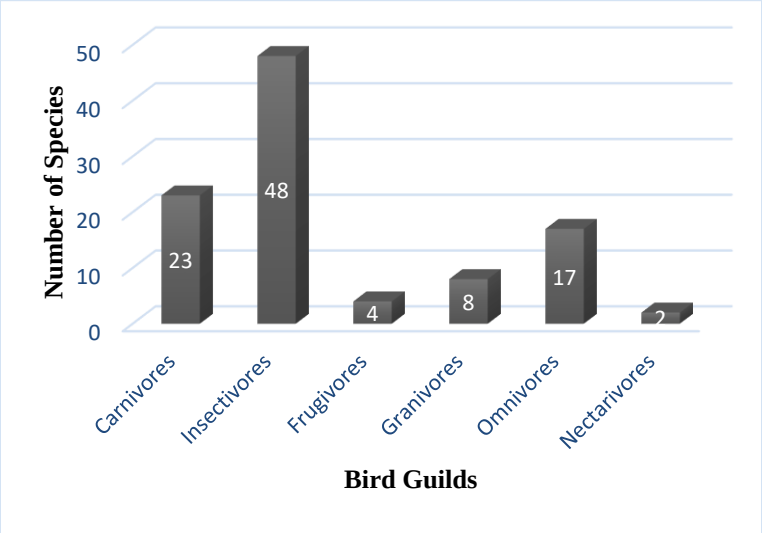

Figure 5 Feeding Guilds of Bird Species

Table 2 List of bird species were identified in the current research from Bimalnagar, Bandipur.

S. N	Family	Common name	Scientific name	Habitat	Number	IUCN status	National status	Migratory status	Feeding Guild
Order: Accipitriformes									
1	Accipitridae	Black Kite	*Milvus migrans* (Boddaert, 1783)	C	1	LC	LC	R	Carnivores
2	Accipitridae	Crested Serpent Eagle	*Spilornis cheela* (Latham, 1790)	D	2	LC	LC	R	Carnivores
3	Accipitridae	White-rumped Vulture	*Gyps bengalensis* (Gmelin, 1788)	D	2	CR	CR	R	Carnivores
4	Accipitridae	Red-headed Vulture	*Sarcogyps calvus* (Scopoli, 1786)	D	1	CR	EN	R	Carnivores
5	Accipitridae	Shikra	*Accipiter badius* (J. F. Gmelin, 1788)	C+D	4	LC	LC	R	Carnivores
6	Accipitridae	Himalayan Buzzard	*Buteo buteo* (Linnaeus, 1758)	D	2	LC	LC	WV	Carnivores
7	Accipitridae	Himalayan Vulture	*Gyps himalayensis* (Hume, 1869)	D	2	NT	VU	R	Carnivores
8	Accipitridae	Egyptian Vulture	*Neophron percnopterus* (Linnaeus, 1758)	D+M	4	EN	VU	R	Carnivores
Apodiformes									
9	Apodidae	House Swift	*Apus nipalensis/affinis* (Hodgson, 1837)	C	61	LC	LC	R	Insectivores
Charadriiformes									
10	Scolopacidae	Common Sandpiper	*Actitis hypoleucos* (Linnaeus, 1758)	M	4	LC	LC	WV	Insectivores
11	Scolopacidae	Green Sandpiper	*Tringa ochropus* (Linnaeus, 1758)	M	2	LC	LC	WV	Insectivores
Ciconiiformes									
12	Ardeidae	Black-crown Night Heron	*Nycticorax nycticorax* (Linnaeus, 1758)	M	2	LC	LC	R	Carnivores
13	Ardeidae	Indian Pond Heron	*Ardeola grayii* (Sykes, 1832)	M	12	LC	LC	R	Carnivores
14	Ardeidae	Striated Heron	*Butorides striata* (Linnaeus, 1758)	M	1	LC	LC	R	Carnivores
15	Ardeidae	Cattle Egret	*Bubulcus ibis* (Linnaeus, 1758)	C+M	46	LC	LC	R	Carnivores
16	Ardeidae	Little Egret	*Egretta garzetta* (Linnaeus, 1766)	M	2	LC	LC	R	Carnivores
Columbiformes									

