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# CHAPTER 13

# An updated status of the primates of Malaysia

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**Abstract:** This chapter presents an overview of the primates of Malaysia, synthesising current knowledge on their population status, ecology, threats, and conservation. The literature on recent advances and emerging trends in primate research and conservation in Malaysia is systematically reviewed. This is followed by taxon-specific accounts that summarise the latest information on the distribution, population status, habitat use and ecology, threats, and conservation measures for all 26 Malaysian primate taxa. Primates play important ecological roles, including seed dispersal, pollination, and pest regulation but Malaysian primates are threatened with extinction and face increasing pressures from habitat loss and degradation, illegal wildlife trade, hunting, and other anthropogenic disturbances. At the same time, significant knowledge gaps continue to limit the development and implementation of effective conservation strategies, highlighting the need for targeted research to inform evidence-based management and policy decisions. To ensure the long -term persistence of Malaysia's primate diversity, research and conservation efforts must be closely aligned and strategically coordinated and addresses the existing knowledge gaps and conservation needs of each taxon.

## INTRODUCTION

Primates are among the most diverse orders of mammals, with more than 500 species distributed across a range of habitats in tropical, subtropical, and temperate biomes (IUCN 2026). Most primate species occur only in forested habitats, and the highest primate diversity is found in tropical evergreen forests. While Malaysia occupies only a small proportion of the primate global distribution range, it is among the most important countries for primate biodiversity, supporting representatives of five primate families (Cercopithecidae, Hylobatidae, Hominidae, Lorisidae, and Tarsiidae) (Lappan and Ruppert 2019). This makes conservation of Malaysian primates important not only because of the crucial ecosystem services that primates provide as seed dispersers, pollinators, and pest control agents (e.g., Wiens *et al.* 2006; McConkey 2018; Holzner *et al.* 2019; Ong et al. 2022), but also as a significant component of Earth's biodiversity and Malaysia's natural heritage.

Our understanding of primate diversity in Malaysia has improved significantly since the 1991 publication of *The State of Nature Conservation in Malaysia* (Kiew 1991). While Bennett (1991) described 15 species of diurnal primates in five genera, and recognised two nocturnal species, we now recognise 26 Malaysian species in nine genera, including 21 diurnal and five nocturnal species. Research on nocturnal primate diversity and occurrence

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that additional taxa will be identified in Malaysia, either through the identification of cryptic species as distinct taxa or through improved knowledge of the distribution boundaries for known taxa. For example, the nocturnal Bengal slow loris (*Nycticebus bengalensis*) was only recently reported to occur in Langkawi, but its current distribution and abundance in Malaysia are not known (Roos *et al*. 2014; Md-Zain et al. 2019).

The primate fauna of Peninsular Malaysia (13 species) is almost entirely distinct from that of Malaysian Borneo (15 species), with only two macaque species, *Macaca fascicularis* and *M. nemestrina*, occurring in both regions. Representatives of three primate genera (*Cephalopachus*, *Nasalis*, and *Pongo*) are restricted to Sabah and Sarawak, while *Symphalangus* occurs only in Peninsular Malaysia (Figure 1). The remaining genera (*Hylobates*, *Macaca*, *Presbytis*, *Trachypithecus*, and *Nycticebus*) are represented in both regions (Ruppert and Lappan 2019).

