

## BIRDING SITES

# Birding in Brunei: Borneo's hidden gem

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## Introduction

Borneo is no stranger to the average birdwatcher. The third largest island in the world, Borneo is an essential stop for birdwatchers and other nature enthusiasts keen for a taste of the Asian tropics, while harbouring a sizeable chunk of endemism. Sites in Sabah, in the northern part of the island, such as Danum Valley, are well-known and regularly visited, and sites in Sarawak, though historically less frequented, are seeing an uptick in visitors after the publication of an article that highlighted its value to birdwatchers (Orenstein *et al.* 2010). Even the often-neglected Indonesian region of Borneo—Kalimantan—receives birdwatchers intent on seeing the otherwise nigh impossible Bornean Peacock-pheasant *Polyplectron schleiermacheri* (Fredriksson & Nijman 2004). However, the island's smallest country still receives comparatively little interest, despite having a large amount of intact lowland forest and good populations of some hard-to-see species. Here we shine a spotlight on Brunei, its birds, habitats and sites, and hope that eager birdwatchers will feel compelled to include it in their itineraries.

Though far smaller than its neighbours that occupy the rest of Borneo, Brunei has much to capture the interest of a birdwatcher. Brunei still maintains intact forests in over 54% of its land area, compared to 3% and 8% in Sarawak and Sabah respectively (Bryan *et al.* 2013). This comparative abundance of unlogged forest is complemented by Brunei's high proportion of peat-swamp forest and kerangas—forest types that have become increasingly scarce in northern Borneo (Koh *et al.* 2011). This extent of high-quality and rare habitats makes Brunei an attractive place to pick up some birds that are difficult in other more commonly visited parts of Borneo.

## Habitats

A large part of Brunei's draw for birdwatchers lies in its large tracts of intact forests (Bryan *et al.* 2013, Jaafar *et al.* 2016). These habitats have almost the full suite of lowland species that birdwatchers generally target in Borneo.

### Lowland dipterocarp forest

The majority of the forests in Brunei belong to this forest type (Jaafar *et al.* 2016). Characterised by a

dominance of large trees of the family Dipterocarpaceae, most lowland forest birds in Borneo can be encountered in these habitats, including a number of highly sought-after endemic species.

In Brunei, most forest in the hilly interior of the Temburong district, the southern parts of Tutong and south-western areas of Belait districts fall into this category (Jaafar *et al.* 2016). These forests are contiguous with larger tracts of lowland forest in Gunung Mulu to the south and are strongholds for species such as Helmeted Hornbill *Rhinoplax vigil* that are becoming increasingly scarce elsewhere (Beastall *et al.* 2016).

### Montane forest

Montane forest above 750 m (Pendry & Proctor 1996) is scarce in Brunei. Major portions of this habitat are limited to the southern tip of Temburong district around Bukit Pagon (Jaafar *et al.* 2016). Birds seen here are typical of the submontane belt in Borneo, including various mountain bulbuls, Bulwer's Pheasant *Lophura bulweri*, Mountain Black-eye *Zosterops emiliae* and even the rare Black Oriole *Oriolus hosii*.

### Peat-swamp and kerangas forest

Peat-swamp forests form over accumulated, partially decayed organic matter, also known as peat (Andriess 1988). These forest types tend to be situated in low altitude areas of river valleys, watersheds and other sub-coastal parts of the region (Posa *et al.* 2011). Characterised by a highly acidic substrate (pH < 4), peat-swamps have a distinct vegetation community when compared to dipterocarp and montane forests (Posa *et al.* 2011).

Kerangas (or heath forest) is a type of forest that grows on low-nutrient, well-drained sandy soils in the region (Moran *et al.* 2000). As such, it has characteristics such as a lower canopy and a denser and distinct vegetation community that set it apart from mixed-dipterocarp forest (Specht & Womersley 1979). In Brunei, kerangas tends to form on the better-drained peripheries of peat-swamp forests and many bird species that are associated with peat-swamp also occur in higher abundances in kerangas (Sheldon 1987, Madge & McGowan 2002).



YONG CHEE KEITA SIN

**Plate 1.** Massive trees, mainly from the family Dipterocarpaceae, dominate the lowland forests of Brunei that house many target species for birdwatchers. Ulu Temburong, Brunei, June 2021.



ULRIKE BAUER

**Plate 2.** Bukit Pagon is one of the few places in Brunei where the submontane land and soundscape of Borneo can be enjoyed. Bukit Pagon, Brunei, March 2012.



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**Plate 3.** The towering *Shorea albida* trees are an unmistakable feature of mature peat-swamp forests. Badas, Brunei, May 2021.



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**Plate 4.** Kerangas habitat is characterised by having a lower canopy and sandy soils, providing great viewing conditions for elusive species such as the Brown-backed Flowerpecker *Dicaeum everetti*. Andulau, Brunei, May 2021.