17	Columbidae	Oriental Turtle Dove	*Streptopelia orientalis* (Latham, 1790)	C	2	LC	LC	R	Granivores
18	Columbidae	Spotted Dove	*Stigmatopelia chinensis* (Scopoli, 1786)	C	10	LC	LC	R	Granivores
19	Columbidae	Rock Pigeon	*Columba livia* (J. F. Gmelin, 1789)	C	57	LC	LC	R	Granivores
Coraciiformes									
20	Alcedinidae	White-throated Kingfisher	*Halcyon smyrnensis* (Linnaeus, 1758)	C+D+M	12	LC	LC	R	Carnivores
21	Meropidae	Chestnut-headed Bee-eater	*Merops leschenaultia* (Vieillot, 1817)	C	4	LC	LC	SV	Insectivores
Cuculiformes									
22	Cuculidae	Common Cuckoo	*Cuculus canorus* (Linnaeus, 1758)	C	2	LC	LC	SV	Insectivores
23	Cuculidae	Greater Coucal	*Centropus sinensis* (Stephens, 1815)	C+D	3	LC	LC	R	Carnivores
24	Cuculidae	Green-billed Malkoha	*Phaenicophaeus tristis* (Lesson, 1830)	C+D	11	LC	LC	R	Carnivores
25	Cuculidae	Sirkeer Malkoha	*Phaenicophaeus leschenaultia* (Lesson, 1830)	D	2	LC	LC	R	Omnivores
26	Cuculidae	Large Hawk Cuckoo	*Hierococcyx sparverioides* (Vigors, 1832)	C+D	13	LC	LC	SV	Insectivores
27	Cuculidae	Indian Cuckoo	*Cuculus micropterus* (Gould, 1838)	C	3	LC	LC	SV	Insectivores
28	Cuculidae	Asian Koel	*Eudynamys scolopaceus* (Linnaeus, 1758)	C	11	LC	LC	R	Omnivores
Falconiformes									
29	Falconidae	Common Kestrel	*Falco tinnunculus* (Linnaeus, 1758)	C+D+M	7	LC	LC	R	Carnivores
30	Falconidae	Collared Falconet	*Microhierax caerulescens* (Linnaeus, 1758)	C	2	LC	NT	R	Carnivores
Galliformes									
31	Phasianidae	Kalij Pheasant	*Lophura leucomelanos* (Latham, 1790)	D	14	LC	LC	R	Omnivores
32	Phasianidae	Red Junglefowl	*Gallus gallus* (Linnaeus, 1758)	C+D	4	LC	LC	R	Omnivores
33	Phasianidae	Black Frankolin	*Francolinus francolinus* (Linnaeus, 1766)	D	2	LC	LC	R	Omnivores
Passeriformes									
34	Muscicapidae	Blue-throated Flycatcher	*Cyornis rubeculoides* (Vigors, 1831)	C	4	LC	LC	PM	Insectivores
35	Dicruridae	Hair-crested Drongo	*Dicrurus hottentottus* (Linnaes,1766)	C+D	18	LC	LC	R	Nectarivores
36	Sturnidae	Common Myna	*Acridotheres tristis* (Linnaeus, 1766)	C	14	LC	LC	R	Omnivores
37	Sturnidae	Jungle Myna	*Acridotheres fuscus* (Wagler, 1827)	C+M	59	LC	LC	R	Omnivores
38	Passeridae	House Sparrow	*Passer domesticus* (Linnaeus, 1758)	C	17	LC	LC	R	Granivores
39	Passeridae	Eurasian Tree Sparrow	*Passer montanus* (Linnaeus, 1758)	C	22	LC	LC	R	Granivores
40	Corvidae	House Crow	*Corvus splendens* (Vieillot, 1817)	C	19	LC	LC	R	Omnivores
41	Corvidae	Large-billed Crow	*Corvus macrorhynchos* (Wagler, 1827)	C	12	LC	LC	R	Omnivores
42	Pycnonotidae	Himalayan Bulbul	*Pycnonotus leucogenys* (Gray, 1835)	C+D	12	LC	LC	R	Frugivores
43	Campephagidae	Scarlet Minivet	*Pericrocotus flammeus* (Forster, 1781)	D	16	LC	LC	R	Insectivores
44	Hirundinidae	Barn Swallow	*Hirundo rustica* (Linnaeus, 1758)	C	51	LC	LC	R	Insectivores
45	Hirundinidae	Plain Martin	*Riparia paludicola* (Vieillot, 1817)	C	8	LC	NT	R	Insectivores
46	Timaliidae	Spiny Babbler	*Turdoides nipalensis* (Hodgson, 1836)	D	1	LC	LC	R	Insectivores
47	Muscicapidae	Pale-chinned Flycatcher	*Cyornis poliogenys* (W. E. Brooks, 1880)	C+D	3	LC	LC	R	Insectivores
48	Campephagidae	Large Cuckooshrike	*Coracina macei* (Lesson, 1831)	C	2	LC	LC	R	Insectivores

