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AVIAN TEMPORAL DIVERSITY ASSESSMENT IN PANGSUN, SELANGOR

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ABSTRACT

Due to the rising need of effective conservation strategies around the world, biodiversity monitoring or assessment has been one of the main concerns. Biodiversity residing in specific habitat is the best indicator of the habitat condition regardless of species diversity changes or their health condition. This information, combining with ecological condition of the habitat will provide sound knowledge for future conservation and research activities. Therefore, we came out with a small scale temporal biodiversity assessment at Pangsun, Hulu Langat forest reserve for a start, but concentrating on avian diversity only. Data were compiled from thesis, reports, proceedings, and published papers from various institutions. We were able to gather data from 1993 to 2011. From this compilation there were 66 bird species from 8 orders, and 23 families recorded from all years. This numbers comprised of only 26% of species recorded by Siti Hawa in her preliminary survey in Hulu Langat Forest Reserve in 1983. The most dominant families were Timaliidae (babblers) with 12 species, followed by Turdidae (Thushers, Robin, Forktail, Shama) with 8 species. Species richness was found to increase temporally which shows good habitat condition of the study area. There were several species recorded in all years which were the *Ceyx erithacus* (Oriental Dwarf kingfisher), *Arachnothera longirostra* (Little spiderhunter) and *Stachyris nigriceps* (Grey-throated babbler). However, some of the forest birds that have been recorded previously were no longer present in the latest monitoring data suggesting that this forest is slowly loosing precious bird species some of which are listed as vulnerable (VU) and near-threatened (NT). Thus, these species can be an indicator of habitat changes. Nevertheless, *Cacomantis sepulcralis* (Rusty-breasted cuckoo), *Ficedula suspecilliaris* (Ultramarine flycatcher) and *Arachnothera affinis* (Streaky-breasted spiderhunter) were among the species that appear in the later year and never been recorded in the study area before.
Keywords: biodiversity assessment, avian, temporal scale, Hulu Langat

INTRODUCTION

In conjunction to the global phenomena of biodiversity loss, conservation effort around the world has stressed the importance of biodiversity monitoring as a guideline for conservation strategies (Gerecke & Lehmann, 2005). Biodiversity monitoring or inventory is a form of long-term studies to determine the biological diversity in specific habitat. These data, combining with knowledge on ecological condition at various spatial scales and ecosystem (O›Connor, 1998; O›Connell, 2000; Polasky & Solow, 2001) is essential for environmental planning (Groomsbridge, 1992) by indicating the state of habitat in the area of concern. Species richness as a standard biological component provides information on biodiversity values of a site while fluctuating trends of species richness allow the study of dynamics, threats, spatial and temporal distribution of biodiversity (Mazaris, 2008). Apart from that, it also allows recognition of indicator species that directly designate habitat condition of specific habitat or ecosystem and thus provides a cost-effective conservation prioritization. Mazaris (2008) in his study recognize that richness of species of conservation interest could be reliably predicted from the richness of higher order taxa such as genus and family in amphibians, birds and mammals.

Tropical region is especially crucial in terms of biodiversity monitoring as it encompasses majority of species residing in the tropical forest (Hawkins, 2001). However, the lack of baseline data becomes a barrier to the efficacy of these measures (Collen *et al.*, 2008). Malaysia as one of the tropical country has undergone constant biodiversity monitoring to determine biological diversity in various sites for biodiversity assessment, environmental impact assessment (EIA) etc. Scientist and researchers from various institutions have published these findings in journals and reports but up to date, there were very few efforts in compiling these data for a long-term study. We also lack of knowledge about the biodiversity patterns and changes through time, and therefore we are facing challenges to determine implication of habitat changes on biological diversity. Furthermore, realizing the pressure of development towards natural forest particularly biodiversity, more advance knowledge need to be explored to better understand the condition of these natural ecosystem. Direct measure thus will be based on secondary data which includes previous studies of biodiversity monitoring. Similar to other tropical countries in general, Malaysia faced significant obstacles including insufficient funding, lack of adequate infrastructure and expertise for data collection, inaccessibility to research sites due to political upheaval, and difficulties in getting data published or made public (Collen *et al.*, 2008).

