

Original Research Article

Avian Diversity of Barail Wildlife Sanctuary, Assam

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Abstract: Barail Wildlife Sanctuary is the only wildlife sanctuary in Southern Assam. It is an important biodiversity area under Barail Hill Range. Except for some sporadic observations, there has not been a comprehensive list of birds in this Sanctuary, which motivated this study. Detail field surveys were carried out between 2014-2018 in this sanctuary covering eleven sites, and each site was visited thrice; all the existing trails were also covered while conducting the surveys. A total of 205 species of birds have been recorded. Threatened status of IUCN, scheduled status of Wildlife (Protection) Act 1972, distribution as migratory or resident, status in Assam as common or uncommon, and food habit of each bird species is noted while preparing the checklist. One vulnerable (Great Slaty Woodpecker *Mulleripicus pulverulentus*) and six near threatened (Himalayan Griffon *Gyps himalayensis*, Alexandrine Parakeet *Psittacula eupatria*, Grey-headed Parakeet *P. finchii*, Red-breasted Parakeet *P. alexandri*, Brown Hornbill *Anorhynchus tickelli* and Great Hornbill *Buceros bicornis*) species were recorded. A total of 134 species were found to be resident, 14 were resident winter migrants, four were winter and local altitudinal migrants, 16 were winter migrants, one was either resident or migrant and 36 species were local or altitudinal migrant, while 24 uncommon species of Assam were also found in Barail Wildlife Sanctuary. The species diversity (H') of the sanctuary was 4.29. The feeding guild is dominated by insectivore species. Proper conservation measures are recommended.

Key words: Barail Wildlife Sanctuary; Assam; diversity, threatened species; birds; feeding guild.

Introduction

Among the eight states of Northeastern India, Assam is the second largest state comprising of 7.84-million-hectare geographical area (Rahmani & Choudhury, 2012). Topographically, it is divided into three parts— the Brahmaputra Valley, the Barak Valley and the hilly areas. The first two are plains, and the hilly area comprises of the Barail Range and the Karbi Plateau. The Barak valley consists of three districts: Cachar, Karimganj and Hailakandi. The valley has 12 reserve forests and one Wildlife Sanctuary— Barail Wildlife Sanctuary (hereinafter, BWS) (Dutta *et al.*, 2015, Dutta *et al.*, 2016), which is a part of the contiguous

Barail Hill Range. The Barail Range is the highest hill range in Assam; the highest peak within BWS is Durbin Tilla (also called Nimotha) is 1100 m ASL (Gogoi *et al.*, 2016).

Hitherto, very few ornithological studies have been carried out in BWS. Choudhury (2000) had mentioned occurrence of some species of birds in BWS. Hussain (2015) worked in two sites, viz., Bombaithal and Durbin Tilla during December 2014, and enlisted 72 species of birds. Besides, Birand & Pawar (2001) recorded 67 bird species from Barail Reserve Forest, which has been now included as Eastern Block of BWS. Since there have been very few records available on the avian

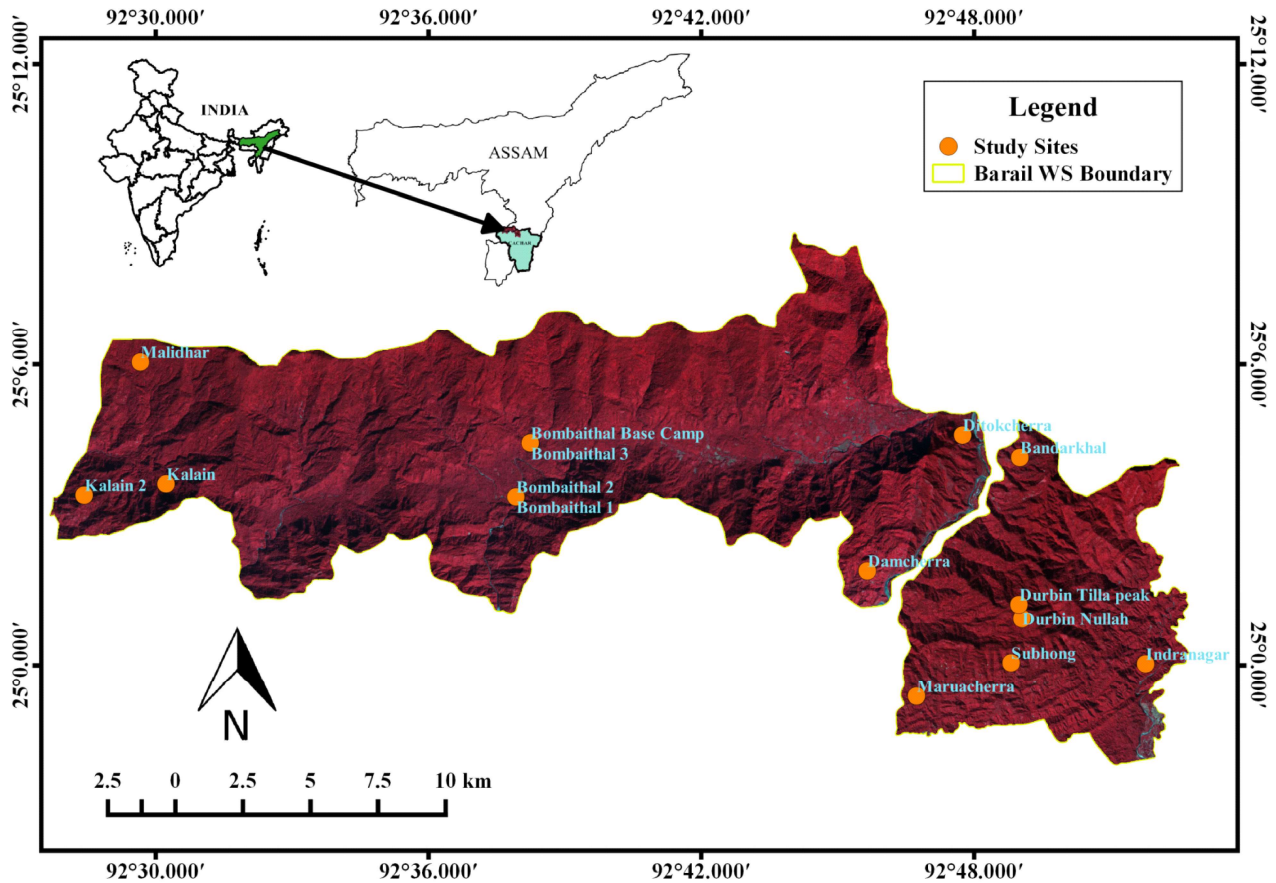


Fig. 1: The surveyed locations of Barail Wildlife Sanctuary, Assam. The orange dots are the study sites. (Satellite Image courtesy: Planet Labs, Inc. <https://www.planet.com/>)

composition of the Sanctuary, the present study was undertaken to document the avian diversity of the Barail Wildlife Sanctuary along with its adjoining areas.

