

Status, Composition and Diversity of Avifauna in the Artificial Putrajaya Wetlands and Comparison with its Two Neighboring Habitats

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ABSTRACT.— Current trends in landscaping, particularly of new townships, incorporates artificial habitat as one of its important features. In Malaysia, the newly developed Putrajaya city integrates an artificial wetland ecosystem to rehabilitate the water quality in the surrounding area. The habitat has attracted many bird species from local to migratory birds to roost, forage and nest in the area. This study evaluated the avifauna status, distribution and potential importance of the Putrajaya Wetlands to them. The avifauna distribution and status were found to vary across the different regions (each has a different habitat) of the wetlands. The northern area possessed the highest species diversity, richness and evenness compared to the other areas, which can be explained by the hydrology and human activity in the area. Comparison with the neighbouring protected habitats, one forest and one wetlands, showed that Putrajaya Wetlands has a far lower diversity of birds, both at the species and family levels, and a preponderance of generalist species, which is probably due to the fact that the wetlands' ecosystem is still new and developing. Nevertheless, the presence of several overlapping species in this artificial habitat with the two neighbouring ones, including migratory species and mixed-species colonies, shows that the area has the potential to be an important link for neighbouring bird areas.

KEY WORDS: Artificial habitat, Putrajaya wetlands, diversity, important link

INTRODUCTION

Continuous human development and urbanization has changed most natural habitats, including wetlands. Hence, the current trend of landscaping, and particularly for new townships, incorporates artificial habitat as one of its primary components to treat the effluent and maintain the water quality and environmental health. In Malaysia, the newly developed Putrajaya City that serves as the federal administrative centre has integrated an artificial wetland ecosystem as its green landscape. The 23 constructed wetland components act as a natural treatment system that filters most of the pollutants in the Chuau and Bisa Rivers

before they enter the Putrajaya Lake (Shutes, 2001). More than 50 types of herbaceous and emergent wetland plants have been reported to grow (Sim et al., 2008) and to assist in sediment retention, pollutant removal, erosion control and for bank stabilization. Furthermore, vegetated islands were also created in open water areas to facilitate in various hydrological functions as well as providing isolated habitats for the fauna. Hence, these combined factors have attracted many bird species to utilize the area for roosting, foraging and nesting.

The creation of an artificial wetland area is viewed as a valuable measure since it can provide a new habitat for bird communities if all other factors are suitable (Zeller,

2003). Moreover, the presence of an artificial wetland habitat will potentially complement its natural counterpart by allowing more species to use different habitats in different conditions (Kloskowski et al., 2009). With the increasing number of birds in artificial wetlands, there is a need to assess and monitor their populations since their numbers, distribution and activities reflect the ecosystem's quality and status. This is very important for the Putrajaya Wetlands as the wetland is in the early stage of development and so any changes in the ecosystem need to be noticed and well understood to ensure the right management strategies can be taken. The aim of this research was to assess the avifauna status, distribution and the potential that the Putrajaya Wetlands has to its neighboring bird areas. There is a high probability for Putrajaya Wetlands to support a good number of avifauna species, if not similar to its neighbors, considering its location and vicinities.

MATERIALS AND METHODS

Study Area.— With a size of 197.2 hectares, Putrajaya Wetlands is an important landscape to the Putrajaya city centre and its surrounding area. Formerly, this area was a natural forest that was then felled and turned into a vast oil palm plantation area. The urbanization of Putrajaya, which started in 1995, along with the creation of the artificial wetland habitat, then changed the plain landscape into a more complex ecosystem. This multi-component wetland consists of four zones (macrophytes, open water, outlet and intermittently flooded) that are designed to mimic natural wetland areas and their functions. The Putrajaya Wetlands include seven regions, the Upper North (UN), Upper

West (UW), Upper East (UE), Lower East (LE), Central Wetland (CW), Upper Bisa (UB) and Putrajaya Lake (PL) that vary in their habitats (Figure 1).