This study hence aimed to develop a database on birds diversity at temporal scale compiling data from survey and monitoring works that had been done previously beginning 1990s to present in Pangsun. We are aware of the gaps in quality of data during data compilation within this period of time. Therefore, we tried to gather as much data in form of reports, proceedings and database from different organizations and institutions that have carried out biodiversity monitoring in this area. From these data, we hope to be able to determine indicator species in this area which is important for future prioritization and planning strategies for efficient conservation effort in this area.

METHODOLOGIES

Study area

Pangsun is located within the Hulu Langat Forest Reserve in Selangor, which is an extension of Langat Basin (Figure 1.0 and 2.0). It comprise of 13,132 ha area at 3°13'N latitude and 101°52'E longitude. This site is an ecologically important forest habitat for water catchments that provide water for Selangor through existing Pangsun and Semenyih Dam. Pangsun was located just a few metres away at the foot of Gunung (Mount) Nuang which is the highest mountain in Selangor with 1493m height. It also play important role in ecotourism as it received high number of visitor along the year for recreation, mountain climbing and also hiking. Therefore, this area is exposed to anthropogenic pressure.

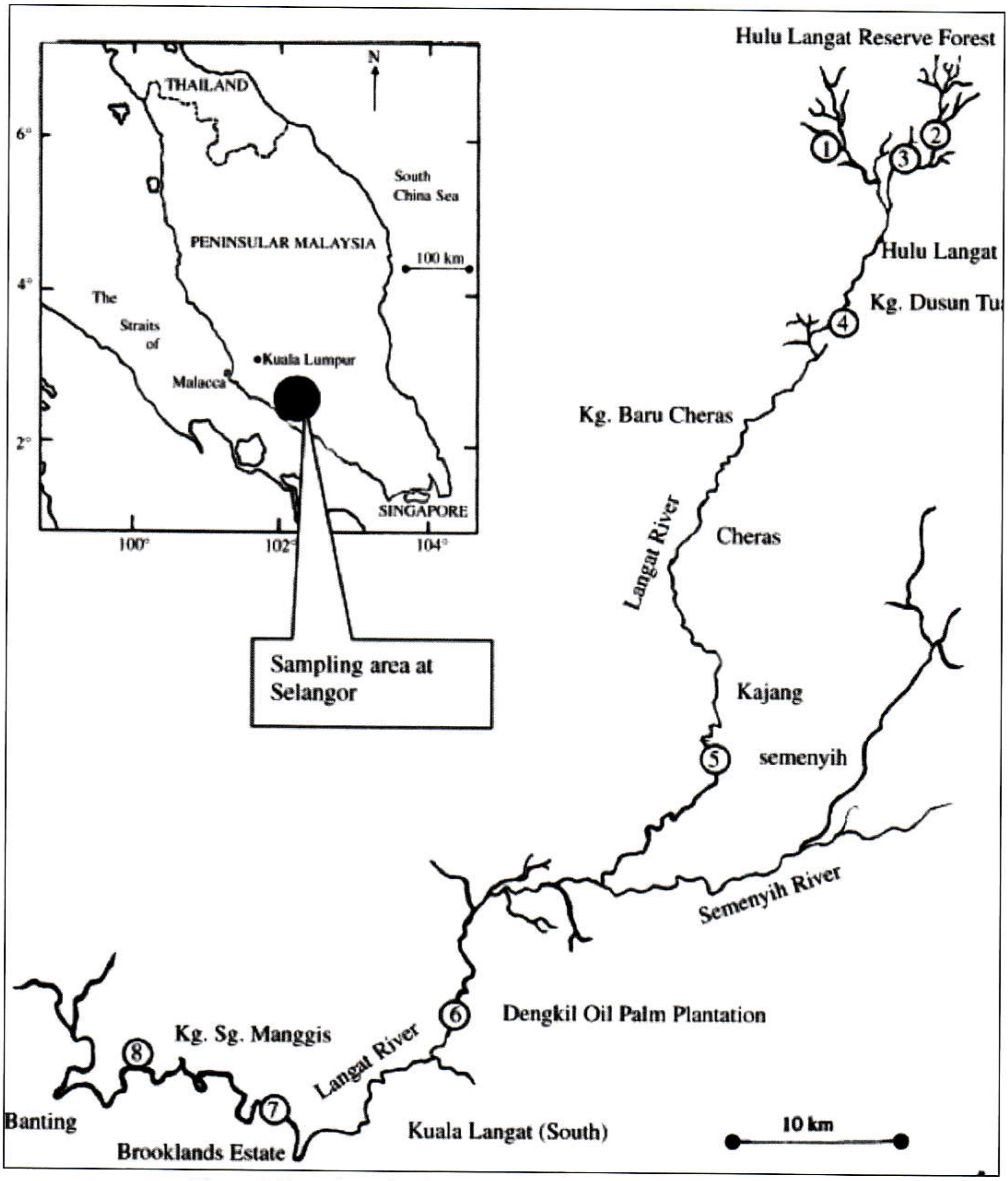

Figure 1: Location of Hulu Langat Forest Reserve in Langat Basin

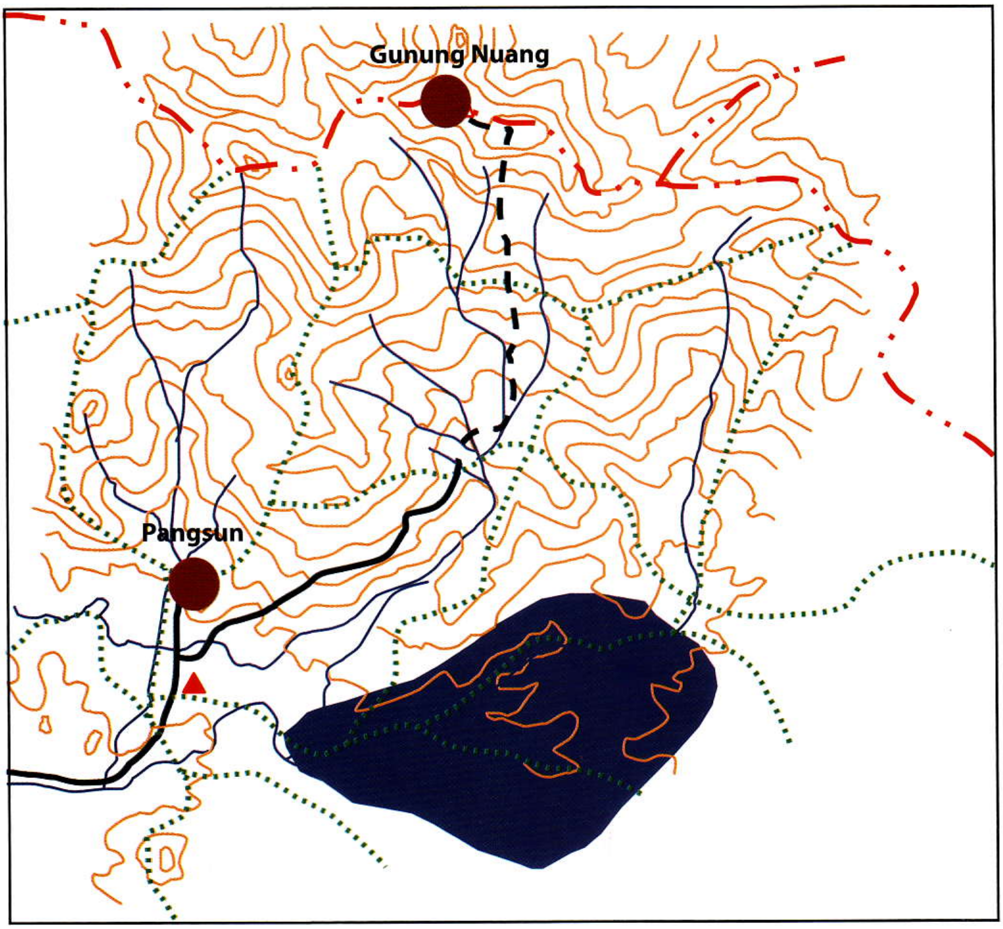

Figure 2: Location of Pangsun and Gunung Nuang in Hulu Langat Forest Reserve

Data compilation

Compilation of avian diversity data was based upon reports, thesis and database which contained information on biodiversity monitoring in Pangsun and Gunung Nuang areas from year 1995, 1998, 2007, 2008, 2010 and 2011. Compilation of birds in 1995 was obtained from PERHILITAN's database. However, this data was very scarce, but we still record it in the checklist. The 1998 data was obtained from (Shukor *et al.