Material and methods

Study area

The Barail Wildlife Sanctuary (24°55.884'—25°5.868' N and 92°27.666' — 93°4.5' E; 55-1100 m ASL; 326.24 sq. km.) was curved out by merging two reserve forests, namely North Cachar Hills and Barail reserve forests (Choudhury, 2005) (Fig. 1). It was notified as a wildlife sanctuary in June 2004. Moreover, BWS has also been updated as an Important Bird and Biodiversity Area based on the presence of threatened birds, endemic birds and belonging to the category of biome 8 and 9 (Rahmani et al., 2016). It is covered by Cachar Tropical Evergreen Forest, Cachar Tropical Semi-evergreen Forest and Subtropical Broadleaf Hill Forest (Champion & Seth, 1968). Choudhury (1993) described it as one of the heaviest rainfall

areas of Assam with average annual rainfall varying from 2000-6000 mm.

Data collection

Detailed surveys were done in the eastern and western blocks of BWS (Fig. 1), during 2014-2018. The following sites were covered: Bandarkhal, Bombaithal, Dolung, Durbin Tilla, Indranagar, Kala Pahar, Kalain, Kayang Valley, Kuki Basti, Malidor, Marwacherra and Subhong. Different habitats were represented by different study sites (Fig. 2). Each of the sites was visited thrice during the study period and the existing forest trails were followed. In addition, paved roads at the periphery of the sanctuary were also followed to record the bird species at the edges. Some opportunistic sightings of birds during 2012-2018 were also added to the checklist. A pair of 8×42 (Vanguard Spirit ED) binoculars were used during the survey, and wherever possible, photographs were taken. Forest staffs,



Fig. 2: The representative habitats at different study sites of Barail Wildlife Sanctuary, Assam (A. Bandarkhal, B. Bombaithal, C. Durbin Tilla, D. Malidor)

villagers and traditional hunters were interviewed and bird calls were also noted as additional aid for identification of species. The birds were identified in the field using field guides of Grimmett *et al.* (2013) and Rasmussen & Anderton (2012).

Data analysis

Nomenclature used in this study follows the updated version of Inskipp *et al.* (1996), and the sequence of families follows Ali & Ripley (1987). The scientific and English common names were followed using Inskipp *et al.* (1996) with some addition from Grimmett *et al.* (2013). The International Union for the Conservation of Nature (IUCN) threatened status of the species was noted from www.iucnredlist.org. (IUCN, 2018).

The Indian conservation status of the species have been followed from Wildlife (Protection Act), 1972 (WPA, 1972).

The avian diversity of BWS was calculated using Shannon-Wiener Index ($H' = -\sum p_i \ln p_i$) (where, the quantity p_i is the proportion of individuals found i^{th} species) (Shannon & Weaver, 1949). Number of individual(s) belonging to each species was summed up to get the total number of individuals belonging to all species from which p_i was calculated. To calculate H' , we considered only those species (136 species), which we encountered (677 number of individuals) in our trail; to be more authentic, we did not consider the opportunistic sightings.

In this paper, in addition to our own records, other published literatures were also collated along with the sighted species to construct a complete checklist of bird species in BWS. Information on species distribution, status and feeding habits was obtained from Choudhury (2000). Each feeding guild class was found out based on the available literatures (Choudhury, 2000), and were subsequently tabulated and analyzed accordingly. The percentage of the feeding guild was calculated as number of bird species belonged to which category of feeding guild out of the total species recorded during our

survey. The bar diagrams were prepared from 205 collated species.

Results

A total of 205 species belonging to 38 families were recorded in BWS and its adjoining areas (Table 1). The highest number of species encountered during the survey belonged to the family Muscipidae. Out of the 205 species recorded, 187 species were encountered during our survey. Among 187 species, one belonged to vulnerable (Great Slaty Woodpecker *Mulleripicus pulverulentus*), six belonged to near threatened (Himalayan Griffon *Gyps himalayensis*, Alexandrine Parakeet *Psittacula eupatria*, Grey-headed Parakeet *P. finchii*, Red-breasted Parakeet *P. alexandri*, Brown Hornbill *Anorhynchus tickelli* and Great Hornbill *Buceros bicornis*) and rests belonged to the least concern category. Twelve species were found to be Schedule 1 species under WPA (1972). A total of 134 species were found to be residents, 14 were resident winter migrants, four were winter and local altitudinal migrants, 16 were winter migrants, one was either resident or migrant and 36 species were local or altitudinal migrant (Fig. 3). Twenty-four species were found to be uncommon to Barail Wildlife Sanctuary. The avian species diversity (H') of the sanctuary was found to be 4.29. The feeding habit was mostly dominated by insectivore species (62%) (Fig. 4).

Some significant records are mentioned here based on threatened and local status of the species.

Significant records: Threatened species

HIMALAYAN GRIFFON *Gyps himalayensis*: Near Threatened, locally uncommon and Schedule 1 species. It is a winter visitor. Five individuals were seen hovering over Durbin Nulla (25°0.936'N 92°49.056'E) during 3rd December 2015 at around 11.30 hrs. The elevation of the area was 900 m. It was determined as Himalayan Griffon as it was heavy-bodied with very broad wings with prominent deeply slotted primaries and underwing-lining having white patagial stripe.

GREY-HEADED PARAKEET *Psittacula finschii*: Near Threatened. Two individuals were seen caged at Bombaithal Khasi *Punjee* (forest village) on 8th December 2014. The individuals had been collected from Bombaithal, western block of Barail Wildlife Sanctuary. Another two individuals were seen calling and flying from one branch to another on 10th

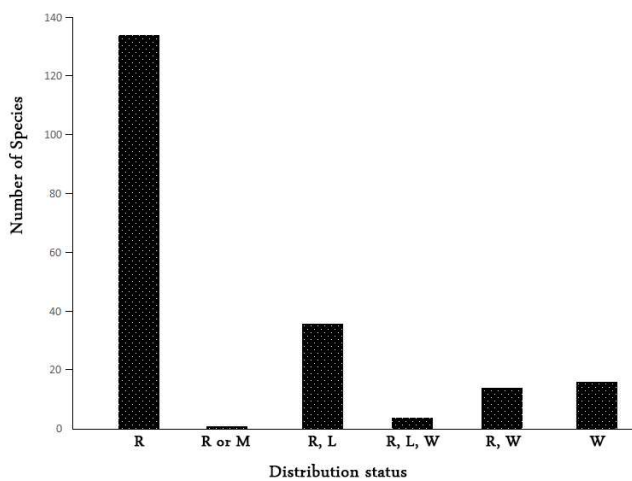


Fig. 3. Distribution status of the birds in Barail Wildlife Sanctuary R = Resident, L = Local and altitudinal migrant. W = winter visitor. M= Migrant, but some breeds here. Followed as per Choudhury (2000).

