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Birds of Kolli hills, Tamilnadu, India : A conservation perspective

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Abstract

Baseline information on the avifauna of an area is a prerequisite to assess the status of an area, as birds are the indicators of habitat quality. However, baseline information on avifauna for most of the places in India has not been well documented and as a result predicting the changes in the population of avifauna due to human-impact over the years become difficult. Kolli Hills is one such an unexplored area in terms of avifauna for many decades. An attempt was made to assess the status of the avifauna of Kolli Hills. In total, 101 species of birds were identified and no species was strictly abundant in Kolli Hills. The Kolli Hills still have some potential habitats for sustaining sizable bird population. However, the existing potential habitats may easily be lost in the very near future as developmental activities are at their absolute peak in recent years.

Keywords : Avifauna, Kolli Hills, Eastern Ghats, Tamil Nadu

INTRODUCTION

Since birds are the indicators of habitat quality, baseline information on the avifauna of an area is a prerequisite to assess the status of an area. However, baseline information on the history of avifauna for most of the places in India has not been well documented and as a result predicting the changes in the population of avifauna due to human-impact over the years become difficult. Kolli Hills is one such an unexplored area in terms of avifauna for many decades. It is likely that in the recent past at least three factors would have shaped the present avian community of Kolli Hills. Firstly, much before documentation of avifauna, a rapid growth of human population and developmental activities would have affected indirectly the avifauna by damaging and reducing the potential habitats available for birds. Secondly, hunting habits of majority of the local people in Kolli Hills would have directly reduced many individuals or removed few species of birds. Finally, Kolli Hills as reserved forest category, the Kolli Hills to a certain extent remains as one of the scientifically ignored sites. At this juncture, Daniels and Saravanan (1998) initiated works on documentation of avifauna of Kolli Hills with no concrete idea of the past status of in Kolli Hills on this aspect. Hence, an attempt was made to assess the status of the avifauna of Kolli Hills, the relic of Western Ghats.

STUDY AREA

Kolli Hills lies geographically between 11 ^{0} 11′ to 11 ^{0} 30′ N and 78 ^{0} 16′ to 78 ^{0} 29′ E and covers an area of about 485 sq.km (Fig. 1). The forest for administrative purposes, has been divided into number of units: Bail Nadu reserved forest (RF), Varagur (RF), Nayakkankombai (RF), Perumalmalai (RF), and Adukkampudukombai (RF) in the North, Vairichettipalaiyam (RF), Gundur (RF) and Puliyanjolai (RF) on the East, Karavallikombai (RF) and Jambuthgu (RF) on the West and Selur (RF) on the southern outer slopes of the hills. The Kolli Hills is almost entirely composed of Charnokites except a small patch in the south-eastern part of hills which is composed of hornblende biotite gneiss (Jawahar Raj, 2001). The total human population of Kolli Hills is about 37, 516 with a thick population in the central parts and a thin population in the northern, north western and northeastern parts of Kolli Hills. A homogeneous community (about 97% of the total population), the *Malayalis*, have been largely managing the landscape of Kolli Hills. Majority of them are directly involved in agricultural activities. Among the crops cultivated, *Cassava* dominates some parts while millet dominates other areas. The encroachment of forested land by the local people, bauxite mining activity, land use pattern, disturbance of water regimes and clogging of stream channels, are the existing threats to the fauna and flora. However, the aggressive hunting-gathering nature of the local inhabitants may not be overlooked in this issue. The following forest cover types have been observed in the Kolli Hills. Shola forest: It occurs between the altitude 900 and 1370 meters above MSL and receives ample rainfall during the north-east monsoon. *Memecylon edule, Persea marmacrantha, Memecylon umbellatum, Clausena dentate* and *Cinnamomum macrocarpum* are the dominant species along with *Ficus virens* and *Redia floribunda.* The tropical dry evergreen forest: It occusr between 900 and 1200 meters above MSL and only on the western aspect. *Ammora canarana, Canarium strictum, Syzyium cumini,* and *Filicium decipiens* are the dominating species. Semi-evergreen Forest: It occurs between 400 and 1200 meters above MSL and present in all aspects. *Persea macrantha, Epiprinus mallotiformis, Terminalia paniculata, Terminalia chebula,* and *Terminalia bellarica* are dominating this forest type. It occurs in depressions and upper slopes and plateau portions of the Karavallikombai and Ariyurshola RF.