*, 2008), whereby 2007 and 2008 were obtained from (Armira, 2008; Farhana, 2008; Lee, 2009). Data for 2010 however was obtained from a brief study of undergraduate's student from Universiti Kebangsaan Malaysia and 2011 data was obtained from a doctorate field sampling (unpublished data). These studies used direct observation and mist-netting. Data from this compilation enable us to determine generalist species, and indicator species in Pangsun area.

Next, we classified the birds according to their habitat, ranging from garden and parks, open country, and forest fringe by referring to Jeyarajasingam (2002). Apart from that, we also classified them according to the IUCN Red List (2009) ranging from least concern (LC), vulnerable (VU) and near-threatened (NT).

RESULTS AND DISCUSSION

Data compilation in 16 years has recorded 66 bird species from 8 orders, and 23 families as listed in Table 1.0. Year 2011 recorded the highest species richness with 35 species (53% from total species recorded in all years), followed by 2007 and 1998 with 26 (39%) and 24 (36%) species respectively. Year 1995 however recorded the least number of species due to the scarce monitoring data conducted by PERHILITAN. Year 2010 recorded the lowest species richness with only 9 species (14%). This was expected due to the short sampling period with only 2 days.

There were stable pattern of occurrence across temporal scale on 8 species namely; Oriental dwarf kingfisher, Green-winged pigeon, White-rumped shama, Little spiderhunter, Rufous piculet, Hairy-backed bulbul, Grey-throated babbler, and Short-tailed babbler. These species can be considered as resistant towards habitat change and generally fed on various types of food resources such as insects, mollusc, fruits and seed. Therefore, they were able to get adapted to the habitat change due to abundance of food resources (Robinson & Holmes, 1982). These species can also be used as indicator towards habitat change by