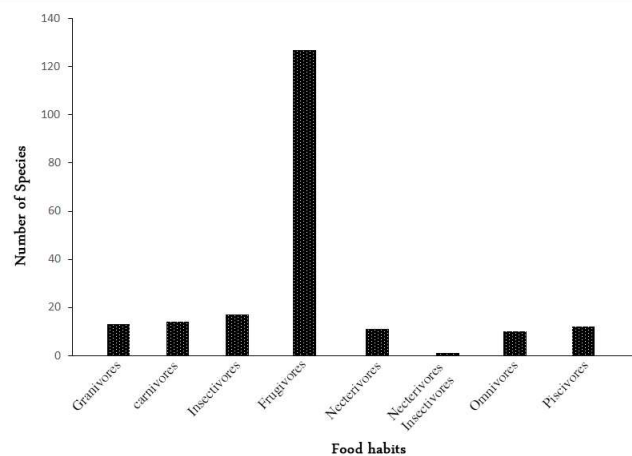


Fig. 4. Feeding guild of the bird species found in Barail Wildlife Sanctuary. Followed as per Choudhury (2000).

Table 1: The annotated checklist of birds of Barail Wildlife Sanctuary and its adjoining areas. Nomenclature, Scientific and English common names were followed according to Inskipp *et al.* (1996) with some addition from Grimmett *et al.* (2013); status, distribution and food habit were followed from Choudhury (2000); and the sequence of families follows the pattern of Ali & Ripley (1987). Scheduled species category was noted as per Wildlife (Protection) Act, 1972. The last two columns are comparison of sighting of bird species between the present study and Birand & Pawar (2001). Abbreviations are explained at the bottom of the table.

Sl. No.	Common and Scientific Names with Families of the Species	WPA Status	Distribution	Status in Assam	Food Habit	Present Study	Birand and Pawar, 2001
Ardeidae							
1.	Indian Cormorant <i>Phalacrocorax fuscicollis</i>	Sch. IV	R	U	P	+	-
2.	Cattle Egret <i>Bubulcus ibis</i>	Sch. IV	R	C	P	+	-
3.	Great Egret <i>Casmerodius albus</i>	Sch. IV	R	C	P	+	-
4.	Intermediate Egret <i>Mesophoyx intermedia</i>	Sch. IV	R	C	P	+	-
5.	Indian Pond Heron <i>Ardeola grayii</i>	Sch. IV	R	C	P	+	-
6.	Striated Heron <i>Butorides striata</i>	Sch. IV	R	C	P	+	-
7.	Black-Crowned Night Heron <i>Nycticorax nycticorax</i>	Sch. IV	R	C	P	+	-
Accipitridae							
8.	Black Baza <i>Aviceda leuphotes</i>	Sch. I	R	C	C	+	-
9.	Black-Eared Kite <i>Milvus (migrans) lineatus</i>		R		C	+	-
10.	Black Eagle <i>Ictinaetus malayensis</i>	Sch. I	R	U	C	+	+
11.	Changeable Hawk Eagle <i>Nisaetus cirrhatus</i>	Sch. I	R	C	C	+	-
12.	Crested Serpent Eagle <i>Spilornis cheela</i>	Sch. I	R	C	C	+	+
13.	Himalayan Vulture <i>Gyps himalayensis</i>	Sch. I	W	U	C	+	-
14.	Oriental Honey-Buzzard <i>Pernis ptilorhynchus</i>	Sch. I	R, L		C	+	-
15.	Besra <i>Accipiter virgatus</i>	Sch. IV	R, W		C	+	-
16.	Shikra <i>Accipiter badius</i>	Sch. I	R	C	C	+	-
Falconidae							
17.	Common Kestrel <i>Falco tinnunculus</i>	Sch. IV	W	C	C	-	+
18.	Pied Falconet <i>Microhierax melanoleucos</i>	Sch. IV	R	U	C	-	+
Phasianidae							
19.	Kalij Pheasant <i>Lophura leucomelanos</i>	Sch. I	R	C	O	-	+
20.	Red Junglefowl <i>Gallus gallus</i>	Sch. IV	R	C	O	+	+
21.	Grey Peacock Pheasant <i>Polyplectron bicalcaratum</i>	Sch. I	R	C	O	+	+

Rallidae							
22.	White-Breasted Waterhen <i>Amaurornis phoenicurus</i>	Sch. IV	R	C	O	+	-
Columbidae							
23.	Ashy Wood Pigeon <i>Columba pulchricollis</i>	Sch. IV	R	U	G	-	+
24.	Ashy-Headed Green Pigeon <i>Treron pompadora</i>	Sch. IV	R	C	G	+	-
25.	Barred Cuckoo Dove <i>Macropygia unchall</i>	Sch. IV	R	C	G	+	-
26.	Emerald Dove <i>Chalcophaps indica</i>	Sch. IV	R	C	G	+	+
27.	Mountain Imperial Pigeon <i>Ducula badia</i>	Sch. IV	R	C	G	-	+
28.	Oriental Turtle Dove <i>Streptopelia orientalis</i>	Sch. IV	R	C	G	+	-
29.	Eurasian Collard Dove <i>Streptopelia decaocto</i>	Sch. IV	R	C	G	+	-
30.	Red Collared Dove <i>Streptopelia tranquebarica</i>	Sch. IV	R	C	G	+	-
31.	Spotted Dove <i>Streptopelia chinensis</i>	Sch. IV	R	C	G	+	-
32.	Thick-Billed Green Pigeon <i>Treron curvirostra</i>	Sch. IV	R	C	G	+	-
33.	Yellow-Footed Green Pigeon <i>Treron phoenicoptera</i>	Sch. IV	R	C	G	+	-
Psittacidae							
34.	Alexandrine Parakeet <i>Psittacula eupatria</i>	Sch. IV	R	C	F	+	-
35.	Grey-Headed Parakeet <i>Psittacula finschii</i>	Sch. IV	R	C	F	+	-
36.	Red-Breasted Parakeet <i>Psittacula alexandri</i>	Sch. IV	R	C	F	+	-
37.	Rose-Ringed Parakeet <i>Psittacula krameri</i>	Sch. IV	R	C	F	+	-
Cuculidae							
38.	Asian Koel <i>Eudynamys scolopaceus</i>	Sch. IV	R, L	C	I	+	-
39.	Indian Cuckoo <i>Cuculus micropterus</i>	Sch. IV	R, L	C	I	+	-
40.	Drongo Cuckoo <i>Surniculus lugubris</i>	Sch. IV	R or M		I	+	-
41.	Green-Billed Malkoha <i>Rhopodytes tristis</i>	Sch. IV	R	C	I	+	-
42.	Greater Coucal <i>Centropus sinensis</i>	Sch. IV	R	C	I	+	-
43.	Lesser Coucal <i>Centropus bengalensis</i>	Sch. IV	R	C	I	+	-
44.	Collared Scops Owl <i>Otus bakkamoena</i>	Sch. IV	R	C	C	+	-
Strigidae							
45.	Asian Barred Owlet <i>Glaucidium cuculoides</i>	Sch. IV	R, L	C	C	+	+
46.	Spotted Owlet <i>Athene brama</i>	Sch. IV	R	C	C	+	-
Apodidae							
47.	Asian Palm Swift <i>Cypsiurus balasiensis</i>	Sch. IV	R	-	I	+	-
48.	Himalayan Swiftlet <i>Collocalia brevirostris</i>	Sch. IV	R	-	I	+	-
Trogonidae							
49.	Red-Headed Trogon <i>Harpactes erythrocephalus</i>	Sch. IV	R	C	I	+	+
Alcedinidae							

