

# An Update on the Bird Population in Gaya Island

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**ABSTRACT** The ecosystem of small islands also plays a crucial role in serving as a habitat for birds especially the endemic and migratory birds. To date, there is still limited study that has been done in documenting the avian community in small islands such as Gaya Island in Sabah. Hence, this study aims to document and update the bird population by looking at the species richness and abundance of birds in Gaya Island. The method that was being used was solely standard point count method in three selected sampling trails for six months of survey. A total number of 524 individuals from 26 species and 17 families were recorded of which adding 16 species of birds from the past study. The value of the Shannon Wiener index and Simpson diversity index for the diversity of birds were 2.607 and 0.906 respectively. Interestingly two endemic species, two near threatened and one vulnerable species namely Philippine Megapode (*Megapodius cumingii*), White-crowned Shama (*Copsychus stricklandii*), White-chested Babbler (*Trichastoma rostratum*), Grey-chested Jungle Flycatcher (*Rhinomyias umbratilis*) and Great Slaty Woodpecker (*Mulleripicus pulverulentus*) were sighted during the survey. The result from this study showed that Gaya Island supports diverse species of birds and play a crucial transit location for migratory bird species. Hence, it indicates for the need of further bird conservation studies in the island.

**KEYWORDS:** Bird, conservation, diversity, Gaya Island, North Borneo

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## INTRODUCTION

Islands are particularly small in size as opposed to large habitat or area such as a continent. It also has its' own functional ecosystem within the small confined areas (Taylor & Kumar, 2016). The unique geological landscape of an island does not only offer mesmerizing beauty of the island's scenery but harbors both marine and terrestrial wildlife (Rodrigues & Cunha, 2012). Apart from that, small islands are well known for harboring species of animals and plants that have high level of endemism (Kier *et al.*, 2009). Past studies have shown that islands are also a vital site in providing habitat for birds especially the endemic, migratory (Turner *et al.*, 2002; David *et al.*, 2016) as well as threatened species (Rodrigues & Cunha, 2012).

Birds have been widely used by researchers as an effective biological indicator (Sodhi *et al.*, 2005) for its' ability to respond quickly the changes of the environment (Yap *et al.*, 2007). Previous studies have shown that bird also plays crucial roles in the ecosystem such as the seed disperser, pollinator (Peh *et al.*, 2005), as well as predators in the food chain (Basnet *et al.*, 2016) across different landscapes around the world including the small islands.

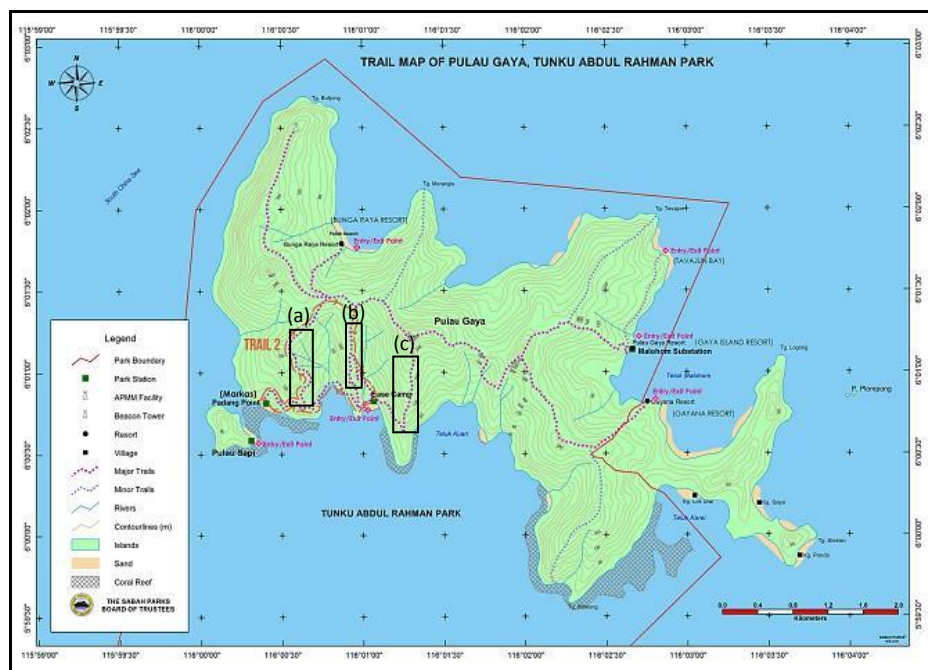
In Sabah, there are still limited avian studies that have been conducted in small forested islands to provide fundamental understanding of the bird community that inhabit in an isolated and confined ecosystem such as Gaya Island. To date, the published study about the avian in Gaya island is only limited to Well 1976, Sompud *et al.*, 2013 and Sompud *et al.*, 2016b. Hence, this study aims to document and update the species composition of the bird population in Gaya Island of Sabah.

## METHODOLOGY

### Study Site

Gaya Island is located in N6000'36" E116001'48" at the west coast part of Sabah. It is also one of the five islands that has been declared as the Tunku Abdul Rahman Marine Park. This island has 1,465 acres of land consisting of primary forest and a small patch of mangrove area (Said, 2008).

