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CHAPTER 1

The state of Malaysia's birds – status, threats and conservation

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Abstract: A total of 864 bird species has been recorded in Malaysia, 728 of them in Peninsular Malaysia, 566 in Sarawak and 619 in Sabah to date. Of these, at least 568 species have (or had) known or presumed resident populations, while about 216 species have regularly migratory populations and 160 are vagrants. Eight are endemic or have distributions mostly restricted to Malaysia. As of 2025, 13 species are 'Critically Endangered', 18 'Endangered' and a further 49 'Vulnerable' on the IUCN Red List. Lowland forests below the steepland boundary support the highest species richness but are the most threatened vegetation type and remain at high risk of conversion to plantation agriculture, imperilling many species. Peat swamp forests are now reduced to a few large patches, mostly in Malaysia Borneo, threatening species such as Storm's Stork *Ciconia stormi* and Wrinkled Hornbill *Rhabdotorrhinus corrugatus*. Coastal wetlands such as mudflats and mangroves are used by a high diversity of migratory species, but are threatened by coastal development, whilst major gaps in protection persist. Illegal trapping to supply markets for pet birds further affects at least ten species, including the Straw-headed Bulbul *Pycnonotus zeylanicus* (CR), *Copsychus* spp. and most leafbirds. Strengthening the conservation of bird species in Malaysia may be achieved through a combination of targeted species action plans and recovery programmes for high profile threatened species (e.g. Straw-headed Bulbul, Milky Stork) alongside efforts to secure the conservation of key habitats in protected and managed areas, where possible in collaboration with local communities. There is also scope to strengthen the conservation of birds in agricultural landscapes such as rice fields, as already practiced elsewhere in the region. While there is some ongoing effort to track bird population trends through monitoring programmes, with initiatives already in place for raptors, waterbirds and urban species, there is an opportunity to expand such programmes through citizen science initiatives, whilst developing a national red list to guide conservation actions for them most threatened species.

INTRODUCTION

Malaysia sits on the upper ranks of the world's mega-biodiverse nations, supporting exceptionally high diversity of many taxonomic groups ranging from vascular plants and insects to birds (Latiff 2018). Presently, 864 bird species are listed for Malaysia (MNS Bird Conservation Council, in prep.), of which 568 species have (or had) known or presumed resident populations, and approximately 216 are regularly occurring migratory species (Lim *et al.* 2020; Puan *et al.* 2020; MNS Bird Conservation Council 2021; see Table 1). Some 45 species have both resident and migrant populations. A summary of data is given in Table 1, based on Wells (1999, 2006), Jeyarajasingham and Pearson (2000), and MNS Bird Conservation Council (in prep.). Over the past two decades, the steady increase in Malaysia's bird list has

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been driven by the annual addition of species that are migratory stragglers such as the Collared Pratincole *Glareola pratincola*, Black Tern *Chlidonias niger* and the Northern Lapwing *Vanellus vanellus* (see MNS-BCC 2024; MNS-BCC 2026), as well as species that are new for science, notably the Spectacled Flowerpecker *Dicaeum dayakorum* (Saucier et al. 2019) and Cream-eyed Bulbul *Pycnonotus pseudosimplex* (Shakya *et al*. 2019).

Table 1. Total species of birds recorded in Malaysia, broken across Peninsular Malaysia, Sabah (including Federal Territory Labuan) and Sarawak. Numbers are affected by taxonomic changes, uncertainties in status (e.g., breeding assumed rather than proven), as well as intensity of geographical coverage. Numerous species have both resident and migrant populations (e.g. Grey Heron *Ardea cinerea*, Black-winged Stilt *Himantopus himantopus*), and definitions of vagrants are imprecise.

Region	Total species	Resident native (R and X)	Introduced resident (F)	Migratory (M)	Vagrant (V)	Endemic (E)
Peninsular Malaysia	728	449	19	194	102	6
Sarawak	566	380	7	149	51	1
Sabah	619	418	11	147	77	3
Total	**864**	**568**	**23**	**216**	**160**	**10**