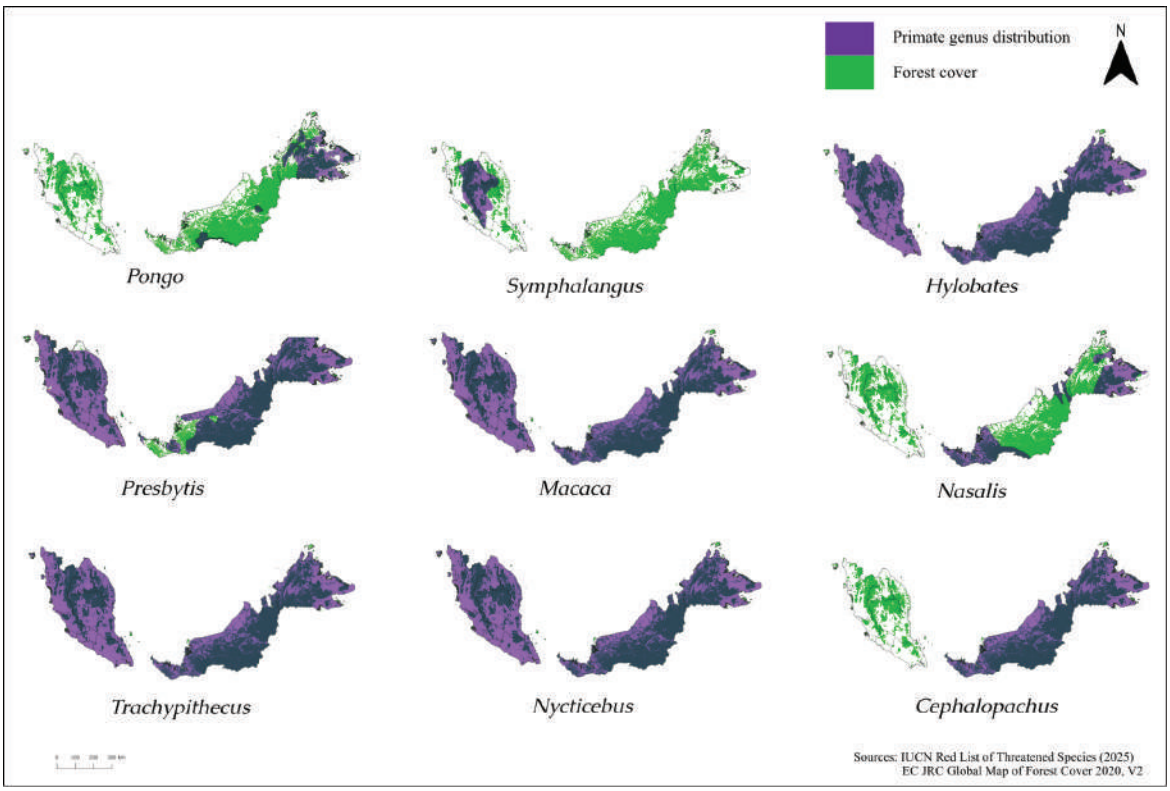


**Figure 1.** The distribution of primate genera across Malaysia.

Malaysian primates exhibit a remarkable diversity of ecological, physiological, and behavioural adaptations. For example, Malaysian primates range in size from the tiny Horsfield's tarsier (*Cephalopachus bancanus*; 60–150 g) (Phillipps and Phillipps 2018; Zahidin *et al.* 2019) to the majestic Bornean orangutan (*Pongo pygmaeus*; adult males 60–91 kg, females 24–56 kg) (Phillipps and Phillipps 2018; Delgado and Van Schaik 2000). Despite this diversity, all Malaysian primates almost exclusively depend on natural forest ecosystems, and most species rely heavily on closed-canopy forests. Consequently, habitat loss, degradation, and fragmentation remain the most significant threats to primate populations throughout Malaysia (Lappan and Ruppert 2019).

Although research on Malaysian primates has expanded considerably in recent decades, important knowledge gaps persist for most species, particularly regarding their distribution, population status, ecology, and responses to environmental change (Lappan and Ruppert 2019). These limitations constrain the development of effective conservation strategies at both local and national scales. To evaluate the current state of knowledge and identify research priorities, in the following we present a systematic review of the scientific literature on Malaysian primates, highlighting major research trends and key opportunities for conservation-oriented actions.

## RESEARCH AND CONSERVATION TRENDS OF MALAYSIAN PRIMATES

### Primate research

Detailed information on animal behaviour and ecology is crucial for effective conservation planning for long-lived, slowly reproducing animals with complex social and ecological needs and relationships. In the past few decades, understanding of some Malaysian primate species has improved substantially, but progress has been uneven. To better understand research trends, a systematic search on Scopus and a review of peer-reviewed publications was conducted for each Malaysian primate species using English search terms for species name and area: [(Species name or common name) AND ("Malaysia" or "Peninsular Malaysia" or "Sabah" or "Sarawak")] (Table 1). The search process followed a systematic workflow beginning with the identification of appropriate keywords based on the study's objectives. Searches were performed using Harzing's '*Publish or Perish*' software (https://harzing.com/resources/publish-or-perish), which is linked to the Scopus database to ensure access to peer-reviewed academic literature.

All retrieved records were manually screened to remove duplicates and non-relevant publications. Titles, abstracts, and keywords were reviewed to confirm their relevance to the study scope. Only journal articles published in English were included. Each publication was classified according to two main criteria: geographical location (representing the study area or region where the research was conducted) and thematic focus (based on the primary research topic addressed in the paper (e.g., ecology, behaviour, conservation, health, or human–wildlife interactions). This classification enabled the identification of spatial and thematic trends in the literature. The resulting dataset was subsequently used to visualise patterns (Word Clouds) in research distribution and thematic emphasis across regions (Figure 2).