The study was conducted for six months between December 2016 until November 2017 in three locations within the Gaya Island, namely Base Camp Trail, Padang Point Trail and Highest Point Trail (Figure 1). These existing trails were selected in order to document the bird population at the western part of the island. A 1500m of transect was established at each of the sampling trails in order for the bird survey to be conducted.



**Figure 1.** The three sampling sites marked in rectangular boxes is: (a) Padang Point Trail, (b) Base Camp Trail and (c) Highest Point Trail. (Sabah Park, 2013)

### Avian Survey

A standard point count method adopted from Buckland *et al* (2008) was used to survey the avian population at the primary forest of Gaya Island. A total of 30 point stations were established along the 1500m transect in three of the sampling trails. The distance between each point stations was 50m (as follows Sompud *et al.*, 2016a). The survey started at 6.00 am until 11.00 am and continued again from 1.00 pm until 4.30 pm in the afternoon using a binocular with 10x40 magnification. The time spent for the observation at each point stations was only 5 minutes in order to avoid recording the same birds twice (Buckland, 2006). The "Birds of Borneo" field guide book (Phillips & Phillips, 2011) was used for the identification of birds. The survey was also stopped during bad weathers such as strong wind and rainy day (Peh *et al.*, 2006) as to avoid the survey being affected.

### Data Analysis

There were two indices that were being used to analyze the diversity of the bird population namely the Shannon-Wiener Index and Simpson Diversity Index (Magurran, 2004). The PAST (Hammer & Harper, 2006) software was used to analyze the data obtained from this study.

## RESULT

**Table 1.** Species assemblage of birds from the study area in Gaya Island.

Family	Scientific Name	Common Name	Number of Individual	IUCN
Monarchidae	<i>Hypothymis azurea</i>	Black-naped Monarch	84	LC
Cisticolidae	<i>Orthotomus sericeus</i>	Rufous-tailed Tailorbird	62	LC
Timaliidae	<i>Trichastoma rostratum</i>	White-chested Babbler	61	NT
Pachcephalidae	<i>Pachycephala grisola</i>	Mangrove Whistler	60	LC
Pycnonotidae	<i>Pycnonotus plumosus</i>	Olive-winged Bulbul	60	LC
	<i>Pycnonotus simplex</i>	Cream-vented Bulbul	31	LC
	<i>Pycnonotus brunneus</i>	Red-eyed Bulbul	1	LC
	<i>Pycnonotus goiavier</i>	Yellow-vented Bulbul	1	LC
Aegithinidae	<i>Aegithina tiphia</i>	Common Iora	31	LC
Nectariniidae	<i>Anthreptes malacensis</i>	Brown-throated Sunbird	28	LC
	<i>Aethopyga siparaja</i>	Eastern-crimson Sunbird	16	-
	<i>Nectarinia sperata</i>	Purple-throated Sunbird	1	-
Muscicapidae	<i>Copsychus stricklandii</i>	White-crowned Shama	21	-
	<i>Rhinomyias umbratilis</i>	Grey-chested Jungle Flycatcher	8	NT
	<i>Cyornis rufigastra</i>	Mangrove Blue Flycatcher	4	LC
Unidentified	Unidentified	Unidentified	13	-
Megapodiidae	<i>Megapodius cumingii</i>	Philippine Megapode	12	LC
Bucerotidae	<i>Anthracoceros</i>	Oriental-pied Hornbill	9	LC
	<i>albirostris</i>			
Picidae	<i>Meiglyptes tristis</i>	Buff-rumped Woodpecker	7	LC
	<i>Mulleripicus</i>	Great Slaty Woodpecker	1	V
	<i>pulverulentus</i>			
Dicaeidae	<i>Diaceum trigonostigma</i>	Orange-bellied Flowerpecker	4	-
Phylloscopidae	<i>Phylloscopus borealis</i>	Artic Warbler	3	LC
Coracidae	<i>Eurystomus orientalis</i>	Dollarbird	2	LC
Rhipiduridae	<i>Rhipidura javanica</i>	Pied Fantail	2	LC
Columbidae	<i>Chalcophaps indica</i>	Emerald Dove	1	LC
	<i>Ducula aenea</i>	Green Imperial Pigeon	1	LC
Total			<b>524</b>	

\* LC= Least Concern, NT= Near Threatened, V= Vulnerable, IUCN= International Union for the Conservation of Nature

A total number of 524 individuals from 26 species and 17 families has been recorded during the survey including the unidentified birds (Table 1). The Pycnonotidae known as the bulbul family has the highest number with 93 individuals recorded. There were 4 species of bulbul that were recorded from this family, namely Olive-winged Bulbul (*Pycnonotus plumosus*), Cream-vented Bulbul (*Pycnonotus simplex*), Red-eyed Bulbul (*Pycnonotus brunneus*) and Yellow-vented Bulbul (*Pycnonotus goiavier*). The second dominating family was the Monarchidae family with 84 individuals. This was then followed by the Cisticolidae family with 62 individuals recorded in the survey. Meanwhile, there were also several families that were recorded the least with only two individuals, namely the Columbidae, Coracidae and Rhipiduridae family.