Malaysia's diverse vegetation, landscapes and extensive mountainous geography are key drivers of high bird species richness and endemism. Among forest types, lowland and hill dipterocarp forests support the most diverse breeding bird communities in Malaysia, as with other parts of Sundaland, with species-rich assemblages of families such as bulbuls, woodpeckers and hornbills in landscapes such as Taman Negara and Danum Valley Conservation Area (Jeyarajasingham and Pearson 2000; Lim *et al.* 2020). Niches (understorey, middle storey and canopies) provided by the complex environment of lowland forests support a high diversity of terrestrial species (e.g., pittas), insectivores (e.g., babblers among foliage, woodpeckers on timber), frugivores (e.g., barbets and hornbills), cavity nesters (e.g., trogons, hornbills, woodpeckers, kingfishers, owls), leafball nesters (e.g., Short-toed Coucal *Centropus rectunguis*, pittas, some partridges) and platform nesters (e.g. large raptors) (see Wells 1999, 2006; Jeyarajasingham and Pearson 2000; Phillipps and Phillipps 2014). The avifauna of submontane and montane forests in Malaysia is less species-rich but characterised by higher endemism—most species with distributions restricted to Malaysia (e.g. Friendly Bush Warbler *Locustella accentor*, Mountain Peacock-pheasant *Polyplectron inopinatum*) occur in montane forests (Sheldon *et al*. 1999; Wells 1999; Moyle and Wong 2002; Puan *et al*. 2020).

Wetlands (excluding forested wetlands such as peat swamps) from the coasts to the floodplains of Malaysia's major river systems support significant assemblages of waterbirds and several passerines, although there is substantial species turnover from coastal to freshwater wetlands. Coastal intertidal wetlands such as mangroves and mudflats provide habitat for over 30 species of migratory shorebirds (Scolopacidae, Charadriidae), terns (Lariidae) and two storks, the Milky Stork *Mycteria cinerea* and Lesser Adjutant *Leptotilos javanicus*, of which the most significant are on the west coast of Peninsular Malaysia, western Sarawak coast (Bakewell *et al*. 2017; Teepol *et al*. 2021; Effendi *et al.* 2024) and potentially Sabah (Makbul *et al*., in review). Inland wetlands including freshwater marshland and lakes, and rice paddies are also used by large congregation of waterbirds including several species of herons, rails, and cormorants, alongside the Oriental Darter *Anhinga melanogaster* and Asian Openbill *Anastomus oscitans*, recent colonists from mainland Southeast Asia (Zainul-Abidin *et al*. 2017).

The conservation challenges faced by birds in Malaysia are complex and represent the full spectrum of threats faced by wildlife more widely in Southeast Asia. The single most important threat and driver of decline for both forest and wetland species is habitat loss

especially coastal wetlands (Yeap *et al*. 2007; Teepol *et al*. 2021; Effendi *et al*. 2025). There is ample evidence to implicate agricultural expansion in both Peninsular Malaysia and Malaysian Borneo as the leading driver of habitat loss (Lambert and Collar 2002; Azhar *et al.* 2011), possibly less so at montane elevations (Soh *et al*. 2021), alongside urbanisation (Puan *et al*. 2019). Hunting and trapping, including that for the caged bird trade (Ng *et al.* 2017), affects several songbird species and waterbirds, and is only better understood in recent years from surveillance and increased enforcement (Yong *et al*. 2024). On the other hand, species historically not known or were very rare in Malaysia, such as the Asian Openbill *Anastomus oscitans*, Painted Stork *Mycteria leucocephala* and several starling species have shown notable distributional range extensions (Zainul-Abidin *et al*. 2017), likely driven by a combination of human-mediated changes (e.g., land use, agriculture, urbanisation) and climatic factors. This paper reviews and summarises these threats, alongside the conservation status of key habitats and groups of birds in Malaysia. We then identify next steps to improve the conservation status of Malaysia's birds, with particular emphasis on forest and wetland habitats

SYSTEMATIC REVIEW

Lowland forest birds

Malaysia's forests are particularly rich in lowland forest groups such as babblers (previously all grouped in Timaliidae, now split among several families), woodpeckers, barbets, and some charismatic groups such as hornbills and pittas (Wells 1999, 2006; Puan *et al*. 2020). Malaysia's forest avifauna is characterised by a few large families (each with many species) and many small genera (each of one or two species) that have been tough to position in traditional taxonomies. Examples of the latter include Crested Jayshrike *Platylophus galericulatus*, Bornean bristlehead *Pityriasis gymnocephala*, Grey-headed Canary-flycatcher *Culicicapa ceylonensis*, White-bellied Erpornis *Erpornis zantholeuca*, and Malaysian Rail-babbler *Eupetes macrocercus*, all birds that have been bounced around from family to family. Reasons include long divergence times since isolation, lack of close relatives, geographical isolation from related taxa, and evolution of distinctive or unique morphological traits.