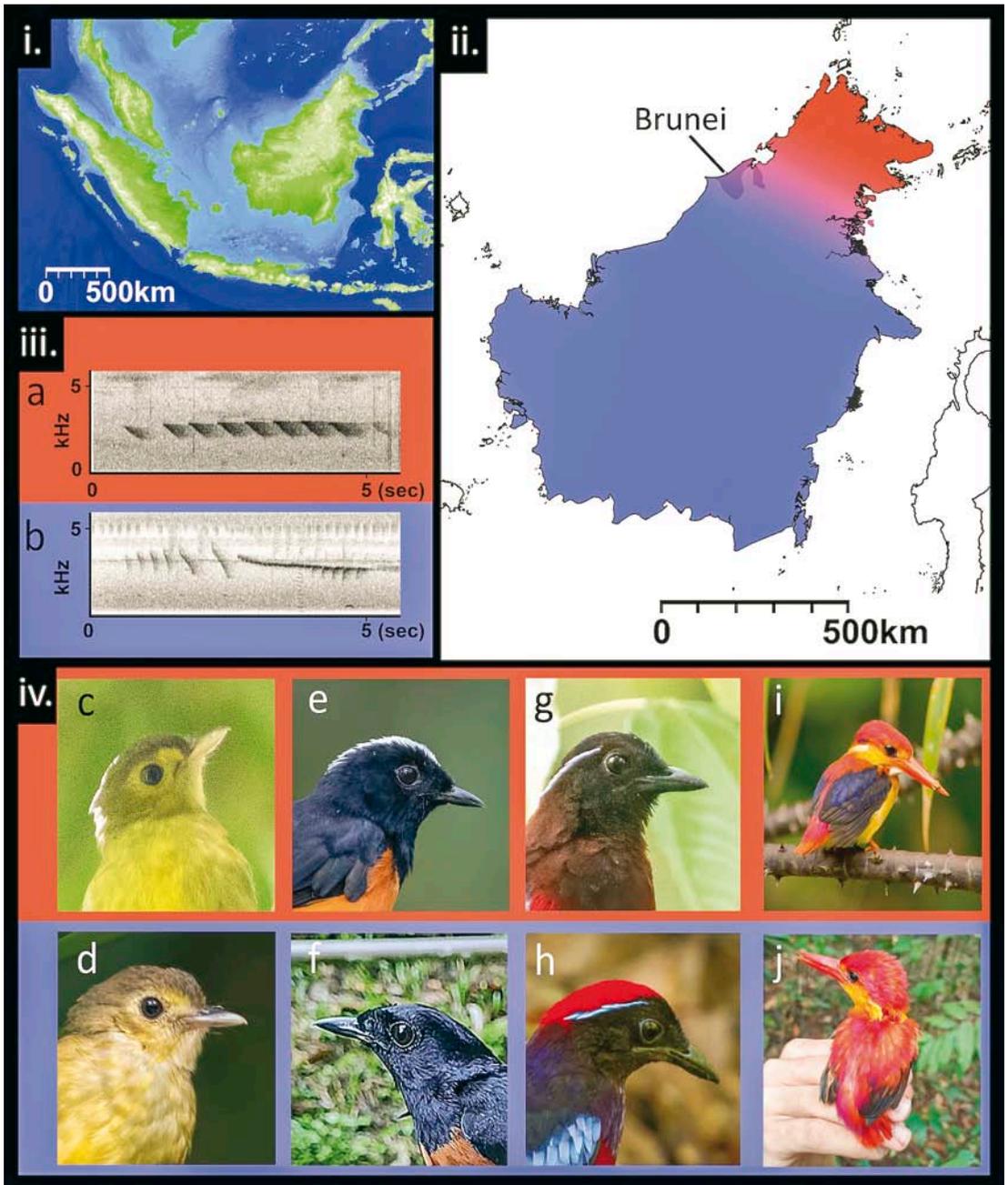
Both these forest types are rarely included along the regular birding circuits in Sabah and Sarawak, with some birdwatchers heading to Klias peat-swamp in Sabah to pick up some of the specialties of these habitats. However, the peat-swamp forest and kerangas in Brunei comprise much larger intact blocks of forests than equivalent formations in Sarawak and Sabah, giving birdwatchers a far better chance of connecting with some tricky species. For instance, a visit to the Badas peat dome in Belait district or the kerangas forest on the southern portions of Andulau Forest Reserve is likely to grant views of Wrinkled Hornbill *Rhabdotorrhinus corrugatus*, Hook-billed Bulbul *Setornis criniger* and Grey-breasted Babbler *Malacopteron albogulare*, all species that would be far from guaranteed at sites elsewhere.

### Birding Brunei as a biogeographer

A rough understanding of the region's biogeography further increases the appeal of birding in Brunei. South-east Asia comprises four broad major

biogeographic entities: the Philippine archipelago, Wallacea, Indochina and Sundaland, with Brunei belonging to the last. The present-day islands of Borneo, Java, Bali and Sumatra, and the Thai-Malay Peninsula on the Asian mainland form part of a continental shelf called Sundaland (Figure 1i). Despite appearing as islands today, recent studies have revealed that the entire shelf was elevated and permanently exposed in the past, thus entirely connected by land. Continuous subsidence of the shelf eventually caused land to be submerged by the sea by about 400,000 years ago (Sarr *et al.* 2019). Since then, sea level oscillations have caused the shelf to be repeatedly connected during periods of low sea levels (glacials) and broken up as islands during periods of high sea levels (interglacials), one of which we are in the midst of today (Voris 2000, Sathiamurthy & Voris 2006).

Although these Sundaic islands have been connected by land during glacial periods for a large part of their history and as recently as c.20,000 years ago (Voris 2000, Sathiamurthy & Voris 2006),



**Figure 1.**

i) the Sunda Shelf, delineated in light blue;  
 ii) map of Borneo showing the Sabah and non-Sabah distributions of bird species (colour-coded red and blue respectively);  
 iii & iv) examples of Sabah vs non-Sabah differences (similarly colour-coded);  
 iii) sonograms of (a) Short-tailed (Leaflietter) Babbler *Pellorneum [malaccensis] poliogenys* and (b) Short-tailed (Glissando) Babbler *P. [malaccensis] saturatum*;  
 iv) c & d) Hairy-backed Bulbul *Tricholestes criniger*; e & f) White-crowned Shama *Copsychus stricklandii* and White-rumped Shama *C. malabaricus*; g & h) Black-crowned Pitta *Erythropitta ussheri* and Garnet Pitta *E. granatina*; i & j) Oriental Dwarf Kingfisher *Ceyx erithaca motleyi* and *C. e. rufidorsa*.  
 (Bathymetric map obtained from The General Bathymetric Chart of the Oceans.)  
 Photos: h) Garnet Pitta HHAS; i) Oriental Dwarf Kingfisher *motleyi* Ayuwat Jearwattanakanok; others YCKS.  
 Sound recordings: Short-tailed (Leaflietter) Babbler YCKS; Short-tailed (Glissando) Babbler ML192211831, Jacob Saucier.

it is increasingly evident that there has been limited gene flow between Bornean and non-Bornean populations in various species complexes on the Sunda Shelf. Advances in bioacoustics and molecular research have revealed deep differentiation among some populations on present-day islands; many birds that have traditionally been thought to be pan-Sundaic might comprise multiple species restricted to individual islands or even small portions of each island (Sadanandan & Rheindt 2015, Manawatthana *et al.* 2017, Cros *et al.* 2020a,b, Eaton *et al.* 2021).