49	Laniidae	Long-tailed Shrike	*Lanius schach* (Linnaeus, 1758)	C	2	LC	LC	R	Insectivores
50	Laniidae	Grey-backed Shrike	*Lanius tephronotus* (Vigors, 1831)	C	1	LC	LC	R	Insectivores
51	Estrildidae	White-rumped Munia	*Lonchura striata* (Linnaeus 1766)	C	12	LC	LC	R	Granivores
52	Dicruridae	Ashy Drongo	*Dicrurus leucophaeus* (Vieillot, 1817)	D	4	LC	LC	R	Insectivores
53	Estrildidae	Scaly-breasted Munia	*Lonchura punctulate* (Linnaeus, 1758)	C	48	LC	LC	R	Granivores
54	Muscicapidae	Spotted Forktail	*Enicurus maculatus* (Vigors, 1831)	C	1	LC	LC	R	Insectivores
55	Cisticolidae	Striated Prinia	*Prinia crinigera* (Hodgson, 1836)	D	1	LC	LC	R	Insectivores
56	Muscicapidae	Oriental-magpie Robin	*Copsychus saularis* (Linnaeus, 1758)	C	5	LC	LC	R	Insectivores
57	Muscicapidae	Dark-sided Flycatcher	*Muscicapa sibirica* (J. F. Gmelin, 1789)	C+D	7	LC	LC	SV	Insectivores
58	Muscicapidae	Taiga Flycatcher	*Ficedula albicilla* (Pallas, 1811)	C	4	LC	LC	WV	Insectivores
59	Corvidae	Common Green Magpie	*Cissa chinensis* (Boddaert, 1783)	C	3	LC	LC	R	Carnivores
60	Paridae	Cinereous Tit	*Parus major* (Linnaeus, 1758)	C+D	16	LC	LC	R	Insectivores
61	Campephagidae	Bar-winged Flycatcher-shrike	*Hemipus picatus* (Sykes, 1832)	C	4	LC	LC	R	Insectivores
62	Timaliidae	Puff-throated Babbler	*Pellorneum ruficeps* (Swainson, 1832)	C	2	LC	LC	R	Insectivores
63	Cisticolidae	Grey-breasted Prinia	*Prinia hodgsonii* (Blyth, 1844)	C	16	LC	LC	R	Insectivores
64	Turdidae	Blue Whistling Thrush	*Myophonus caeruleus* (Scopoli, 1786)	C+D+M	13	LC	LC	R	Omnivores
65	Emberizidae	Crested Bunting	*Melophus lathami* (Gray, 1831)	C	14	LC	LC	R	Granivores
66	Muscicapidae	Pied Bushchat	*Saxicola caprata* (Linnaeus, 1766)	C	33	LC	LC	R	Insectivores
67	Timaliidae	Jungle Babbler	*Turdoides striata* (Dumont, 1823)	D	8	LC	LC	R	Insectivores
68	Sturnidae	Chestnut-tailed Starling	*Sturnus malabaricus* (Gmelin, 1789)	C	18	LC	LC	R	Omnivores
69	Muscicapidae	Grey-headed Canary Flycatcher	*Culicicapa ceylonensis* (Swainson, 1820)	C	16	LC	LC	PM	Insectivores
70	Sylviidae	Grey-hooded Warbler	*Phylloscopus xanthoschistos* (J. E. & G R. Gray, 1847)	C+D	23	LC	LC	R	Insectivores
71	Dicruridae	Black Drongo	*Dicrurus macrocercus* (Vieillot, 1817)	C+D	17	LC	LC	R	Carnivores
72	Hirundinidae	Red-rumped Swallow	*Hirundo daurica* (Laxmann, 1769)	C	19	LC	LC	R	Insectivores
73	Pycnonotidae	Red-vented Bulbul	*Pycnonotus cafer* (Linnaeus, 1766)	C	47	LC	LC	R	Omnivores
74	Motacillidae	White Wagtail	*Motacilla alba* (Linnaeus, 1758)	M	11	LC	LC	WV	Insectivores
75	Sylviidae	Greenish Warbler	*Phylloscopus trochiloides* (Sundevall, 1837)	D	2	LC	LC	WV	Insectivores
76	Muscicapidae	Plumbeous Water Redstart	*Rhyacornis fuliginosa* (Vigors, 1831)	M	16	LC	LC	R	Insectivores
77	Muscicapidae	White-capped Water Redstart	*Chaimarrornis leucocephalus* (Vigors, 1831)	M	8	LC	LC	R	Insectivores
78	Cisticolidae	Common Tailorbird	*Orthotomus sutorius* (Pennant, 1769)	C+D	12	LC	LC	R	Insectivores
79	Zosteropidae	Oriental White-eye	*Zosterops palpebrosus* (Temminck, 1824)	C	15	LC	LC	R	Omnivores
80	Nectariniidae	Crimson Sunbird	*Aethopyga siparaja* (Raffles, 1822)	C+D	18	LC	LC	R	Nectarivores
81	Artamidae	Ashy Woodswallow	*Artamus fuscus* (Vieillot, 1817)	C	6	LC	LC	R	Insectivores
82	Corvidae	Rufous Treepie	*Dendrocitta vagabunda* (Latham, 1790)	D	8	LC	LC	R	Omnivores
83	Sylviidae	Whistler's Warbler	*Seicercus whistleri* (Ticehurst, 1925)	C	2	LC	LC	R	Insectivores
84	Sittidae	Chestnut-bellied Nuthatch	*Sitta castanea* (Lesson, 1831)	C+D	11	LC	LC	R	Insectivores