Much research has looked at the effects of forest disturbance (logging) on birds across the board (Meijaard *et al*. 2005), mostly by comparison of areas before and after logging, or comparison of areas after differing recovery periods (Johns 1992, 1996), but the conclusions tend to be quite general. There have been few studies on the effects of logging on individual species. Problems are compounded by changes in visibility and audibility in disturbed forest. The best data come from prolonged mist-netting at a few sites in extreme lowlands (Pasoh, Kuala Lompat, Danum Valley) (Wong 1985, 1986; Zakaria and Francis 1999, 2001; Francis and Wells 2003), on which conservation techniques could be built. Research has compared sounds and sighting rates, as proxies for population density, but there are limited data on changed foraging patterns, diet (Murray *et al*. 2020), nest site availability (Kaur *et al.* 2020), individual movements, or reproductive success and mortality. The genetic consequences of population change through logging are virtually unknown except for a study of genetic differences between populations in forest fragments for a handful of understorey species (Soh 2019).

Among the problems faced by lowland forest birds are loss of absolute area of habitat, loss of forest in the level lowlands, changed microhabitats and microclimates, and isolation of scattered populations in fragments of forests. Mention of some broad categories of ecological niches (see above) hardly touches on the topic of why there are short-distance differences in species composition, even within the same forest type. Autecological studies often seek to correlate population density or presence/absence with forest structure such as number of big trees, understorey density or fallen timber, but these are very hard to translate into conservation actions. These are all factors potentially under local or national control. There are also multiple problems of climate change that are beyond the control of any one country.

Peat swamp forest

Peat swamp forests share the bulk of their avifauna with other lowland forest types such as lowland dipterocarp, mangroves and back-mangrove forests, and heath or '*kerangas*' forests, but their distributions are far more limited, being largely restricted to the lower floodplains of major rivers and situated close to coasts (UNDP 2006). It is estimated that 23 – 30% of the Malaysian avifauna occurs in peat swamps (Posa *et al.* 2011), whilst several lowland forest species regularly use peat swamp forests, the best examples being Wrinkled Hornbill *Rhabdotorrhinus corrugatus* (EN) and Storm's Stork *Ciconia stormii* (EN). A handful of species are strongly associated with peat swamps, notably the Black Partridge *Melanoperdix nigra*, Hook-billed Bulbul *Setornis criniger* (in Borneo) and Grey-breasted Babbler *Malacopteron albogulare* in particular (Posa and Marques 2012; Yong *et al*. 2014; Lim *et al.* 2020). The ecology of bird communities in peat swamps in Malaysia is not well known given the difficulty of access to most sites, although there have been mist-netting surveys in south Pahang, north Selangor and the remnant peat swamps in Sabah's Klias Peninsula (e.g. Sheldon *et al*. 2014; Hawa *et al*. 2016). The extent of peat swamp forests in Malaysia have declined substantially, with an estimated 25% of the original extent remaining in Peninsular Malaysia and 36% in Malaysian Borneo as at 2010 (Posa *et al*. 2011). Since then, further losses have occurred due to logging, drainage and agricultural conversion (Amit *et al*. 2011; Hawa *et al*. 2016) and forest fires (Yong and Peh 2016). Anecdotal information suggests that the threatened Wrinkled Hornbill in both Peninsular Malaysia and Malaysian Borneo has become increasing rare, possibly linked to the loss of peat swamp and other lowland forest types, while Storm's Stork is now possibly on the verge of extinction in the peninsula with very few recent records (Wells 1999; Yong *et al*., in prep).

Montane forest birds

Among about 110 resident species that are dependent on montane forest and/or the broader sweep of hill slopes below, Malaysia supports interesting endemics or near-endemics. Ecologically integrated into the montane avifauna is a smaller number of forest-dependent migrants (e.g., Eyebrowed Thrush *Turdus obscurus*). Most mountains offer small areas of suitable habitat—typically less than a few tens of km^2—or, if they form mountain ranges (e.g., Crocker Range, Titiwangsa Range), the habitat is elongated, narrow, and easily fragmented by roads and tourism developments. Due to the altitudinal zonation within montane forest, few species can be found throughout. Populations of some species may be pocketed into valleys by intervening ridges, or vice versa. Documentation of Malaysia's montane avifauna are predominantly from a handful of well visited sites, where highland tourism and agriculture can potentially eat out the cores of protected areas. The popularity of hiking and birdwatching has increased the range of sites visited, but there are still large gaps in coverage.

When climate change is added to the mix, the lower elevational limits of montane species are expected to rise, confining them to increasingly smaller areas of higher ground and eventually forcing them off the peaks of 'sky islands' (Soh *et al.* 2021). Furthermore, elevation limits of lowland birds may be raised, complicating competition between them.