The northern parts of Borneo—coincidentally almost aligning with the present-day political boundaries of Sabah—host an inexplicably large element of endemism (Figure 1ii). Many Bornean birds have different forms in Sabah compared to the rest of their ranges (Figure 1) (Eaton *et al.* 2021), and multiple hypotheses for the underlying reasons behind this phenomenon are still being studied (Sheldon *et al.* 2015). Brunei lies at the boundary of where some species are represented by their Sabah forms, and others by their non-Sabah counterparts.

This pattern becomes even more compelling when considering the many cryptic species pairs that have been recognised in recent years. Some species of babblers and bulbuls have been shown to exhibit deep genomic and bioacoustic differentiation between Sabah and non-Sabah populations (Figure 1iv) (Lim & Sheldon 2011, Eaton *et al.* 2021). However, the boundaries where one form is replaced by the other differ between species pairs. For instance, in Ulu Temburong the non-Sabah forms of the Hairy-backed Bulbul *Tricholestes criniger* and Dark-throated Oriole *O. xanthonotus* occur alongside the Sabah forms of Horsfield's Babbler *Malacocincla sepiaria* and Short-tailed Babbler *Pellorneum malaccensis*. For some species the exact transition zone between the non-Sabah and Sabah forms remains unclear and birdwatchers can contribute to these ornithological discoveries in many ways. Evidence of genomic differentiation is often hidden in songs and in subtle morphological distinctions (Figure 1iii). Taking and sharing sound recordings and photographs of the birds in Brunei will provide pieces to help resolve the biogeographic puzzle of Sabah. Some of these species could even be potential splits and listers might be able to enjoy multiple 'armchair ticks' in the future!

### Must-see birds in Brunei

There are several species of birds in Brunei that are easier to encounter here than in areas of Borneo most frequented by birdwatchers. In part, this is due to the mix of habitat types present in Brunei, with

its abundance of peat-swamp and kerangas, forest types that are rarely birded elsewhere. In addition, the low rate of habitat destruction in the country has preserved large, contiguous forest patches, allowing for the persistence of especially large-bodied species that are doing more poorly elsewhere.

### (Bornean) Crestless Fireback

#### *Lophura [erythrophthalma] pyronota* VU

This rare, ground-dwelling pheasant (Plate 5) is typically found in peat-swamp and low-nutrient forest habitats (Posa 2011). The Bornean subspecies of the Crestless Fireback likely deserves species recognition (del Hoyo & Collar 2014, Eaton *et al.* 2021) and the male is characterised by having a greyer plumage compared to its Peninsular Malaysian and Sumatran counterparts, with distinct white streaks on the breast. In Brunei, this bird has been detected in surveys of the Belait peat-swamps and fortunate birdwatchers could conceivably encounter it at Badas.

### Bonaparte's Nightjar *Caprimulgus concretus* VU

This poorly known, nocturnal species is infrequently encountered on Borneo. Thought to prefer fern clearings in peat-swamp forests, it is best detected by keeping an ear out for its haunting call. Recent records from Brunei have been concentrated along the Badas area. Indeed, the road that most birdwatchers would use to access Badas has numerous spots which would seem suitable for these birds. As with most nightjars, dawn and dusk are the best periods to target this species.

**Plate 5.** Camera trap image of a pair of (Bornean) Crestless Firebacks *Lophura [erythrophthalma] pyronota*. Seeing this species in the wild takes a fair bit of luck but the chances of an encounter are elevated in ideal habitat patches like Badas. Ulu Belait, Brunei, November 2019.





HANYROL H. AHMAD SAH

**Plate 6.** Good views of the Helmeted Hornbill *Rhinoplax vigil* can be enjoyed at the Ulu Temburong canopy walk when fig trees are fruiting. Ulu Temburong, Brunei, December 2016.

**Cinnamon-headed Green-pigeon**  
*Treron fulvicollis baramensis* NT

Another species associated with peat-swamps is this spectacular-looking pigeon. Flocks can be found along Badas and the kerangas forests on the southern fringes of Andulau Forest Reserve. The *baramensis* subspecies of this pigeon (endemic to Borneo) is characterised by its greyish belly.

**Helmeted Hornbill *Rhinoplax vigil* CR**

This highly sought-after species (by both birdwatchers and poachers) seems to have a stronghold in Brunei. Its unmistakable song echoes through most of the intact dipterocarp forests in the nation. While getting good views of this bird from the forest interior is challenging, the Ulu Temburong canopy walk presents a remarkable opportunity for eye-level views when the fig trees are fruiting (Plate 6).

**Wrinkled Hornbill *Rhabdotorrhinus corrugatus* EN**

Highly dependent on low-lying (typically <50 m), low-nutrient forest types, this rarely encountered hornbill seems to occur at surprisingly high densities in the peat-swamp forests of Brunei. Sightings of this species have declined dramatically

throughout its range, it having disappeared from former strongholds. The forest types that this species prefers are often not included in protected areas and are highly threatened by land-use change. The Badas area and kerangas of Andulau Forest Reserve present good opportunities to see this species (Plate 7).