50.	Stork-Billed Kingfisher <i>Pelargopsis capensis</i>	Sch. IV	R	C	P	+	-
51.	White-Throated Kingfisher <i>Halcyon smyrnensis</i>	Sch. IV	R	C	P	+	-
52.	Blue-Eared Kingfisher <i>Alcedo meninting</i>	Sch. IV	R	U	P	+	-
53.	Common Kingfisher <i>Alcedo atthis</i>	Sch. IV	R	C	P	+	-
54.	Pied Kingfisher <i>Ceryle rudis</i>	Sch. IV	R	C	P	+	-
Meropidae							
55.	Blue-Bearded Bee-Eater <i>Nyctyornis athertoni</i>	Sch. IV	R	C	I	+	-
56.	Blue-Tailed Bee-Eater <i>Merops philippinus</i>	Sch. IV	R, L	C	I	+	-
57.	Chestnut-Headed Bee-Eater <i>Merops leschenaulti</i>	Sch. IV	R	C	I	+	-
58.	Green Bee-Eater <i>Merops orientalis</i>	Sch. IV	R	C	I	+	-
Coraciidae							
59.	Indian Roller <i>Coracias benghalensis</i>	Sch. IV	R, L	C	I	+	-
60.	Dollar Bird <i>Eurystomus orientalis</i>	Sch. IV	R	C	I	+	-
Upupidae							
61.	Common Hoopoe <i>Upupa epops</i>	Sch. IV	R, L, W	C	I	+	-
Bucerotidae							
62.	Brown Hornbill <i>Anorrhinus tickelli</i>	Sch. I	R	U	F	+	+
63.	Great Hornbill <i>Buceros bicornis</i>	Sch. I	R	U	F	+	+
64.	Oriental Pied Hornbill <i>Anthracoceros albirostris</i>	Sch. IV	R	C	F	+	+
Megalaimidae							
65.	Blue-Eared Barbet <i>Megalaima australis</i>	Sch. IV	R	C	F	+	-
66.	Blue-Throated Barbet <i>Megalaima asiatica</i>	Sch. IV	R	C	F	+	+
67.	Coppersmith Barbet <i>Megalaima haemacephala</i>	Sch. IV	R	C	F	+	+
68.	Great Barbet <i>Megalaima virens</i>	Sch. IV	R	C	F	-	+
69.	Lineated Barbet <i>Megalaima lineata</i>	Sch. IV	R	C	F	+	+
Picidae							
70.	Bay Woodpecker <i>Blythipicus pyrrhotis</i>	Sch. IV	R	-	I	+	+
71.	Great Slaty Woodpecker <i>Mulleripicus pulverulentus</i>	Sch. IV	R	U	I	+	+
72.	Greater Flameback <i>Chrysocolaptes lucidus</i>	Sch. IV	R	C	I	+	-
73.	Greater Yellownape <i>Picus flavinucha</i>	Sch. IV	R	C	I	+	+
74.	Grey-Headed Woodpecker <i>Picus canus</i>	Sch. IV	R	C	I	+	+
75.	Lesser Yellownape <i>Picus chlorolophus</i>	Sch. IV	R	C	I	+	+
76.	Stripe-Breasted Woodpecker <i>Dendrocopos atratus</i>	Sch. IV	R	U	I	+	-
77.	Pale-Headed Woodpecker <i>Gecinulus grantia</i>	Sch. IV	R	-	I	-	+
78.	Rufous Woodpecker <i>Celeus brachyurus</i>	Sch. IV	R	C	I	+	+

79.	Speckled Piculet <i>Picumnus innominatus</i>	Sch. IV	R	U	I	+	-
80.	White-Browed Piculet <i>Sasia ochracea</i>	Sch. IV	R	U	I	+	+
Eurylaimidae							
81.	Long-Tailed Broadbill <i>Psarisomus dalhousiae</i>	Sch. IV	R, L	-	I	+	+
82.	Silver-Breasted Broadbill <i>Serilophus lunatus</i>	Sch. IV	R	-	I	+	-
Pittidae							
83.	Blue-Naped Pitta <i>Pitta nipalensis</i>	Sch. IV	R, L		I	+	-
84.	Hooded Pitta <i>Pitta sordida</i>	Sch. IV	R, L	C	I	+	-
85.	Barn Swallow <i>Hirundo rustica</i>	Sch. IV	R, W	C	I	+	-
Hirundinidae							
86.	Striated Swallow <i>Hirundo striolata</i>	Sch. IV	R, W	-	I	+	-
87.	Red-Rumped Swallow <i>Hirundo daurica</i>	Sch. IV	R, W	-	I	+	-
Laniidae							
88.	Long-tailed Shrike <i>Lanius schach</i>	Sch. IV	W, R	C	I	+	-
89.	Grey-Backed Shrike <i>Lanius tephronotus</i>	Sch. IV	W	C	I	+	-
90.	Brown Shrike <i>Lanius cristatus</i>	Sch. IV	W	C	I	+	-
Oriolidae							
91.	Black-Hooded Oriole <i>Oriolus xanthornus</i>	Sch. IV	R	C	O	+	+
92.	Slender-Billed Oriole <i>Oriolus tenuirostris</i>	Sch. IV	R	U	F	+	+
93.	Maroon Oriole <i>Oriolus trailii</i>	Sch. IV	R	C	O	+	-
Dicruridae							
94.	Ashy Drongo <i>Dicrurus leucophaeus</i>	Sch. IV	R, W	C	I	+	+
95.	Black Drongo <i>Dicrurus macrocercus</i>	Sch. IV	R	C	I	+	-
96.	Bronzed Drongo <i>Dicrurus aeneus</i>	Sch. IV	R	C	I	+	-
97.	Crow-Billed Drongo <i>Dicrurus annectans</i>	Sch. IV	R	-	I	+	-
98.	Greater Racket-Tailed Drongo <i>Dicrurus paradiseus</i>	Sch. IV	R	C	I	+	-
99.	Lesser Racket-Tailed Drongo <i>Dicrurus remifer</i>	Sch. IV	R	C	I	+	+
100.	Spangled Drongo <i>Dicrurus hottentottus</i>	Sch. IV	R	C	I	+	+
Sturnidae							
101.	Asian Pied Starling <i>Gracupica contra</i>	Sch. IV	R	C	I	+	-
102.	Chestnut-Tailed Starling <i>Sturnia malabarica</i>	Sch. IV	R	C	I	-	+
103.	Jungle Myna <i>Acridotheres fuscus</i>	Sch. IV	R	C	I	+	-
104.	Common Myna <i>Acridotheres tristis</i>	Sch. IV	R	C	I	+	+
105.	Hill Myna <i>Gracula religiosa</i>	Sch. I	R	C	I	+	-
Corvidae							
106.	Rufous Treepie <i>Dendrocitta vagabunda</i>	Sch. IV	R	C	O	+	-