monitoring their abundance. Apart from that, there were several other species which is increasing temporally such as Chestnut-naped forktail, Grey-breasted spiderhunter, Long-billed spiderhunter and Grey-headed Babbler. These species are resident bird and categorized as totally protected (TP) and some of them listed as near-threatened species (NT) by Red Data Book and IUCN Redlist such as Chestnut-naped Forktail. Generally, this group of species comprised of insectivore, insectivore-frugivore and nectarivores type of feeding guild. According Wong (1986), abundance of insectivores and frugivores are characteristic of a good quality forest. Thus the positive species trend across temporal scale shows that Pangsun area still retained healthy habitat and provide abundant food resources for the birds.

However, there were contrastingly declining species trend for Siberian blue-robin, Purple-naped sunbird, Grey-cheeked bulbul, Yellow-bellied bulbul, Spotted fantail, Banded Kingfisher, Black-naped Monarch, Chestnut-rumped Babbler and Scaly-crowned Babbler. Straw-headed bulbul was never to be found since 1995 survey. These species were also resident bird species, most of them are totally protected but some of them are vulnerable (VU) such as the banded kingfisher and near-threatened (NT) such as the Chestnut-rumped babbler and Scarlet-rumped trogon. The disappearance of these species might indicate temporal disturbance at Pangsun area. On the flip side, there were several species present in the later years. The Rusty-breasted cuckoo, Ultramarine flycatcher and Streaky-breasted spiderhunter were recorded in 2010. There were other species that only recorded in one year and most of these species are resident bird except Crow-billed drongo, Tiger shrike and Mugimaki flycatcher which happened to be migrant species. They probably present here in 2008 during their passage migratory. Their absent in other years however could be due to insufficient sampling effort and not because they were absent here.