A total of 622 scientific articles were found from 1963 until 2025 and classed into four broad themes (Table 2). Substantial research effort has been devoted to only a small number of diurnal primate species (Figure 3), including *Macaca fascicularis*, *M. nemestrina*, *Pongo pygmaeus*, and *Nasalis larvatus* (>50 publications each), and to a lesser extent to *Trachypithecus obscurus* and *Hylobates lar* (≥25 publications each). Much less research has been done on any aspect of nocturnal primates (e.g., *Nycticebus coucang*: 25 publications). Over the last 62 years, fewer than ten unique publications were produced for 15 species, including most *Presbytis* species, *M. arctoides*, *N. kayan*, *N. menagensis*, *H. agilis*, and *H. funereus*, and no publications were found for *H. abbotti* (Figure 3).

**Table 1.** Search terms used for each species for the systematic literature review and additional information on the 26 Malaysian primate species. Search terms included Species name, Common name and Area.

| | Family | Species name | Common name | Area | Synonyms |
|---|---|---|---|---|---|
| 1 | Cercopithecidae | *Macaca arctoides* | Stump-tailed macaque | Peninsular Malaysia | *Macacus arctoides*, *M. speciosa*, *M. rhesoides* |
| 2 | Cercopithecidae | *Macaca fascicularis* | Long-tailed macaque | Malaysia (Peninsular Malaysia, Sabah, Sarawak) | *Cynomolgus fascicularis*, *Macacus cynomolgus*, *M. irus*, *Simia fascicularis* |
| 3 | Cercopithecidae | *Macaca nemestrina* | Southern pig-tailed macaque | Malaysia (Peninsular Malaysia, Sabah, Sarawak) | *Macacus nemestrinus*, *M. leonina*, *M. nemestrina pagensis* |
| 4 | Cercopithecidae | *Nasalis larvatus* | Proboscis monkey | Sabah, Sarawak | *N. concolor*, *N. larvatus orientalis*, *N. larvatus carlottae* |
| 5 | Cercopithecidae | *Presbytis chrysomelas* | Bornean banded langur | Sabah, Sarawak | *P. hosei chrysomelas*, *P. chrysomelas cruciger* |
| 6 | Cercopithecidae | *Presbytis femoralis* | Raffles' banded langur | Peninsular Malaysia | *P. femoralis femoralis*, *P. femoralis robinsoni* |
| 7 | Cercopithecidae | *Presbytis frontata* | White-fronted Langur | Sarawak | *P. frontata frontata*, *P. frontata nudifrons* |
| 8 | Cercopithecidae | *Presbytis hosei* | Hose's Langur | Sabah, Sarawak | *P. aygula*, *P. frontata hosei* |
| 9 | Cercopithecidae | *Presbytis robinsoni* | Robinson's Langur | Peninsular Malaysia | *P. melalophos robinsoni*, *P. femoralis robinsoni* |
| 10 | Cercopithecidae | *Presbytis rubicunda* | Maroon langur or Red langur | Peninsular Malaysia, Sabah, Sarawak | *P. rubicunda rubicunda*, *P. rubicunda rubida*, *P. rubicunda ignita* |
| 11 | Cercopithecidae | *Presbytis sabana* | Sabah grey langur | Sabah | *P. hosei sabana* |
| 12 | Cercopithecidae | *Presbytis siamensis* | White-thighed surili or Malayan pale-thighed langur | Peninsular Malaysia | *P. melalophos siamensis*, *P. femoralis siamensis* |
| 13 | Cercopithecidae | *Trachypithecus cristatus* | Silvery langur | Sabah, Sarawak | *Semnopithecus cristatus*, *T. villosus*, *T. argentatus* |
| 14 | Cercopithecidae | *Trachypithecus obscurus* | Dusky langur or Spectacled leaf monkey | Peninsular Malaysia | *Semnopithecus obscurus*, *T. phayrei obscurus* |