85	Corvidae	Grey Treepie	*Dendrocitta formosae* (Swinhoe, 1863)	C+D	16	LC	LC	R	Omnivores
86	Timaliidae	Black-chinned Babbler	*Stachyris pyrrhops* (Blyth, 1844)	C	7	LC	LC	R	Insectivores
87	Aegithalidae	Himalayan Black-lored Tit	*Parus xanthogenys* (Vigors, 1831)	C+D	12	LC	LC	R	Insectivores
88	Sittidae	Velvet-fronted Nuthatch	*Sitta frontalis* (Swainson, 1820)	C+D	4	LC	LC	R	Insectivores
89	Timaliidae	White-crested Laughingthrush	*Garrulax leucolophus* (Hardwicke, 1815)	C+D	16	LC	LC	R	Omnivores
90	Corvidae	Red-billed Blue Magpie	*Urocissa erythrorhyncha* (Boddaert, 1783)	C+D	8	LC	LC	R	Carnivores
91	Sittidae	Wallcreeper	*Tichodroma muraria* (Linnaeus, 1766)	M	3	LC	LC	R	Insectivores
92	Pycnonotidae	Ashy Bulbul	*Hemixos flavala* (Blyth, 1845)	C+D	5	LC	LC	R	Omnivores
Pelecaniformes									
93	Phalacrocoracidae	Great Cormorant	*Phalacrocorax carbo* (Linnaeus, 1758)	M	3	LC	NT	WV	Carnivores
Piciformes									
94	Picidae	Rufous Woodpecker	*Celeus brachyurus* (Vieillot, 1818)	C	1	LC	LC	R	Insectivores
95	Picidae	Fulvous-breasted Woodpecker	*Dendrocopos macei* (Veillot, 1818)	D	2	LC	LC	R	Insectivores
96	Ramphastidae	Blue-throated Barbet	*Megalaima asiatica* (Latham, 1790)	C+D	15	LC	LC	R	Frugivores
97	Picidae	Grey-headed Woodpecker	*Picus canus* (Gmelin, 1788)	C+D	4	LC	LC	R	Insectivores
98	Picidae	Greater Yellownape	*Picus flavinucha* (Gould, 1834)	C+D	3	LC	LC	R	Insectivores
99	Ramphastidae	Lineated Barbet	*Megalaima lineata* (Vieillot, 1816)	C	1	LC	LC	R	Frugivores
100	Ramphastidae	Great Barbet	*Megalaima virens* (Boddaert, 1783)	C	12	LC	LC	R	Frugivores
101	Picidae	Speckled Piculet	*Picumnus innominatus* (E. Burton, 1836)	C+D	2	LC	LC	R	Insectivores
Strigiformes									
102	Strigidae	Asian barred Owlet	*Glaucidium cuculoides* (Vigors, 1831)	C	3	LC	LC	R	Carnivores