**Blue-banded Kingfisher *Alcedo euryzona* NT**

This spectacular kingfisher is highly dependent on pristine forest streams (Plate 8). Visitors to Ulu Temburong can keep a look out for this species along streams, and it could also be encountered during the boat ride to the interior of the national park. In flight, its high-pitched flight call gives away its presence as it zooms by very close to the water surface.

**Bornean Bristlehead *Pityriasis gymnocephala* NT**

Undoubtedly one of the most taxonomically intriguing birds on Borneo, the Bristlehead is the sole representative of a monotypic family (Plate 9). While encounters with this species require a great deal of luck due to its nomadic habits and low population density, there are sightings from the peat-swamps of the Badas area.



YONG CHEE KEITA SIN

**Plate 7.** The peat-swamp-dependent Wrinkled Hornbill *Rhabdotorrhinus corrugatus* is one of the key species that can be relatively easily observed in Badas and Andulau. Badas, Brunei, May 2021

**Plate 8.** Frequently seen perching quietly along pristine forest streams is the Blue-banded Kingfisher *Alcedo euryzona*. Taman Negara, Malaysia, April 2019.



YONG CHEE KEITA SIN



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**Plate 9.** As the sole member of its family, the Bornean Bristlehead *Pityriasis gymnocephala* is one of the most highly sought-after birds in the lowland forests of Borneo. Danum Valley, Malaysia, September 2019

#### Hook-billed Bulbul *Setornis criniger* VU

This highly localised species is almost exclusively found in peat-swamps and kerangas forests. Its loud cat-like cries can be rather easily heard in the Badas area and patches of kerangas in the vicinity. Other sites at which to connect with this species, such as the Klias Forest Reserve in Sabah, have become increasingly irregular. The low-nutrient forest formations in Brunei may prove to be one of the easiest places to see this bird (Plate 10).

#### Black-and-white Bulbul

##### *Microtarsus melanoleucos* NT

This highly nomadic bulbul is not an easy species to encounter due to its irruptive habits. It is more often heard than seen. There are scattered observations of this species from a wide range of forested sites in Brunei and visitors should keep an eye (and ear) out for it when scanning the forest canopy (Plate 11). It is worth noting that the Oriental Magpie-robin *Copsychus saularis* in Brunei belongs to the *adamsi* subspecies, with all dark underparts. While their shapes and habits are different, care should be taken not to confuse poor views of this species with the rarer bulbul.

**Cream-eyed Bulbul *Pycnonotus pseudosimplex* LC**  
Formerly thought to be a pale-eyed morph of the

Cream-vented Bulbul *P. simplex*, this species was only recently recognised as being distinct (Sheldon & Shakya 2019). This Bornean endemic can be easily identified as it is the only brown bulbul on the island having pale irides (Plate 12). Much about the species is still poorly known; photographic and

**Plate 10.** A peat-swamp specialist, the Hook-billed Bulbul *Setornis criniger* is not an easy species to see elsewhere. Badas, Brunei, May 2021.



YONG CHEE KEITA SIN



HUSINI BAKAR

**Plate 11.** The loud two-note call often gives away the presence of the highly nomadic Black-and-white Bulbul *Microtarsus melanoleucos*. Telingan, Brunei, April 2021.



YONG CHEE KEITA SIN

**Plate 12.** One of the most recently described species from Borneo is the Cream-eyed Bulbul *Pycnonotus pseudosimplex*, the only bulbul on Borneo with a pale iris. Ulu Temburong, Brunei, June 2021.

vocal recordings of this species will contribute to regional ornithological knowledge.

#### **Grey-breasted Babbler *Malacopteron albobulare* NT**

Another species often associated with peat-swamp and kerangas forest, the Grey-breasted Babbler is an attractive species not easily encountered along the conventional birding circuits in Borneo. In Brunei, this species has been noted from the Belait district.

#### **Sunda Blue-flycatcher *Cyornis caerulatus* VU**

The melodic song of this species can be occasionally

heard in the lowland dipterocarp forests of Borneo. It is often associated with interior forest and is replaced by the Malaysian Blue-flycatcher *C. turcosus* along riverine areas.

#### **Grey-chested Jungle-flycatcher *Cyornis umbratilis* NT**

This flycatcher has remarkably high population densities at some sites (e.g. Andulau Forest Reserve) and occurs in most inland forest types in Brunei. It is likely overlooked at many popular birding sites in Borneo and its tinkling song can be commonly heard at several of the sites listed in this article (Plate 13).

#### **Scarlet-breasted Flowerpecker *Prionochilus thoracicus* NT**

The brilliant scarlet breast patch on the male of this flowerpecker is unmistakable (Plate 14). Being another low-nutrient forest associated species, it can be easily encountered along Badas and the southern fringes of Andulau. Females can be distinguished from other co-occurring flowerpeckers by the grey head that contrasts strongly with the olive-brown mantle.

#### **Spectacled Flowerpecker *Dicaeum dayakorum* DD**

One of the greatest ornithological discoveries of Borneo is this flowerpecker that was only recently discovered and described (Edwards *et al.* 2009, Boyd *et al.* 2016, Saucier *et al.* 2019). Much about it is still unknown, but this diminutive canopy specialist is best observed from the Ulu Temburong canopy walk when the mistletoe fruits (Plate 15).

**Plate 13.** The melodious song of Grey-chested Jungle-flycatcher *Cyornis umbratilis* serenades visitors to the forest during the dawn chorus. Johor, Malaysia, May 2017.



YONG CHEE KEITA SIN



IAN ANTHONY ECHUAL

**Plate 14.** The male Scarlet-breasted Flowerpecker *Prionochilus thoracicus* is possibly one of the most striking looking flowerpeckers that can be found in the lowlands of Borneo. Labi, Brunei, May 2021.



HANYROL H. AHMAD SAH

**Plate 15.** One of the most desired species on Borneo is the enigmatic Spectacled Flowerpecker *Dicaeum dayakorom*. Ulu Temburong, Brunei, August 2016.