Sampling Activity.— Major surveys on the wetland's avifauna were conducted between March 2007 and 2008 using a modified transect line approach (Bibby et al., 1992) to extensively survey throughout the wetland area so as to assess the avifauna status and to identify important habitats used by the birds. Each transect had a total length of 400 m, with 100 m of sub transects. In total 20 transects were performed, comprised of (number transects/ ha area) UN (4/54.1 ha),

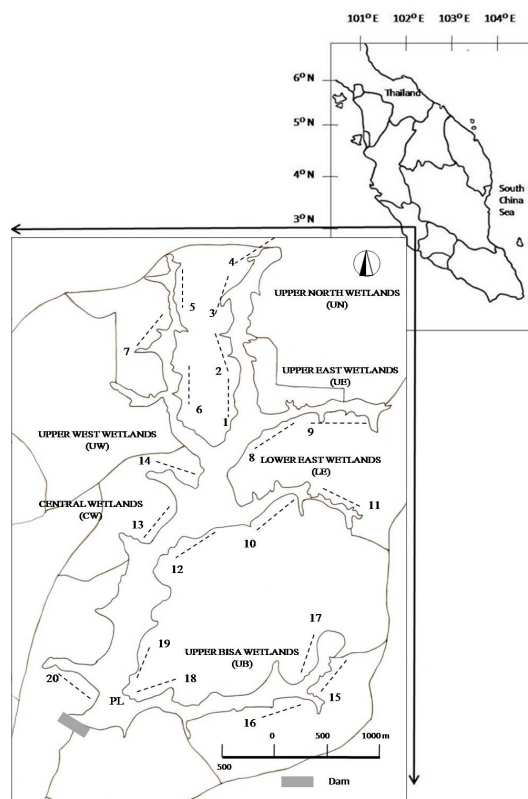


FIGURE 1. General view of the Putrajaya Wetlands and its components. The numbers and dotted lines showed the tracks used in the various regions of the area.

UW (3/38.5 ha), UE (2/15.8 ha), LE (2/14.3 ha), CW (3/50.9 ha) and UB (3/23.6 ha). PL was surveyed from three different locations, with single transect in each one, close to the shore line (2 transects/ km shore line). For each transect, three observers walked along the transect at a distance of 20 m from each other, and independently recorded any bird species and numbers in the area with the aid of binoculars. Whenever possible, photographs were also taken to aid in the identification process. A total of 20 transects were established along the various terrains available within the wetlands (Fig. 1). Roads, off road tracks, and small lanes were used to cover as much of each region as possible. Species diversity, richness and evenness were determined using the diversity indices method (Shannon and Margalef's indices). One-Way ANOVA and Tukey's comparison test were used to compare species diversity among the different areas of the wetlands, with all comparisons being made at the 95% level of significance using the Statistical Package of Social Science version 17 software.

RESULTS

More than 1000 individual birds, comprised of a total of 82 species from 32 families, were recorded during the study. Of these 82 species, 71 species (86.6%) are residents and the remaining 11 are winter visitors (migratory birds). Five of these 82 species (6.1%) are recorded as being of conservation concerns, two under the vulnerable status, Chinese Egret (*Egretta eulophotes*) and Dark-rumped Swift (*Apus acuticauda*) and the remaining three, the Painted Stork (*Mycteria leucocephala*), Black-bellied Malkoha (*Phaenicophaeus diardi*), and the Rufous-crown babbler (*Malacopteran magnum*), are of near

threatened status (IUCN, 2011). From the 1,000+ individual birds recorded, the most commonly found species were *Pycnonotus goiavier* (9.44%), *Acridotheres tristis* (8.12%), *Streptopelia chinensis* (6.79%) and *Passer montanus* (5.67%). In terms of families, the Ardeidae were the most diverse family present with 10 species, followed by Nectariidae and Columbidae with six species each and the Cuculidae, Sylviidae and Passeridae with five species each.

