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## AVIAN FAUNA OF AMBOLI GHAT, SINDHUDURG DISTRICT, MAHARASHTRA STATE, INDIA

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**Abstract:** The present report puts forth a systematic checklist of bird species observed at Amboli Ghat in Maharashtra from 2009 to 2012, along with information on their status. A total of 208 species were recorded, which is around 15% of bird species of the Indian subcontinent. A family-wise analysis showed that the families Accipitridae and Muscipidae (14 species each) followed by Ardeidae dominated the avifauna of the region. The study also revealed that the area consisted of 11 species of birds that are classified under Near Threatened category and two under Vulnerable category of IUCN. This study highlights the urgent need to conserve the biodiversity-rich area of Amboli Ghat with long-term plans.

**Keywords:** Amboli, avian fauna, diversity, endemic, Western Ghats.

The Western Ghats along the western coast of peninsular India is one of the most ecologically significant biological regions of the world. These hill ranges are recognized as a unique biogeographic province (Mani 1974), a global biodiversity hotspot (Myers et al. 2000), and as one of the 200 most important eco-regions of the world (Olson & Dinerstein 1998). Amboli Ghat lies in the Sahyadri Hills of the Western Ghats in the Sindhudurg District of Maharashtra State, India. It is located at 15.962°N–73.997°E and has an average altitude of

approximately 690m. The highest point is 1,100m and the lowest point is 166m. The terrain is undulating with steep escarpments and dense forests. There are three well-defined seasons in Amboli: the monsoon spanning from June to around mid-November, the winter from mid-November to February, and the summer, from March to May. It is the wettest place in Maharashtra State with an average annual precipitation of 7500mm. The plant life in Amboli is extremely rich since the climatic conditions give rise to a wide range of habitats. The habitats range from the tropical semi-evergreen forests, tropical moist deciduous forests, subtropical broadleaf hill forests, tropical dry deciduous forests, tropical thorn vegetation, grasslands, and agricultural lands to wetlands. The wetlands are mainly formed by the collection of water from streams in abandoned agricultural lands. In general, the vegetation turns drier as one moves from west to east (into the rain shadow region) across the hills. Lower elevations on the eastern region receive less than 1,200mm of annual rainfall and contain tropical dry deciduous and thorny forests, with tropical moist deciduous forests in more well-watered

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**Competing interests:** The authors declare no competing interests.

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areas (Champion & Seth 1968). With an increase in elevation, tropical semi-evergreen rainforests appear along the higher slopes and ridges. The western region of the hills tends to have mostly tropical moist deciduous forests with wet evergreen forests at lower elevations. The former gives way to the latter type as one climbs higher. The forest is mainly fragmented and the semi-evergreen forest patches occur in isolated pockets.

In less than five years, four new faunal species were described and reported from Amboli. A species of toad, *Xanthophryne tigerinus*, was recently described as endemic to Amboli (Biju et al. 2009). Amboli was reported as one of the type localities of a species of frog *Pseudophilautus amboli* (Biju & Bossuyt 2009), a new species of coral snake *Calliophis castoe* (Smith et al. 2012), and a new species of colubrid *Dendrelaphis giri* (Vogel & Rooijen 2011). Other snakes like Ornate Flying Snake and Brown Vine Snake were also sighted in this region.

Birds are considered as useful biological indicators because they are ecologically versatile and live in all kinds of habitats. Extensive documentation of avian fauna of various regions of the Western Ghats and Maharashtra are available. Prasad (2003) listed about 450 bird species from western Maharashtra, Abdulali (1981) listed 540 bird species from Maharashtra, and Gole (1998) studied bird species of Sahyadri; documentation can also be found in Ranjit et al. (1990), Lainer (2004), Padhye et al. (2007), Lawate & Mule (2008), and Kachare et al. (2011). A systematic study on the avian fauna of Amboli Ghat is wanting. The aim of our study was to explore the nature of bird assemblage in various macrohabitat types in and around Amboli Ghat. The finding of this study can provide baseline data for intensive studies in the future. The study also highlights the ecological significance of this highly biodiverse spot in the Western Ghats of India.

## METHODS

### Study area

An area of around 54km<sup>2</sup> covering locations like Amboli Town, Papdi, Malai, Chaukul, Mahadevgarh, Parpoli, and adjoining areas (Fig. 1), was explored for the study since each zone varies in its landscape type. In addition to the slope of the valley of Amboli Ghat, this study also included areas of lower hilly terrains, as the valley is surrounded by hills on almost all sides. The present study explores areas used for agriculture and human settlements as well as natural habitats such as forest patches, grasslands, streambanks, and scrublands. Locations around the collection of large wetlands near Papdi were also investigated. Habitat details of the

above-mentioned locations are as follows:

1) Papdi (15.888°N & 74.0372°E) – a mostly flat terrain with a slightly undulating land, agricultural fields, and streams present with temporary marshes during monsoon and early winter.

2) Malai Forest (15.941°N & 74.001°E) - dense evergreen forest.