Habitat categorization on these birds show subtle increase of birds of garden and parks (GP) and open country (OC). This is somewhat a serious matter that need to be focused, as spreading of non-native species to the forest indicate that this forest is undergoing temporal disturbance. Moreover, the non-native or generalist species are generally known to be aggressive and thus could result in elimination of the native forest species. Figure 3.0 summarize the results. Analysis on the IUCN red list status on the other hand shows increasing trend of species categorized as near-threatened (NT). These indicate that this forest is increasingly harvesting more highly concerned species and thus it is essential to protect these species from further depauperate through time.

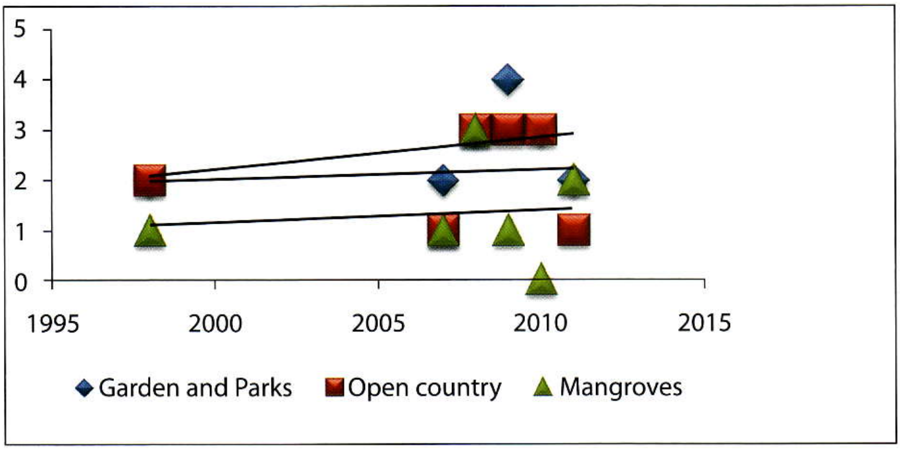

Figure 3: Habitat categorization across temporal scale

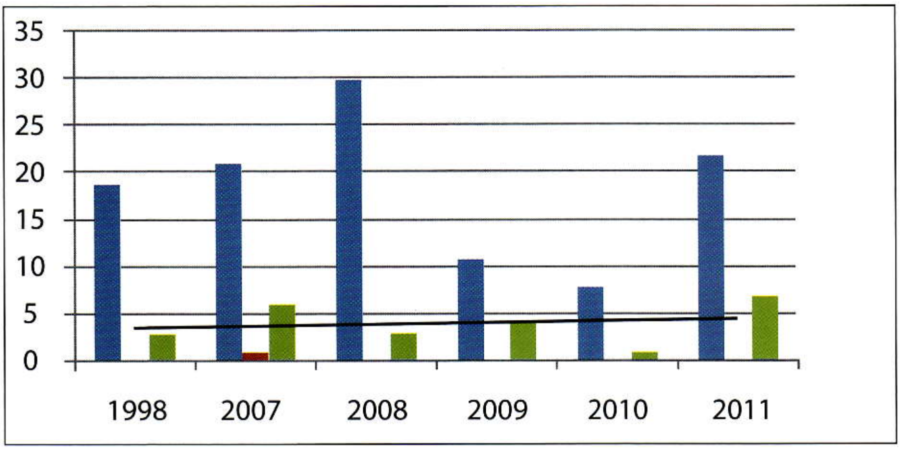

Figure 4: IUCN red list across temporal scale

CONCLUSION

Pangsun resemble a good quality forest with the presence of a large number of native forest species. However, due to anthropogenic activities, this forest is slowly losing its value with the lost of several vulnerable and near-threatened species through time. Therefore, it is essential to preserve this forest from further disturbance. Anthropogenic activities should be limited to a specific area only, in this case Gunung Nuang only.