107.	Grey Treepie <i>Dendrocitta formoase</i>	Sch. IV	R, L	C	O	+	+
108.	Large-Billed Crow <i>Corvus macrorhynchos</i>	Sch. IV	R	C	O	+	-
Campephagidae							
109.	Ashy Minivet <i>Pericrocotus divaricatus</i>	Sch. IV	R	U	I	+	-
110.	Large Cuckooshrike <i>Coracina macei</i>	Sch. IV	R	C	I	+	-
111.	Black-Winged Cuckooshrike <i>Coracina melaschistos</i>	Sch. IV	R, L	-	I	+	+
112.	Large Woodshrike <i>Tephrodornis virgatus</i>	Sch. IV	R	C	I	+	-
113.	Long-Tailed Minivet <i>Pericrocotus ethologus</i>	Sch. IV	R	C	I	+	-
114.	Scarlet Minivet <i>Pericrocotus flammeus</i>	Sch. IV	R	C	I	+	+
115.	Short-Billed Minivet <i>Pericrocotus brevirostris</i>	Sch. IV	R, L	U	I	+	-
Irenidae							
116.	Asian Fairy Bluebird <i>Irena puella</i>	Sch. IV	R, L	C	I	+	-
117.	Blue-Winged Leafbird <i>Chloropsis cochinchinensis</i>	Sch. IV	R	U	I	+	+
118.	Common Iora <i>Aegithina tiphia</i>	Sch. IV	R	C	I	+	-
119.	Golden-Fronted Leafbird <i>Chloropsis aurifrons</i>	Sch. IV	R	C	I	+	+
Pycnonotidae							
120.	Ashy Bulbul <i>Hemixos flavala</i>	Sch. IV	R	C	I	-	+
121.	Black Bulbul <i>Hypsipetes leucocephalus</i>	Sch. IV	R, L	C	I	+	-
122.	Black-Headed Bulbul <i>Pycnonotus atriceps</i>	Sch. IV	R	C	F	+	-
123.	Black-Crested Bulbul <i>Pycnonotus melanicterus</i>	Sch. IV	R	C	F	+	+
124.	Red-Vented Bulbul <i>Pycnonotus cafer</i>	Sch. IV	R	C	F	+	-
125.	Red-Whiskered Bulbul <i>Pycnonotus jocosus</i>	Sch. IV	R	C	F	+	-
126.	White-Throated Bulbul <i>Alophoixus flaveolus</i>	Sch. IV	R, L	C	I	+	+
Muscicapidae							
127.	Puff-Throated Babbler <i>Pellorneum ruficeps</i>	Sch. IV	R	C	I	+	+
128.	Abbott's Babbler <i>Malacocincla abbotti</i>	Sch. IV	R	C	I	+	-
129.	Grey-Throated Babbler <i>Stachyris nigriceps</i>	Sch. IV	R	C	I	+	+
130.	Striped Tit Babbler <i>Macronous gularis</i>	Sch. IV	R	C	I	+	-
131.	Rufous-Capped Babbler <i>Stachyris ruficeps</i>	Sch. IV	R, L	C	I	+	-
132.	White-Hooded Babbler <i>Gamporhynchus rufulus</i>	Sch. IV	R	C	I	-	+
133.	White-Browed Scimitar Babbler <i>Pomatorhinus schisticeps</i>	Sch. IV	R	C	I	+	-
134.	Streak-Breasted Scimitar Babbler <i>Pomatorhinus ruficollis</i>	Sch. IV	R, W	C	I	+	+
135.	Slender-Billed Scimitar Babbler <i>Pomatorhinus superciliaris</i>	Sch. IV	R, W, L		I	+	-
136.	Streaked Wren Babbler <i>Napothera brevicaudatus</i>	Sch. IV	R	-	I	+	-
137.	Greater Necklaced Laughingthrush <i>Garrulax pectoralis</i>	Sch. IV	R	C	I	+	+
138.	Lesser Necklaced Laughingthrush <i>Garrulax monileger</i>	Sch. IV	R	C	I	+	+

