

A preliminary ornithological assessment and conservation evaluation of the PT Daisy logging concession, Berau district, East Kalimantan, Indonesia

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An ornithological survey in the PT Daisy logging concession, Berau district, East Kalimantan, Indonesia, was undertaken as part of a wider research effort to provide baseline data on its biodiversity in order to facilitate improved forest management. PT Daisy retains almost 30% of primary terrestrial forest, whilst 45% of the concession has now been logged. A total of 230 bird species were recorded including six Vulnerable, 47 Near Threatened and two restricted-range species. Compared to other protected areas in Kalimantan, the bird species diversity of PT Daisy is above average, but the reserve supports fewer globally threatened species and restricted-range species. The bird fauna of PT Daisy shows greatest similarity with Gunung Palung and Tanjung Puting National Parks. The undisturbed mixed dipterocarp lowland forests of PT Daisy are likely to be typical of the Sangkulirang Peninsula. At a landscape level, PT Daisy is important since it is part of a currently contiguous forest chain running through the Sangkulirang Peninsula. The best current conservation opportunity for forests in the peninsula is probably under a sustainable forest management regime. The current unsustainable approach to forest management at PT Daisy will inevitably lead to seriously reduced levels of biodiversity.

INTRODUCTION

In Kalimantan (Indonesian Borneo), remaining natural forests are subject to logging, conversion to oil palm and other tree crops and clearance for permanent agriculture. In the 12-year period from 1985 to 1997, forest cover in Kalimantan declined from 75% to 60%, a loss of 8,474,000 ha (706,000 ha per year), comprising 21% of the four provincial forest estates (Holmes 2002). This is worse than on Sumatra and Sulawesi, in terms of area and rate of forest loss (Holmes 2002). Conversion to plantation crops, particularly oil palm, has been assumed to be the primary cause of forest loss. Other sources include steady small-scale encroachment by smallholder farmers along the length of the forest frontier boundary. Most of the deforestation has occurred on lowland plains. Lowland forest supports the highest levels of biodiversity and has the greatest potential for sustainable forestry (Holmes 2002). If current trends continue, all non-swampy lowland forest in Kalimantan will be virtually destroyed by 2010 (Holmes 2002).

Holmes (2002) believed that the situation had become so critical that he recommended a complete revision of the forest function classification to represent the reality of present forest distribution in Kalimantan, and that absolute limits be set on the extent and distribution of further conversions in Kalimantan. He also recommended a number of biodiversity conservation initiatives, including a review of those areas of the biodiversity action plan that required re-evaluation. Subsequently, some sites proposed in the 1982 National Conservation Plan (MacKinnon and Artha 1981) have now lost their conservation value, whilst the relative value of others has increased as a result of surrounding landscape conversions.

Holmes (2002) further identified a number of sites where immediate biodiversity conservation initiatives are urgently required. These include lesser-known areas that are believed to still have major importance for the conservation of biodiversity, such as

Sangkulirang Peninsula in East Kalimantan. MacKinnon and Artha (1981) noted both that the existing protected areas system for East Kalimantan was far from satisfactory and that the scope for acquiring new areas was very limited. They made a number of recommendations for habitat types that should be included in the protected areas system, and specifically mentioned the need to include forests on limestone as found on the Sangkulirang Peninsula. The Sangkulirang Peninsula was subsequently identified as one of 23 Important Bird Areas in Kalimantan on the basis of the globally threatened and restricted-range bird species it supports (Holmes *et al.* 2000, 2001).

PT Daisy is an active logging concession located on the Sangkulirang Peninsula (Fig. 1). It covers 67,500 ha in two disjunct forest blocks on karst limestone with moderate to steep slopes at 0–700 m. The natural vegetation consists of hill evergreen and lowland mixed dipterocarp forest, mangrove forest, intertidal habitats and inshore islands. According to land classification based on the Landsat TM 116/59 of 13 November 1999, primary terrestrial forest now covers at least 29.6% of the area, mangrove forest covers at least 2.2%, logged forest covers at least 45%, and 8.8% of the area is classified as non-forest (permanent agriculture or shifting cultivation; note that 14% was obscured by clouds and unclassified in this image). The landscape is composed of a mosaic of primary and derivative vegetation types. The forest supports at least 44 plant families and at least 60 mammal species, of which 16 are endemic to Borneo (Eames *et al.* 2001).

Jarvie (2001) reported that the concession has been heavily affected by over-cutting, there is barely any protection of forest and the *plasma nutfah* areas (reserved forest blocks providing a natural source of seed, which is mandatory under Indonesian forest law) are wholly inadequate to conserve representative biodiversity. Furthermore, the volume of wood extracted is unsustainable, especially from the easily accessible level lowland areas where the 35-year prescribed interval between logging cycles has not been followed.

This has resulted in total canopy destruction in many areas. The complexity of forest laws, rampant corruption in the forestry administration, lack of security of forest concession tenure, low levels of understanding amongst concession managers of basic forest management practices (including basic map-reading skills) and illegal logging by outsiders have all been identified as management issues (Eames *et al.* 2001). The current unsustainable approach to forest management at PT Daisy threatens sustainability of the commercial forestry operation and in the long term will inevitably lead to seriously reduced levels of biodiversity.

To achieve more sustainable forest management, PT Daisy and the Tropical Forest Trust are developing a new collaborative venture. A preliminary biological assessment was considered an important stage in project development (Eames *et al.* 2001). This paper presents the results of a 21-day ornithological survey undertaken during 7–27 September 2001. This work was undertaken as part of a wider research effort to provide baseline data on the biodiversity of PT Daisy, to put this into a regional and global context, and to make conservation recommendations to guide planning of future forestry activities proposed by the Tropical Forest Trust and the management of PT Daisy (Eames *et al.* 2001).

METHODS

Bird surveys were conducted during 7–27 September 2001 from three forest camps in Block B and at the logging concession headquarters on Suleman Bay. Camp A was located on a logging road in primary forest at 01°13'20"N 118°37'45"E, camp B was located in logged forest at 01°04'10"N 118°47'10"E and camp C was located in logged forest 200 m from the primary forest in the *plasma nutfah* at 01°08'56"N 118°41'31"E. Additional observations were made elsewhere in Block B, in Block A and in mangrove forest in both blocks. Active searches were begun from shortly after dawn, with effort continuing all day, weather permitting. Most observations were made at the forest edge from logging roads. Trails in the forest and along logging roads were walked slowly with frequent stops to observe mixed-species feeding flocks or birds feeding at fruiting trees. Birds were detected both by sight and by call. Searches for nocturnal birds were also made. On 14 transects (Table 1), data were collected on the bird community using a modification of the method outlined in MacKinnon and Phillipps (1993). This involved making a list of the first ten species recorded, and then repeating the process to make several such lists. Plotting the cumulative number of species recorded gave species discovery curves to indicate local diversity. Species recorded on a high proportion of lists are likely to be the most abundant and/or detectable (MacKinnon and Phillipps 1993). Threat status follows BirdLife International (2004) and restricted-range status follows Stattersfield *et al.* (1998). The degree of similarity between the bird faunas at PT Daisy and other protected areas was assessed using Sorenson's Similarity Index (Magurran 1988), which is given by the formula:



Figure 1. Location of PT Daisy.

$$C = \frac{2j}{(a + b)}$$

where j = the number of shared species between two areas, a = the number of species in area A, and b = the number of species in area B.