| | | | | | |
|---|---|---|---|---|---|
| 15 | Cercopithecidae | *Trachypithecus selangorensis* | Selangor silver langur | Peninsular Malaysia | *Semnopithecus cristatus*, *T. villosus*, *T. argentatus*, *T. cristatus selangorensis* |
| 16 | Hominidae | *Pongo pygmaeus* | Bornean orangutan | Sabah, Sarawak | *Simia satyrus*, *P. satyrus*, *P. wurmbii* |
| 17 | Hylobatidae | *Hylobates lar* | Lar gibbon, White-handed gibbon | Peninsular Malaysia | *H. entelloides*, *H. carpenteri*, *H. agilis lar* |
| 18 | Hylobatidae | *Hylobates agilis* | Agile gibbon, Black-handed gibbon | Peninsular Malaysia | *H. unko* |
| 19 | Hylobatidae | *Hylobates funereus* | Northern gray gibbon | Sabah | *H. muelleri funereus* |
| 20 | Hylobatidae | *Symphalangus syndactylus* | Siamang | Peninsular Malaysia | *Hylobtes syndactylus*, *S. continentis* |
| 21 | Hylobatidae | *Hylobates abbotti* | Abbott's gray gibbon | Sarawak | *H. cinereus abbotti*, *H. muelleri abbotti* |
| 22 | Lorisidae | *Nycticebus bengalensis* | Bengal slow loris | Peninsular Malaysia | *N. cinereus*, *N. incanus*, *N. tenasserimensis* |
| 23 | Lorisidae | *Nycticebus coucang* | Sunda slow loris | Peninsular Malaysia | *Tardigradus coucang*, *N. bengalensis coucang*, *N. coucang menagensis*, *N. javanicus*, *N. menagensis coucang* |
| 24 | Lorisidae | *Nycticebus menagensis* | Philippines slow loris | Sabah, Sarawak | *Lemur menagensis*, *N. coucang menagensis*, *N. menagensis philippinus*, *N. menagensis menagensis*, *N. borneanus*, *N. bancanus*, *N. menagensis borneanus* |
| 25 | Lorisidae | *Nycticebus kayan* | Kayan slow loris | Sabah, Sarawak | *Nycticebus menagensis* (Borneo), Bornean slow loris morphotype 4 |
| 26 | Tarsiidae | *Cephalopachus bancanus* | Western tarsier, Horsfield's tarsier | Sabah, Sarawak | *Tarsius bancanus bancanus*, *T. bancanus borneanus*, *T. bancanus*, *T. borneanus*, *C. bancanus* |