139.	Black-Chinned Yuhina <i>Yuhina nigrimenta</i>	Sch. IV	R	C	I	+	-
140.	Brown-Cheeked Fulvetta <i>Alcippe poiocephala</i>	Sch. IV	R	C	I	+	-
141.	Nepal Fulvetta <i>Alcippe nipalensis</i>	Sch. IV	R, L	C	I	+	+
142.	Rufous-Throated Fulvetta <i>Alcippe rufogularis</i>	Sch. IV	R	C	I	+	-
143.	Rufous-Backed Sibia <i>Heterophasia annectens</i>	Sch. IV	R	U	I	+	-
144.	White-Bellied Yuhina <i>Yuhina zantholeuca</i>	Sch. IV	R	U	I	-	+
145.	Asian Brown Flycatcher <i>Muscicapa dauurica</i>	Sch. IV	W	U	I	-	+
146.	Asian Paradise-Flycatcher <i>Terpsiphone paradisi</i>	Sch. IV	R, L	U	I	+	-
147.	Grey-Headed Canary Flycatcher <i>Culicicapa ceylonensis</i>	Sch. IV	R, W	C	I	+	+
148.	Pale Blue Flycatcher <i>Cyornis unicolor</i>	Sch. IV	W	C	I	+	-
149.	Pale-Chinned Flycatcher <i>Cyornis poliogenys</i>	Sch. IV	R	C	I	-	+
150.	Rufous-Gorgeted Flycatcher <i>Ficedula strophciata</i>	Sch. IV	R	U	I	+	-
151.	Red-Throated Flycatcher <i>Ficedula parva</i>	Sch. IV	W	C	I	-	+
152.	Slaty-Blue Flycatcher <i>Ficedula tricolor</i>	Sch. IV	R, W, L	C	I	+	-
153.	Taiga Flycatcher <i>Ficedula albicilla</i>	Sch. IV	W	C	I	+	-
154.	Large Niltava <i>Niltava grandis</i>	Sch. IV	R, L	C	I	+	-
155.	Rufous-Bellied Niltava <i>Niltava sundara</i>	Sch. IV	R, L	C	I	-	+
156.	Small Niltava <i>Niltava macgrigoriae</i>	Sch. IV	R, L	C	I	+	-
157.	White-Throated Fantail <i>Rhipidura albicollis</i>	Sch. IV	R	C	I	+	+
158.	Black-Naped Monarch <i>Hypothymis azurea</i>	Sch. IV	R, L	C	I	+	+
159.	Chestnut-Headed Tesia <i>Tesia castaneocoronata</i>	Sch. IV	R, L	C	I	+	-
160.	Grey-Bellied Tesia <i>Tesia cyaniventer</i>	Sch. IV	R, L	C	I	+	-
161.	Aberrant Bush Warbler <i>Cettia flavolivacea</i>	Sch. IV	W	U	I	+	-
162.	Brownish-Flanked Bush Warbler <i>Cettia fortipes</i>	Sch. IV	R, W	-	I	+	-
163.	Ashy Prinia <i>Prinia socialis</i>	Sch. IV	R	C	I	+	-
164.	Striated Prinia <i>Prinia criniger</i>	Sch. IV	R, L	C	I	+	-
165.	Common Tailorbird <i>Orthotomus sutorius</i>	Sch. IV	R	C	I	+	+
166.	Dark-Necked Tailorbird <i>Orthotomus atrogularis</i>	Sch. IV	R	C	I	+	-
167.	Blyth's Leaf Warbler <i>Phylloscopus reguloides</i>	Sch. IV	R, W	-	I	+	-
168.	Dusky Warbler <i>Phylloscopus fuscatus</i>	Sch. IV	W	C	I	+	-
169.	Greenish Warbler <i>Phylloscopus trochiloides</i>	Sch. IV	R, W	C	I	+	-
170.	Grey-Hooded Warbler <i>Seicercus xanthoschistos</i>	Sch. IV	R, L	C	I	+	-
171.	Tickell's Leaf Warbler <i>Phylloscopus affinis</i>	Sch. IV	W	C	I	+	-
172.	Yellow-Browed Warbler <i>Phylloscopus inornatus</i>	Sch. IV	R, W	-	I	+	-
173.	Yellow-Bellied Warbler <i>Abroscopus superciliaris</i>	Sch. IV	R, L	C	I	-	+
174.	Oriental Magpie Robin <i>Copsychus saularis</i>	Sch. IV	R	C	I	+	-

175.	White-Rumped Shama <i>Copsychus malabarica</i>	Sch. IV	R	C	I	+	-
176.	White-Capped Water Redstart <i>Chaimarromis leucocephalus</i>	Sch. IV	R, W	C	I	+	+
177.	Plumbous Water Redstart <i>Rhyacornis fuliginosa</i>	Sch. IV	R, W	C	I	+	-
178.	Black-Backed Forktail <i>Enicurus immaculatus</i>	Sch. IV	R	C	I	+	+
179.	White-Crowned Forktail <i>Enicurus leschenaulti</i>	Sch. IV	R, L	U	I	+	-
180.	Slaty-Backed Forktail <i>Enicurus schistaceus</i>	Sch. IV	R, L	C	I	-	+
181.	Little Forktail <i>Enicurus scouleri</i>	Sch. IV	R, L	C	I	+	-
182.	Blue Rock Thrush <i>Monticola solitarius</i>	Sch. IV	W	C	I	+	-
183.	Blue Whistling Thrush <i>Myophonus caeruleus</i>	Sch. IV	R, L	C	O	+	+
Paridae							
184.	Sultan Tit <i>Melanochloa sultanea</i>	Sch. IV	R	C	I	+	+
Sittidae							
185.	Chestnut-Bellied Nuthatch <i>Sitta castanea</i>	Sch. IV	R, L	C	I	+	-
Motacillidae							
186.	Olive-Backed Pipit <i>Anthus hodgsoni</i>	Sch. IV	W	C	I	+	-
187.	Paddyfield Pipit <i>Anthus rufulus</i>	Sch. IV	R	C	I	+	-
188.	White Wagtail <i>Motacilla alba</i>	Sch. IV	W	C	I	+	-
189.	Citrine Wagtail <i>Motacilla citreola</i>	Sch. IV	W	C	I	+	-
190.	Western Yellow Wagtail <i>Motacilla flava</i>	Sch. IV	W	C	I	+	-
Dicaeidae							
191.	Fire-Breasted Flowerpecker <i>Dicaeum ignipectus</i>	Sch. IV	R, L	C	N	+	-
192.	Plain Flowerpecker <i>Dicaeum concolor</i>	Sch. IV	R	C	N	+	+
193.	Scarlet-Backed Flowerpecker <i>Dicaeum cruentatum</i>	Sch. IV	R	C	N	+	-
194.	Yellow-Vented Flowerpecker <i>Dicaeum chrysorrheum</i>	Sch. IV	R	C	N	+	-
Nectariniidae							
195.	Black-Throated Sunbird <i>Aethopyga saturata</i>	Sch. IV	R, L, W	C	N	-	+
196.	Crimson Sunbird <i>Aethopyga siparaja</i>	Sch. IV	R, L	C	N	+	-
197.	Green-Tailed Sunbird <i>Aethopyga nipalensis</i>	Sch. IV	R, L		N	+	-
198.	Little Spiderhunter <i>Arachnothera longirostra</i>	Sch. IV	R	C	N	+	+
199.	Purple Sunbird <i>Nectarinia asiatica</i>	Sch. IV	R	C	N, I	+	-
200.	Purple-Rumped Sunbird <i>Nectarinia zeylonica</i>	Sch. IV	R	U	N	+	-
201.	Ruby-Cheeked Sunbird <i>Anthreptes singalensis</i>	Sch. IV	R	C	N	+	-
202.	Streaked Spiderhunter <i>Arachnothera magna</i>	Sch. IV	R, L	C	N	+	-
Zosteropidae							
203.	Oriental White-Eye <i>Zosterops palpebrosus</i>	Sch. IV	R	C	I	+	-

Ploceidae

204.	White-Rumped Munia <i>Lonchura striata</i>	Sch. IV	R	C	G	+	-
205.	Scaly-Breasted Munia <i>Lonchura punctulate</i>	Sch. IV	R	C	G	+	-

Abbreviations**Schedule Status (WPA 1972)**

Sch. I = Schedule I

Sch. IV = Schedule IV

Distribution Status

R = Resident

L = Local and altitudinal migrant

W = winter visitor

M = Migrant, but some breeds here

Status in Assam

C = Common

U = Uncommon

Food habit

G = Granivores

P = Piscivores

I = Insectivores

C = Carnivores

O = Omnivores

F = Frugivores

N = Nectarivores

N & I = Nectarivores and Insectivores

December 2014 in Bombaithal. The habitat was dominated by semi evergreen forest. Photographs were taken for this species and it was identified by its paler ashy-grey head, yellowish-green wash to upperparts and lilac-blue tail with paler yellowish-cream tip.