RESULTS

A total of 230 bird species was recorded (Appendix 1), including six Vulnerable species: Bulwer's Pheasant *Lophura bulweri*, Short-toed Coucal *Centropus rectunguis*, Large Green Pigeon *Treron capellei*, Wallace's Hawk Eagle *Spizaetus nanus*, Lesser Adjutant *Leptoptilos javanicus* and Blue-headed Pitta *Pitta baudii*, 47 Near Threatened species (Appendix 2) and two restricted-range species: Hose's Broadbill *Calyptomena hosii* and Chestnut-crested Yuhina *Yuhina everetti*.

To determine the most abundant/detectable species, a total of 96 lists of ten species were made in two habitats, logged forest edge (80 lists) and primary forest edge (16 lists). The ten most commonly recorded bird species in each habitat are listed in Tables 2 and 3. Six species were recorded in both habitats. These results may reveal subtle differences in the avifauna of forest-edge habitats but reveal little about relative abundance between logged and primary forest. Species discovery curves for the two habitats show similar initial steepness, but the smaller sample of forest-edge lists means that it is not possible to determine whether the curves would have levelled out at similar values (Fig. 2).

SELECTED SPECIES ACCOUNTS

Species accounts are provided for threatened and restricted-range species, plus species that were newly recorded for East Kalimantan or represented significant range extensions within Borneo according to Smythies (1999) and van Balen and Nurwatha (1997). All records refer to sight records.

Table 1. Transects used for bird surveys.

No.	Starting coordinates	Altitude (m)	Length (m)	Habitat	Date	Start time	End time	No. lists completed
1	01°13'4"N 118°38'02"E	360	5,000	Logged forest edge	9 Sept	07h02	09h35	8
2	01°13'20"N 118°37'45"E	c.350	5,000	Primary forest edge	10 Sept	06h00	10h03	9
3	01°13'20"N 118°37'45"E	c.350	1,000	Primary forest edge	11 Sept	06h05	09h25	7
4	01°11'30"N 118°41'51"E	c.10	2,000	Logged forest edge	12 Sept	05h50	09h55	8
5	01°11'00"N 118°42'05"E	c.10	2,000	Logged forest edge	12 Sept	05h57	09h55	7
6	01°04'11"N 118°47'11"E	c.300	5,000	Logged forest edge	14 Sept	06h06	09h50	10
7	01°04'11"N 118°47'11"E	c.300	3,000	Logged forest edge	15 Sept	05h58	08h22	6
8	01°08'56"N 118°41'31"E	c.250	4,000	Logged forest edge	17 Sept	06h45	09h52	8
9	01°08'56"N 118°41'31"E	c.250	<1,000	Logged forest edge	18 Sept	06h25	10h00	4
10	01°08'56"N 118°41'31"E	c.250	2,500	Logged forest edge	19 Sept	06h25	08h40	7
11	01°06'56"N 118°46'30"E	600	4,000	Logged forest edge	21 Sept	06h17	10h05	8
12	01°16'24"N 118°29'23"E	280	2,500	Logged forest edge	23 Sept	07h00	09h30	2
13	01°05'07"N 118°46'26"E	678	3,000	Logged forest edge	26 Sept	06h40	09h30	5
14	01°09'30"N 118°43'15"E	5	3,000	Logged forest edge	27 Sept	07h15	09h33	7

BULWER'S PHEASANT *Lophura bulweri*

Vulnerable. This is a submontane species inhabiting mixed dipterocarp forest, bamboo areas on old landslips and *Agathis* forest (Smythies 1999). A pair was seen at the roadside in primary forest-edge at 15h45 on 11 September by D. da Costa and L. Nyoman.

OLIVE-BACKED WOODPECKER *Dinopium rafflesii*

Near Threatened. This species is an uncommon resident of primary and secondary lowland forest (Smythies 1999). One female was seen on transect 14 on 27 September. According to Smythies (1999) this represents the first record from East Kalimantan, but the species has apparently been previously recorded at PT Daisy (S. van Balen *in litt.* 2004).

SHORT-TOED COUCAL *Centropus rectunguis*

Vulnerable. This species occurs in primary and logged lowland forest and is an extreme lowland forest specialist (Smythies 1999). Three were recorded: one heard on transect 8 on 17 September, one seen on transect 11 on 21 September, and one heard on transect 12 on 23 September.

LARGE GREEN PIGEON *Treron capellei*

Vulnerable. This species is resident, but sparingly distributed throughout lowland forest in Borneo and it is scarce in most areas in comparison with the smaller green pigeons (Smythies 1999). Up to 50 birds were observed feeding in a large fruiting fig near Camp C from 17h00 on 16 September. Ten birds were present the following morning, and 30 were seen after 17h00. In addition, one was seen on transect 8 on 17 September and flocks of four and two were seen on transect 9 on 18 September.

WALLACE'S HAWK EAGLE *Spizaetus nanus*

Vulnerable. This species is resident in Borneo, occurring in particular in East Kalimantan (Smythies 1999). One was seen flying through the canopy carrying a small passerine on transect 11 on 21 September. Later

Table 2. The ten most commonly recorded bird species in logged forest-edge.

Species	No. lists	% lists
BLACK-HEADED BULBUL <i>Pycnonotus atriceps</i>	32	43.8
EMERALD DOVE <i>Chalcophaps indica</i>	31	42.5
LITTLE SPIDERHUNTER <i>Arachnothera longirostra</i>	23	31.5
BLUE-EARED BARBET <i>Megalaima australis</i>	22	30.1
GREAT ARGUS <i>Argusianus argus</i>	22	30.1
CHESTNUT-WINGED BABBLER <i>Stachyris erythroptera</i>	20	27.4
SOOTY-CAPPED BABBLER <i>Malacopteron affine</i>	20	27.4
BLACK-AND-YELLOW BROADBILL <i>Eurylaimus ochromalus</i>	20	27.4
WHITE-RUMPED SHAMA <i>Copsychus malabaricus</i>	20	27.4
ASIAN FAIRY BLUEBIRD <i>Irena puella</i>	19	26.0

Table 3. The ten most commonly recorded bird species in primary forest-edge.