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Figure 1. Maps showing the study area

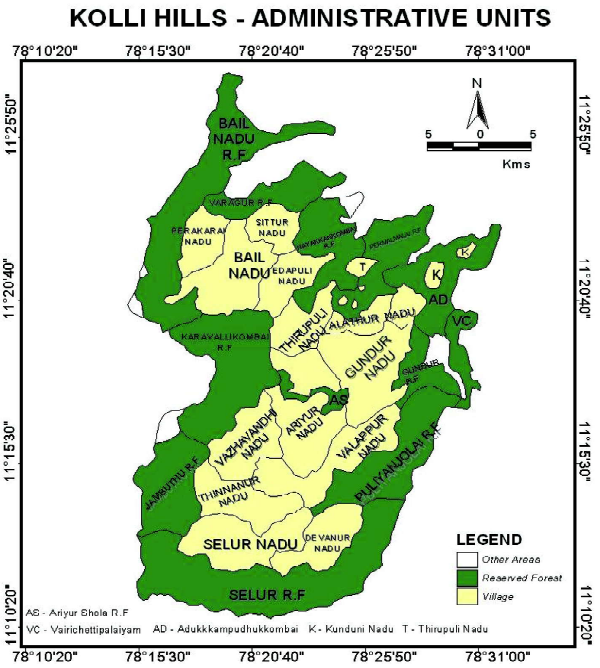

Figure2 . Potential raptor habitats in Kolli Hills

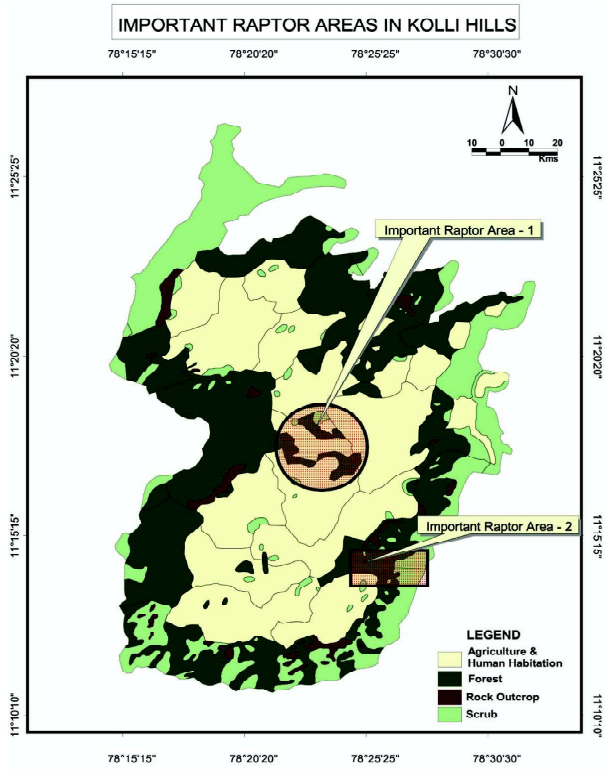

Figure 3. Potential threats to avaifauna of Kolli Hills.