Small geographical range size is one of the best predictors of extinction risk amongst species (Harris and Pimm 1995). Montane endemics have generally smaller ranges than their lowland counterparts and are therefore more vulnerable (Long 1995). It is fortunate that Gunung Tahan and Gunung Kinabalu are within large and well-established protected areas, but neither of them supports the full suite of montane birds (see Sheldon *et al.* 1999; Wells 1999; Harris *et al*. 2012); every mountain tends to have a slightly differing subset of the whole montane bird community, making it necessary to protect a variety of montane landscapes for representativeness, covering Malaysia's different mountain ranges. Alonside these problems, the study and conservation of montane birds suffer from the same poor information base already highlighted for lowland forests.

Status of hornbill conservation and large forest landscapes

Some birds require very large forest landscapes to maintain genetically viable populations, either because food sources occur at low density or because they range over large areas. Hornbills have been documented travelling many kilometres between scattered, fruiting trees in forest landscapes. Medway and Wells (1971) suggested that viable hornbill populations might need more than 2,500 km^2 of forest, a size only achieved by Taman Negara among Peninsular Malaysia's protected areas. For species such as the Plain-pouched Hornbill *Rhyticeros subruficollis* that undertake seasonal migrations along the Malay Peninsula to non-breeding areas in Kedah and Perak (i.e. Ulu Muda, Belum-Temengor; see Kaur *et al*. 2011; Yeap *et al*. 2017), there is a need for the conservation of not just large forest landscapes, but also a connected network of forest landscapes across its distribution, including sites where the species stage.

As a result of habitat loss, the majority of Malaysian hornbill species are now globally threatened, with the exception of two species. The Helmeted Hornbill *Rhinoplax vigil* is the most imperilled, impacted not just by habitat loss, but is also targeted by hunters for its casques, and hunting is widely acknowledged to be the cause of its decline across its Southeast Asian distribution (Jain *et al*. 2020).

Status of pheasants and other Galliformes

Malaysia is rich in ground-living birds. There are 24 species of Galliformes (15 each in Peninsular Malaysia and in Malaysian Borneo), following recent taxonomic changes (Wells 1999; Mann 2008; Lim *et al.* 2020; Puan *et al.* 2020). Of these, only the Green Peafowl *Pavo muticus* is definitively extinct (Wells 1999; Table 2) although Peninsular Malaysia was probably only marginal to its historical range, where it was known from a few large rivers such as the Pahang, inhabiting seasonally shifting sandbanks and the immediately adjacent forest, and specialised vegetation types behind the east coast dunes (Robinson and Chasen 1936; Wells 1999). One re-introduction has been attempted (Othman 1998), but the outcomes unclear. Three species are endemic or near-endemic to Peninsular Malaysia and a fourth (Malaysian Peacock-pheasant *Polyplectron malacense*) may now be extinct in neighbouring countries. Eight are endemic to Borneo, of which two (lowland Sabah Partridge *Tropicoperdix graydoni* and hill-slope dependent Dulit Partridge *Rhizothera dulitensis*) are nearly or wholly endemic to Malaysia. The last-named species has not been reliably documented since 1902 (Berryman and Boakes 2023; Table 2).

Several pheasants have unusual mating systems of scientific interest. Nests of several species have never been found, and for others there are just a handful of records. One such species is the Malayan Crested Argus *Rheinardia nigrescens* (NT), primarily confined to the submontane and lower montane forests of Peninsular Malaysia and only recently recognised as a distinct species (Davison *et al*. 2020). Calls of several species are poorly documented or unknown, and diets virtually unknown. Thus, even basic facts needed for surveys and planning are lacking. Recent photography sites (e.g. Gunung Trus Madi, Sabah) have begun to yield new information that might be relevant to conservation of species such as the Bulwer's Pheasant *Lophura bulwerii* (Zaini 2024).

Globally, pheasants and partridges are among the most imperilled groups of birds, and a large proportion of species are listed on the IUCN Red List. While Galliformes tend to be charismatic attractions for ecotourism revenue, they are also vulnerable to indiscriminate ground traps and snares set by poachers (Yong *et al.* 2022). Devising conservation measures other than total protection for Malaysia's threatened pheasants is challenging. Captive breeding has been attempted for several species in Malaysia (see Othman 1998) but could be a drain on wild populations if numbers trapped exceed numbers released. Production of significant numbers of genetically unrelated individuals, and development of effective release techniques, have not yet succeeded.

Table 2. List of birds that may have been extirpated as breeding species in Malaysia. Species marked '?' may not have been totally extirpated.