Species	No. lists	% lists
WHITE-RUMPED SHAMA <i>Copsychus malabaricus</i>	8	47.1
BLUE-CROWNED HANGING PARROT <i>Loriculus galgulus</i>	8	47.1
LITTLE SPIDERHUNTER <i>Arachnothera longirostra</i>	8	47.1
CHESTNUT-WINGED BABBLER <i>Stachyris erythroptera</i>	8	47.1
GREY-HEADED CANARY FLYCATCHER <i>Culicicapa ceylonensis</i>	7	41.2
WHISKERED TREESWIFT <i>Hemiprocne comata</i>	6	35.5
EMERALD DOVE <i>Chalcophaps indica</i>	5	29.4
BLACK-AND-YELLOW BROADBILL <i>Eurylaimus ochromalus</i>	5	29.4
ASIAN FAIRY BLUEBIRD <i>Irena puella</i>	5	29.4
RUFIOUS-TAILED TAILORBIRD <i>Orthotomus sericeus</i>	4	23.5

in the afternoon a juvenile was observed trying to catch an unseen prey item, perhaps a lizard, snake or small mammal, by climbing through the lower canopy and

middle storey at forest edge by the logging camp in Block A.

LESSER ADJUTANT *Leptoptilos javanicus*

Vulnerable. This species is a local resident in Borneo (Smythies 1999). It was recorded on several occasions: one was seen feeding in the intertidal area of an inlet on 12 and 13 September; three birds were seen feeding at the same location and a flock of 12 were seen soaring in the distance on 16 September; six birds were seen feeding at the same locality on 19 September. A colony with six nests and five fledged young was located at the north entrance to the channel between the mainland and Sigenting-besar island on 20 September. One was seen in mangroves in Block A on 23 September and another was seen in Block A on 25 September; a group of five were seen feeding at a creek mouth near 01°16'N 118°41'E on 25 September; and one was seen in the intertidal inlet south of Suleman bay on 26 September.

BLUE-HEADED PITTA *Pitta baudi*

Vulnerable. This is a locally common resident throughout lowland forests (Smythies 1999). Several were recorded: a female was seen in late morning along transect 4 on 12 September; several were heard there in the late afternoon on the same day; one was heard on transect 11 on 21 September; a pair was observed along a stream in late afternoon on Block A also on 21 September; one male was seen foraging in riverine forest in Block A on 22 September; and one was heard on transect 13 on 26 September.

HOSE'S BROADBILL *Calyptomena hosii*

Near Threatened; restricted-range. This is primarily a submontane species (although there are recent lowland observations) which has a patchy distribution (Smythies 1999); it had been previously recorded at Maau on the Bengalun River in East Kalimantan (Smythies 1999) and in Kayan Mentarang National Park (van Balen and Nurwatha 1997). Up to five were seen at a fruiting tree on transect 6 on 14 September and a female was seen at the same tree on 15

September. These records extend the range of the species 275 km eastwards in Borneo.

CHESTNUT-CRESTED YUHINA *Yuhina everetti*

Restricted-range. This species is a common submontane and montane resident (Smythies 1999). Six were recorded: two were seen mobbing a Moustached Hawk Cuckoo *Hierococcyx vagans* on transect 8 on 17 September; two were seen at forest edge on transect 10 on 19 September; and two were seen on transect 11 at 600 m on 21 September. The species has been previously found at low elevations at Kutai Reserve in East Kalimantan (Smythies 1999) and in Kayan Mentarang National Park (van Balen and Nurwatha 1997). These records are the first from the Sangkulirang Peninsula, and extend the known range of the species by c.200 km eastwards in Borneo.

SCARLET-BREADED FLOWERPECKER *Prionochilus thoracicus*

Near Threatened. This species is a common resident in the lowlands of Borneo (Smythies 1999). One was seen on transect 1 on 9 September. According to Smythies (1999) this is the first record from East Kalimantan.

DISCUSSION

Biological importance

Bird species diversity at PT Daisy (230 species) was above the mean value of 218 species for eight protected areas in Kalimantan (Table 4), although it should be noted that these totals are likely to reflect observer effort to some degree. Adding in data for two other Bornean sites (Danum Valley Conservation Area including Ulu Segama forests: 240 species; Kayan Mentarang National Park: 286 species) gives a mean of 227, which is just below the value for PT Daisy. Of the 230 bird species recorded in PT Daisy, 53 species (23%) are considered threatened (Vulnerable) or Near Threatened, although many of the latter remain common and widespread. This reflects the international concern for the conservation status of lowland Sundaic forests. The number of globally threatened species found in eight protected areas in Kalimantan ranged from two to twelve species, with a mean of seven species (Table 4). PT Daisy, with six species, is slightly below the mean, although the same caveats about observer effort apply. The number of restricted-range species at these sites was 0–12, with a mean of three (Table 4). PT Daisy also fell below average in this respect, with two species (Hose's Broadbill and Chestnut-crested Yuhina). The Bornean Mountains Endemic Bird Area should therefore be extended eastwards to encompass this part of the Sangkulirang Peninsula. PT Daisy supports four Bornean endemics: Bulwer's Pheasant, Blue-headed Pitta, Hose's Broadbill and Bornean Blue Flycatcher *Cyornis superbus*. Whilst levels of micro-endemism are low (2%), levels of regional endemism are much higher, with 118 species (51%) endemic to the Sunda region (peninsular Malaysia, Java, Bali, Sumatra and Borneo).

The degree of similarity between the bird faunas at PT Daisy and other protected areas in Kalimantan was compared using Sorenson's Similarity Index; high

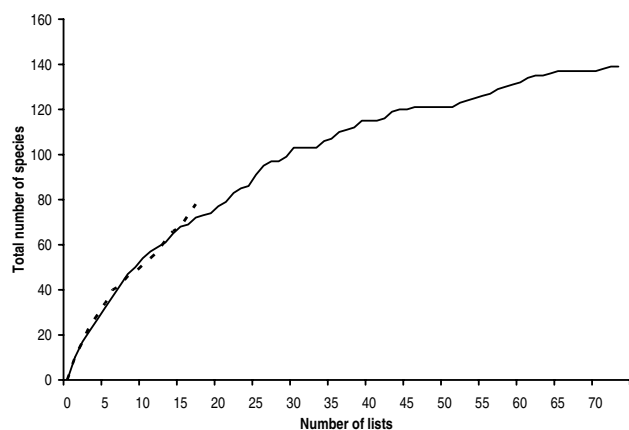


Figure 2. Species discovery curves in logged (dashed line) and primary (solid line) forest-edge, derived from repeated lists of ten species.