Table 1. Checklist of birds of Kolli Hills

S.No	Common Name	Status	Habitat (Location in Kolli Hills)
1	Little Egret *Egreta garzetta*	Not common, Resident.	Wetlands (Vayals in Upper Kolli Hills)
2	Cattle Egret *Bubulcus ibis*	Not common, Resident.	Wetlands (Vayals in Upper Kolli Hills)
3	Indian Pond Heron *Ardeola grayii*	Not common, Resident.	Wetlands (Vayals in upper Kolli Hills)
4	Oriental Honey-Buzzard *Pernis ptilorhynus*	Rare, Resident.	semi-evergreen and shoal (Ariyur shola forest)
5	Black-shouldered Kite *Elanus caeruleus*	Not common, Migrant.	Open areas (Almost in all altitudes)
6	Black Kite *Milvus migrans*	Not common, Resident.	Human Habitation (Almost rare in upper Kolli Hills but common in outer margin of Kolli Hills)
7	Brahminy Kite *Haliastur Indus*	Not common, Resident.	Human Habitation (Almost rare in upper Kolli Hills but common in outer margin of Kolli Hills)
8	Crested Serpent Eagle *Spilornis cheela*	Common, Resident.	Riverine, semi evergreen, and shoals (Near water sources, particularly more near Arrappali Ishwaran Kovil)
9	Shikra *Accipiter badius*	Very common, Resident.	Largely open areas (Entire Kolli Hills)
10	Black Eagle *Ictinaetus malayensis*	Very rare, Resident.	Semi evergreen and shoals (Ariyur shola forest)
11	Bonelli's Eagle *Hieraaetus fasciatus*	Very rare Resident.	Semi evergreen and shoals (Ariyur shola forest)
12	Common Kestrel *Falco tinnunculus*	Not common, Resident.	Open areas near forested areas, and cliffs (Southern slopes, Kulivalavu, Ariyur shoal)
13	Painted Spurfowl *Galloperdix lunulata*	Not common and Resident.	Scrub (Southern slopes)
14	Grey Jungle Fowl *Gallus sonneratii*	Not common, Resident.	Forest undergrowth (Ariyur shola patches, Sikkupparaipatti patches, forest patches at Valkuli)
15	Indian Peafowl *Pavo cristatus*	Not common, Resident.	Open woodland and groves (Eastern slopes)
16	White-breasted Waterhen *Amaurornis phoenicurus*	Common and Resident.	Near vayals and watercourses (Vayals in Upper Kolli Hills)
17	Red-wattled Lapwing *Vanellus indicus*	Not common, Resident	Open ground near water (Vayals in Kolli Hills)
18	Spotted Dove *Streptopelia chinensis*	Not common, Resident.	Human settlement to open forest (More on southern to north eastern slopes, less on upper hills)
19	Yellow-legged Green Pigeon *Treron phoenicoptera*	Not common, Resident.	Deciduous forests and groves (Pulliayan jolai, Northeastern slopes)
20	Rose-ringed Parakeet *Psittacula krameri*	Not common, Resident.	Forested and Cultivated areas (More on southern to north-eastern slopes, upper southern areas)
21	Plum-headed Parakeet *Psittacula cyanocephala*	Not common, Resident.	Deciduous to semi-evergreen forest areas (Ariyur shola, Pulliayan jolai, Northeastern slopes)
22	Blue-winged Parakeet *Psittacula columboides*	Rare, Resident.	Sholas (Ariyur shoal)
23	Brainfever Bird *Hierococcyx varius*	Not common, Resident.	Scrub to deciduous forest (Southern to north-eastern slopes)
24	Asian Koel *Eudynamys scolopacea*	Not common, Resident.	Open forest to cultivation (More on southern to north-eastern slopes, less on upper reaches)
25	Small Green-billed Malkoha *Phaenicophaeus viridirostris*	Rare, Resident.	Scrub and secondary growth (Southern to north-eastern slopes)
26	Greater Coucal *Centropus sinensis*	Not common, Resident.	Scrub (More on southern to north-eastern slopes)

27	Barn Owl *Tyto alba*	Rare, Resident.	Human habitation (Pulliyan joli)
28	Collared Scops Owl *Otus bakkamoena*	Not common, Resident.	Forested areas (Forested areas near Mullukkkurichi)
29	Jungle Owlet *Glaucidium radiatum*	Common, Resident.	Human habitation to forested areas (Almost in all places in the upper region of Kolli Hills)
30	Spotted Owlet *Athene brama*	Common, Resident.	Habitation and cultivation (Entire Kolli Hills)
31	Indian Jungle Nightjar *Caprimulgus indicus*	Not common, Resident.	Open areas and scrubs (South-western slopes to North-western slopes)
32	Asian Palm Swift *Cypsiurus balasiensis*	Common, Resident.	Human habitation, rocky areas and cliffs (Entire Kolli Hills)
33	House Swift *Apus affinis*	Common, Resident.	Human habitation, rocky areas and cliffs (Entire Kolli Hills)
34	Common Kingfisher *Alcedo atthis*	Common, Resident.	Near water sources (Almost near all water sources in the upper region of Kolli Hills, Puliyanjolai, Mullukkurichi)
35	White-breasted Kingfisher *Halcyon smyrnensis*	Not common, Resident	Water sources (Ottakadai, Mekkanikadu)
36	Lesser Pied Kingfisher *Ceryle rudis*	Not common, Resident.	Near water sources (Puliyan joli, Mullukkurichi)
37	Small Bee-eater *Merops orientalis*	Common, Resident	Open and scrub (Near all the vayals)
38	Indian Roller *Coracias benghalensis*	Not common, Resident.	Cultivation and scrub (Chemmedu, Vasalur)
39	Common Hoopoe *Upupa epops*	Not common, Migrant	Open and cultivation (Arappali Iswaran Kovil)
40	Brown-headed Barbet *Megalaima zeylanica*	Not commo, Resident.	Forested areas and habitation (Mostly in and around Ariyur shoal)
41	White-cheeked Barbet *Megalaima viridis*	Common, Resident.	Forest, garden and orchard (Entire Kolli Hills)
42	Crimson-throated Barbet *Megalaima rubricapilla*	Common, Resident.	Forested areas (Largely in and around Ariyur Shola)
43	Coppersmith Barbet *Megalaima haemacephala*	Common, Resident.	Forested areas (Entire Kolli Hills)
44	Lesser Golden-backed Woodpecker *Dinopium benghalense*	Not common, Resident.	Forested areas (All the forested areas in the upper kolli Hills)
45	Goldenbacked Woodpecker *Chrysocolaptes lucides*	Rare, Resident.	Forested areas (Ariyur shola, Arappalli Iswaran Kovil)
46	Heart-spotted Woodpecker *Hemicircus canente*	Rare, Resident.	Forested areas (Ariyur shola, forested areas near Periyaswamy temple)
47	Indian Pitta *Pitta brachyura*	Rare, Migrant	Forested areas and plantation (Ariyur Shola)
48	Singing Bushlark *Mirafra cantillans*	Not common, Resident.	Open scrub (Belukkurichchi slopes)
49	Ashy-crowned Finchlark *Eremopterix grisea*	Not common, Resident.	Open scrub (Belukkurichchi slopes)
50	Red-rumped Swallow *Hirunda daurica*	Common, Resident.	Human habitation and open grassland (Entire Kolli Hills)
51	Grey Wagtail *Motacilla cinerea*	Not common, Migrant	Streams in forest and lower lands (Riverine patches of Pullianjolai, Arappali Ishwaran Kovil, and Mullukkurichi)