Figure 6 depicts the abundance of bird species as follows: 57.84% (n = 59) were Uncommon, 35.29% (n = 36) were Frequent and 6.86% (n = 7) were Common.

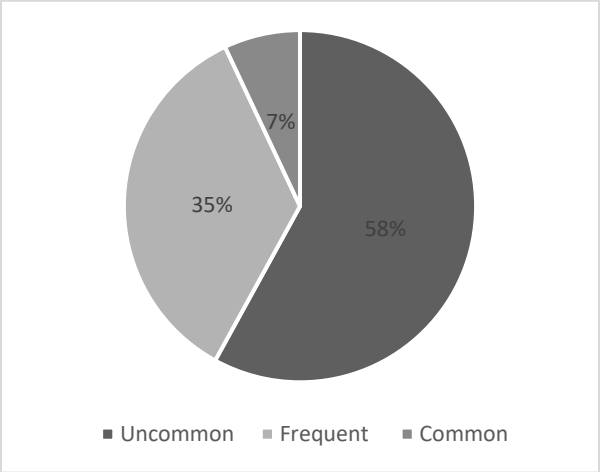

Figure 6 Abundance status of birds

Two Globally threatened species, Critically Endangered (*Gyps bengalensis* and *Sarcogyps calvus*) species were recorded in the area. Four Nationally threatened species (*Gyps bengalensis*, *Sarcogyps calvus*, *Gyps himalayensis*, *Neophron percnopterus*) were recorded of which one was Critically Endangered, one Endangered, and two Vulnerable. This study consequently emphasizes the conservation relevance of the Bandipur region's various ecosystems (Table 3).