Table 1: Species list recorded according to temporal scale from 1998 to 2010

Family	*Species*	Nama Inggeris	Habitat	IUCN Status	1993	1998	2007	2008	2010	2011
Alcedinidae	*Lacedo pulchella*	Banded Kingfisher	LF	LC	0	1	0	0	0	0
	Halcyon chloris	Collared Kingfisher	LF	LC	1	0	0	0	0	0
	Ceyx erithacus	Oriental Dwarf Kingfisher	MG	LC	0	2	1	2	1	0
	Halcyon coromanda	Ruddy Kingfisher	MG	LC	0	1	0	0	0	0
	Actenoides concretus	Rufous collared kingfisher	LF/ LMF	NT	0	0	3	0	0	2
Columbidae	*Chalcophaps indica*	Green-winged Pigeon	LF/ LMF	LC	0	3	1	2	0	3
Cuculidae	*Cacomantis sepulcralis*	Rusty-breasted Cuckoo	OC/LF	LC	0	0	0	0	1	0
Dicaeidae	*Dicaeum everetti*	Brown-backed flowerpacker	LF	NT	0	0	0	0	0	1
	Dicaeum trigonostigma	Orange-bellied Flowerpecker	LF/ LMF	LC	0	0	1	0	0	1
	Prionochilus maculatus	Yellow-breasted Flowerpecker	LF/ LMF	LC	0	1	1	0	0	1
Dicruridae	*Dicrurus aeneus*	Bronzed Drongo	LF/ LMF	LC	0	1	0	0	0	0
Eurylaimidae	*Colyptomena viridis*	Green Broadbill	LF/ LMF	NT	0	0	1	0	0	1
Falconidae	*Falco peregrinus*	Peregrine Falcon	OC/LF/ LMF	LC	0	1	0	0	0	0
Indicatoridae	*Indicator archipelagicus*	Malaysian honeyguide	LF	NT	0	0	0	0	0	1
Irenidae	*Irena puella*	Asian Fairy-Bluebird	LF/ LMF	LC	0	0	2	0	0	0
Laniidae	*Lanius tigrinus*	Tiger Strike	LF/ LMF	LC	0	0	0	8	0	0
Monarchidae	*Philentoma pyrhopterum*	Rufous-winged Philentoma	LF	LC	0	1	3	0	0	0
	Tersiphone paradisi	Asian paradise flycatcher	MG/LF/ LMF	LC	0	0	0	0	0	2
	Hypothymis azurea	Black-naped Monarch	LF	LC	0	1	0	0	0	0

Muscicapidae	*Muscicapa williamsoni*	Brown-streaked Flycatcher	LF	LC	0	0	0	1	0	2
	Enicurus ruficapillus	Chestnut-naped Forktail	LF/ LMF	NT	0	0	1	0	1	4
	Cyornis banyumas	Hill Blue flycatcher	LF/ LMF	LC	0	0	0	0	0	1
	Ficedula mugimaki	Mugimaki Flycatcher	LF/ LMF	LC	0	0	0	1	0	1
	Luscinia cyane	Siberian Blue Robin	LF/ LMF	LC	0	3	0	2	0	0
	Cyornis tickelliae	Tickell›s blue flycatcher	LF/ LMF	LC	0	0	0	0	0	1
	Ficedula suspecilliaris	Ultramarine Flycatcher		LC	0	0	0	0	1	0
	Copsychus malabaricus	White-rumped Shama	LF	LC	0	3	7	3	0	4
	Cyornis concretus	White-tailed flycatcher	LF/ LMF	LC	0	0	0	0	0	1
	Myiomela leucura	White-tailed Robin		LC	0	0	1	0	0	0
Nectariniidae	*Arachnothera modesta*	Grey-breasted Spiderhunter	LF/ LMF	LC	0	0	1	1	0	11
	Arachnothera longirostra	Little Spiderhunter	GP/ LF/ LMF	LC	0	7	18	53	12	35
	Arachnothera robusta	Long-billed spidehunter	LF/ LMF	LC	0	0	0	3	0	6
	Nectarinia jugularis	Olive-backed sunbird	GP/OC/ MG	LC	0	0	0	0	0	1
	Hypogramma hypogrammicum	Purple-naped Sunbird	LF/ LMF	LC	0	5	3	1	0	1
	Arachnothera affinis	Streaky-breasted Spiderhunter	LMF/ UMF	LC	0	0	0	0	1	0
Picidae	*Blythipicus rubiginosus*	Maroon Woodpecker	LF/ LMF	LC	0	0	2	1	0	1
	Sasia abnormis	Rufous Piculet	LF/ LMF	LC	0	0	1	1	0	1