Common name	Scientific name	IUCN Red List (2025)	Peninsular Malaysia	Sabah	Sarawak
White-winged Duck[1]	*Asarcornis scutulata*	CR	+		
Green Peafowl[2]	*Pavo muticus*	EN	+	?	?
Dulit Partridge	*Rhizothera dulitensis*	DD			?
Silvery Pigeon	*Columba argentina*	CR			
Sarus Crane[1]	*Antigone antigone*	VU	+	?	?
Beach Stone-curlew	*Esacus magnirostris*	NT	+		
Milky Stork[2]	*Mycteria cinerea*	EN	+		+
White-shouldered Ibis	*Pseudibis davisoni*	CR			
Red-headed Vulture	*Sarcogyps calvus*	CR	+		
White-rumped Vulture[1]	*Gyps bengalensis*	CR	+		
Slender-billed Vulture[1]	*Gyps tenuirostris*	CR	+		

[1] Species that are likely never more than marginal to Malaysian territory within the historical period.
[2] Species whose wild populations are certainly extirpated in Malaysia, but where reintroductions are either recently attempted or has recently reintroduced populations.

Status of migratory waterbirds

Close to 150 waterbird species are known from Malaysia, the largest families being the sandpipers (Scolopacidae), plovers (Charadriidae) and terns (Lariidae), the majority long -distance migrants from eastern and northern Asia (see also See *et al*. 2026). At least 24 species of sandpipers, including Nordmann's Greenshank Tringa guttifer (EN), Great Knot Calidris tenuirostris (EN), and Far Eastern Curlew Numenius madagascariensis (EN), regularly overwinter in Malaysia. Recent surveys show that coastal wetlands in Penang and Selangor supports some of the largest wintering congregations of Nordmann's Greenshank in the region (Effendi *et al.* 2024; Crosby *et al*. 2025), while Sarawak's Buntal Bay and the adjacent Sejingkat ash ponds host at least 1% of the world population of the Far Eastern Curlew (Bakewell *et al*. 2017; Teepol *et al*. 2023). Most migratory waterbirds in Southeast Asia are dependent on coastal wetlands such as intertidal mudflats as foraging habitat, alongside mangrove forests and adjacent areas of man-made wetlands such as fishponds and ash ponds as high tide roosts (Teepol *et al.* 2021) although the Masked Finfoot *Heliopais personata* uses mostly forested wetlands further inland (Chowdhury *et al*. 2020).

Whilst there are limited data on the long-term population trends of most migratory waterbirds in Malaysia, several species of shorebirds have expectedly declined, notably the Curlew Sandpiper *Calidris ferruginea*, and corroborated by monitoring data from other parts of the region (BirdLife International 2026). The Masked Finfoot, a regular non-breeding visitor until the 2010s, has not been definitively recorded for over a decade (Chowdhury *et al*. 2020). A recent exercise to prioritise wetlands of flyway-level importance for waterbirds identified seven coastlines, with mainland Penang (Kuala Muda–Teluk Air Tawar coast) and north-central Selangor coast of the highest priority (Crosby *et al*. 2025). Little is known about the importance and value for Sabah's coastline for migratory waterbirds but recent surveys by Makbul *et al*. (in review) suggest that Marudu Bay and Tawau coast are likely significant for migratory waterbirds, including for species such as Far Eastern Curlew. The discovery of wintering Spoon-billed Sandpiper *Calidris pygmaea* (Teepol *et al.* 2023) and small groups of Chinese Crested Tern *Thalasseus bernsteini* (Ng, J.J. in litt. 2025, Bakewell, D. in litt. 2026) in the coast of Sarawak and Sabah (Up to five individuals per Bakar, J. in litt. 2025) allude to the need for further work in Malaysian Borneo (BirdLife International 2025).

Status of raptors

Raptors in Malaysia have also attracted considerable attention from birdwatchers and local researchers. The country's ecosystems support a highly diverse raptor assemblage, comprising 47 diurnal and 22 nocturnal species that occupy a wide range of habitats. These include forests, wetlands, mangroves and limestone karsts, as well as human-modified landscapes, where raptors are ecologically important as apex or meso predators. Approximately 20 raptor species are migratory and are associated with the East Asian-Australasian, Central Asian and West Asian-East African flyways, with the Crested Honey Buzzard *Pernis ptilorhynchus* being the most prominent and regularly recorded migrant. Long-term migration monitoring at Tanjung Tuan and Taiping has revealed clear, species-specific patterns in northbound and southbound movements as raptors pass through Peninsular Malaysia, respectively (Puan and Yong 2026). In addition, citizen science initiatives have contributed essential data on breeding, behaviour and distribution of resident raptors, much of which has been published in birdwatching bulletins such as the '*Suara Enggang*' and '*Malaysian Bird Report*'. The resident subspecies of the Peregrine Falcon *Falco peregrinus ernesti* is of special interest, breeding mostly on limestone cliffs in Perak that are themselves threatened (Kéry *et al.* 2024), and has been extensively documented by citizen scientists.