Table 4. Bird species diversity and endemism at PT Daisy compared to seven other protected areas in Kalimantan (sources: MacKinnon and Phillipps 1993, van Balen and Nurwatha 1997, Eames *et al.* 2001).

Site	Total no. species	No. restricted-range species	No. threatened species	No. Near Threatened species	No. species shared with PT Daisy	Sorenson's Similarity Index
PT Daisy	230	2	6	46		
Betung Kerihun	241	12	9	59	148	0.630
Danau Sentarum	224	0	5	50	157	0.693
Gunung Palung	245	1	12	62	175	0.738
Tanjung Puting	234	2	9	54	168	0.726
Gunung Niut	126	7	2	26	78	0.439
Sungai Negara	161	0	3	11	93	0.477
Kutai	279	1	9	65	177	0.697

values indicate a high degree of similarity between the species assemblages (Table 4). There was greatest similarity with Gunung Palung and Tanjung Puting, reflecting the shared occurrence of lowland forest habitats in these areas. There was least similarity with Gunung Niut (which supports montane habitats) and Sungai Negara (which supports swamp habitats). The undisturbed mixed dipterocarp lowland forests of PT Daisy are likely to be typical of the Sangkulirang Peninsula.

At a landscape level, PT Daisy is important since it part of a currently contiguous forest chain running north-west to south-east through the Sangkulirang Peninsula. However, although PT Daisy is larger than all but three existing protected areas in East Kalimantan (Jepson *et al.* 2002), it may not be large enough by itself to support viable populations of bird species that have large home-range sizes and occur at low population densities. It is therefore important that forest cover be maintained both within the area and contiguously outside it. If PT Daisy were incorporated into the proposed Sangkulirang-Mangaliat National Park, as has been previously suggested by MacKinnon (1982), Momberg *et al.* (1998) and Jepson *et al.* (2002), then this problem could be avoided. The proposed reserve would be the second largest protected area in Kalimantan after Kayan Mentarang National Park. Alternatively, if PT Daisy together with adjoining concessions were placed under sustainable forest management regimes, and then combined with the proposed Sangkulirang-Mangaliat National Park, the protected landscape would be far larger, with even bigger benefits to conservation.

Conservation

The effects of logging on biodiversity in the tropics have been documented by Grieser Johns (1997) and Haworth and Counsell (1999). Within the Indo-Malayan Realm there have been a number of studies, including ones that have focused specifically on the effects on lowland bird communities e.g. Johns (1986, 1987), Lambert (1990, 1992) and Marsden (1998). Although some studies have shown that selective logging reduces species richness and overall abundance (e.g. Johns 1986), others show species richness to be similar in logged and primary forest, with composition and population densities of many species differing

between these habitats (Lambert 1992, Grieser Johns 1996). This may explain the similarity of the species discovery curves in Fig. 3 (notwithstanding the small sample size). Following logging, certain taxa, notably flycatchers, woodpeckers, trogons and wren babblers become comparatively rare, whilst nectivorous and opportunistic frugivorous species increase in abundance. Furthermore the activity levels of some species increase, whilst others range over a larger area (Lambert 1992). Although a high proportion of species recorded in unlogged forest reappear in logged forest 12 years after logging, some, including terrestrial litter-gleaning and understorey flycatchers, do not (Johns 1989). While quantitative data on the effects of logging on bird species diversity and abundance was not collected in the present survey, anecdotal observations suggested differences between logged and unlogged forest. For example: Red-naped Trogon *Harpactes kasumba* was only recorded from primary forest; Grey-chested Jungle Flycatcher *Rhinomyias umbratilis* was recorded four times in primary forest but only once in logged forest; Bornean Blue Flycatcher was recorded only in primary riverine forest; and Striped Wren Babbler *Kenopia striata* was recorded only in primary riverine forest.

Previous proposals to establish the Sangkulirang-Mangaliat National Park (MacKinnon 1982, Momberg *et al.* 1998) have not yet been acted upon. Furthermore, since political and administrative decentralisation have become policy initiatives in the post-Suharto era, major ecosystem reserves have become more difficult to designate. Therefore the best current conservation opportunity for forests in the Sangkulirang Peninsula, including PT Daisy, is probably under sustainable forest management. In order to maintain the full biodiversity attributes of PT Daisy it is recommended that (1) the original boundaries of the concession should be maintained; (2) a sustainable forest management regime should be developed and implemented; and (3) levels of forest law enforcement should be immediately increased. There is an important role for international NGOs and donors such as the World Bank to lobby and press for a nation-wide increase in wages, means, and number of people employed in forest law enforcement in Indonesia. Such measures will reduce the occurrence of illegal logging in concessions and protected areas,

and improve the implementation of sustainable forestry. In order to maintain the full biodiversity attributes of the Sangkulirang Peninsula at the regional scale, it is recommended that a landscape-level management plan be developed in collaboration with adjacent timber concessions on the Sangkulirang Peninsula.