Table 3 The threatened status of birds in Bimalnagar, Bandipur, Nepal. Status based on IUCN Red List category (iucnredlist.org) and National Red list Series 2015

S. N	Family	Common name	Scientific name	Global status	National status
1	Accipitridae	White-rumped Vulture	*Gyps bengalensis* (Gmelin, 1788)	CR	CR
2	Accipitridae	Red-headed Vulture	*Sarcogyps calvus* (Scopoli, 1786)	CR	EN
3	Accipitridae	Himalayan Griffon	*Gyps himalayensis* (Hume, 1869)	NT	VU
4	Accipitridae	Egyptian Vulture	*Neophron percnopterus* (Linnaeus, 1758)	EN	VU

The Rural Municipality Committee has managed the study area. Local people have significantly degraded the varied ecosystems due to a lack of public awareness and education in the region. During the study, locals were seen utilizing catapults and bird traps to hunt birds for meat. Other threats to bird species were noted, such as the petting of Asian barred Owlets and common mynas. The area's forest and agricultural ecosystems are being degraded as a result of indiscriminate cattle grazing, grass cutting, and the excessive use of chemical fertilizers and pesticides in agricultural fields. The study included a larger number of Insectivores (48) and other feeding guilds, but the use of pesticides harms them directly or indirectly through pesticide-contaminated crops, fruits, worms and insects.

Bhattarai, (2014) documented 69 species of birds from the Sati Karnali Community Forest, Kailali, which is the district's first registered community forest and a well-recognized community forest in Nepal, belonging to 38 families dominated by Accipitridae and Columbidae. Basnet and Sapkota, (2006) recorded 152 bird species, of which 129 were inhabitants, 18 were winter visitors and five were summer visitors in the lower Mai Valley region. Compared with the studies, higher bird species numbers were found in forest-type ecosystems may be due to the diverse range of habitats provided by them.

Figure 8 Petting of Asian Barred Owlet

Figure 9 Photo of the habitat in the area

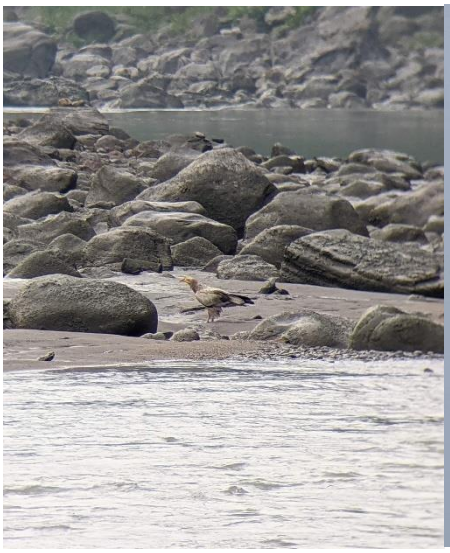

Figure 10 Egyptian Vulture

Figure 11 White-rumped Vulture

Figure 12 Great Cormorants on Marshyangdi River

Figure 13 Pied Bushchat

4. CONCLUSION

The presence of species of conservation concern and the high species richness in Bimalnagar, Bandipur reflect the area's ecological relevance. The current study emphasizes the significance of the region as a favorable habitat for avifauna. Petting of wild birds, use of chemical fertilizers in agricultural fields, overgrazing, and habitat destruction like problems are prominent in the area so, there is an urgent need to analyze the ecosystem's biodiversity and health. Further in-depth investigations in the topic area must employ a multi-organismal strategy. Most importantly, awareness and education about the role of birds in ecology are desperately needed in the region, as they lack such information. Controlling habitat loss, exploitation of its wildness, and anthropogenic activities from tourists might indeed help with bird conservation. This necessitates careful management of eco-tourism activities as well as habitat restoration with the goal of conserving the local fauna.

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Author's contribution

Conceptualization: NP. Data curation: NP, PR. Formal analysis: NP, PR. Writing original draft: NP, PR. Review: SB.

Informed consent

Not applicable.

Ethical approval

The Animal ethical guidelines are followed in the study for species observation & identification.

Conflicts of interests

The authors declare that there are no conflicts of interests.

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Data and materials availability

All data associated with this study are present in the paper.

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