52	Small Minivet *Pericrocotus cinnamomeus*	Common, Resident.	Open forest and grooves (Scrub to forested areas of Kolli Hills)
53	Scarlet Minivet *Pericrocotus flammeus*	Common, Resident.	Forest (Forested areas of entire kolli hills, More can be seen near Arappali Iswaran falls riverine patches).
54	Red-whiskered Bulbul *Pycnonotus jocosus*	Not common, Resident.	Forested areas (Forested areas of Kulivalavu, tenur, nattukulai, and ariyur)
55	Red-vented bulbul *Pycnonotus cafer*	Common, Resident.	Cultivation and human habitation (All places in upper and lower kolli Hills)
56	White-browed Bulbul *Pycnonotus luteolus*	Common, Resident.	Scrub and dry areas (Mullukkurichi and Puliyanjolai scrub forests)
57	Yellow-browed Bulbul *Iole indica*	Not common, Resident.	Forested areas (Ariyur shola, Arappali Iswaran Kovil riverine patches).
58	Common Iora *Aegithina tiphia*	Common, Resident.	Open to forested areas (Scrub to forested areas of Kolli Hills)
59	Jerdon's Chloropsis *Chloropsis cochinchinensis*	Not common, Resident.	Open to forested areas (Scrub forest of Puliyan joli Mullukkurichi, forested areas of Arappali Isawaran Kovil, Ariyur and Kulivalavu)
60	Brown Shrike *Lanius cristatus*	Not common, Resident	Open areas (Scrub forests of Mullukkurichi)
61	Rufous-backed Shrike *Lanius schach*	Not common, Resident.	Open areas (Scrub forests of Mullukkurichi)
62	Blue Rock Thrush *Monticola solitarius*	Rare, Migrant	Cliffs and rocky areas (Sikkupparaipatti view point)
63	Malabar Whistling Thrush *Myophonus horsfieldii*	Not common, Resident.	Close to watercourse in forest (Arappali Ishwaran Kovil Falls area)
64	Orange-headed Thrush *Zoothera citrina*	Not common, Resident.	Forested areas (Ariyur shoal)
65	Oriental Magpie Robin *Copsychus saularis*	Common, Resident.	Cultivation and forest (Almost in all the villages but in few numbers)
66	Spotted Babbler *Pellorneum ruficeps*	Not common, Resident.	Undergrowth of the forested areas (Forested areas of the slopes of Mullukkurichi)
67	Indian Robin *Saxicoloides fulicata*	Common, Resident.	Scrub and stony areas, cultivation (Almost in all the villages but in few numbers)
68	Indian Scimitar Babbler *Pomatorhinus horsfiedii*	Not common, Resident.	Scrub to forested areas (Scrub forest in northeastern slopes)
69	Jungle babbler *Turdoides striatus*	Not common, Resident.	Forested areas and cultivation (Almost close to all forested areas)
70	White-headed Babbler *Turdoides affinis*	Common, Resident.	Scrub and cultivation (Near human settlements)
71	Quaker Tit-babbler *Alcippe poioicephala*	Not common, Resident.	Thick forest (Ariyur shola, near Peria swami Kovil)
72	Blyth's Reed Warbler *Acrocephalus dumetorum*	Not common, Resident.	Cultivation, scrub and deciduous forest. (Northeastern slopes)
73	Common Tailorbird *Orthotomus sutorius*	Common, Resident.	Cultivation, forest edges (All the villages).
74	Willow Warbler *Phylloscopus trochiloides*	Not common, Migrant	Forest areas (Forest patches near Chemmedu, Kulivalavu, Tenur and Ariyur shoal)
75	Asian Brown Flycatcher *Muscicapa ruficauda*	Resident. .	Open scrub to deciduous forest (Scrub forest at northeastern slopes)
76	Red-breasted flycatcher *Ficedula parva*	Not common, Migrant.	Open scrub to deciduous forest. Scrub forest at northeastern slopes
77	Asian Paradise Flycatcher *Terpsiphone paradisi*	Not common, Migrant	Open grooves and forest (Puliyanjolai and north-eastern riverine patches)