In recent years, raptor research has advanced through ecological studies employing more sophisticated approaches, including bioacoustic methods (see Yee *et al*. 2016). The Eastern Barn Owl *Tyto javanica* remains the most widely distributed and intensively studied raptor species in Malaysia, largely due to its success in oil palm plantations, where abundant rodent prey and the widespread provision of nest-boxes facilitate both *in situ* and *ex situ* research (Puan *et al*. 2011). Despite these advances, over 40% of Malaysian raptor species remain poorly studied, particularly nocturnal species such as the Rajah Scops Owl *Otus brookii*, known only from limited records (Puan *et al*. 2015).

The conservation status of Malaysia's raptors has not been fully evaluated, but coastal (or wetland-dependent) raptors such as White-bellied Fish Eagle *Ichthyaetus leucogaster* and Brahminy Kite *Haliastur indus* appear to have held up well. Species such as Grey-headed Fish Eagle *Ichthyaetus icthyophaga* have also been able to take advantage of artificial waterbodies, such as impoundments, occurring even in dams in the Klang Valley (Yong, D.L. pers obs.). Raptors associated with open agriculture such as Black-shouldered Kite *Elanus caeruleus*, migrant harriers, eagles and vultures could all face pressures from habitat change, poaching and agro-chemicals (Puan *et al*. 2020). Species of forested riverscapes and inland forest are least studied and face the usual pressures of habitat loss, fragmentation and degradation. The position of raptor species at the top of food chains makes them susceptible to cascade effects upwards from other trophic levels.

Status of migratory passerines

About 48 species of passerines are regular migratory visitors to Malaysia, the majority chats, robins and flycatchers (Muscicapidae), followed by leaf warblers (Phylloscopidae; seven species), and swallows (Hirundinidae; five species). Few except for the Barn Swallow *Hirundo rustica*, Pallas's Grasshopper Warbler *Helopsaltes certhiola*, and Oriental Reed Warbler *Acrocephalus orientalis*, among the commoner species, were extensive studied through ringing in Sungai Way in the 1960s (Nisbet 1972). Recent migration studies have tracked Pallas's Grasshopper Warbler from eastern Russia to Peninsular Malaysia (Slepsov *et al*. 2023). Tropical lowland forests and paddy fields are the key habitat for most species, with about 30 species known to overwinter in lowland dipterocarp forests, ten species strongly associated with freshwater wetlands (Yong *et al*. 2022), and at least six species in mangroves (Round *et al*. 2026). In the absence of long-term ringing studies, it is difficult to assess species population trends although Wells (1999) reported lower densities of Siberian Blue Robins *Luscinia cyane* in logged and degraded forests (in Pasoh Forest Reserve), suggesting that forest-wintering passerines are more sensitive to the effects of deforestation

than thought. The Himalayan-breeding Large Blue Flycatcher *Cyornis magnirostris* (lumped with the Hill Blue Flycatcher *sensu lato* for a period, *C. banyumas*) winters largely in the lowland forests of the Malay Peninsula and was almost as numerous as Siberian Blue Robin based on bird ringing data from Fraser's Hill in the early 1970s (Medway and Wells 1976), but there are no recent records. On the converse, the Rufous-headed Robin *Luscinia ruficeps*, one of Asia's least known migratory passerines and known previously from one record (Wells 2006), was rediscovered in the Genting Highlands (Gunung Ulu Kali) in the 2010s, where at least one individual was observed over two consecutive winters (Puan *et al*. 2020; Yong *et al*. 2020).