3) Chaukul Road (15.943°N & 74.031°E) – a flat terrain covered with vegetation during monsoon and dry scrub in late winter and summer.

4) Amboli Town (15.966°N & 74.004°E) - human settlements near Amboli reserve forest.

5) Mahadevgarh Road (15.967°N & 73.990°E) - evergreen forest cover with sporadic open grassland patches.

6) Amboli Ghat (15.934°N & 73.990°E) - steep escarpments with moist deciduous and evergreen forests.

7) Parpoli (15.950°N & 73.975°E) - foothills of Amboli receiving maximum rainfall in the study area. The short grown vegetation remains submerged under water till early winter. The remaining area is covered by evergreen forests.

Bimonthly surveys were carried out in the selected areas of various habitats from March 2009 to March 2012. The areas were surveyed using binoculars and digital cameras for documenting bird species. Direct observations and noting of species sighted were made by walking on the roads and village tracks and through grasslands and agriculture areas. Monitoring of areas was done in the morning from 6:00 to 10:00 hr as well as in the evening from 15:00 to 19:00 hr. Visits were also made in the afternoons and late evenings to check the activities of the avian fauna at different times. Birds were identified using widely accepted field guides like Ali & Ripley (1983) and Grimmett et al. (1998, 2011). For taxonomy, species sequence, and nomenclature, we followed Praveen et al. (2016).

The status of birds was assigned based on the following criteria:

1) Resident - if a bird was seen all throughout the year (not necessarily nesting).

2) Winter visitor - if a bird was seen only during the period from December to February.

3) Summer visitor - if a bird was seen only during the period from March to May.

The birds were assigned strictly with reference to the study area on the basis of presence or absence method. The birds that showed irregular trends of sighting and population fluctuations (non-seasonal) were placed under uncertain status. Current status of threatened

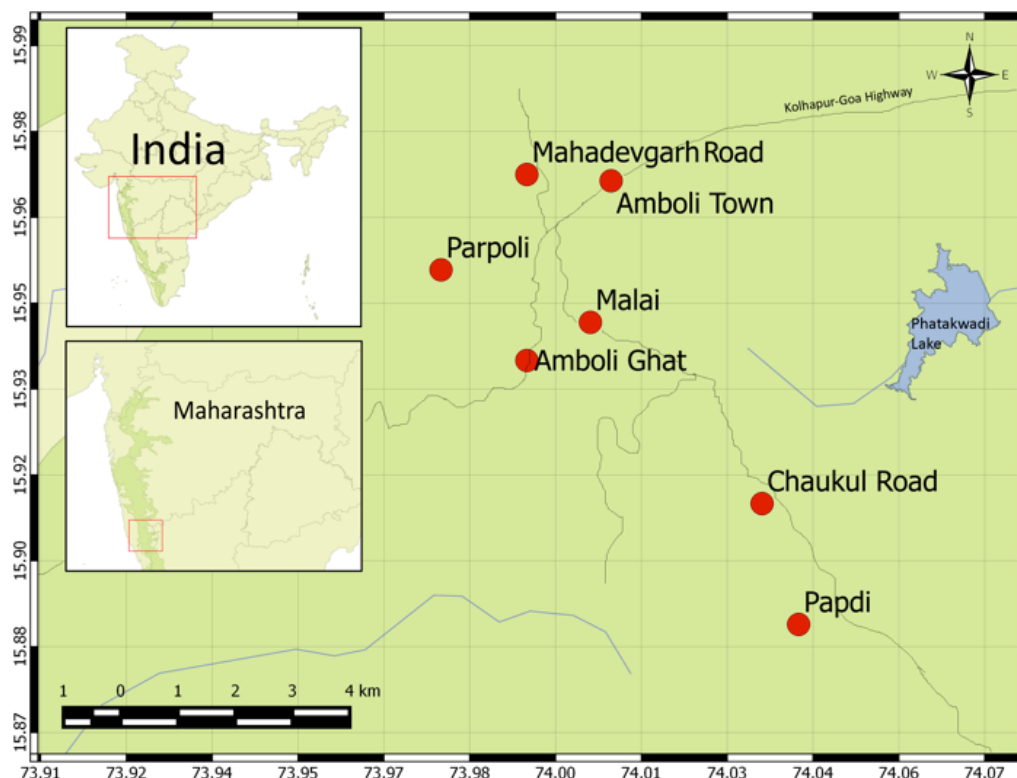


Figure 1. Map showing different locations in the study area in Amboli Ghat, Maharashtra State, India (Quantum GIS Development Team 2016).

categories was adopted from IUCN Red list (IUCN 2016).