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APPENDIX 1

Birds species recorded at PT Daisy

Species	Status
CRESTED PARTRIDGE <i>Rollulus rouloul</i>	NT
CRESTED FIREBACK <i>Lophura ignita</i>	NT
BULWER'S PHEASANT <i>Lophura bulweri</i>	VU
GREAT ARGUS <i>Argusianus argus</i>	NT
RUFIOUS PICULET <i>Sasia abnormis</i>	
WHITE-BELLIED WOODPECKER <i>Dryocopus javensis</i>	
OLIVE-BACKED WOODPECKER <i>Dinopium rafflesii</i>	NT
MAROON WOODPECKER <i>Blythipicus rubiginosus</i>	
ORANGE-BACKED WOODPECKER <i>Reinwardtipicus validus</i>	
BUFF-RUMPED WOODPECKER <i>Meiglyptes tristis</i>	
BUFF-NECKED WOODPECKER <i>Meiglyptes tukki</i>	NT
GREY-AND-BUFF WOODPECKER <i>Hemicircus concretus</i>	
GREAT SLATY WOODPECKER <i>Mulleripicus pulverulentus</i>	
GOLD-WHISKERED BARBET <i>Megalaima chrysopogon</i>	
RED-CROWNED BARBET <i>Megalaima rafflesii</i>	NT
RED-THROATED BARBET <i>Megalaima mystacophanos</i>	NT
YELLOW-CROWNED BARBET <i>Megalaima henricii</i>	NT
BLUE-EARED BARBET <i>Megalaima australis</i>	
BROWN BARBET <i>Calorhampus fuliginosus</i>	
ORIENTAL PIED HORNBILL <i>Anthracoceros albirostris</i>	
BLACK HORNBILL <i>Anthracoceros malayanus</i>	NT
RHINOCEROS HORNBILL <i>Buceros rhinoceros</i>	NT
HELMETED HORNBILL <i>Buceros vigil</i>	NT
BUSHY-CRESTED HORNBILL <i>Anorrhinus galeritus</i>	
WHITE-CROWNED HORNBILL <i>Aceros comatus</i>	NT
WRINKLED HORNBILL <i>Aceros corrugatus</i>	NT
WREATHED HORNBILL <i>Aceros undulatus</i>	
RED-NAPED TROGON <i>Harpactes kasumba</i>	NT
DIARD'S TROGON <i>Harpactes diardi</i>	NT
SCARLET-RUMPED TROGON <i>Harpactes duvaucelii</i>	NT
DOLLARBIRD <i>Eurystomus orientalis</i>	
COMMON KINGFISHER <i>Alcedo atthis</i>	
BLUE-EARED KINGFISHER <i>Alcedo meninting</i>	
ORIENTAL DWARF KINGFISHER <i>Ceyx erithacus</i>	
BANDED KINGFISHER <i>Lacedo pulchella</i>	
STORK-BILLED KINGFISHER <i>Halcyon capensis</i>	
COLLARED KINGFISHER <i>Todiramphus chloris</i>	
SACRED KINGFISHER <i>Todiramphus sanctus</i>	
RED-BEARED BEE-EATER <i>Nyctyornis amictus</i>	
BLUE-THROATED BEE-EATER <i>Merops viridis</i>	
MOUSTACHED HAWK CUCKOO <i>Hierococcyx vagans</i>	NT
INDIAN CUCKOO <i>Cuculus micropterus</i>	
BANDED BAY CUCKOO <i>Cacomantis sonneratii</i>	
PLAINTIVE CUCKOO <i>Cacomantis merulinus</i>	
VIOLET CUCKOO <i>Chrysococcyx xanthorhynchus</i>	
BLACK-BELLIED MALKOHA <i>Phaenicophaeus diardi</i>	NT
RAFFLES'S MALKOHA <i>Phaenicophaeus chlorophaeus</i>	
CHESTNUT-BELLIED MALKOHA <i>Phaenicophaeus sumatranus</i>	NT
SHORT-TOED COUCAL <i>Centropus rectunguis</i>	VU
GREATER COUCAL <i>Centropus sinensis</i>	
BLUE-RUMPED PARROT <i>Psittinus cyanurus</i>	NT
BLUE-CROWNED HANGING PARROT <i>Loriculus galgulus</i>	
BLACK-NEST SWIFTLET <i>Collocalia maxima</i>	
EDIBLE-NEST SWIFTLET <i>Collocalia fuciphaga</i>	
SILVER-RUMPED NEEDLETAIL <i>Rhaphidura leucopygialis</i>	
BROWN-BACKED NEEDLETAIL <i>Hirundapus giganteus</i>	
ASIAN PALM SWIFT <i>Cypsiurus balasienis</i>	

Species	Status
FORK-TAILED SWIFT <i>Apus pacificus</i>	
GREY-RUMPED TREESWIFT <i>Hemiprocne longipennis</i>	
WHISKERED TREESWIFT <i>Hemiprocne comata</i>	
BARRED EAGLE OWL <i>Bubo sumatranus</i>	
BUFFY FISH OWL <i>Ketupa ketupu</i>	
BROWN WOOD OWL <i>Strix leptogrammica</i>	
BROWN HAWK OWL <i>Ninox scutulata</i>	
MALAYSIAN EARED NIGHTJAR <i>Eurostopodus temminckii</i>	
SPOTTED DOVE <i>Streptopelia chinensis</i>	
EMERALD DOVE <i>Chalcophaps indica</i>	
LITTLE GREEN PIGEON <i>Treron olax</i>	
PINK-NECKED GREEN PIGEON <i>Treron vernans</i>	
THICK-BILLED GREEN PIGEON <i>Treron curvirostra</i>	
LARGE GREEN PIGEON <i>Treron capellei</i>	VU
JAMBU FRUIT DOVE <i>Ptilinopus jambu</i>	NT
GREEN IMPERIAL PIGEON <i>Ducula aenea</i>	
PIED IMPERIAL PIGEON <i>Ducula bicolor</i>	
RED-LEGGED CRAKE <i>Rallina fasciata</i>	
WHITE-BREADED WATERHEN <i>Amauornis phoenicurus</i>	
WHIMBREL <i>Numenius phaeopus</i>	
COMMON REDSHANK <i>Tringa totanus</i>	
TEREK SANDPIPER <i>Xenus cinereus</i>	
COMMON SANDPIPER <i>Actitis hypoleucos</i>	
GREY-TAILED TATTLER <i>Heteroscelus brevipes</i>	
RUDDY TURNSTONE <i>Arenaria interpres</i>	
RED-NECKED STINT <i>Calidris ruficollis</i>	
KENTISH PLOVER <i>Charadrius alexandrinus</i>	
LESSER SAND PLOVER <i>Charadrius mongolus</i>	
GREATER SAND PLOVER <i>Charadrius leschenaultii</i>	
GULL-BILLED TERN <i>Gelochelidon nilotica</i>	
LESSER CRESTED TERN <i>Sterna bengalensis</i>	
GREAT CRESTED TERN <i>Sterna bergii</i>	
BLACK-NAPED TERN <i>Sterna sumatrana</i>	
COMMON TERN <i>Sterna hirundo</i>	
WHISKERED TERN <i>Chlidomas hybridus</i>	
OSPREY <i>Pandion haliaetus</i>	
ORIENTAL HONEY-BUZZARD <i>Pernis ptilorhynchus</i>	
BAT HAWK <i>Macheiramphus alcinus</i>	
BRAHMINY KITE <i>Haliaeetus Indus</i>	
WHITE-BELLIED SEA EAGLE <i>Haliaeetus leucogaster</i>	
CRESTED SERPENT EAGLE <i>Spilornis cheela</i>	
CRESTED GOSHAWK <i>Accipiter trivirgatus</i>	
BLACK EAGLE <i>Ictinaetus malayensis</i>	
BLYTH'S HAWK EAGLE <i>Spizaetus albomiger</i>	
WALLACE'S HAWK EAGLE <i>Spizaetus namus</i>	VU
BLACK-THIGHED FALCONET <i>Microhierax fringillarius</i>	
LITTLE PIED CORMORANT <i>Phalacrocorax melanoleucos</i>	
LITTLE EGRET <i>Egretta garzetta</i>	
PACIFIC REEF EGRET <i>Egretta sacra</i>	
GREAT-BILLED HERON <i>Ardea sumatrana</i>	
GREAT EGRET <i>Casmerodius albus</i>	
CATTLE EGRET <i>Bubulcus ibis</i>	
JAVAN POND HERON <i>Ardeola speciosa</i>	
LITTLE HERON <i>Butorides striatus</i>	
LESSER ADJUTANT <i>Leptoptilos javanicus</i>	VU
GREAT FRIGATEBIRD <i>Fregata minor</i>	
LESSER FRIGATEBIRD <i>Fregata ariel</i>	
BLUE-HEADED PITTA <i>Pitta baudii</i>	VU
HOODED PITTA <i>Pitta sordida</i>	
GARNET PITTA <i>Pitta granatina</i>	NT