The Black-naped Monarch (*Hypothymis Azurea*) was the most dominating species with 84 individuals recorded followed by Rufous-tailed Tailorbird (*Orthotomus sericeus*) and White-chested Babbler (*Trichastoma rostratum*) with 62 and 61 individuals recorded each. Apart from that, there were also several species that were recorded as singleton during the survey namely Emerald Dove (*Chalcophaps indica*), Green Imperial Pigeon (*Ducula aenea*), Purple-throated Sunbird (*Nectarinia sperata*), Great Slaty Woodpecker (*Mulleripicus pulverulentus*), Red-eyed Bulbul (*Pycnonotus brunneus*) and Yellow-vented Bulbul (*Pycnonotus goiavier*).

The results of the Shannon Wiener index and Simpson diversity index for Gaya Island were 2.607 and 0.906 respectively. The Shannon Wiener Index's value falls in the range between 1.5 to 3.5, of which was a common range value obtained from empirical data based on Magurran (2004).

## DISCUSSION

The findings from this study provide general insight of the bird population in Gaya Island. Apart from that, several species of birds that have been recorded by Sompud *et al.*, 2013 were able to be sighted again during the survey such as the Olive-winged Bulbul (*Pycnonotus plumosus*), Yellow-vented Bulbul (*Pycnonotus goiavier*), Mangrove Blue Flycatcher (*Cyornis rufigastra*), Rufous-tailed Tailorbird (*Orthotomus sericeus*) and Eastern-crimson Sunbird (*Aethopyga siparaja*).

The review on the past studies of birds in other small islands around Sabah showed that there were several similar species of birds that were also documented in other islands apart from Gaya Island. The Rufous-tailed Tailorbird (*Orthotomus sericeus*) and White-crowned Shama (*Copsychus stricklandii*) were able to be recorded in Banggi Island by (Rahman & Abdullah, 2002). Furthermore, species of birds such as the Olive-winged Bulbul (*Pycnonotus plumosus*), Eastern-crimson Sunbird (*Aethopyga siparaja*) and Black-naped Monarch (*Hypothymis azurea*) were also sighted by (Wells, 1977) in Balambangan Island. Meanwhile, past studies of the bird checklist in small islands at Peninsular Malaysia have also shown similarity of bird species that were recorded in Gaya Island. Species of birds such as Emerald Dove (*Chalcophaps indica*) and Artic Warbler (*Phylloscopus borealis*) were able to be found in Pulau Perhentian Besar, Terengganu by David *et al.*, 2016. Moreover, the Dollarbird (*Eurystomus orientalis*) was found in Pulau Jarak at the Straits of Malacca by Ramli *et al.*, 2008 while the Green Imperial Pigeon (*Ducula aenea*) as well as the Pied Fantail (*Rhipidura javanica*) were found in Pulau Tioman by (Sodhi *et al.*, 1999). As such it indicates that the presence of these species of birds in other small islands in Malaysia showed that the ecosystem of small island does play a crucial role in supporting the survival of the birds similar with the continental ecosystem.

Interestingly, there were two endemic species (Phillips & Phillips, 2011) of birds that were recorded in this study namely the White-crowned Shama (*Copsychus stricklandii*) and Phillipine Megapode (*Megapodius cumingii*). Apart from that, the Great Slaty Woodpecker (*Mulleripicus*



*pulverulentus*) of which was listed as vulnerable status, while the White-chested Babbler (*Trichastoma rostratum*) and Grey-chested Jungle Flycatcher (*Rhinomyias umbratilis*) that were listed as near threatened species under the International Union for the Conservation of Nature (IUCN, 2016) were recorded during the six months of survey. According to the Phillips & Phillips (2011), the Great Slaty Woodpecker (*Mulleripicus pulverulentus*) is known as a scarce resident that usually inhabit in an undisturbed lowland primary forest. Thus, the presence of the endemic, vulnerable and near threatened species of birds indicates that the primary forest of Gaya Island serves as an important habitat for these birds. In addition, an Artic Warbler (*Phylloscopus borealis*) of which is known as one of the migratory species based on Phillips & Phillips (2011) was also recorded. The results of this study reaffirms to the findings of Sompud *et al.* (2016b) that the island plays a very significant role as a transit location for the migratory species. Therefore, there is a significant need to conduct a long-term monitoring of the bird population in Gaya Island in order to provide the fundamental understanding on the changes of the avian population in this island. Further study still need to be conducted in a long term of which includes expanding the survey in other parts of the island in order to obtain a holistic data on the bird community that can be useful for proper park conservation management of the birds in Gaya island.

## CONCLUSION

The findings from this study showed that Gaya Island support diverse species of birds. Gaya Island plays a very significant role as a transit location for the migratory bird species. The findings indicate for the needs of further bird conservation studies in Gaya Island.

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