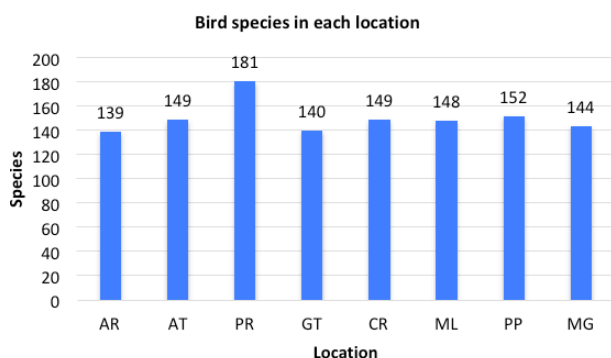
## RESULTS

A total of 208 species was recorded during the study (Table 1), constituting around 15% of the total species listed in the Indian subcontinent by Grimmett et al. (2011). Birds from 64 families were recorded. Family-wise analysis showed that the families Accipitridae and Muscicapidae (14 species each) followed by Ardeidae (10 species) dominated the avian fauna, indicating a healthy bird diversity in the region. Out of the total species encountered, analysis of data revealed that 165 species were residents, 38 species were winter visitors, two species were summer visitors, and the remaining species have an uncertain status. The status of three species, European Roller *Coracias garrulus*, Asian Pied Starling *Gracupica contra*, and Green Avadavat *Amandava formosa*, was considered uncertain as they showed irregular trends of sighting and population fluctuations (non-seasonal). Since there are no habitats appropriate for Green Avadavat in the study area, the individuals sighted could be those escaped from cages. A comparative graph was prepared to see the differences in avian faunal diversity in the locations in the study area which revealed Parpoli region with maximum

number of species (181 species of birds) (Figs. 2 & 3). A few bird species like Pompadour Green Pigeon *Treron pompadora*, Grey-bellied Cuckoo *Cacomantis passerinus*, Drongo Cuckoo *Surniculus lugubris*, Blue-faced Malkoha *Phaenicophaeus viridirostris*, Lesser Golden-backed Woodpecker *Dinopium benghalense*, Yellow-fronted Pied Woodpecker *Dendrocopos mahrattensis*, White-naped Woodpecker *Chrysocolaptes festivus*, Heart-spotted Woodpecker *Hemicircus canente* and Little Spiderhunter *Arachnothera longirostra* (Table 1) were sighted only at the low-lying well-wooded region of Parpoli in the study area. Studies show that habitats with structurally complex matrices have greater potential for supporting the populations of forest birds than open areas such as pastures (Raman 2006). Sixty-one species of birds are recognized as endemic to India (Praveen et al. 2016), of which 13 were sighted in the study area. A few birds that showed local seasonal migration due to heavy rainfall in the higher altitude areas of Amboli.

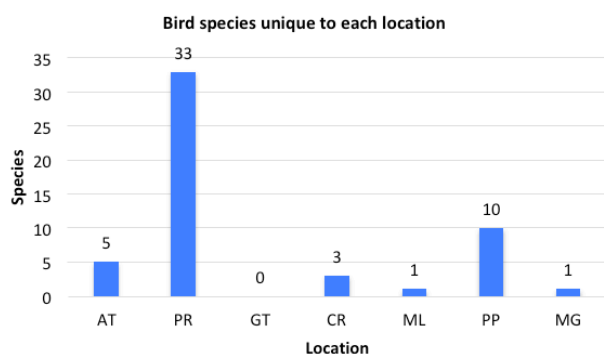
Based on the present study, it can be concluded that there are 11 species of birds in the study area that are struggling for their existence throughout their distributional range and therefore can be placed under threat categories as identified by IUCN (2016). These species are the Vulnerable Woolly-necked Stork *Ciconia*





**Figure 2. Number of bird species sighted in the different locations in Amboli Ghat**

**Key to locations:** AR-All Regions, AT-Amboli Town, PR-Parpoli, GT-Amboli Ghat, CR-Chaukul Road, ML-Malai Forest, PP-Papdi, MG-Mahadevgarh Road



**Figure 3. Number of bird unique species unique to different locations in Amboli Ghat**

**AT - Amboli Town, PR - Parpoli, GT - Amboli Ghat, CR - Chaukul Road, ML - Malai Forest, PP - Papdi, MG - Mahadevgarh Road**

*episcopus*, Nilgiri Wood Pigeon *Columba elphinstonii* (observed roosting), and Green Avadavat (observed roosting) and the Near Threatened Black-necked Stork *Ephippiorhynchus asiaticus*, Black-headed Ibis *Threskiornis melanocephalus*, Oriental Darter *Anhinga melanogaster*, Pallid Harrier *Circus macrourus*, River Tern *Sterna aurantia*, Great Hornbill *Buceros bicornis*, Malabar Pied Hornbill *Anthraceroceros coronatus*, and Grey-headed Bulbul *Brachypodius priocephalus* (observed feeding and roosting). Of these, Grey-headed Bulbul and Nilgiri Wood Pigeon are endemic to the Western Ghats. Vultures were not encountered in the present study.