Species	Status
DUSKY BROADBILL <i>Corydon sumatranus</i>	
BLACK-AND-RED BROADBILL <i>Cymbirhynchus macrorhynchus</i>	
BLACK-AND-YELLOW BROADBILL <i>Eurylaimus ochromalus</i>	NT
GREEN BROADBILL <i>Calyptomena viridis</i>	NT
HOSE'S BROADBILL <i>Calyptomena hosii</i>	NT, RR
GOLDEN-BELLIED GERYGONE <i>Gerygone sulphurea</i>	
ASIAN FAIRY BLUEBIRD <i>Irena puella</i>	
GREATER GREEN LEAFBIRD <i>Chloropsis sonnerati</i>	
LESSER GREEN LEAFBIRD <i>Chloropsis cyanopogon</i>	NT
BLUE-WINGED LEAFBIRD <i>Chloropsis cochinchinensis</i>	
MANGROVE WHISTLER <i>Pachycephala grisola</i>	
CRESTED JAY <i>Platylophus galericulatus</i>	NT
BLACK MAGPIE <i>Platysmurus leucopterus</i>	NT
SLENDER-BILLED CROW <i>Corvus enca</i>	
WHITE-BREADED WOODSWALLOW <i>Artamus leucorhynchus</i>	
DARK-THROATED ORIOLE <i>Oriolus xanthonotus</i>	NT
BLACK-NAPED ORIOLE <i>Oriolus chinensis</i>	
BLACK-HOODED ORIOLE <i>Oriolus xanthornus</i>	
BAR-BELLIED CUCKOOSHRIKE <i>Coracina striata</i>	
LESSER CUCKOOSHRIKE <i>Coracina fimbriata</i>	
PIED TRILLER <i>Lalage nigra</i>	
SCARLET MINIVET <i>Pericrocotus flammeus</i>	
BAR-WINGED FLYCATCHER-SHRIKE <i>Hemipus picatus</i>	
BLACK-WINGED FLYCATCHER-SHRIKE <i>Hemipus hirundinaceus</i>	
WHITE-THROATED FANTAIL <i>Rhipidura albicollis</i>	
PIED FANTAIL <i>Rhipidura javanica</i>	
BRONZED DRONGO <i>Dicrurus aeneus</i>	
GREATER RACKET-TAILED DRONGO <i>Dicrurus paradiseus</i>	
BLACK-NAPED MONARCH <i>Hypothymis azurea</i>	
ASIAN PARADISE-FLYCATCHER <i>Terpsiphone paradisi</i>	
COMMON IORA <i>Aegithina tiphia</i>	
GREEN IORA <i>Aegithina viridissima</i>	NT
RUFOUS-WINGED PHILENTOMA <i>Philentoma pyrhopterum</i>	
MAROON-BREADED PHILENTOMA <i>Philentoma velatum</i>	NT
LARGE WOODSHRIKE <i>Tephrodornis gularis</i>	
GREY-CHESTED JUNGLE FLYCATCHER <i>Rhinomyias umbratilis</i>	NT
GREY-STREAKED FLYCATCHER <i>Muscicapa griseisticta</i>	
ASIAN BROWN FLYCATCHER <i>Muscicapa dauurica</i>	
VERDITER FLYCATCHER <i>Eumyias thalassina</i>	
PALE BLUE FLYCATCHER <i>Cyonis unicolor</i>	
BORNEAN BLUE FLYCATCHER <i>Cyornis superbus</i>	
GREY-HEADED CANARY FLYCATCHER <i>Culicicapa ceylonensis</i>	
ORIENTAL MAGPIE ROBIN <i>Copsychus saularis</i>	
WHITE-RUMPED SHAMA <i>Copsychus malabaricus</i>	
CHESTNUT-NAPED FORKTAIL <i>Enicurus ruficapillus</i>	NT
ASIAN GLOSSY STARLING <i>Aplonis panayensis</i>	
HILL MYNA <i>Gracula religiosa</i>	
VELVET-FRONTED NUTHATCH <i>Sitta frontalis</i>	
BARN SWALLOW <i>Hirundo rustica</i>	
PACIFIC SWALLOW <i>Hirundo tahitica</i>	
BLACK-AND-WHITE BULBUL <i>Pycnonotus melanoleucos</i>	NT
BLACK-HEADED BULBUL <i>Pycnonotus atriceps</i>	
SCALY-BREADED BULBUL <i>Pycnonotus squamatus</i>	NT
PUFF-BACKED BULBUL <i>Pycnonotus eutilotus</i>	NT
YELLOW-VENTED BULBUL <i>Pycnonotus goiavier</i>	
OLIVE-WINGED BULBUL <i>Pycnonotus plumosus</i>	
CREAM-VENTED BULBUL <i>Pycnonotus simplex</i>	
RED-EYED BULBUL <i>Pycnonotus brunneus</i>	
SPECTACLED BULBUL <i>Pycnonotus erythrophthalmos</i>	