Pycnonotidae	*Hemixos flavala*	Ashy bulbul	LF/ LMF	LC	0	0	0	0	0	1
	Pycnonotus atriceps	Black-headed bulbul	LF/ LMF	LC	0	0	0	0	0	1
	Criniger bres	Grey-cheeked Bulbul	LF	LC	0	6	1	0	0	2
	Hypsipetes criniger	Hairy-backed Bulbul	LF	LC	0	0	3	1	0	3
	Pycnonotus brunneus	Red-eyed Bulbul	LF	LC	0	0	0	3	0	0
	Pycnonotus erythropthalmos	Spectacled bulbul	LF	LC	0	0	0	0	0	1
	Pycnonotus zeylanicus	Straw-headed Bulbul	LF	VU	2	0	0	0	0	0
	Alophoixus phaeocephalus	Yellow-bellied Bulbul	LF		0	5	0	0	0	0
Rallidae	*Amaurornis phoenicurus*	White-breasted Waterhen	IS		1	0	0	0	0	0
Rhipiduridae	*Rhipidura perlata*	Spotted fantail	LF	LC	0	2	0	0	0	0
Strigidae	*Otus bakkamonea*	Collared Scops-Owl	GP/OC/ LF	LC	0	0	0	1	1	0
Sturnidae	*Gracula religiosa*	Hill Myna	MG/LF		2	0	0	0	0	0
Sylvidae	*Orthotomus sericeus*	Rufous-tailed Tailorbird	MG/LF	LC	0	0	2	2	0	0
	Ficedula dumetoria	Rufous-chested flycatcher	LF	NT	0	0	0	0	0	1
	Malacocincla abbotti	Abbott›s Babbler		LC	0	0	1	0	0	0

Timaliidae	*Pellorneum capistratum*	Black-capped Babbler	LMF	LC	0	0	1	0	0	1
	Stachyris maculata	Chestnut-rumped Babbler	LF	NT	0	1	0	0	0	0
	Macronous ptilosus	Fluffy-backed Tit Babbler	LF	NT	0	0	1	0	0	0
	Malacopteron albogulare	Grey-breasted Babbler	LF	NT	0	0	0	1	0	0
	Stachyris poliocephala	Grey-headed Babbler	LF	LC	0	6	0	2	3	11
	Stachyris nigriceps	Grey-throated Babbler	LF/ LMF	LC	0	1	1	4	1	2
	Malacopteron magnirostre	Moustached Babbler	LF	LC	0	1	2	0	0	0
	Malacopteron cinereum	Scaly-crowned babbler	LF	LC	0	1	0	0	0	1
	Trichastoma malaccensis	Short-tailed Babbler	LF	NT	0	1	1	1	0	2
	Macronous gularis	Striped Tit Babbler	LF/ LMF	LC	0	0	1	0	0	0
	Yuhina zantholeuca	White-bellied Yuhina	LF/ LMF	LC	0	0	0	1	0	2
Trogonidae	*Harpactes duvaucelii*	Scarlet-rumped Trogon	LF	NT	0	1	0	0	0	0
Tytonidae	*Phodilus badius*	Bay Owl	LF	LC	0	1	0	0	0	0
Number of species					5	24	26	22	9	35

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