## DISCUSSION

A list with authentic records reflects the true natural diversity of the avian fauna of any region. For taxa that are widespread or migrating, records in such lists form an essential part of the information that can be used to map

their global distribution and seasonal movements. The Amboli Ghat area still provides some potential habitats for the declining population of many bird species. During the breeding season, Grey-headed Bulbuls were observed foraging in areas of Amboli Ghat dominated by sub-canopy trees bearing fruits. Fruit availability is also an important factor that decides the breeding season of this species (Balakrishnan 2011). The occurrence of Malabar Grey Hornbill can be attributed to the retention of fruits in the canopy, which provides food for the species (Raman & Mudappa 2003). Open areas are of utmost importance for bird populations as these areas provide better visibility for vigilance against predators and free movement for food procurement (Desai & Shanbhag 2012). It is the need of the hour to monitor these areas systematically in the rapidly changing environment with a focused study on the status, distribution, and conservation of the avian fauna of the region, which can be achieved only through strengthening public participation species.

One of the problems faced by Amboli Ghat in the recent years is the disturbance caused by humans along with deforestation for plantation, development, and mining. Changes in vegetation components could affect the availability of food resources and microclimatic conditions, which could then affect the richness and abundance of bird species (Johns 1991).

Animals in protected areas may face interference in their daily activities due to tourists and their associated activities. Tourism in protected areas can have negative influences on animal populations, as tourists often seek out rare or spectacular species during sensitive times such as breeding or nesting (Knight & Cole 1995). Where human traffic is frequent, species withdraw, change behaviour, or become habituated to human presence (Griffiths & van Schaik 1993). During the current study, Blue-capped Rock Thrush *Monticola cinclorhynchus*, Yellow-browed Bulbul *Acritillas indica*, and Quaker Tit Babbler *Alcippe poioicephala* were found feeding on garbage left by tourists.

Amboli Ghat is visited extensively by tourists and most of the tourist activities are concentrated around the Amboli Waterfall on State Highway 121 on the outskirts of Amboli Town. Good connectivity by roads to Karnataka, Goa, and the rest of Maharashtra State results in about 15,000 tourists visiting Amboli during weekends between July and September. During this period, the roadsides are littered without care. During the study period, it was revealed that around 20,000 vehicles pass through the study area, mainly Amboli Town on State Highway 121, which results in a number of roadkills and affects the feeding and nesting of birds.

Table 1. A systematic checklist of bird species of Amboli Ghat, Maharashtra State, India

	Family	Scientific name	Common name	Status	Sighting location
1	Anatidae	<i>Anas poecilorhynca</i>	Indian Spot-billed Duck	R	AR
2	Phasianidae	<i>Pavo cristatus</i>	Indian Peafowl	R	AR
3		<i>Perdica asiatica</i>	Jungle Bush Quail	R	AR
4		<i>Gallus sonneratii</i>	Grey Junglefowl	R, EI	AR
5		<i>Gallus spadicea</i>	Red Spurfowl	R, EI	AR
6	Podicipedidae	<i>Tachybaptus ruficollis</i>	Little Grebe	R	PP
7	Columbidae	<i>Columba livia</i>	Rock Pigeon	R	AR
8		<i>C. elphinstonii</i>	Nilgiri Wood Pigeon	R, EI	AT
9		<i>Streptopelia orientalis</i>	Oriental Turtle Dove	R	AR
10		<i>S. chinensis</i>	Spotted Dove	R	AR
11		<i>Treron pompadora</i>	Pompadour Green Pigeon	R	PR
12		<i>T. phoenicoptera</i>	Yellow-legged Green Pigeon	R	AR
13		<i>Chalcophaps indica</i>	Emerald Dove	R	AR
14	Podargidae	<i>Batrachostomus moniliger</i>	Sri Lankan Frogmouth	R	CR, ML, MG
15	Caprimulgidae	<i>Caprimulgus indicus</i>	Grey Nightjar	R	AR
16		<i>C. atripennis</i>	Jerdon's Nightjar	R	CR
17		<i>C. affinis</i>	Savanna Nightjar	R	AT, CR
18	Apodidae	<i>Hemiprocne coronata</i>	Crested Treeswift	R	PR
19		<i>Apus pacificus</i>	Fork-tailed Swift	W	AR
20		<i>A. affinis</i>	Indian House Swift	R	AR
21	Cuculidae	<i>Centropus sinensis</i>	Greater Coucal	R	AR
22		<i>Phaenicophaeus viridirostris</i>	Blue-faced Malkoha	R	PR
23		<i>Clamator jacobinus</i>	Pied Cuckoo	S	AR
24		<i>Eudynamis scolopaceus</i>	Asian Koel	R	AR
25		<i>Cacomantis passerinus</i>	Grey-bellied Cuckoo	R	PR
26		<i>Surniculus lugubris</i>	Drongo Cuckoo	R	PR
27		<i>Hierococcyx varius</i>	Common Hawk Cuckoo	R	AR
28		<i>Cuculus canorus</i>	Eurasian Cuckoo	W	AR
29	Rallidae	<i>Rallina eurizonoides</i>	Slaty-legged Crane	R	CR
30		<i>Zapornia pusilla</i>	Ballion's Crane	W	PP
31		<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	R	AR
32	Ciconiidae	<i>Ciconia episcopus</i>	Woolly-necked Stork	R	PP
33		<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	R	PP
34	Ardeidae	<i>Ixobrychus cinnamomeus</i>	Cinnamon Bittern	R	PP, AT
35		<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	R	AR
36		<i>Butorides striata</i>	Striated Heron	R	PP
37		<i>Ardeola grayii</i>	Indian Pond Heron	R	AR
38		<i>Bubulcus ibis</i>	Cattle Egret	R	AR
39		<i>Ardea cinerea</i>	Grey Heron	W	PP, AT
40		<i>A. purpurea</i>	Purple Heron	R	PP
41		<i>A. alba</i>	Greater Egret	R	AR
42		<i>A. intermedia</i>	Median Egret	R	AR
43		<i>Egretta garzetta</i>	Little Egret	R	AR
44	Threskiornithidae	<i>Threskiornis melanocephalus</i>	Black-headed Ibis	R	PP
45	Phalacrocoracidae	<i>Microcarbo niger</i>	Little Cormorant	R	AR
46	Anhinga	<i>Anhinga melanogaster</i>	Oriental Darter	R	PP