Species	Status
GREY-CHEEKED BULBUL <i>Alophoixus bres</i>	
YELLOW-BELLIED BULBUL <i>Alophoixus phaeocephalus</i>	
HAIRY-BACKED BULBUL <i>Tricholestes criniger</i>	
BUFF-VENTED BULBUL <i>Iole olivacea</i>	NT
STREAKED BULBUL <i>Ixos malaccensis</i>	NT
YELLOW-BELLIED PRINIA <i>Prinia flaviventris</i>	
DARK-NECKED TAILORBIRD <i>Orthotomus atrogularis</i>	
RUFOUS-TAILED TAILORBIRD <i>Orthotomus sericeus</i>	
ASHY TAILORBIRD <i>Orthotomus ruficeps</i>	
YELLOW-BELLIED WARBLER <i>Abroscopus superciliaris</i>	
WHITE-CHESTED BABBLER <i>Trichastoma rostratum</i>	NT
FERRUGINOUS BABBLER <i>Trichastoma bicolor</i>	
ABBOTT'S BABBLER <i>Malacocincla abbotti</i>	
HORSFIELD'S BABBLER <i>Malacocincla sepiarium</i>	
SHORT-TAILED BABBLER <i>Malacocincla malaccensis</i>	NT
BLACK-CAPPED BABBLER <i>Pellorneum capistratum</i>	
MOUSTACHED BABBLER <i>Malacopteron magnirostre</i>	
SOOTY-CAPPED BABBLER <i>Malacopteron affine</i>	NT
SCALY-CROWNED BABBLER <i>Malacopteron cinereum</i>	
RUFOUS-CROWNED BABBLER <i>Malacopteron magnum</i>	NT
CHESTNUT-BACKED SCIMITAR BABBLER <i>Pomatorhinus montanus</i>	
STRIPED WREN BABBLER <i>Kenopia striata</i>	NT
RUFOUS-FRONTED BABBLER <i>Stachyris rufifrons</i>	
GREY-HEADED BABBLER <i>Stachyris poliocephala</i>	
CHESTNUT-RUMPED BABBLER <i>Stachyris maculata</i>	NT
CHESTNUT-WINGED BABBLER <i>Stachyris erythroptera</i>	
STRIPED TIT BABBLER <i>Macronous gularis</i>	
FLUFFY-BACKED TIT BABBLER <i>Macronous pilosus</i>	NT
BROWN FULVETTA <i>Alcippe brunneicauda</i>	NT
CHESTNUT-CRESTED YUHINA <i>Yuhina everetti</i>	RR
WHITE-BELLIED YUHINA <i>Yuhina zantholeuca</i>	
YELLOW-BREADED FLOWERPECKER <i>Prionochilus maculatus</i>	
SCARLET-BREADED FLOWERPECKER <i>Prionochilus thoracicus</i>	NT
ORANGE-BELLIED FLOWERPECKER <i>Dicaeum trigonostigma</i>	
PLAIN SUNBIRD <i>Anthreptes simplex</i>	
BROWN-THROATED SUNBIRD <i>Anthreptes malacensis</i>	
RUBY-CHEEKED SUNBIRD <i>Anthreptes singalensis</i>	
PURPLE-NAPED SUNBIRD <i>Hypogramma hypogrammicum</i>	
PURPLE-THROATED SUNBIRD <i>Nectarinia sperata</i>	
COPPER-THROATED SUNBIRD <i>Nectarinia calcostetha</i>	
OLIVE-BACKED SUNBIRD <i>Nectarinia jugularis</i>	
CRIMSON SUNBIRD <i>Aethopyga siparaja</i>	
TEMMINCK'S SUNBIRD <i>Aethopyga temminckii</i>	
LITTLE SPIDERHUNTER <i>Arachnothera longirostra</i>	
THICK-BILLED SPIDERHUNTER <i>Arachnothera crassirostris</i>	
LONG-BILLED SPIDERHUNTER <i>Arachnothera robusta</i>	
SPECTACLED SPIDERHUNTER <i>Arachnothera flavigaster</i>	
YELLOW-EARED SPIDERHUNTER <i>Arachnothera chrysogenys</i>	
GREY-BREADED SPIDERHUNTER <i>Arachnothera affinis</i>	
EURASIAN TREE SPARROW <i>Passer montanus</i>	
YELLOW WAGTAIL <i>Motacilla flava</i>	
GREY WAGTAIL <i>Motacilla cinerea</i>	
DUSKY MUNIA <i>Lonchura fuscans</i>	
BLACK-HEADED MUNIA <i>Lonchura malacca</i>	

Key

VU = Vulnerable, NT = Near Threatened, RR = restricted-range

APPENDIX 2

Near Threatened species recorded at PT Daisy

Crested Partridge *Rollulus rouloul*

A common resident throughout the lowland forests of Borneo (Smythies 1999). Four males and a female, and a pair were seen in the vicinity of transect 4 on 12 September.

Crested Fireback *Lophura ignita*

A common resident in the lowland forests throughout Borneo, excluding peat swamp forest (Smythies 1999). Three females were seen to cross a logging road near the HQ on 8 September.

Great Argus *Argusianus argus*

A common resident throughout the lowland forests of Borneo (Smythies 1999). It was commonly recorded, with 33 records, mostly of calling birds, in both logged and primary forest.

Buff-necked Woodpecker *Meiglyptes tukki*

A common resident in the mixed dipterocarp forests of Borneo (Smythies 1999). A single bird was seen on transect 7 on 15 September.

Red-crowned Barbet *Megalaima rafflesii*

A common resident in the lowlands in mixed dipterocarp (often disturbed) forest from sea-level to 500 m (Smythies 1999). This species was heard on 7 and 8 September and on transect 10 on 19 September.

Red-throated Barbet *Megalaima mystacophanos*

This species is an abundant lowland resident of primary mixed dipterocarp forest and secondary forest from sea-level up to 1,375 m (Smythies 1999). It was commonly recorded, with 16 records, mainly of calling birds in primary forest-edge.

Yellow-crowned Barbet *Megalaima henrici*

A common submontane resident throughout Borneo in primary and logged lowland forest (Smythies 1999). One was heard on transect 5 on 13 September.

Black Hornbill *Anthracoceros malayanus*

Resident throughout the lowland forests of Borneo, mainly below 600 m (Smythies 1999). Thirteen individuals were recorded during 7–27 September.

Rhinoceros Hornbill *Buceros rhinoceros*

Resident throughout Borneo in hilly and lowland forest (Smythies 1999). Twenty-two were recorded during 7–27 September.

Helmeted Hornbill *Buceros vigil*

Resident throughout Borneo in lowland alluvial forest (Smythies 1999). Nineteen were recorded during 7–18 September. A male was observed feeding a female at a nest hole at the end of transect 5 on 13 September and again on 26 September.

White-crowned Hornbill *Aceros comatus*

Resident at low density throughout Borneo in primary and logged forest, mainly in hilly country but not often seen (Smythies 1999). Five were recorded during 12–22 September.