78	Black-naped Monarch *Hypothymis azurea*	Not common, Resident.	Thick forest and plantation (Ariyur shoal)
79	Tickell's Flowerpecker *Dicaeum erythrorhynchos*	Common, Resident.	Open to forested areas (Entire Kolli hills)
80	Plain Flowerpecker *Dicaecum concolor*	Not common, Resident.	Plantations, grooves, forested areas (Ariyur shoal)
81	Purple-rumped Sunbird *Nectarinia zeylonica*	Common, Resident.	Cultivation and secondary growth. (Riverine patches of Pullianjolai, Arappali Ishwaran Kovil, and Mullukkurichi)
82	Purple Sunbird *Nectarinia asiatica*	Not common, resident	Cultivation and forest (Riverine patches of Pullianjolai, Arappali Ishwaran Kovil, and Mullukkurichi)
83	Loten's Sunbird *Nectarinia lotentia*	Not common, Resident	Forested areas and plantation (Ariyur shoal)
84	Oriental White-eye *Zosterops palpebrosus*	Not common, Resident.	Open area to forest (Puliyanjolai riverine patches and Mullukkurich riverine patches)
85	Common Rosefinch *Carpodacus erythrinus*	Rae, Migrant	Cultivation and grassland in forest (Southern to North-eastern slopes)
86	White-rumped Munia *Lonchura striata*	Not common, Resident.	Cultivation and scrub (Northeastern slopes)
87	Black-throated Munia *Lonchura kelaarti*	Not common, Resident.	Cultivation, scrub (Northern areas, semmedu to Arappali Ishwaran Kovil areas)
88	House Sparrow *Passer domesticus*	Not common, Resident.	Human habitation (Few villages especially northwestern side of kolli hills and villages in the south)
89	Yellow-throated Petronia *Petronia xanthocollis*	Not common, Resident	Deciduous forest (North-eastern slopes)
90	Brahminy Starling *Sturnus pagodarum*	Not common, Resident.	Open dry and scrub, cultivation. (Northwestern part of upper kolli hills)
91	Common Myna *Acridotheres tristis*	Common, Resident.	Human habitation and cultivation (Many villages on the upper Kolli Hills and Northeastern slopes)
92	Jungle Myna *Acidotheres fuscus*	Resident.	Forest and cultivation near forested areas (Forested areas of Upper kolli hills)
93	Eurasian Golden Oriole *Oriolus oriolus*	Not common, Resident.	Forested areas and grooves (Forested areas in the upper kolli hills, Puliyanjolai)
94	Black Drongo *Dicrurus macrocercus*	Common, Resident.	Around habitation (All the places in the upper Kolli hills)
95	Ashy Drongo *Dicrurus leucophaeus*	Not common, Resident.	Forest areas. Arappalli Iswaran Kovil, Kulivalavu
96	Bronzed Drongo *Dicrurus aeneus*	Not common, Resident.	Forested areas. Arappalli Iswaran Kovil, Kulivalavu
97	Greater Racket-tailed Drongo *Dicrurus paradiseus*	Rare, Resident.	Thick forest areas (Sighted only in the riverine patches of Arappali Iswaan Kovil to Vaslur route)
98	Ashy Woodswallow *Artamus fuscus*	Common, Resident.	Open areas and habitation (Many villages, more can be seen in Chemmedu mission settlement with nests)
99	Rufous Treepie *Dendrocitta vagabunda*	Common, Resident.	Forest and orchard (All the forested areas of upper and down Kolli Hills)
100	House Crow *Corvus splendens*	Common, Resident.	Human habitation (Entire Kolli Hills)
101	Large-billed Crow *Corvus macrorhynchos*	Not common, Resident	Human habitats and forested areas. (Entire Kolli Hills)