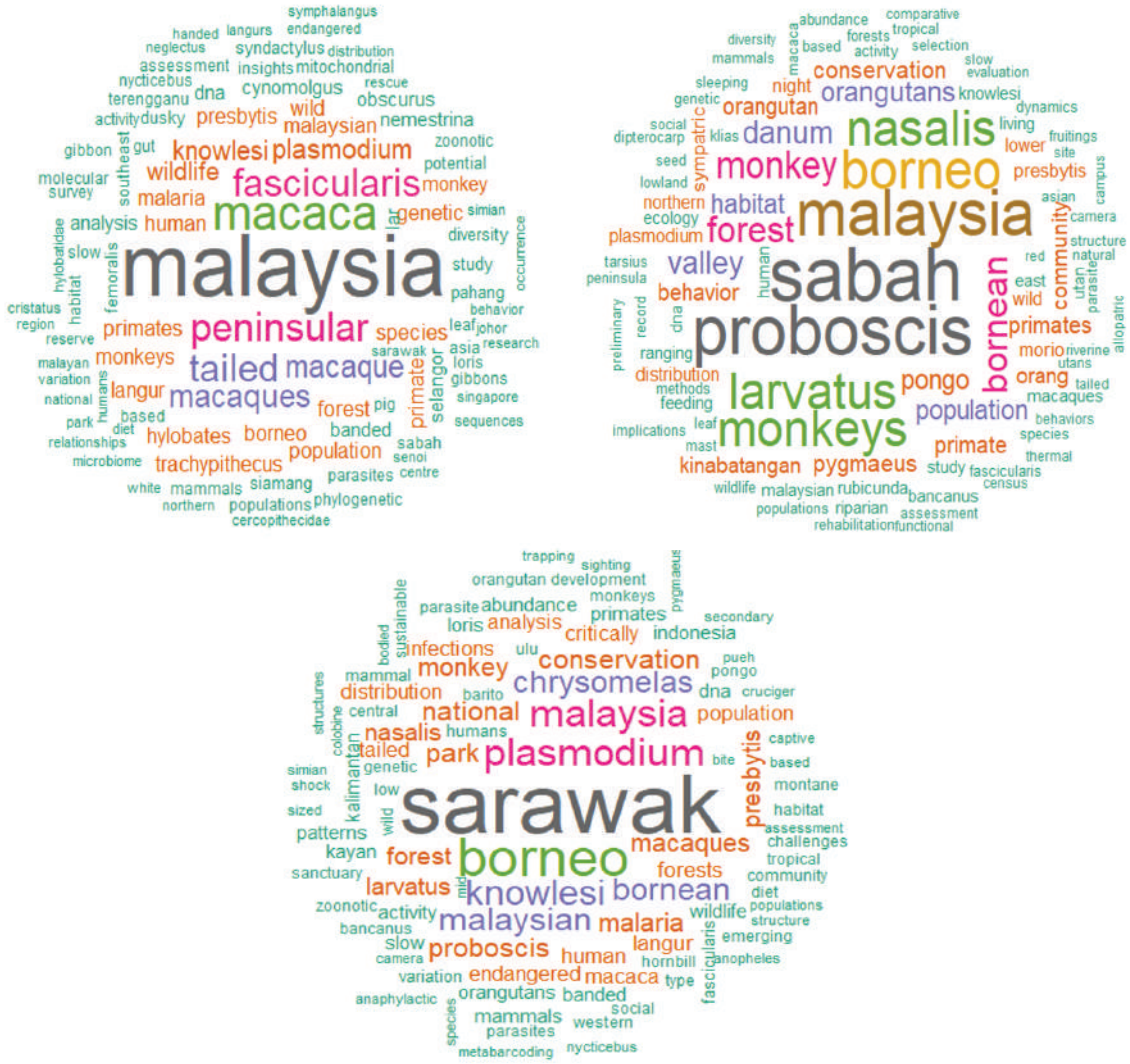


**Figure 2.** Word Clouds of terms used in publication titles of primate research in (Peninsular) Malaysia, Sabah and Sarawak. The bigger the word, the more often it was used in a title.

**Table 2.** Number of publications per theme and topic focussing on primates of each administrative region in Malaysia (Peninsular Malaysia, Sabah, and Sarawak).

| Theme | Topic | Number of publications | | |
|---|---|---|---|---|
| | | Peninsular Malaysia | Sabah | Sarawak |
| General biology | Morphology, anatomy, physiology, behaviour | 50 | 30 | 6 |
| Phylogeny, distribution, and abundance | Population genetics, phylogenetics, molecular evolution, DNA barcoding, genetic diversity, gene flow, conservation genetics, distribution, abundance | 112 | 33 | 27 |

| | | | | |
|---|---|---|---|---|
| Behavioural ecology and conservation | Feeding ecology, diet | 34 | 24 | 7 |
| | Habitat use, population, demography, habitat suitability, threats to habitats, conservation, movement, interactions with other species | 35 | 26 | 9 |
| | Human-primate interactions and conservation | 44 | 19 | 112 |
| Diseases and One Health | Diseases, pathogens, parasites | 153 | 19 | 10 |
| | Forensic science | 6 | 0 | 0 |
| **Total** | | **434** | **151** | **171** |

***Note:*** The number of publications deviates from Figure 3 as several publications listed more than one study species, area, or topic.