	Family	Scientific name	Common name	Status	Sighting location
47	Charadriidae	<i>Vanellus malabaricus</i>	Yellow-wattled Lapwing	W	AT
48		<i>V. indicus</i>	Red-wattled Lapwing	R	AR
49	Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper	W	AR
50		<i>Tringa totanus</i>	Common Redshank	W	PP
51		<i>T. glareola</i>	Wood Sandpiper	W	AR
52	Turnicidae	<i>Turnix suscitator</i>	Barred Buttonquail	R	AR
53	Laridae	<i>Sterna aurantia</i>	River Tern	R	AR
54	Accipitridae	<i>Elanus caeruleus</i>	Black-winged Kite	R	AR
55		<i>Pernis ptilorhynchus</i>	Oriental Honey Buzzard	R	AR
56		<i>Spilornis cheela</i>	Crested Serpent Eagle	R	AR
57		<i>Circaetus gallicus</i>	Short-toed Snake Eagle	R	AR
58		<i>Ictinaetus malaiensis</i>	Black Eagle	R	AR
59		<i>Aquila rapax</i>	Tawny Eagle	R	AT
60		<i>A. fasciata</i>	Bonelli's Eagle	R	AR
61		<i>Hieraaetus pennatus</i>	Booted Eagle	W	AR
62		<i>Circus macrourus</i>	Pallid Harrier	W	AR
63		<i>C. pygargus</i>	Montagu's Harrier	W	CR, PP
64		<i>Accipiter badius</i>	Shikra	R	AR
65		<i>Haliastur indus</i>	Brahminy Kite	R	AR
66		<i>Milvus migrans</i>	Black Kite	R	AR
67		<i>Butastur teesa</i>	White-eyed Buzzard	R	AR
68	Tytonidae	<i>Tyto alba</i>	Common Barn Owl	R	AR
69	Strigidae	<i>Athene brama</i>	Spotted Owlet	R	AR
70		<i>Strix leptogrammica</i>	Brown Wood Owl	R	AR
71		<i>Bubo bengalensis</i>	Indian Eagle Owl	R	AR
72		<i>Ketupa zeylonensis</i>	Brown Fish Owl	R	AR
73	Bucerotidae	<i>Buceros bicornis</i>	Great Hornbill	R	AR
74		<i>Anthracosceros coronatus</i>	Malabar Pied Hornbill	R	AR
75		<i>Ocyrceros griseus</i>	Malabar Grey Hornbill	R, EI	AR
76		<i>O. birostris</i>	Indian Grey Hornbill	R	AR
77	Upupidae	<i>Upupa epops</i>	Common Hoopoe	R	AR
78	Picidae	<i>Picumnus innominatus</i>	Speckled Piculet	R	ML
79		<i>Hemicircus canente</i>	Heart-spotted Woodpecker	R	PR
80		<i>Dinopium benghalense</i>	Lesser Golden-backed Woodpecker	R	PR, ML
81		<i>Micropternus brachyurus</i>	Rufous Woodpecker	R	PR
82		<i>Chrysocolaptes festivus</i>	White-naped Woodpecker	R	PR
83		<i>Dendrocopos mahrattensis</i>	Yellow-fronted Pied Woodpecker	R	PR
84	Ramphastidae	<i>Psilopogon zeylanica</i>	Brown-headed Barbet	R	PR
85		<i>P. viridis</i>	White-cheeked Barbet	R, EI	AR
86	Meropidae	<i>Merops orientalis</i>	Green Bee-eater	R	AR
87		<i>M. leschenaulti</i>	Chestnut-headed Bee-eater	R	AR
88	Coraciidae	<i>Coracias benghalensis</i>	Indian Roller	R	AR
89		<i>C. garrulus</i>	European Roller	UC	CR
90	Alcedinidae	<i>Ceyx erithaca</i>	Oriental Dwarf Kingfisher	R	AT, CR, ML
91		<i>Alcedo meninting</i>	Blue-eared Kingfisher	R	PR, AT
92		<i>A. atthis</i>	Common Kingfisher	R	AR
93		<i>Ceryle rudis</i>	Pied Kingfisher	R	AR