**Brown-backed Flowerpecker *Dicaeum everetti* NT**  
 Another bird associated with peat-swamp and kerangas forest, this nondescript flowerpecker is best looked for by staking out fruiting mistletoes in these forests. While drab looking, it can be distinguished from the similar looking Thick-billed Flowerpecker *D. agile* by the lack of white tips to its tail-feathers and its typically warmer plumage. It also does not exhibit the tail-flagging

habit that is characteristic of the Thick-billed Flowerpecker.

**Sites**

Here we introduce some of the key birding sites in Brunei that birdwatchers should consider including in their itinerary (Figure 2). Visitors are reminded to abide by local laws when accessing these sites.

**Figure 2.** Map of Brunei showing the birding sites introduced in this article.



## Ulu Temburong

Ulu Temburong comprises mixed-dipterocarp forests and most visitors to this site head to the Ulu Ulu Resort. Access to the resort used to be inconvenient as the Temburong district is separated from the rest of the nation by the Brunei Bay. An approximately two-hour drive or a boat ride used to be the only access to Temburong. However, this has been circumvented by the recent construction of the Sultan Haji Omar Ali Saifuddien Bridge, a 30 km-long bridge connecting Brunei–Muara and Temburong districts. After entering the Temburong district, visitors should head to Batang Duri and thereafter take a 30-minute boat ride along the Temburong River to the resort.

The Ulu Temburong Canopy Walk presents an opportunity to observe high canopy species at close quarters. Highly sought-after species include Helmeted Hornbill and, with luck, Spectacled Flowerpecker. Fruiting events can be especially spectacular, with six hornbill species, numerous bulbuls, leafbirds and pigeons, including the increasingly scarce Large Green-pigeon *Treron capellei*. Mammal sightings from the canopy walk can also be excellent, with the North Borneo Gibbon *Hylobates funereus*, the highly range-

restricted Hose's Langur *Presbytis hosei* (Plate 16), Binturong *Arctictis binturong*, Cream-coloured Giant Squirrel *Ratufa affinis* and Thomas's Flying Squirrel *Aeromys thomasi* (Phillipps & Phillipps 2016).

The trail system around the area is fantastic to search for lowland species, including the Sunda Blue-flycatcher, Garnet Pitta *Erythropitta granatina* and Crested Jay *Platylophus galericulatus*. Fruiting trees attract hordes of leafbirds and bulbuls, including Cream-eyed Bulbul and Scaly-breasted Bulbul *Ixodia squamatus*, as well as the regionally uncommon Finsch's Bulbul *Iole finschii*. Spiderhunters can be expected on flowering trees, including otherwise difficult-to-observe species such as the Long-billed *Arachnothera robusta* and Thick-billed *A. crassirostris* Spiderhunters. An assortment of babblers is also present, including the Sabah subspecies of Horsfield's Babbler and Short-tailed Babbler *Pellorneum malaccensis poliogenys*, with genomic evidence pointing to a split in the latter as the 'Leaf-litter Babbler' (Lim & Sheldon 2011, Eaton *et al.* 2021). Searching the riverside and edge habitats can produce species such as the Malaysian Blue-flycatcher and White-chested Babbler *Pellorneum rostratum*, with the latter again being split as the endemic 'Bornean Swamp Babbler' *P. [rostratum] macropteron* based on molecular and bioacoustic data (Cros *et al.* 2020a, Eaton *et al.* 2021). Such open sites can also produce raptors such as Rufous-bellied Eagle *Lophotriorchis kienerii* and Crested (Sunda) Honey Buzzard *Pernis [orientalis] torquatus* during midday. Lucky birdwatchers might even encounter a Bulwer's Pheasant during dipterocarp masting events.

Naturalists can also enjoy other spectacular wildlife in the area. Ulu Temburong is a hotspot for amphibian diversity (Grafe & Keller 2009). On the mammal front, large mammals such as Sun Bear *Helarctos malayanus*, Borneo Bay Cat *Catopuma badia* and Sunda Clouded Leopard *Neofelis diardi* have all been camera-trapped in the area. Numerous squirrel species are possible while walking the trails in the day, including Horse-tailed *Sundasciurus hippurus*, Prevost's *Callosciurus prevostii* and Bornean Pygmy *Exilisciurus exilis* Squirrels, while nocturnal sorties might turn up Horsfield's Tarsier *Cephalopachus bancanus*.

## Bukit Pagon

More adventurous birdwatchers seeking montane and submontane birds should head to Bukit Pagon on the southernmost tip of the Temburong District. Standing at 1,850 m on the border with Sarawak, Malaysia, Bukit Pagon is the highest peak in Brunei. On the Brunei side, extensive virgin and

**Plate 16.** The forests of Brunei are the best place in the world to see the endemic and fast-disappearing Hose's Langur *Presbytis hosei*. Ulu Temburong, Brunei, February 2017.



under-explored lowland and montane forests prevail. Access to the peak is laborious and few have made it to the peak from Brunei ... unless, of course, you have the resources to fly in by helicopter! In contrast, many have historically accessed the peak from the Malaysian border through logging roads, although most of the forest on the Malaysian side is now gone due to historic logging operations. Today, it is comparatively harder to get to Pagon through the abandoned, overgrown and washed-out logging roads.

The montane forest of Bukit Pagon offers those intrepid birdwatchers species that are not available elsewhere in Brunei. These include the distinctive (Green-winged) Cinereous Bulbul *Hemixos [cinereus] connectens*, Bornean Bulbul *Rubigula montis*, Cinnamon-rumped Trogon *Harpactes orrhophaeus*, Bornean Leafbird *Chloropsis kinabaluensis* and Mountain Serpent-eagle *Spilornis kinabaluensis*. Other common lowland and submontane birds sighted here include the (Bornean) Hair-crested Drongo *Dicrurus [hottentottus] borneensis*, Philippine Cuckoo-dove *Macropygia tenuirostris*, Little Cuckoo-dove *M. ruficeps* and Bornean Spiderhunter *Arachnothera everetti*.