Southern Dry mixed deciduous forest: It occurs between 400 and 110 meters above MSL. The dominant species are *Wrightia tinctoria, Bridelia retusa, Phyllanthus emblica, Terminalia chebula* and *Tectona grandis*. Southern Thorn Forest: It occurs between 220 (foothills) and 1100 meters above msl. The dominant species is *Moringa concanensis*. Southern Euphorbia Scrub: It occurs between 200 and 1100 meters above MSL. The following are the predominant species: *Euphorbia antiquorum, Cassia aurigulata* and *Randia malabarica.* Plantations: Besides natural forests, plantations of eucalyptus, bamboo, tamarind and silver oak are also grown in Kolli Hills. Research activities**:** In general, fauna of kolli Hills has not been well explored. Of the very few available literatures on fauna, Daniels and JayashreeVenkatesan (1998) opined that kolli hills are a biogeographical relic of Western Ghats. Daniels and Kumar (1998) listed the amphibians and reptiles of Kolli Hills. Jawahar (2002) studied the terrain and mapped the resources using remote sensing and GIS. Threats: Conversion of forested land into agricultural land, hunting habits and developmental activities are the major threats to Kolli hills. Hunting for food has had a major impact on the biodiversity in Kolli Hills (Daniels and Jayashree Venkatesan 1998). As local people "*Malaiyali*" are fierce hunters and placing the highest value on hunted flesh among available food, considerable loss of wild animal species has been very apparent in Kolli Hills. Although Gaur (*Bos gauru)s*, Leopard (*Panthera pardu)s* and Sambar (*Rusa unicolo)r* were once recorded, no authentic record of presence of single species of larger mammal in the recent years in Kolli Hills is available. In the last few decades, Kolli Hills has also faced severe forested-habitat loss due to human population increase and developmental activities. The method of cultivation has also been experiencing rock exposure in many areas. Forest-fire although not frequent, is also a threat to Kolli Hills. Recently, natural decline in rainfall during the last decades is also further threatening the natural resources of Kolli Hills. The reserved forest status given by the forest department to Kolli Hills may also be responsible to a certain degree for the persistent loss of forest resources in Kolli Hills.

MATERIALS AND METHODS

In order to know the overall assemblage of birds, Kolli Hills was surveyed on foot and vehicle. Once a bird was seen/heard information such as name of the species, number of individuals sighted, location where the bird was sighted and threats to birds if any were noted. Local people were also interviewed for additional information about birds, habitat threats and hunted birds. Initially, a complete check-list was prepared based on the available data. Based on the number of individuals sighted, birds were classified as 1. Common (seen almost in all the surveyed areas), 2. Not common (sighted <50% of the surveyed areas), and 3. Rare (sighted only in one or two locations). Similarly, birds were further classified as (1) migratory - species seen in one season only (Nov-March), and (2) resident – species sighted throughout the year or all the seasons.

RESULTS AND DISCUSSION

In total, 101 species of birds have been identified in Kolli Hills during the present study. (Table 1). The current figure is higher than Daniels and Saravanan (1998) who listed only 77 species of birds. Similarly, three species of birds namely Tawny-bellied Babbler, Large Cuckoo Shrike and Large-tailed Nightjar have been reported from Kolli Hills by Daniels and Saravanan (1998) were not recorded in the present study. The numerical difference could be due to the thin population structure of majority of the birds in Kolli Hills as observed in the present study, and as suggested by Daniels and Saravanan (1998). In general, birds were seen in poor numbers in Kolli Hills irrespective of habitats. In some cases, it may be suspected that only few pairs are only representing the entire Kolli Hills. No bird was strictly abundant in the Hills. In general, calls of Shikra and Jungle owlet, and sightings of Common Myna were frequent in many places while Barbets were very abundant only in Selur shola.

As top predators, raptors are key species for our understanding and conservation of ecosystems. Changes in raptor status can reflect changes in the availability of other prey species, including population declines of mammals, birds, reptiles, amphibians, and insects. Changes in raptor status also can be indicators of more subtle detrimental environmental changes such as chemical contamination and the occurrence of toxic levels of heavy metals (e.g., mercury, lead). Consequently, determining and monitoring the population status of raptors are necessary steps in the wise management of our natural resources. Hence, measures of raptor community structure, population productivity, and species distribution and abundance, may be used as functional indices of environmental health (Leck, 1979; Newton, 1979; Peakall and Kiff, 1988; Robinson and Wilcove, 1989) to identify unique environments that are in need of special conservation attention. Moreover, such measures often reflect overall species richness and diversity of an area (Oldendorff et al., 1989). In general, raptors are one of the poorly studied groups among birds in India. Samant *et al.* (1995) studied the status of some endangered raptors in protected areas and Prakash (1988) studied the ecology of raptors in Keoladeo National Park, Bharatpur. Majority of the other studies (Ganesha and Kannaiah, 1989; Naoroji and Forsman, 2001; Naoroji and D'silva, 1996; Naoroji, 1984, 1985a, 1985b, 1986, 1990, 1991, 1994a, 1994b; Paralkar and Chaturvedi, 1991; Gokula, 1999; Parry *et al.* 2002; Ashok Verma 2002a,b) are either short notes on rare behaviors