Seabird breeding colonies

Malaysia supports seven breeding seabird species: all terns, except for the Brown Booby *Sula leucogaster*, although Masked Booby *Sula dactylatra* may potentially breed. Over the 2016 – 2019 period, surveys covering islands and rocky islets on the east coast of Peninsular Malaysia between Terengganu and Johor reported large breeding colonies of Black-naped *Sterna sumatrana* and Bridled terns *Amniochorion anethetus*, and potentially smaller groups of Roseate terns *S. dougallii* (Hamza *et al*. 2016a, 2016b, 2019). The islets of Tokong Burung in Johor's Seribuat Archipelago, protected in a series of marine parks (e.g. Tioman, Pulau Tinggi), were found to support 10,000 pairs of Bridled Terns, likely the largest in the region (Hamza and Wong 2020). Recent surveys of the Melaka Straits islands, notably Pulau Perak, confirmed that historically documented breeding colonies of Brown Booby and Brown Noddy still occur (Tan C.E. pers. obs.), albeit only with about 200 individuals of either species (Abdul Rahman *et al*. 2025). Hamza *et al*. (2019) noted that none of these islands are formally protected and are at risk from introduced rats and indiscriminate egg collection and disturbance from fisherman and tourists (also Wells 1999). Off the coast of Malaysian Borneo, the atoll of Layang-Layang remains important for several breeding seabirds, including Greater Crested Tern *Thalasseus bergii* and Brown Booby, with over 1,000 pairs of the former (Marzuki *et al*. 1997; Wells 1999; Tan, C.E. pers. obs.), while most of the islands closer to the Sabah and Sarawak coast typically support breeding Black-naped and Bridled Terns (e.g. Talang-Satang) (Wilson 2002). Presently, there is very limited monitoring or survey work of seabird colonies, or information on breeding populations and recruitment, and there is much scope for long-term studies established at some of the more accessible colonies off the Peninsular east coast, alongside targeted conservation work to, control egg collection, restore habitat at breeding colonies and manage introduced predators.

KEY THREATS

The threats and drivers of decline faced by birds in Malaysia represent the myriad threats faced by species in Southeast Asia (Wells 1999; Puan *et al.* 2020; Yong *et al*. 2022). Presently, 80 species (about 9%) of Malaysia's avifauna are globally threatened. As of 2025, 13 species are 'Critically Endangered', 18 'Endangered' and a further 49 'Vulnerable' (see Table 3). Habitat loss driven by deforestation and exacerbated by fragmentation, is the single biggest threat to species in the country, affecting the widest range of species. In the past two decades, the rate of deforestation in both Peninsular Malaysia and Malaysian Borneo have remained steady, primarily driven by commercial logging and monoculture expansion although the two are not always mutually exclusive. Forested land, especially in the lowlands, is excised for logging, and typically cleared later for palm oil monoculture (Koh and Wilcove 2010; Azhar *et al*. 2011). To date, research on the impacts of logging on forest bird communities has looked at the effects of varying intensities of forest disturbance (logging) (Meijaard *et al.* 2005; Peh *et al*. 2006), comparison of forest areas before and after logging (Johns 1992, 1996; Hawa *et al*. 2016) and disturbance gradients (Nordin *et al.* 2025), and forest fragmentation (Yong *et al*. 2011; Atikah *et al.* 2025). Large-bodied species such as hornbills are most impacted by forest loss, degradation and fragmentation, given the loss of preferred nesting tree species and food sources (Yeap *et al.* 2026), but small-bodied species such as insectivorous birds are also impacted (Yong *et al.* 2011).

Table 3. Global conservation status of threatened, near threatened and data deficient species recorded in Malaysia, whether resident or otherwise. Categories follow the IUCN Red List (2025).

IUCN Category	Peninsular Malaysia	Sarawak	Sabah	Total
Globally Extinct (EX)	0	0	0	0
Extinct in the Wild (EW)	0	0	0	0
Critically Endangered (CR)	10	6	3	13
Endangered (EN)	16	13	13	18
Vulnerable (VU)	34	35	35	49
Near Threatened (NT)	95	88	89	106
Data Deficient (DD)	–	1	2	2

The conversion of coastal intertidal wetlands directly reduces habitat for migratory waterbirds, and its impact on shorebirds, for instance, has been well documented in East Asia. While there remain extensive intertidal mudflats and mangroves on the Peninsular, Sabah and Sarawak coasts, the expansion of port infrastructure and residential development has contributed to the loss and degradation of coastal wetlands in the Peninsular, especially in Johor, Selangor and Penang (Yeap *et al.* 2007; Williams 2016). Few areas of coastal wetlands, and especially intertidal wetlands, are formally protected, exposing much of these key habitats for shorebirds to future conversion to land uses such as aquaculture (Yeap *et al.* 2007; Yong *et al*. 2021). Further inland, three artificial wetland types remain important for birds, former tin-mining areas (especially in Perak) (Mohd Rafi Kudus *et al*. 2010), ash ponds (Teepol *et al.* 2023) and paddy fields (Azman *et al*. 2019). Most tin-mining areas in Peninsular Malaysia have now been reclaimed and redeveloped although there are pockets such as the Taman Alam Kinta preserved for its scenic beauty as part of the Kinta Valley Geopark. Waterbirds that use paddy fields, however, are exposed to the impacts of agricultural intensification, which limits that amount of suitable wetland habitat in a rice farming landscape.