### Badas Road

Birdwatchers can either drive in via Jalan Badas or Simpang 638. The drive in goes past rank grassland which is a good site to look for the distinctive Bornean subspecies of the Yellow-bellied Prinia *Prinia flaviventris latrunculus* and flocks of munias, primarily composed of Chestnut *Lonchura atricapilla* and endemic Dusky *L. fuscans* Munias. As the grassland transitions to forest, Chestnut Munia becomes less common and is replaced by the more forest-associated White-bellied Munia *L. leucogastra*. Grey-headed Fish-eagle *Haliaeetus ichthyaeus* can sometimes be seen perched on the bare trees that pepper the grassland. The road leading into Badas is often partially submerged in several sections, especially after rain. These areas typically drain quickly and, while a high-clearance vehicle is not necessarily required, visitors should apply common sense to avoid ruining their vehicles. Birdwatchers can also expect to be shin-deep in cola-coloured water (the tannin-stained water of peat-swamps) while birding along the road and should be attired appropriately.

The peat-swamp forest here is one of the best and most easily accessible sites to look for Hook-billed Bulbul and Grey-breasted Babbler. Wrinkled Hornbill can be reliably found here in good numbers, as can Great Slaty Woodpecker *Mulleripicus pulverulentus*. Other notable species include the Olive-backed Woodpecker *Gecinulus*

*rafflesii*, Violet *Chrysococcyx xanthorhynchus* and Little Bronze *C. minutillus* Cuckoos and Black-and-white Bulbul. Flocks of pigeons should be carefully scanned for the habitat-specific Cinnamon-headed Green-pigeon, which often flies together with the congeneric Thick-billed *Treron curvirostra* and Pink-necked *T. vernans* Green-pigeons. Birdwatchers should pay special attention to the tiny birds zipping around the canopy as peat-swamp specialists such as Scarlet-breasted and Brown-backed Flowerpeckers can be expected here. Entering the peat-swamp forest without guidance is highly inadvisable due to the precarious forest floor, and many of these species can be observed from the roadside as well.

One of the biggest draws of this site is the range-restricted Bonaparte's Nightjar. Its haunting calls can be very soft, and searching for this species at dawn and dusk along the fern clearings offers the best chance of success. Care is needed in identification as Large-tailed Nightjar *Caprimulgus macrurus* is very common in the area. Other nocturnal species, including Barred Eagle-owl *Bubo sumatranus*, Brown Boobook *Ninox scutulata* and Buffy Fish-owl *Ketupa ketupu*, can also be encountered here.

### Andulau

The Andulau Forest Reserve can be conveniently accessed via Labi Road from the town of Sungai Liang, where hotels are easily available. The northern section of this site is characterised by lowland mixed dipterocarp forest which transitions towards kerangas forest towards the south. Birdwatching can take place along the road while interior forest species can be found by accessing the forest along various side trails.

The mixed dipterocarp section is inhabited by species such as Common Hill Myna *Gracula religiosa*, Maroon-breasted Philentoma *Philentoma velata* and very high densities of Grey-chested Jungle-flycatcher. At present, this area is also good for Grey-cheeked Bulbul *Alophoixus tephrogenys*, which has become increasingly rare across its range due to trapping for the songbird trade. Further south towards the kerangas the bird assemblage is rather similar to that along Badas road. However, the kerangas forest might offer better views of Brown-backed Flowerpecker due to the shorter trees typical of this habitat. Brunei's first record of Rainbow Bee-eater *Merops ornatus*—the third record for all of Borneo—also occurred along the southern fringes of Andulau Forest Reserve. Birdwatchers should also pay attention to migratory species, either from Australia or the northern hemispheric temperate region, depending on the season of their visit.

Mammals such as the Yellow-throated Marten *Martes flavigula* and Maroon Leaf Monkey *Presbytis rubicunda* can also be encountered here, while at night others such as the Small-toothed Palm Civet *Arctogalidia trivirgata* and Philippine Slow Loris *Nycticebus menagensis* can be reliably encountered.

### Bukit Telingan

Bukit Telingan is in Mukim Labi, Belait. The site is quite remote, located at least two-and-a-half hours' drive from the capital. The area is well known for frequent sightings of Bornean Bristlehead. Formerly a logging road, it is very much accessible by four-wheel drive. With the road being along a ridge itself, there are plenty of opportunities for viewpoints that overlook the surrounding valley, making it almost impossible not to spot any hornbills, Helmeted Hornbill being chief amongst these. It also provides the chance to get good views of typical high canopy species, including the Blue-rumped Parrot *Psittinus cyanurus* and Blue-crowned Hanging-parrot *Loriculus galgulus*. Accommodations include some homestays near to the site as well as traditional *iban* longhouses which provide similar services.

### Meriuk Farmstay

This easily accessible site with a well-established trail network is just a 45-minute drive from the airport. Close to 300 species of bird have been recorded on site, including all eight of Brunei's hornbill species as well as the prized Bornean Bristlehead. The site consists of a mature fruit farm area and regrowth mixed dipterocarp forest which attracts interesting fauna, especially birds and mammals, and even more during the fruiting season, which is usually between July and September.

For accommodation there is a small community-run farmstay which has all the basic amenities. Apart from being a superb site for birdwatching, this is also one of the prime locations in Borneo to see the elusive Bornean endemic Hose's Langur.

### Tasek Merimbun

Tasek Merimbun is the largest black water lake in Brunei, designated in 1984 as an ASEAN heritage park. It is one of three such parks in Borneo. The site is very much unique on its own, managed by the museum department and consequently has its own on-site museum as well as research facilities. The area is protected and is constantly patrolled by rangers.