RED-BREASTED PARAKEET *Psittacula alexandri*: Near Threatened. Commonly seen at Bombaithal, Marwacherra and Durbin Tilla. However, we did not see any other of the species in the other sites of BWS during our survey. It is one of the most common parakeets found in BWS. The most prominent identifying character of this species is its lilac-grey crown and earcoverts, broad black chin stripe and deep lilac-pink breast and belly.

BROWN HORNBILL *Anorrhinus tickelli*: Near Threatened, locally uncommon and Schedule 1 species (Wildlife Protection Act 1972). On 25th December 2014, a flock of six individuals was seen at Durbin Nulla (25°0.936'N 92°49.056'E) at an elevation of 900 m. They were seen restless and busy, perching and flying from one tree to another, making noisy croaks and squeals. Another flock was encountered at our base camp, near Durbin Tilla (25°1.098'N 92°49.068'E) on the same day, located at 1,027 m—where, five adults and one juvenile were seen perching on a tall tree (c.10 m). Later, again a flock of six

individuals were seen between these two places. The habitat comprised of semi-evergreen and tropical evergreen forests mostly dominated by *Michelia montana*, *Cinnamomum* sp., *Eugenia* sp., *Phoebe goalparensis*, *Cynometra polyandra*, *Ficus benghalensis* etc. The species was identified based on its large stout pale bill and casque. Both males and females were observed during the survey, and males were seen having white cheeks, throat and upper breast, while the females have entire dusky brown underparts, with pale streak in the crown.

GREAT HORNBILL *Buceros bicornis*: Near Threatened, Schedule 1 (Wildlife Protection Act 1972) and locally uncommon species. A pair was seen at Durbin Tilla (25°1.236'N 92°49.026'E) at 1,100 m on 24 December 2014. They were huge birds with very large yellow bill and double-ridged casque, black face band and white tail with black subterminal band. They were flying from one branch to the other side of the hill. The height of the tree was c.12 m. The habitat of the area composed of sub-tropical broadleaved hill forests.

Significant Records: Locally Uncommon Species

BLACK EAGLE *Ictinaetus malayensis*: Locally uncommon and Schedule 1 species (Wildlife Protection Act 1972). One individual was sighted near Durbin Nulla (c. 940 m) on 25th December 2014. The bird was perching on a branch of tree (c. 8 m) near

the edge of the hill. It had long wings extended to the tip of tail and a distinctive wing shape and long tail, which helped in identifying the bird as Black Eagle.

SHIKRA *Accipiter badius*: Schedule 1 species (Wildlife Protection Act 1972). It was seen near the hill stream, perching on a branch of a tree (c. 10 m) on 11th April 2016 at Marwacherra. The nearby habitat was moderately degraded forest. The lone individual was having a pale underwing with fine and clear barring on remiges, and darker wing-tips.

GREY PEACOCK PHEASANT *Polyplectron bicalcaratum*: Schedule 1 species (Wildlife Protection Act 1972). Though we did not see a live bird, we saw feathers of a dead bird, which had been collected as a trophy by a local at Bombaithal. He reported it as a common species in Barail Range.

BLUE-EARED KINGFISHER *Alcedo meninting*: Locally uncommon. Sighted at Marwacherra, near the hill stream on 11th April 2016. The species was seen clearly having blue-ear coverts, darker blue upperparts and rump and deeper orange underparts.

SPECKLED PICULET *Picumnus innominatus*: Locally uncommon. One individual was sighted on 04th December 2015 (c. 15:30 hrs.) at Durbin Nulla (c. 906 m). It was pecking on a tree trunk near a bamboo patch. It was having a whitish face broken by blackish ear-covert patch and malar stripe. The underparts were highly spotted with black. The presence of the greyish crown and square-ended blackish tail with white on central and outer feathers helped in identifying the bird also.

WHITE-BROWED PICULET *Sasia ochracea*: Locally uncommon. One individual was sighted while returning from Durbin Tilla on 24th December 2014 (around 15:00 hrs.). Photographs were taken of this bird and was identified based on its tiny size and tailless appearance. It also had greenish-olive upperparts and rufous underparts and a very short black tail with fine white supercilium behind the eye.

ASHY MINIVET *Pericrocotus divaricatus*: Locally uncommon. One individual was sighted on 11th December 2014 (c. 10:00 hrs.) at Bombaithal. The nearby habitat was composed of Semi-evergreen forest with bamboo patches in between. The bird was perching in the upper canopy of the tree (c. 7 m). The individual was male having black cap and a white forehead.

SHORT-BILLED MINIVET *Pericrocotus brevirostris*: Locally uncommon. We saw a male at Bombaithal on 11th December 2014 (c. 14:30 hrs.). The habitat comprised of Semi-evergreen forest with small grassland patches and riparian vegetation in between. It was identified as male, as it lacks the extension of red wing patch down to the secondaries, deeper black throat patch and a shorter tail.

BLUE-WINGED LEAFBIRD *Chloropsis cochinchinensis*: Locally uncommon. An individual was sighted while coming down from Durbin Nulla to our base camp (25p 0.21¹N, 92p 48.858¹E; 697 m) on 4th December 2015. It was seen preening on a branch of middle canopy of a tree (9 m). It had a fine and clear blue panel in wing and blue sides to tail. It also did not have the golden-orange forehead.

RUFIOUS-BACKED SIBIA *Heterophasi aanelectans*: Locally uncommon. An individual was seen while going towards Durbin Nulla (c.700 m) on 3rd December 2015. The habitat was covered with dense forest. It was a small and Short-tailed Sibia and had a black cap, black and white streaked upper mantle merging into rufous back and rump and white underparts with deep buff flanks and vent.