	Family	Scientific name	Common name	Status	Sighting location
94		<i>Pelargopsis capensis</i>	Stork-billed Kingfisher	R	AR
95		<i>Halcyon smyrnensis</i>	White-throated Kingfisher	R	AR
96		<i>H. pileata</i>	Black-capped Kingfisher	R	PP
97	Falconidae	<i>Falco tinnunculus</i>	Common Kestrel	W	AR
98		<i>F. peregrinus</i>	Peregrine Falcon	R	AR
99	Psittaculidae	<i>Psittacula cyanocephala</i>	Plum-headed Parakeet	R	AR
100		<i>P. krameri</i>	Rose-ringed Parakeet	R	AR
101		<i>Loriculus vernalis</i>	Vernal Hanging Parrot	R	AR
102	Pittidae	<i>Pitta brachyura</i>	Indian Pitta	W	AR
103	Campephagidae	<i>Pericrocotus cinnamomeus</i>	Small Minivet	R	PR
104		<i>P. flammeus</i>	Scarlet Minivet	R	AR
105		<i>Lalage melanoptera</i>	Black-headed Cuckooshrike	R	PR
106	Oriolidae	<i>Oriolus xanthornus</i>	Black-hooded Oriole	R	PR
107		<i>O. kundoo</i>	Indian Golden Oriole	W	AR
108	Artamidae	<i>Artamus fuscus</i>	Ashy Woodswallow	R	PR
109	Vangidae	<i>Hemipus picatus</i>	Bar-winged Flycatcher Shrike	R	PR
110		<i>Tephrodornis virgatus</i>	Large Woodshrike	R	MG, PR
111		<i>T. pondicerianus</i>	Common Woodshrike	R	PR
112	Aegithinidae	<i>Aegithina tiphia</i>	Common Iora	R	AR
113	Dicruridae	<i>Dicrurus macrocercus</i>	Black Drongo	R	AR
114		<i>D. leucophaeus</i>	Ashy Drongo	R	AR
115		<i>D. caerulescens</i>	White-bellied Drongo	R	PR
116		<i>D. paradiseus</i>	Greater Racket-tailed Drongo	R	PR
117	Rhipiduridae	<i>Rhipidura aureola</i>	White-browed Fantail	R	PR
118		<i>R. albicollis</i>	White-throated Fantail	R	PR
119	Laniidae	<i>Lanius schach</i>	Long-tailed Shrike	R	AR
120		<i>L. vittatus</i>	Bay-backed Shrike	R	AR
121	Corvidae	<i>Dendrocitta vagabunda</i>	Rufous Treepie	R	PR
122		<i>Corvus splendens</i>	House Crow	R	AR
123		<i>C. macrorhynchos</i>	Large-billed Crow	R	AR
124	Monarchidae	<i>Hypothymis azurea</i>	Black-naped Monarch	R	AR
125		<i>Terpsiphone paradisi</i>	Indian Paradise-flycatcher	R	AR
126	Dicaeidae	<i>Dicaeum agile</i>	Thick-billed Flowerpecker	R	AR
127		<i>D. erythrorhynchos</i>	Pale-billed Flowerpecker	R	AR
128		<i>D. concolor</i>	Plain Flowerpecker	R	AR
129	Nectariniidae	<i>Arachnothera longirostra</i>	Little Spiderhunter	R	PR
130		<i>Leptocoma zeylonica</i>	Purple-rumped Sunbird	R	AR
131		<i>L. minima</i>	Crimson-backed Sunbird	R, EI	AR
132		<i>Cinnyris asiaticus</i>	Purple Sunbird	R	AR
133		<i>Aethopyga vigorsii</i>	Vigors's Sunbird	R, EI	AR
134	Irenidae	<i>Irena puella</i>	Asian Fairy Bluebird	R	PR
135		<i>Chloropsis aurifrons</i>	Golden-fronted Leafbird	R	AR
136	Ploceidae	<i>Ploceus philippinus</i>	Baya Weaver	R	AR
137	Estrildidae	<i>Amandava formosa</i>	Green Avadavat*	UC, EI	AT
138		<i>Euodice malabarica</i>	Indian Silverbill	R	PR
139		<i>Lonchura striata</i>	White-rumped Munia	R	AR
140		<i>L. punctulata</i>	Scaly-breasted Munia	R	AR