The songbird trade is widely acknowledged to be a major threat for several songbird species (see Krishnasamy and Stoner 2016; Chng *et al.* 2021) and impacts birds in two ways: (1) birds are removed from their wild populations at an unsustainable rate, driving declines, or (2) unintended introductions may result in species invasions of alien species. As with neighbouring Indonesia, the trapping of targeted, high-value species for the cagebirds trade immediately threatens at least ten species, the majority forest species, and most famously leafbirds *Chloropsis* spp., White-rumped Shama *Copsychus malabaricus*, Oriental Magpie Robin *C. saularis*, and several species of bulbuls (Pycnonotidae) (Lim *et al.* 2020; Chng *et al.* 2021), even though all are protected in some way under the wildlife legislation of Peninsular Malaysia, Sabah or Sarawak.

RECOMMENDATIONS AND NEXT STEPS

This paper identifies several priorities to advance the knowledge base on the state of key bird groups and families in Malaysia, whilst highlighting recommendations that can strengthen bird conservation.

First, there is a need for continued work to prioritise key areas of forest landscapes and coastal wetlands for bird conservation, building on existing work to identify, assess and delineate IBAs (Yeap *et al.* 2007). These prioritised areas have long-term potential for site-level conservation activities, including through the designation of protected areas such as state parks (and national parks in Sarawak) and wildlife sanctuaries. The Malaysian Nature Society (MNS) and BirdLife International have to date identified 55 sites as IBAs (Yeap *et al.* 2007), representing the full suite of forest and wetland landscapes important for bird conservation in Malaysia, but over time new areas important for bird conservation have

been identified. Several large forest landscapes in Peninsular Malaysia, including the Dungun forest complex (Liang *et al.* 2018) and coastal wetlands in Sabah (e.g. Makbul *et al*., in review) currently lack comprehensive survey data but are expected to be important for bird conservation.

Second, the identification of priority landscapes and the design of protected areas for bird conservation needs to be guided by the ecological principles of landscape connectivity, given that large-bodied birds such as hornbills and raptors have large foraging ranges, while migratory waterbirds typically disperse extensively across wetland areas for foraging (e.g. Teepol *et al.* 2021). Existing initiatives to promote and advance landscape connectivity are already in place for large mammal conservation (e.g. Malayan Tiger, Asian and Borneo Pygmy Elephants) such as the 'Central Forest Spine' and 'Heart of Borneo' initiatives (Sloan *et al.* 2019) and offers opportunities and mandates for synergy with conservation initiatives targeting forest birds. However, there are also opportunities to build and maintain ecological connectivity within landscapes, even in the Greater Klang Valley where there remain extensive forest patches embedded within a wider suburban matrix (e.g. see *Rantaian* Urban Green Spaces – RUGS; https://www.rugs.my/), as well as wetland sites.

Third, there is a need to strengthen existing levels of protection for species of high conservation priority, and this may involve a combination of compiling a National Red List for Birds in consultation with diverse stakeholders (see Lang *et al.* 2014), alongside species conservation action plans for flagship species. Action plans already exist for species such as the Helmeted Hornbill (Jain *et al.* 2018) outlining the key actions regionally and nationally, but there are opportunities to develop or convene either regional or national-level action plans for other large, charismatic species such as the other hornbills, waterbirds, raptors and several pheasants. Such action plans, however, need to be implemented on the ground in coordination with local stakeholders such as local NGOs, community members, while ensuring that there are clear and tangible benefits for local communities (e.g. livelihood benefits).

Finally, there is a need to strengthen the evidence base for bird conservation through a combination of targeted research (focusing on threatened species, or landscape management) and leveraging on the potential of citizen science (Puan *et al*. 2019), which has grown considerably in Malaysia in the past decade. There are large knowledge gaps on the status and ecology of many threatened species, including species of montane forests and peat swamps, inaccessible habitats which has hampered efforts to collect data here although new technology such as bioacoustic monitoring and the use of camera traps may help address gaps, especially for cryptic, terrestrial species (Liang *et al.* 2018; Berryman and Boakes 2023). The use of ubiquitous tracking technology can also be more widely deployed on species such as hornbills, shorebirds and other large waterbirds to gather data on movements and range size, which can in turn inform conservation. While citizen science tends to bias data availability to the most accessible sites (such as Fraser's Hill, Panti Bird Sanctuary), there are opportunities for citizen science to address knowledge gaps in wetland areas that are near major settlements.

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