The best way to birdwatch the lake is by renting a boat from the community-run rental in the early morning or late evening. One of the attractions here is the colonies of Purple *Ardea purpurea* and Grey *A. cinerea* Herons. The considerable expanses

of swamp and kerangas forest here are likely to hold populations of the aforementioned peat-swamp specialist birds.

### Bandar Seri Begawan and its surroundings

The mangroves of Bandar are often visited by those searching for the comical-looking Proboscis Monkey *Nasalis larvatus*. Those keen to search for this species should head to the jetty opposite the water village where boats can be hired to explore the Brunei river estuary. Birdwatching along the journey can be productive, with species such as Ruddy *Halcyon coromanda* and Stork-billed *Pelargopsis capensis* Kingfishers, Grey-headed Fish-eagle, Mangrove Blue-flycatcher *Cyornis rufigaster* and nesting colonies of Black-crowned *Nycticorax nycticorax* and Nankeen *N. caledonicus* Night-herons.

Promising patches of forest around town might be surprisingly productive for those who have time to spare before heading out of the city. A short exploration of the forest patch around Simpang 67, just beside the jetty, produced surprisingly high densities of the Sunda Frogmouth *Batrachostomus cornutus*. This species is typically associated with more degraded habitats and might elude birdwatchers visiting pristine forest sites. Those who do not have time to travel further afield can also look for Philippine Slow Loris and Small-toothed Palm Civet here.

### Wasan Paddy Field

The Wasan Paddy Field, only a 45-minute drive from the capital, is among the most popular birdwatching destinations for locals. The area comprises 400 hectares of rice-fields and swampland, offering a haven of paddy and freshwater habitat for migratory birds. The prime season to search for migratory waterbirds is between October and early April. Frequent denizens of this swampland include Wandering Whistling Duck *Dendrocygna arcuata*, Red-necked Phalarope *Phalaropus lobatus*, Green Sandpiper *Tringa ochropus*, Circus harriers and *Acrocephalus* warblers. Rare vagrants that have also been recorded in the past include Eurasian Bittern *Botaurus stellaris*, Pied Stilt *Himantopus leucocephalus*, Northern *Vanellus vanellus* and Grey-headed *V. cinereus* Lapwings, Middendorff's Grasshopper-warbler *Helopsaltes ochotensis* and Black-collared Starling *Gracupica nigricollis*. Other resident birds that can be seen here include Lesser Adjutant *Leptoptilos javanicus* and King Quail *Synoicus chinensis*.

### Conservation

National Forest Reserves make up 41% of Brunei's total land area and are protected by Brunei's

national Wild Life Protection Act (last revised in 1984), which gives general protection against illegal wildlife gathering, and the Wild Fauna and Flora Order of 2007, which gives national protections to CITES-listed species. The majority of Brunei's National Forest Reserves are recreational forests which are open to the public (Brunei Forestry Department n.d.). While such a large area of publicly accessible forest means there are plenty of birding sites to choose from, hunting and poaching are prevalent at accessible sites and protections may be under-enforced. It is not uncommon to encounter glue-traps near access roads set by locals as a casual pastime.

Hunting and trapping are only expressly illegal within wildlife sanctuaries, and to date the only wildlife sanctuaries which have been established are in marine ecosystems, although the Sungai Ingei Conservation Forest might be designated as a wildlife sanctuary in the coming years. Protected species are safe regardless of whether they are inside a sanctuary or not, but the list of protected species is quite short, including only 23 species of birds, or 34 species in total based on the Wild Life Protection Act 1984. The list protects many large-bodied species, including all of the local hornbills, several eagles (White-bellied Sea Eagle *Haliaeetus leucogaster* and Grey-headed Fish-eagle) and pheasants (Great Argus *Argusianus argus grayi* and Bulwer's Pheasant), but does not include any passerines.

While the Wild Fauna and Flora Order of 2007 does apply to all CITES-listed species, it provides protection only against international trade and does not stop local trapping. As a result, many endangered species can be trapped in Brunei without consequence. Despite the lack of protections, trapping pressure in Brunei is not as severe as in other parts of the region.

Those who observe birds being trapped or put on sale should contact the Asian Songbird Trade Specialist Group (ASTSG) (asiansongbirdtradesg@gmail.com), especially if the species in question comprise priority species as defined by the ASTSG. A list of these species can be accessed at: <https://www.asiansongbirdtradesg.com/taxa-list>.

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### References

Andriess, J.P. (1988) *Nature and management of tropical peat soils*. Rome: Food and Agriculture Organization Soils Bulletin 59.