Species diversity, richness and evenness were determined for the different regions of the Putrajaya Wetlands. In terms of the bird diversity (H') and richness (M) in the different regions of the wetlands, the ranked order for both H' and M was UN (H' : 3.33, M : 7.06) > UW (H' : 3.08, M : 5.61) > LE (H' : 2.93, M : 4.70) > UE (H' : 2.71, M : 4.08) > CW (H' : 2.62, M : 3.84) > PL (H' : 2.43, M : 3.03) > UB (H' : 2.05, M : 2.62). Results of the one-way, between subject ANOVA analysis revealed a significant effect of the region on the number of species present in the wetlands, $F_{(5, 141)} = 4.225$, $p = 0.01$). Tukey's comparison test, however, revealed that the result is only true for the UB area. Omnivores were the dominant guild, followed by carnivores, insectivores and piscivores, respectively (Table 1). This simplicity of guilds and the low numbers of specialist bird species that were recorded further points towards the Putrajaya Wetlands being a less complex and less developed ecosystem. Hence, generalist species have the advantage and can thrive better than other guilds.

With respect to the neighboring protected habitats, the Paya Indah Wetland (PIW) to the south west accommodates a total of 100 bird species from 38 families, while the Ayer Hitam Forest Reserve (AHFR) to the North West is occupied by 180 bird species from 48 different families.

TABLE 1. Avifauna composition and guilds in different regions of the Putrajaya Wetlands.

Classification	UN	UW	LE	UE	CW	UB
Wetland Area (ha)	54.1	38.5	14.3	15.8	50.9	23.6
Inundated area (ha)	38.3	27.0	9.5	10.8	48.3	20.6
Major Families	Ardeidae/ Ploceidae/ Rallidae/ Columbidae/ Alcedinidae/ Sturnidae	Ardeidae/ Ploceidae/ Columbidae/ Sturnidae	Ploceidae/ Columbidae/ Sturnidae	Ploceidae/ Columbidae/ Sturnidae	Columbidae/ Sturnidae	Ardeidae/ Ploceidae
Guilds ^a						
Carnivore/ Insectivore	3 (6.7%)	1 (3.4%)	2 (8.7%)	1 (5.0%)	-	-
Carnivore/ Insectivore/ piscivore	8 (17.8%)	4 (13.8%)	3 (13.0%)	2 (10.0%)	-	7 (50.0%)
Frugivore/ Insectivore	5 (11.1%)	7 (24.1%)	5 (21.7%)	5 (25.0%)	5 (27.8%)	1 (7.1%)
Granivore	4 (8.9%)	3 (10.4%)	1 (4.4%)	1 (5.0%)	1 (5.6%)	3 (21.4%)
Granivore/ Insectivore	1 (2.2%)	1 (3.4%)	1 (4.4%)	-	-	-
Insectivore	6 (13.3%)	2 (6.9%)	4 (17.4%)	2 (10.0%)	5 (27.8%)	1 (7.1%)
Nectarivore/ Insectivore	4 (8.9%)	3 (10.4%)	1 (4.4%)	1 (0.5%)	2 (11.0%)	-
Omnivore	14 (31.1%)	8 (27.6%)	6 (26.0%)	8 (40.0%)	5 (27.8%)	2 (14.3%)
Total	45 (100%)	29 (100%)	23 (100%)	20 (100%)	18 (100%)	14(100%)

^aGuilds are shown as number of species (% of all species). Bold font shows the most common guild within that location

Thus, the artificial habitat of the Putrajaya Wetlands, with at least 82 bird species from 32 families, has much lower species diversity than the two neighboring habitats. There were members from 10 families recorded at the PIW that are not found in Putrajaya (Estrildidae, Aegithinidae, Anatidae, Scolopacidae, Coraciidae, Emberizidae, Jacanidae, Muscicapidae, Pachycephalidae and Podicipedidae), but four families present in the Putrajaya Wetlands (Ciconiidae, Apodidae, Chloropsidae and Timalidae) were not recorded at the PIW. In addition, seventeen families that were recorded at AHFR were not found in the Putrajaya Wetlands (Batrachostomidae, Bucerotidae, Coraciidae,

Dicaeidae, Estrildidae, Eurylaimidae, Falconidae, Hemiprocnidae, Megalaimidae, Monarchidae, Muscicapidae, Pittidae, Psittacidae, Sittidae, Strigidae, Trogonidae and Tytonidae), compared to four families present in the Putrajaya Wetlands (Charadriidae, Ciconiidae, Cisticolidae and Turnicidae) that were not found in the AHFR. With respect to their feeding guild, insectivores were the dominant guild in the PIW and frugivores/ insectivores were the highest recorded guild in the AHFR, whilst in the Putrajaya Wetlands omnivores or generalist species dominated the study area. Table 2 summarizes the differences in the avifauna recorded in the neighboring habitats.