	Family	Scientific name	Common name	Status	Sighting location
141		<i>L. malacca</i>	Black-headed Munia	R	AR
142	Passeridae	<i>Passer domesticus</i>	House Sparrow	R	AR
143		<i>Gymnoris xanthocollis</i>	Yellow-throated Sparrow	R	PR
144	Motacillidae	<i>Dendronanthus indicus</i>	Forest Wagtail	W	ML, MG, CR
145		<i>Anthus rufulus</i>	Paddyfield Pipit	R	AR
146		<i>Motacilla cinerea</i>	Grey Wagtail	W	AR
147		<i>M. citreola</i>	Citrine Wagtail	W	AR
148		<i>M. maderaspatensis</i>	White-browed Wagtail	W	AR
149		<i>M. alba</i>	White Wagtail	W	AR
150	Fringillidae	<i>Erythrura erythrura</i>	Common Rosefinch	W	AR
151	Paridae	<i>Parus cinereus</i>	Cinereous Tit	R	PR
152		<i>P. xanthogenys</i>	Black-lored Tit	R	AR
153	Alaudidae	<i>Galerida malabarica</i>	Malabar Lark	R, EI	AR
154	Cisticolidae	<i>Prinia hodgsonii</i>	Grey-breasted Prinia	R	PR
155		<i>P. socialis</i>	Ashy Prinia	R	AR
156		<i>P. inornata</i>	Plain Prinia	R	AR
157		<i>Orthotomus sutorius</i>	Common Tailorbird	R	AR
158	Acrocephalidae	<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler	W	AR
159		<i>A. agricola</i>	Paddyfield Warbler	W	AR
160	Hirundinidae	<i>Cecropis daurica</i>	Red-rumped Swallow	R	AR
161		<i>Hirundo smithii</i>	Wire-tailed Swallow	R	AR
162		<i>H. rustica</i>	Barn Swallow	R	AR
163		<i>Ptyonoprogne concolor</i>	Dusky Crag Martin	R	AR
164	Pycnonotidae	<i>Hypsipetes leucocephalus</i>	Black Bulbul	R	AR
165		<i>Pycnonotus melanicterus</i>	Flame-throated Bulbul	R	PR, GT
166		<i>P. jocosus</i>	Red-whiskered Bulbul	R	AR
167		<i>P. cafer</i>	Red-vented Bulbul	R	AR
168		<i>Brachypodius priocephalus</i>	Grey-headed Bulbul	R, EI	AR
169		<i>Acrillias indica</i>	Yellow-browed Bulbul	R	AR
170	Phylloscopidae	<i>Phylloscopus collybita</i>	Common Chiffchaff	W	AR
171		<i>P. tytleri</i>	Tytler's Leaf Warbler	W	PR
172		<i>P. affinis</i>	Tickell's Leaf Warbler	W	PR, ML
173		<i>Seicercus nitidus</i>	Green Leaf Warbler	W	AR
174		<i>S. trochiloides</i>	Greenish Leaf Warbler	W	AR
175	Sylviidae	<i>Curruca crassirostris</i>	Eastern Orphean Warbler	W	PR
176		<i>C. curruca</i>	Lesser Whitethroat	W	PR
177		<i>Chrysomma sinense</i>	Yellow-eyed Babbler	R	PR
178	Zosteropidae	<i>Zosterops palpebrosus</i>	Oriental White-eye	R	PR
179	Timaliidae	<i>Pomatorhinus horsfieldii</i>	Indian Scimitar Babbler	R	AR
180		<i>Dumetia hyperythra</i>	Tawny-bellied Babbler	R	AR
181		<i>Rhopocichla atriceps</i>	Dark-fronted Babbler	R	PR
182	Pellorneidae	<i>Pellorneum ruficeps</i>	Puff-throated Babbler	R	AR
183	Leiothrichidae	<i>Alcippe poioicephala</i>	Quaker Tit Babbler	R	AR
184		<i>Argya malcolmi</i>	Large Grey Babbler	R	AT
185		<i>A. subrufa</i>	Rufous Babbler	R, EI	AR
186		<i>Turdoides striata</i>	Jungle Babbler	R	AR

	Family	Scientific name	Common name	Status	Sighting location
187	Sturnidae	<i>Pastor roseus</i>	Rosy Starling	W	AR
188		<i>Gracupica contra</i>	Asian Pied Starling	UC	AR
189		<i>Sturnia pagodarum</i>	Brahminy Starling	R	AR
190		<i>Acridotheres tristis</i>	Common Myna	R	AR
191		<i>A. fuscus</i>	Jungle Myna	R	AR
192		<i>Gracula religiosa</i>	Hill Myna	R	AR
193	Muscicapidae	<i>Copsychus saularis</i>	Oriental Magpie Robin	R	AR
194		<i>Kittacincla malabaricus</i>	White-rumped Shama	R	AR
195		<i>Muscicapa dauurica</i>	Asian Brown Flycatcher	W	AR
196		<i>Cyornis pallidipes</i>	White-bellied Blue Flycatcher	R, EI	CR, ML, PR, MG
197		<i>C. tickelliae</i>	Tickell's Blue Flycatcher	R	AR
198		<i>C. rubeculoides</i>	Blue-throated Flycatcher	W	MG
199		<i>Eumyias thalassinus</i>	Verditer Flycatcher	W	AR
200		<i>Larivora brunnea</i>	Indian Blue Robin	W	AR
201		<i>Myophonus horsfieldii</i>	Malabar Whistling Thrush	R, EI	AR
202		<i>Ficedula parva</i>	Red-breasted Flycatcher	W	ML, PR
203		<i>Monticola cinclorhynchus</i>	Blue-capped Rock Thrush	W	ML, PR
204		<i>M. solitarius</i>	Blue Rock Thrush	W	AR
205		<i>Saxicola maurus</i>	Siberian Stonechat	W	CR, PR
206		<i>S. caprata</i>	Pied Bushchat	R	AR
207	Turdidae	<i>Geokichla citrina</i>	Orange-headed Thrush	R	AR
208		<i>Turdus simillimus</i>	Indian Blackbird	S	AR