performed by raptor species or range extension. However, after Praksh (1999) who reported that the Gyps species faced a population crash (> 90%) in the Keoladeo National Park, concern over the studies on raptors has been increased and studies are being carried out in various protected and reserved forests in India. Samant *et. al.* (1995) recorded a minimum of eight to a maximum of 25 species of raptors in various National parks in India and concluded that undisturbed or less disturbed forests could able to support more number of species of raptors than disturbed habitats. In Kolli Hills, only nine species of diurnal raptors and four species of nocturnal raptors were recorded and such a poor number of species could be due to loss of forested habitats in Kolli Hills. The Kolli Hills has been under severe anthropogenic pressure for the past few decades and during this period, it has experienced an increase of 35.66% human population and a drastic decrease of 51.16 % of forest cover. Based on remote sensing data, Jawahar raj (2001) calculated that the forest cover of kolli Hills was reduced from 388.95 sq,km to 189.96 sq.km over a short span of 65 years (1931-97). The tree cover often gives ample opportunities to the raptors to forage, roost, and nest, and protects the chicks, and thus loss of tree cover directly affects the diversity of species of raptors. The precise impacts of changing land use patterns on raptors are species specific. For example, severe human activities has made habitats that are more open and reduced the primary forest in Kolli Hills and this in turn influenced the open habitat preferring raptor species to increase and primary forest preferring species to decrease in their population. It could be one of the reasons for having sighted more number of shikra and Kestrel, open habitat preferring species, in Kolli Hills than other primary forest species viz. Black Eagle. Samant *et. al.* (1995) already cautioned that the habitat for the open country raptors has been increasing tremendously at the cost of primary forest in India. Although much of the forested areas were cleared, Kolli Hills still supports some forest preferring species like Black Eagle, Crested Serpent Eagle and Oriental Honey Buzzard. However, Jawahar (2001) suggested that the natural terrain characteristics of Kolli Hills such as steep slope and poor soil cover do not favour regeneration of forests in these reserved forests. Hence, both natural and anthropogenic pressure has considerably played a major role in the reduction of forest cover in Kolli Hills. In addition, the Local tribes, being fierce hunters, diminished considerable wild prey population very long back. The interview with them during the study also reveled that they shot many individuals of raptors including vultures in the past just to protect their domestic fowls and other pet animals. Besides, they also admitted that they killed raptors accidentally.

CONCLUSION

Although it seems too late to initiate conservation activities in Kolli Hills due to poor status of avifauna, but it is not so as the hills still having some potential habitats for birds. Hence, a proper awareness campaign, regulation of developmental activities, prevention of forest-encroachment activities and destruction of forest resources would certainly restore the avifauna in the future. Forest patches around Ariyurnadu, Paravattuppatti and Alatturnadu are still potential enough to support purely forest dependent species of birds namely Black Eagle, Bonelli's Eagle and Oriental Honey Buzzard (Important raptor Area 1: Figure 2). Similarly, riverine track starting from the Arappali Ishwaran Kovil to Puliyanjolai supports several pairs of Crested Serpent Eagles (Important raptor Area 2: Figure 2). These two-forested areas are potential enough to support more number of individuals if protected from human disturbance (Figure 3) than what they support now. People exploit both the patches of forests during festival times. Hence, a proper monitoring of these two patches at least during the festival time and the nesting time of raptors. Raptors maintain site fidelity and thus nesting areas/trees of raptors has to be identified and monitored. Human disturbance should be minimized in such areas.

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REFERENCES

Ali, S. and Ripley, S.D. 1993. *Handbook of the birds of India and Pakistan*. Compact edition: Oxford University Press, New Delhi.

Ashok Verma. 2002 Notes on the status and movement of raptors at Mahul Creek, Mumbai, India. *Asian Raptors Bulletin* 3:10-13.

Ashok Verma. 2002. A large roost of Eurasian Marsh Harriers Circus aeruginosus at Keoladeo National Park, Bharatpur, India. *Forktail* 18: 150-151.

Daniels, R.J.R 1994. The Nilgiri Reserve and its role in conserving India's biodiversity. *Current Science* 64(10):706-708

Daniels, R.J.R and Jayashree Venkatesan. 1998. Ecosystem flips in cultural landscapes: The case of Kolli Hills. *Current science* 75(4):353-355.

Daniels, R.J.R and Ravi kumar, M.V. 1998. Amphibians and reptiles of Kolli Hills. *Cobra,* 31:3-5

Daniels.R.J.R and Saravanan,S. 1998. Kolli Hills: a little known endemic bird area in southern India. *Newsletter for birdwatchers*. Vol 38 (3).

Ganesh. T and Kannaiah,P 1989. Calls of harriers (Circus spp.) near Hyderabad, Andhra Pradesh. *Journal of Bombay Natural History Society,* 83 (Suppl.):448.