TABLE 2. Avifauna composition and guilds in different regions of the Putrajaya Wetlands.

Classification	Paya Indah Wetlands¹	Ayer Hitam Forest Reserve²	Putrajaya Wetlands³
Species no.	100	180	82
Families	38	48	32
Feeding Guilds (%)			
Carnivore/ Insectivore	3	8	6
Carnivore/ Insectivore/ Piscivore	17	9	24
Frugivore/ Insectivore	8	37	13
Granivore	3	4	4
Granivore/ Insectivore	6	4	3
Insectivore	37	20	15
Nectarivore/ Insectivore	7	7	6
Omnivore	19	11	29
Total (%)	100	100	100

Sources: ¹ Zakaria et al., 2009; ² Zakaria et al., 2008; and ³ This study.

DISCUSSION

In terms of species diversity, the northern part of the Putrajaya Wetlands is very important to the bird communities, which could probably be explained by the wetland hydrology in the northern area which has shallower and slower running water compared to the southern area that is close to the Putrajaya dam. The UN and UW regions are the two important foraging areas of the Putrajaya Wetlands for the waders, especially the ardeids. Both solitary and group feeders can often be observed at these sites taking advantage of the presence of the secluded shallow and deep marshes. The UN region has the largest wetland area at 54.1 ha and is also furthest from the disturbances of the city centre and urban settlement. The CW region (50.9 ha), which is mostly inundated (94.9%) and the UW region (38.5 ha), are the second and third largest wetland regions, respectively, whilst the UW region, like the UN region, is very much sheltered by the macrophytes and the surrounding forest and is sequestered. The LE region is the smallest area (14.3 ha) and is an open water area. Although the UB region has the lowest level of species

richness and diversity, it holds a large colony of mixed-species waterbirds that roost, forage and nest in the area, including species of conservation concern like the Painted Stork that breed in the area.

These findings for the bird diversity in the Putrajaya Wetlands were compared to a recent study in the PIW (Zakaria et al., 2009) to the south west, and in the AHFR (Zakaria et al., 2008) to the North West (Figure 2). Historically, the PIW region was once known for its tin and sand mining activities even before 1997. The peat swamp forest slowly recovered soon after these activities stopped, turning the abandoned mining area into a large lake. Thus, the PIW had already undergone almost 10 years of recovery period and succession/maturity before the Putrajaya Wetlands development had finished, and this is likely to account for the more advanced level of maturity and species diversity. Now, the PIW harbors more than 10,000 birds from 100 species and 38 families (Zakaria et al., 2009). As for the AHFR, it is a lowland dipterocarp forest and is one of the few forest reserves that still remain in Selangor State. Currently, the forest is under the management of the Forestry Department of UPM and is used for

teaching, research and an extension of forestry and nature based activities. The suitability of this forest as an environmental education centre or outdoor laboratory for natural sciences and ecology has been discussed previously (Ismail, 1999) along with other studies that have highlighted its role in education and recreation purposes (Abd Ghani et al., 1999; Mohd et al., 1999). This forest supports at least 180 avifauna species from 38 families (Zakaria, 2008).

The status of the avifauna in these two areas could serve as important reference to the ecological development of the Putrajaya Wetlands due to the history and past-developments that they had. Moreover, the close proximity of the Putrajaya Wetlands to the PIW and AHFR is very important as the

artificial Putrajaya Wetlands could develop into or be a vital extension to its neighbor's occupants in the future. These habitats create an essential link that would complement each other by providing the bird communities with various accesses to new foraging and nesting sites. Hence, there is possibility for the terrestrial birds from AHFR and waterbirds from PIW to utilize Putrajaya Wetlands as their new extended habitat.