ASIAN PARADISE-FLYCATCHER *Terpsiphone paradise*: Locally uncommon and very rare. One male was recorded on 10th September 2015 during survey of the roadside forested areas in Marwacherra, eastern part of Barail Wildlife Sanctuary. The habitat was a degraded forest, with thick understory growth. The bird was preening on a tree branch (c. 5 m) for about 30 seconds and finally disappeared after it sensed our presence. Next year, a pair was sighted on 22nd October 2016 in Marwacherra. The male bird had black head and crest, with white or rufous upperparts and long tail streamers, female had a rufous plumage and a shorter crest and short square-ended tail.

RUFIOUS-GORGETED FLYCATCHER *Ficedula strophliata*: Locally uncommon. One male individual was sighted in the trail towards Durbin Tilla on 04th December 2015 at around 11:30 hrs. It had a dark olive-brown upperpart, blackish face and throat, prominent white forehead and eyebrow. The rufous patch in its breast was clearly seen.

ABERRANT BUSH WARBLER *Cettia flavolivacea*: Locally uncommon and winter visitor. One individual was seen on

05th December 2015, while returning from Durbin Tilla at c. 350 m elevation (08:40 hrs.). A yellowish-green warbler, with olive upperparts and yellowish supercilium and olive-yellow underparts.

WHITE-CROWNED FORKTAIL *Enicurus leschenaultia*: Locally uncommon. On 3rd December 2015 (around 07:30 hrs.), one individual was sighted near the stream of Durbin Nulla. It was seen having a longer and larger tail than the Black-backed Forktail and prominent white forehead and forecrown was present.

PURPLE-RUMPED SUNBIRD *Nectarinia zeylonica*: Locally uncommon. On 4th December 2015 (c. 16:30 hrs.), one male individual was seen near our base camp at Durbin Tilla (c. 970 m). The area was covered with dense forest but understory flowering plants were also available. The individual was having a narrow maroon breast-band, maroon head sides and mantle, metallic green shoulder patch and yellow lower breast and belly with distinctive greyish-white flanks.

Discussion

During our survey, we observed 187 species, among which 137 were addition to the list of species from this protected area. As, very few extensive works have been carried out by the earlier workers in these areas, hence, we tried to cover the protected area extensively at large. Chakdar *et al.* (2019) also recorded 215 species in Rajiv Gandhi Orang National Park in Assam out of 284 bird species in total mentioned in the checklist. Their work can be compared with that of ours. They also collated already recorded species by other authors, which they could not sight, and added maximum species themselves.

Earlier records show that Barail Wildlife Sanctuary, which is a part of the Barail Hill Range was extremely rich in avifauna (Hume, 1877, 1880, Baker, 1922—30). Choudhury (2000) states that BWS encompasses the breeding sites of Blyth's Tragopan *Tragopan blythii* and Cinereus Vulture *Aegypius monachus* in Assam. The Lesser Adjutant *Leptoptilos javanicus* was seen in the southern valleys. There was also past record of a breeding site of the critically endangered Slender-billed Vulture *Gyps tenuirostris*. Swamp Francolin *Francolinus gularis* was also reported from the southwestern

fringe of this area (Choudhury, 2000). Our record of Brown Hornbill (also see Hussain, 2015) is a significant one as Choudhury (2000) also had mentioned its possible occurrence in Barail Hill Range in Cachar district.

The sighting of species like Great Hornbill, Brown Hornbill, Asian Paradise Flycatcher, Hooded Pitta, Red-headed Trogon, etc. was indicative of presence of a quality forest in the area. The site is the conjuncture of three notable Biomes namely, Biome 8 (Sino-Himalayan Subtropical Forest), Biome 9 (Indo-Chinese Tropical Moist Forest) and Biome 5 (Eurasian High Montane—Alpine and Tibetan) (Rahmani *et al.*, 2016). Among the 95 species listed in Biome 8 by BirdLife International, nine were found in this protected area. Two of the nine species of Biome 9 and one species i.e. Grey-backed Shrike *Lanius tephronotus* of Biome 5 were also reported from the area (Rahmani *et al.*, 2016). Evidence in the form of feather collection of one Biome-8 and Schedule 1 species like Grey Peacock Pheasant *Polyplectron bicalcaratum* was also recorded during our survey. Though it has been mentioned as a common species in Barail Range (Birand & Pawar, 2001, Choudhury, 2000), we could not see a live specimen.

The Shannon Diversity index of the bird community of BWS (4.29) was found to be quite high. Debnath *et al.* (2018) found in their study the species diversity (H') ranged between 1.272 to 1.487 in a wetland habitat. Likewise, in Chandubi Tectonic Lake, Guwahati the species diversity during various seasons of the year were ranged between 3.46–4.07 (Deka & Nath, 2013). However, Gajera *et al.* (2013) recorded that the species diversity ranged between 4.10 to 4.47 in various mining habitats in Kachchh, Gujarat. Thus, Derso *et al.* (2015) stated that most values calculated using the H' range from 1.5 to 3.5, rarely exceeding 4.5; values above 3.0 indicate that habitat structure is very much balanced and stable, whereas values below 1.0 indicate the presence of pollution and degradation of habitat structure. Based on these principles, it is understood that being diverse habitats, the BWS has a stable bird population which is very evenly distributed throughout.

Among the recorded species maximum were insectivores, which also reflect the rich insect diversity in BWS. Though we did not study the relationship between prey and

the predators in terms of insects as prey and birds as predators, it could be interesting study in future.

Victor & de Casenave (1999) found that availability of vegetation strata is principal determinant factor for high species richness. Still good vegetation patches are found in BWS in some places, and therefore, species richness is also good. However, growing threats like shrinkage of habitat, exploitation of the wild resources, poaching and degradation of the habitat due to *jhumming* are creating a worrisome situation for the flora and fauna of the sanctuary (Birand & Pawar, 2001, Das, 2008, Deori et al., 2016).

Since this protected area has recently been updated as an Important Bird and Biodiversity Area (Rahmani et al., 2016) because of its richness in threatened and endemic birds, long term monitoring of this protected area may lead to some important significant findings from Biome 8 and Biome 9 species. Earlier record mentioned the presence of vulnerable species like Great Slaty Woodpecker in the disturbed open forest of Barail Hill Range (Birand & Pawar, 2001). Moreover, presence of some notable uncommon species like Pied Falconet, White-bellied Yuhina, Ashy Wood Pigeon, Asian Brown Flycatcher, were also sighted in the degraded forests and sparse understory of the open riparian patch near Jhum fallows of erstwhile Barail Reserve Forest (Birand & Pawar, 2001). However, during our survey we did not encounter these species. This wildlife sanctuary is the only area left with the thick primary forest and is a safe haven for the other wild animals besides butterflies and birds, but mounting pressure and exploitation of the resources are damaging the habitats and the primary forest cover. Proper conservation measures should be taken for the rich avifauna of this sanctuary.

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