Gokula, V. 1999. *Bird communities of the thorn and dry deciduous forest in Mudumalai wildlife sanctuary, Tamil Nadu, India*. Ph.D thesis, Bharathiyar University, Tamil Nadu, India.

Jawahar Raj, N. 2001**.** *Integrated terrain and resources analysis for environmental management of the Kolli Hills, Tamil Nadu, using remote sensing and GIS.* Ph. D thesis, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India.

Leck, C.F. 1979. Avian extinction in an isolated tropical wet forest preserve, Ecuador. *Auk*, 96:343-52.

Naoroji, R.K. 1984. Observations on the Crested Hawk Eagle in Rajpipla Forests, South Gujarat. *Journal of Bombay Natural History Society,* 80(2) 273-285.

Naoroji, R.K. 1985a**.** Notes on some common breeding raptors of the Rajpipla Forests, South Gujarat. *Journal of Bombay Natural History Society,* 82(2) 273.

Naoroji, R.K. 1985b**.** Notes on some common breeding raptors of the Rajpipla Forests, South Gujarat. *Journal of Bombay Natural History Society,* 82(2) 278.

Naoroji, R.K. 1986a Raptors and their habitats in danger-part 1. *Hornbill* 3: 29-33.

Naoroji, R.K. 1986b Raptors and their habitats in danger-part II. *Hornbill* 4: 28-33.

Naoroji, R.K. 1989. Communal gathering of Blackwinged Kites (Elanus caeruleus vociferous). *Journal of Bombay Natural History Society,* 83 (Suppl.): 447-448.

Naoroji, R.K. 1990**.** Predation by Aquila eagles on nestling stroks and herons in Keoladeo National Park, Bharatpur. J.Bomaby Nat. Hist. Soc. 87(1):37-46

Naoroji, R.K. 1991. Shikra Accipiter badius taking carrion. *Journal of Bombay Natural History Society,*. 88 (3):447-449.

Naoroji, R.K. 1994a Occurrence of the eastern Marsh Harrier Circus aeruginosus spilonotus Kaup in Corbett National Park: a range extension. *Journal of Bombay Natural History Society,*.:91(1):140.

Naoroji, R.K. 1994b Observation on the courtship, nesting and hunting behaviour of the Crested Serpent Eagle. *Journal of Bombay Natural History Society,* 91(2):311-313.

Naoroji, R.K. and Carl D'silva 1996. Sighting of Red Kite Milvus milvus at Ranikhet. *Journal of Bombay Natural History Society,*.:95(2):339-340.

Naoroji, R.K. and Dick Forsman 2001. First breeding record of the Upland Buzzard Buteo hemilasius for the Indian subcontinent in Changtang, Ladakh, and identification characters of upland Buzzard and long-legged Buzzard Buteo rufinus. *Forktail* 17: 105-108.

Newton, I. 1979. *Population ecology of raptors*, Buteo books, Vermillion, South Dakota, USA: 399 pp.

Oldendorff, R.R., Bibles, D.D., Dean, M.T Haugh, J.R and Kochert, M.N. 1989. *Raptor habitat management under the US bureau of Land Management Multiple-use Mandate*. Raptor Research Reports No. 8, US bureau of land management, Washington DC, USA.

Paralkar, V. K and N.C. Chaturvethdi 1991. An unusual roosting site of the Marsh Harrier Circus aeruginosus (Linn.). *Journal of Bombay Natural History Society,* 91(2):313.

Parry, S.J , Clark, W.S and V.Prakash. 2002. On the taxonomic status of the Indian Spotted Eagle Aquila hastata *IBIS* 144: 665-675

Peakall,D.B. and Kiff, L. 1988**.** DDE contamination in peregrines and American Kestrels and its effect on reproduction. In: *Peregrine Falcon populations: their management and recovery* (eds T.J. Cade, J.H. Enderson, C.G Thelander and C.M. White). pp.337-50 The peregrine fund Inc., Boise, Idaho, USA: **Prakash, V. 1998.** The general ecology of raptors (Family: Accipitridae, Strigidae, Class Aves) in Keoladeo National Park, Bharatpur, Ph.D. Thesis, University of Bombay.

Prakash, V. 1999**.** Status of Vultures in keoladeo National park, Bharatpur, rajasthan with special reference to population crash in Gyps species. *Journal of Bombay Natural History Society,*95: 365-378.

Robinson, S.K. and Wilcove, D.S. 1989. Conserving tropical raptors and game birds. *Conservation biology*: 92-3.

Samant, J.S., Prakash, V., and Naoroji, R. 1995. *Ecology and behaviour of Resident raptors with special reference to endangered species,* Final Report, 1990-93. Bombay Natural History society, Mumbai.