The difference in species composition and diversity in the three different habitats reflect the ecosystem complexity and suitability that changes over time. The presence of more specialist families in both the PIW and AHFR compared to the Putrajaya Wetlands shows that these two areas are highly diverse in terms of resources and have more complex ecosystems. Evidently, the Putrajaya Wetlands ecosystem is still in the early phase of its development and is far less complex than its counterparts. However, its current avifauna status is promising and the area could be developed into an important avian habitat in the future. Although small in number, the presence of several specialists, including a number of migrating species, in the Putrajaya Wetlands shows that the area has the potential to become an important bird area, as well as a stopover area, if it is well managed. Identifying the requirements of specific species in the wetland habitat could further promote the area and increase the bird's population number in the future.

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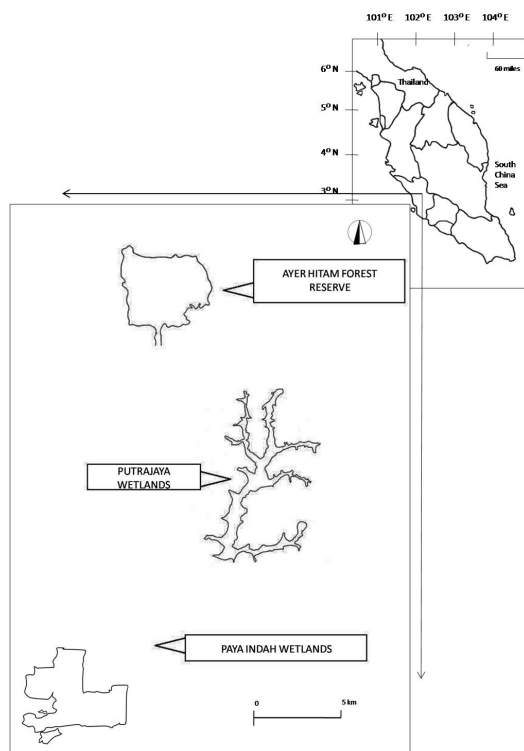


FIGURE 2. The three neighboring habitats important to the avifauna in the Putrajaya-Selangor area.

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APPENDIX 1. List of bird species recorded in the Putrajaya Wetlands.