Key: S - summer visitor, W - winter visitor, R - resident, UC - uncertain

EI - endemic to India (from Praveen et al. 2016), \* - sighted once

Abbreviations for location: PR - Parpoli region, GT - Ghat region, AT - Amboli Town, CR - Chaukul Road, ML - Malai region, PP - Papdi region, MG - Mahadevgarh region, AR - all regions

It was found that species like Oriental Dwarf Kingfisher *Ceyx erithaca* at Amboli are vehemently sought after by photographers and their enthusiasm has disturbed some of their favourite nesting sites. There are three main motorable roads in Amboli Ghat area. During monsoon, an average of around 24 roadkills of animals, mainly composing of reptiles and amphibians, are recorded per day. Most of these reptile and amphibian species were from the Endangered category of the IUCN Red Data Book (IUCN 2016) and were observed on all the motorable roads each day during the study period. The strategy of biodiversity conservation is based on applying methods of protection in a specified area. Tourism development must be carefully managed to avoid turning Amboli Ghat into yet another tourist town where bottles, wrappers, plastics, and billboards dominate the landscape. Though ecotourism is capable of generating high revenue for natural areas that need protection, planning and development of infrastructure pertaining to tourism, its marketing should focus on conservation

of nature, minimizing negative visitor impact, and involvement and employment of local populations in all aspects of business operations. Commercialization programs should have policies to meet higher social and environmental goals like building ecolodges powered by alternative energy resources and allowing travellers to stay in relative comfort while having magnificent wildlife-viewing from their doorsteps, which minimally impacts the local environment.

The following management strategies can be implemented at Amboli Ghat (Wood 2002):

- 1) Provide adequate budget to conserve popular tourist areas and earmark tourism fees for conservation.
- 2) Tourism businesses should pay impact fees that should fund infrastructure for solid waste treatment, sewage treatment, electricity, water and tourists must receive clear incentives for conserving water and electricity.
- 3) Environmental impact monitoring programs should

be regularly implemented.

4) Well-managed trails and camping areas should be clearly marked with rules for low-impact use.

5) Restrictions should be in place for the type of vehicles permitted in specific zones, speed limits, dumping of waste, and off-road driving.

6) Training programs should be initiated at local levels to provide local inhabitants with the opportunity to run their own businesses.

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Image 1. Blue-capped Rock Thrush *Monticola cinclorhynchus*



Image 2. Indian Blue Robin *Larvivora brunnea*



Image 3. Yellow-browed Bulbul *Acritillas indica*



Image 4. Forest Wagtail *Dendronanthus indicus*



Image 5. Short-toed Snake Eagle *Circaetus gallicus*

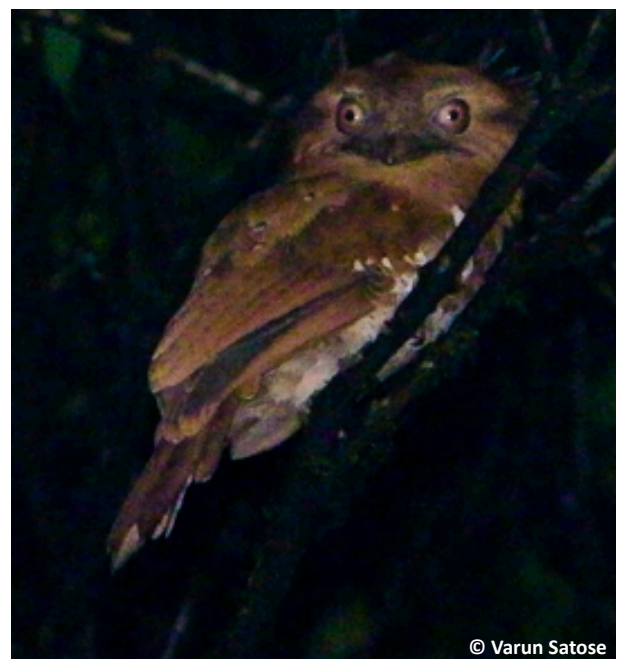


Image 6. Sri Lankan Frogmouth *Batrachostomus moniliger*





Image 7. Slaty-legged Crake *Rallina eurizonoides*



Image 8. Malabar Pied Hornbill *Anthracoceros coronatus*



Image 9. Malabar Grey Hornbill *Ocyrceros griseus*



Image 10. Great Hornbill *Buceros bicornis*



Image 11. Plain Flowerpecker *Dicaeum concolor*



Image 12. Oriental Darter *Anhinga melanogaster*







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