- Beastall, C., Shepherd, C.R., Hadiprakarsa, Y. & Martyr, D. (2016) Trade in the Helmeted Hornbill *Rhinoplax vigil*: the 'ivory hornbill'. *Bird Conserv. Int.* 26(2): 137–146.
- Boyd, N.S., Phillipps, Q. & Fischer, J. (2016) The first record of the undescribed "Spectacled Flowerpecker" (species novum) for Indonesia. *Kukila* 19: 42–49.
- Bryan, J.E., Shearman, P.L., Asner, G.P., Knapp, D.E., Aoro, G. & Lokes, B. (2013) Extreme differences in forest degradation in Borneo: comparing practices in Sarawak, Sabah, and Brunei. *PLoS One* 8(7): e69679.
- Brunei Forestry Department (n.d.) *National Forest Policy*. Accessed at <http://www.forestry.gov.bn/SitePages/National%20Forest%20Policy.aspx> on 10/01/2022.
- Cros, E., Chattopadhyay, B., Garg, K.M., Ng, N.S., Tomassi, S., Benedick, S., Edwards, D.P. & Rheindt, F.E. (2020a) Quaternary land bridges have not been universal conduits of gene flow. *Mol. Ecol.* 29(14): 2692–2706.
- Cros, E., Ng, E.Y.X., Oh, R.R.Y., Tang, Q., Benedick, S., Edwards, D.P., Tomassi, S., Irestedt, M., Ericson, P.G.P. & Rheindt, F.E. (2020b) Fine-scale barriers to connectivity across a fragmented South-East Asian landscape in six songbird species. *Evol. Appl.* 13(5): 1026–1036.
- del Hoyo, J. & Collar, N.J. (2014) *HBW and BirdLife International illustrated checklist of the birds of the world. Volume 1. Non-passerines*. Barcelona: Lynx Edicions.
- Eaton, J.A., van Balen, S., Brickle, N.W. & Rheindt, F.E. (2021) *Birds of the Indonesian Archipelago: Greater Sundas and Wallacea*. Second edition. Barcelona: Lynx Edicions.
- Edwards, D.P., Webster, R.E. & Rowlett, R.A. (2009) 'Spectacled Flowerpecker': a species new to science discovered in Borneo? *BirdingASIA* 12: 38–41.
- Fredriksson, G.M. & Nijman, V. (2004) Habitat use and conservation status of two elusive ground birds (*Carpococcyx radiatus* and *Polyplectron schleiermacheri*) in the Sungai Wain Protection Forest, East Kalimantan, Indonesian Borneo. *Oryx* 38(3): 297–303.
- Grafe, T.U. & Keller, A. (2009) A Bornean amphibian hotspot: the lowland mixed dipterocarp rainforest at Ulu Temburong National Park, Brunei Darussalam. *Salamandra* 45(1): 25–38.
- Jaafar, S.M., Sukri, R.S. & Procheş, Ş. (2016) An investigation of soil physico-chemical variables across different lowland forest ecosystems of Brunei Darussalam. *Malaysian J. Sci.* 35(2): 151–168.
- Koh, L.P., Miettinen, J., Liew, S.C. & Ghazoul, J. (2011) Remotely sensed evidence of tropical peatland conversion to oil palm. *Proc. Nat. Acad. Sci.* 108(12): 5127–5132.
- Lim, H.C. & Sheldon, F.H. (2011) Multilocus analysis of the evolutionary dynamics of rainforest bird populations in Southeast Asia. *Molecular Ecology* 20(16): 3414–3438.
- Madge, S. & McGowan, P. (2002) *Pheasants, partridges and grouse*. London: Christopher Helm.
- Manawatthana, S., Laosinchai, P., Onparn, N., Brockelman, W.Y. & Round, P.D. (2017) Phylogeography of bulbuls in the genus *Iole* (Aves: Pycnonotidae). *Biol. J. Linnean Soc.* 120(4): 931–944.
- Moran, J.A., Barker, M.G., Moran, A.J., Becker, P. & Ross, S.M. (2000) A comparison of the soil water, nutrient status, and litterfall characteristics of tropical heath and mixed-dipterocarp forest sites in Brunei 1. *Biotropica* 32(1): 2–13.
- Orenstein, R., Wong, A., Abghani, N., Bakewell, D., Eaton, J., Yeo, S.T. & Yong, D.L. (2010) Sarawak—a neglected birding destination in Malaysia. *BirdingASIA* 13: 30–41.

- Pendry, C.A. & Proctor, J. (1996) The causes of altitudinal zonation of rain forests on Bukit Belalong, Brunei. *J. Ecol.* 84: 407–418.
- Phillipps, Q. & Phillipps, K. (2016) *Phillipps' field guide to the mammals of Borneo and their ecology: Sabah, Sarawak, Brunei, and Kalimantan*. Princeton: Princeton University Press.
- Posa, M.R.C. (2011) Peat swamp forest avifauna of Central Kalimantan, Indonesia: effects of habitat loss and degradation. *Biol. Conserv.* 144(10): 2548–2556.
- Posa, M.R.C., Wijedasa, L.S. & Corlett, R.T. (2011) Biodiversity and conservation of tropical peat swamp forests. *BioScience* 61(1): 49–57.
- Sadanandan, K.R. & Rheindt, F.E. (2015) Genetic diversity of a tropical rainforest understory bird in an urban fragmented landscape. *The Condor: Ornithol. Appl.* 117(3): 447–459.
- Sarr, A.-C., Husson, L., Sepulchre, P., Pastier, A.-M., Padoja, K., Elliot, M., Arias-Ruiz, C., Solihuddin, T., Aribowo, S. & Susilohadi (2019) Subsiding Sundaland. *Geology* 47(2): 119–122.
- Sathiamurthy, E. & Voris, H.K. (2006) Maps of Holocene sea level transgression and submerged lakes on the Sunda Shelf. *Trop. Nat. Hist. Suppl* 2: 1–44.
- Saucier, J.R., Milensky, C.M., Carballo-Ortiz, M.A., Ragai, R., Dahlan, N.F. & Edwards, D.P. (2019) A distinctive new species of flowerpecker (Passeriformes: Dicaeidae) from Borneo. *Zootaxa* 4686(4): 451–464.
- Sheldon, F.H. (1987) Habitat preferences of the Hook-billed Bulbul *Setornis criniger* and the White-throated Babbler *Malacopteron albugulare* in Borneo. *Forktail* 3: 17–25.
- Sheldon, F.H., Lim, H.C. & Moyle, R.G. (2015) Return to the Malay Archipelago: the biogeography of Sundaic rainforest birds. *J. Ornithol.* 156(1): 91–113.
- Sheldon, F.H. & Shakya, S.B. (2019) Discovery of a new species of Bornean bulbul. *Sabah Soc. J.* 36: 99–102.
- Specht, R.L. & Womersley, J.S. (1979) Heathlands and related shrublands of Malesia (with particular reference to Borneo and New Guinea). Pp.321–338 in R.L. Specht (ed.) *Ecosystems of the world. 9A heathlands and related shrublands. Descriptive studies*. Amsterdam: Elsevier Scientific Publishing Company.
- Voris, H.K. (2000) Maps of Pleistocene sea levels in Southeast Asia: shorelines, river systems and time durations. *J. Biogeogr.* 27(5): 1153–1167.

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