No.	Classification	Family	English name	Scientific Name	IUCN	Status
1	Waterbird	Ardeidae	Grey Heron	<i>Ardea cinerea</i>	LC	R
2	Waterbird	Ardeidae	Purple Heron	<i>Ardea purpurea</i>	LC	R
3	Waterbird	Ardeidae	Chinese Pond Heron	<i>Ardeola bacchus</i>	LC	WV
4	Waterbird	Ardeidae	Little egret	<i>Egretta garzetta</i>	LC	WV
5	Waterbird	Ardeidae	Cattle egret	<i>Bubulcus ibis</i>	LC	WV
6	Waterbird	Ardeidae	Chinese egret	<i>Egretta eulophotes</i>	VU	WV
7	Waterbird	Ardeidae	Little Heron	<i>Butorides striatus</i>	LC	R
8	Waterbird	Ardeidae	Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	LC	R
9	Waterbird	Ardeidae	Yellow Bittern	<i>Ixobrychus sinensis</i>	LC	R
10	Waterbird	Ardeidae	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	LC	R
11	Waterbird	Ciconiidae	Painted Stork	<i>Mycteria leucocephala</i>	NT	R
12	Waterbird	Charadriidae	Pacific Golden Plover	<i>Pluvialis fulva</i>	LC	WV
13	Raptor	Accipitridae	Black-shouldered Kite	<i>Elanus axillaris</i>	LC	R
14	Raptor	Accipitridae	Crested-serpent Eagle	<i>Spilornis cheela</i>	LC	R
15	Raptor	Accipitridae	Brahminy Kite	<i>Haliastur indus</i>	LC	R
16	Raptor	Accipitridae	White-bellied Sea Eagle	<i>Haliaeetus leucogaster</i>	LC	R
17	Terrestrial Bird	Phasianidae	Red Jungle fowl	<i>Gallus gallus</i>	LC	R
18	Terrestrial Bird	Turnicidae	Barred Buttonquail	<i>Turnix suscitator</i>	LC	R
19	Waterbird	Rallidae	White-breasted Water hen	<i>Amaurornis phoenicurus</i>	LC	R
20	Waterbird	Rallidae	Common Moorhen	<i>Gallinula chloropus</i>	LC	R
21	Waterbird	Rallidae	Purple Swamp hen	<i>Porphyrio porphyrio</i>	LC	R
22	Waterbird	Rallidae	Water cock	<i>Gallinula chloropus</i>	LC	WV
23	Terrestrial Bird	Columbidae	Pink-necked Pigeon	<i>Treron vernans</i>	LC	R
24	Terrestrial Bird	Columbidae	Thick-billed green Pigeon	<i>Treron curvirostra</i>	LC	R
25	Terrestrial Bird	Columbidae	Emerald Dove	<i>Chalcophaps indica</i>	LC	R
26	Terrestrial Bird	Columbidae	Spotted Dove	<i>Stigmatopelia chinensis</i>	LC	R
27	Terrestrial Bird	Columbidae	Zebra Dove	<i>Geopelia striata</i>	LC	R
28	Terrestrial Bird	Columbidae	Rock Pigeon	<i>Columba livia</i>	LC	R
29	Terrestrial Bird	Campephagidae	Pied Triller	<i>Lalage nigra</i>	LC	R
30	Terrestrial Bird	Cuculidae	Asian Koel	<i>Eudynamis scolopacea</i>	LC	R
31	Terrestrial Bird	Cuculidae	Lesser Coucal	<i>Centropus bengalensis</i>	LC	R
32	Terrestrial Bird	Cuculidae	Greater Coucal	<i>Centropus sinensis</i>	LC	R
33	Terrestrial Bird	Cuculidae	Black-bellied Malkoha	<i>Phaenicophaeus diardi</i>	NT	R
34	Terrestrial Bird	Cuculidae	Indian cuckoo	<i>Cuculus micropterus</i>	LC	WV
35	Terrestrial Bird	Alcedinidae	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	LC	R
36	Terrestrial Bird	Alcedinidae	Black-capped Kingfisher	<i>Halcyon pileata</i>	LC	R
37	Terrestrial Bird	Meropidae	Blue-tailed Bee-eater	<i>Merops philippinus</i>	LC	R
38	Terrestrial Bird	Meropidae	Blue-throated Bee Eater	<i>Merops viridis</i>	LC	R
39	Terrestrial Bird	Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>	LC	WV
40	Terrestrial Bird	Hirundinidae	Pacific Swallow	<i>Hirundo tahitica</i>	LC	R
41	Terrestrial Bird	Apodidae	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	LC	R
42	Terrestrial Bird	Apodidae	House Swift	<i>Apus affinis</i>	LC	R
43	Terrestrial Bird	Apodidae	Dark-rumped Swift	<i>Apus acuticauda</i>	VU	R
44	Terrestrial Bird	Chloropseidae	Common Iora	<i>Aegithina tiphia</i>	LC	R
45	Terrestrial Bird	Pycnonotidae	Yellow-vented Bulbul	<i>Pycnonotus goiavier</i>	LC	R
46	Terrestrial Bird	Dicruridae	Black Drongo	<i>Dicrurus macrocercus</i>	LC	WV
47	Terrestrial Bird	Oriolidae	Black-naped Oriole	<i>Oriolus chinensis</i>	LC	R
48	Terrestrial Bird	Corvidae	House Crow	<i>Corvus splendens</i>	LC	R
49	Terrestrial Bird	Timaliidae	Abbott's Babbler	<i>Malaccocincla abbotti</i>	LC	R
50	Terrestrial Bird	Timalidae	Black-capped babbler	<i>Pellorneum capistratum</i>	LC	R
51	Terrestrial Bird	Timalidae	Rufous-crown babbler	<i>Malacopteron magnum</i>	NT	R
52	Terrestrial Bird	Turdidae	Magpie Robin	<i>Copsychus saularis</i>	LC	R
53	Terrestrial Bird	Turdidae	White-rumped Shama	<i>Copsychus malabaricus</i>	LC	R
54	Terrestrial Bird	Sylviidae	Oriental Reed-Warbler	<i>Acrocephalus orientalis</i>	LC	WV
55	Terrestrial Bird	Sylviidae	Chestnut-crowned warbler	<i>Seicercus castaneiceps</i>	LC	R
56	Terrestrial Bird	Sylviidae	Dark-necked Tailorbird	<i>Orthotomus atrogularis</i>	LC	R
57	Terrestrial Bird	Sylviidae	Common Tailorbird	<i>Orthotomus sutorius</i>	LC	R
58	Terrestrial Bird	Sylviidae	Rufous-tailed Tailorbird	<i>Orthotomus sericeus</i>	LC	R