Wrinkled Hornbill *Aceros corrugatus*

Resident and sparsely distributed throughout Borneo in the lowlands in primary forest from sea-level to 800 m (Smythies 1999). Nineteen were recorded during 7–19 September.

Red-naped Trogon *Harpactes kasumba*

Resident throughout Borneo in primary forest, bamboo, and rarely in logged forest if virgin patches are available nearby (Lambert 1990 in Smythies 1999). Three were recorded during 8–23 September.

Diard's Trogon *Harpactes diardi*

Resident and fairly common throughout Borneo up to 1,200 m in virgin and logged forest (Smythies 1999). Ten were recorded during 8–26 September.

Scarlet-rumped Trogon *Harpactes duvaucelii*

A common resident throughout the lowland forests of Borneo (Smythies 1999). At least 16 were recorded during 9–26 September.

Moustached Hawk Cuckoo *Hierococcyx vagans*

A rare resident of lowland forest (Smythies 1999). One seen on transect 8 on 17 September was being mobbed by two Chestnut-crested Yuhinas *Yuhina everetti*.

Black-bellied Malkoha *Phaenicophaeus diardi*

Resident and usually common throughout the lowlands of Borneo (Smythies 1999). Three were seen during 9–21 September.

Chestnut-bellied Malkoha *Phaenicophaeus sumatranus*

A common resident of the lowlands, predominantly in coastal areas up to 500 m (Smythies 1999). Two were seen together with three Raffles's Malkohas *Phaenicophaeus chlorophaeus* on transect 8 on 17 September.

Blue-rumped Parrot *Psittinus cyanurus*

Resident in virgin and logged forest up to about 500 m (Smythies 1999). One was seen along transect 3 on 11 September. Two flew overhead along transect 5 on 13 September. One briefly visited a fruiting fig tree near Camp C on 17 September. Two were seen on transect 10 on 19 September.

Jambu Fruit Dove *Ptilinopus jambu*

Local resident but widely distributed in Borneo (Smythies 1999). One male was seen near transect 4 on 12 September. A pair were observed visiting a fruiting tree on transect 6 on 15 September.

Garnet Pitta *Pitta granatina*

Resident in lowlands in mixed dipterocarp forest (Smythies 1999). Nine were recorded during 7–27 September.

Black-and-yellow Broadbill *Eurylaimus ochromalus*

Resident throughout Borneo in the lowlands in primary forest (Smythies 1999). Common at PT Daisy and recorded almost daily throughout the survey.

Green Broadbill *Calypdomena viridis*

Resident throughout Borneo in mixed dipterocarp forest of the lowlands (Smythies 1999). A minimum of 21 were recorded during 9–27 September.

Lesser Green Leafbird *Chloropsis cyanopogon*

A common resident throughout the lowland forests of Borneo from sea-level to about 600 m (Smythies 1999). Eleven were recorded during 8–27 September.

Crested Jay *Platylophus galericulatus*

A common resident throughout the lowland forests of Borneo (Smythies 1999). Five were recorded during 8–17 September.

Black Magpie *Platysmurus leucopterus*

A fairly common resident throughout the lowlands of Borneo (Smythies 1999). At least eight were recorded during 10–18 September.

Dark-throated Oriole *Oriolus xanthonotus*

Resident throughout Borneo in the lowland forests, where it is the only common lowland oriole (Smythies 1999). Eleven birds were recorded during 13–26 September.

Green Iora *Aegithina viridissima*

A common resident species throughout the lowlands of Borneo (Smythies 1999). Fifteen birds were recorded during 10–27 September.

Maroon-breasted Philentoma *Philentoma velatum*

Resident throughout the lowland forests of Borneo (Smythies 1999). A pair was seen on transect 8 on 17 September and one was seen on transect 11 on 21 September.

Grey-chested Jungle Flycatcher *Rhinomyias umbratilis*

Resident throughout the lowlands of Borneo in primary and disturbed forest (Smythies 1999). Six were recorded during 9–18 September.

Chestnut-naped Forktail *Enicurus ruficapillus*

Resident throughout lowland Borneo (Smythies 1999). One was seen briefly along a stream in Block A on 21 September. Two were seen on transect 12 on 23 September.

Black-and-white Bulbul *Pycnonotus melanoleucos*

Resident throughout the lowland mixed dipterocarp forest of Borneo and in secondary forest (Smythies 1999). Around 18 birds were recorded during 12–26 September.

Scaly-breasted Bulbul *Pycnonotus squamatus*

A rather rare submontane resident of primary forest (Smythies 1999). Singles were seen along transect 6 on 14 September and on transect 7 on 14 and 15 September.

Puff-backed Bulbul *Pycnonotus eutilotus*

Sparsely distributed and resident in mixed dipterocarp forest up to 600 m throughout Borneo (Smythies 1999). At least eight were recorded during 11–23 September.

Buff-vented Bulbul *Iole olivacea*

Resident in the lowlands of Borneo (Smythies 1999). At least ten were recorded during 14–27 September.

Streaked Bulbul *Ixos malaccensis*

Resident in the lowlands of Borneo in primary and secondary forest, and generally scarce (Smythies 1999). One was seen near Camp C on 16 September.

White-chested Babbler *Trichastoma rostratum*

Resident and locally common throughout the lowland mixed dipterocarp forests of Borneo (Smythies 1999). Recorded daily during 19–23 September.

Short-tailed Babbler *Malacocincla malaccensis*

Resident and locally common throughout the lowlands of Borneo (Smythies 1999). Eight were recorded during 12–23 September.

Sooty-capped Babbler *Malacopteron affine*

A common resident in the lowland forest throughout Borneo from sea-level to about 550 m (Smythies 1999). Recorded on 13 dates during 8–27 September.

Rufous-crowned Babbler *Malacopteron magnum*

A common resident in the lowland forest throughout Borneo from sea-level to about 600 m (Smythies 1999). Recorded on ten dates during 10–26 September.

Striped Wren Babbler *Kenopia striata*

Distributed throughout the lowland forests of Borneo (Smythies 1999). Two were seen on transect 12 on 23 September.

Chestnut-rumped Babbler *Stachyris maculata*

Resident throughout the mixed dipterocarp forests of Borneo (Smythies 1999). Ten were recorded during 8–27 September.

Fluffy-backed Tit Babbler *Macronous pilosus*

Resident throughout Borneo in the lowlands (Smythies 1999). Fourteen were recorded during 10–26 September.

Brown Fulvetta *Alcippe brunneicauda*

Resident in primary forest throughout Borneo in the lowlands from nearly sea-level to 1,200 m (Smythies 1999). Recorded on ten dates during 9–26 September.