APPENDIX 1. (continue)

No.	Classification	Family	English name	Scientific Name	IUCN	Status
59	Terrestrial Bird	Cisticolidae	Plain Prinia	<i>Prinia inornata</i>	LC	R
60	Terrestrial Bird	Cisticolidae	Yellow-bellied Prinia	<i>Prinia flaviventris</i>	LC	R
61	Terrestrial Bird	Rhipiduridae	Pied Fantail	<i>Rhipidura javanica</i>	LC	R
62	Terrestrial Bird	Rhipiduridae	White-browed Fantail	<i>Rhipidura aureola</i>	LC	R
63	Terrestrial Bird	Motacillidae	Grey Wagtail	<i>Motacilla cinerea</i>	LC	WV
64	Terrestrial Bird	Motacillidae	Richard's Pipit	<i>Anthus richardi</i>	LC	R
65	Terrestrial Bird	Laniidae	Brown Shrike	<i>Lanius cristatus</i>	LC	R
66	Terrestrial Bird	Sturnidae	Philippine Glossy Starling	<i>Aplonis panayensis</i>	LC	R
67	Terrestrial Bird	Sturnidae	Common Myna	<i>Acridotheres tristis</i>	LC	R
68	Terrestrial Bird	Sturnidae	Jungle Myna	<i>Acridotheres fuscus</i>	LC	R
69	Terrestrial Bird	Nectariniidae	Brown-throated Sunbird	<i>Anthreptes malacensis</i>	LC	R
70	Terrestrial Bird	Nectariniidae	Olive-backed Sunbird	<i>Nectarinia jugularis</i>	LC	R
71	Terrestrial Bird	Nectariniidae	Plain Sunbird	<i>Anthreptes simplex</i>	LC	R
72	Terrestrial Bird	Nectariniidae	Little Spider hunter	<i>Arachnothera longirostra</i>	LC	R
73	Terrestrial Bird	Nectariniidae	Long-billed Spider hunter	<i>Arachnothera robusta</i>	LC	R
74	Terrestrial Bird	Nectariniidae	Grey-breasted Spider hunter	<i>Arachnothera affinis</i>	LC	R
75	Terrestrial Bird	Passeridae	Eurasian Tree-Sparrow	<i>Passer montanus</i>	LC	R
76	Terrestrial Bird	Ploceidae	Baya Weaver	<i>Ploceus philippinus</i>	LC	R
77	Terrestrial Bird	Ploceidae	White-headed Munia	<i>Lonchura maja</i>	LC	R
78	Terrestrial Bird	Ploceidae	Black-headed Munia	<i>Lonchura malacca</i>	LC	R
79	Terrestrial Bird	Ploceidae	Scaly-breasted munia	<i>Lonchura punctulata</i>	LC	R
80	Terrestrial Bird	Caprimulgidae	Large-tailed Nightjar	<i>Caprimulgus macrurus</i>	LC	R
81	Terrestrial Bird	Caprimulgidae	Malaysian Eared Nightjar	<i>Eurostopodus temminckii</i>	LC	R
82	Terrestrial Bird	Picidae	Common Flameback	<i>Dinopium javanense</i>	LC	R

(Status: R – Resident; WV– Winter Visitor, IUCN: LC – Least Concern; NT – Near Threatened; VU– Vulnerable)

*Based on the IUCN red list (IUCN, 2011).