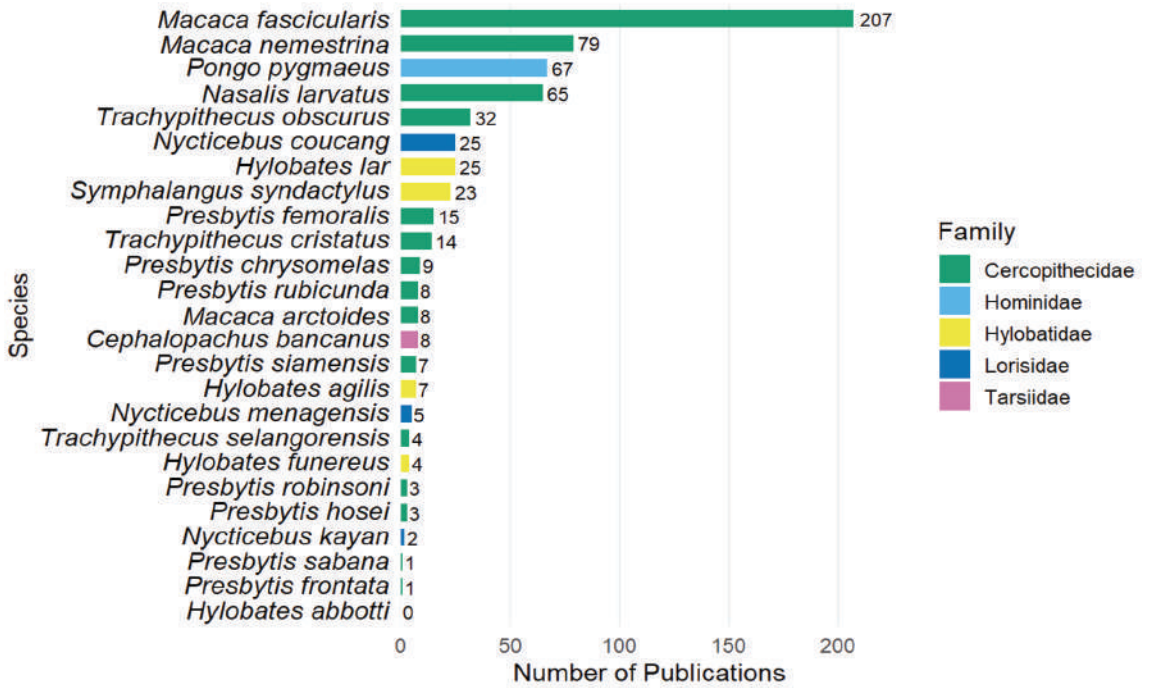


**Figure 3.** Number of unique publications per primate species in Malaysia from 1963 until 2025 (n = 622).

Significant taxonomic revisions in the genera *Hylobates* (Thinh 2010; Chan *et al.* 2013; Matsudaira and Ishida 2021), *Presbytis* (Osterholz *et al.* 2008; Meyer *et al.* 2011; Ang *et al.* 2024), and *Trachypithecus* (Osterholz *et al*. 2008; Roos *et al.* 2008) may have led to misclassification of some publications. This may have resulted in omissions, particularly for subspecies recently elevated to full species, such as *H. abbotti*, *H. funereus*, *P. chrysomelas*, *P. femoralis*, *P. robinsoni*, *P. sabana*, *P. siamensis*, and *T. selangorensis*, but this alone is unlikely to explain these skewed patterns adequately. The inclusion of search terms in Bahasa Malaysia or other local languages and grey literature outside peer-reviewed scientific databases could further increase the number of published references for certain taxa but is not expected to have a significant influence on the current results.

Most publications derived from Peninsular Malaysia (n = 434), with considerably fewer from Sarawak (n = 171) and Sabah (n = 151). Most research revolved around the themes of primate 'Diseases and One Health' (n = 188) and 'Phylogeny, distribution, and abundance' (n = 172; Table 2).

**Conservation**

Peninsular Malaysia had already lost half of its forest cover by 1990, and since the publication *The State of Nature Conservation in Malaysia* (Kiew 1991), forest loss has continued at an alarming pace. For example, from 2001 to 2025, remotely sensed data suggest that Malaysia has lost an estimated 3 million ha of primary forest, and 9.5 million ha of tree cover, with particularly high losses of tree cover in the Peninsular Malaysian states of Johor (51%) and Melaka (60%) (World Resources Institute 2025). Other states lost between 28% and 37% of their tree cover during this interval (World Resources Institute 2025), but since baseline tree cover in Sabah and Sarawak was higher, and these states together comprise more than half of Malaysia's land area, the total area of forest lost in these states was very high (5.3 million ha of tree cover and 2.2 million ha of primary forest). Accordingly, the conservation status of Malaysia's forest-dependent primates has become increasingly dire.

Bennett (1991) assessed the status of Malaysian diurnal primates on a national level using the IUCN Red List criteria then in place (v. 1.0; Table 3). Several of the taxa included in Bennett's (1991) assessment have since been revised, such that the 15 diurnal taxa that Bennett assessed correspond with 21 species now recognised to occur in Malaysia (Table 3). This chapter uses the taxonomy currently accepted by the IUCN and its Red List Categories from the most recent global assessment available for each Malaysian primate taxon, since recent national-level assessments have not been conducted.

The Red List assessments confirm that, while our understanding of primate biodiversity in Malaysia has improved, the conservation situation for Malaysian primates has significantly deteriorated in the past few decades (Figure 4). In 1991, two of 15 species evaluated were assessed as Endangered in Malaysia, and seven species as Vulnerable (Bennett 1991). *Macaca arctoides* was assessed as "possibly extinct in Malaysia," based on its very small area of occurrence in northern Peninsular Malaysia. The three remaining diurnal species, *Macaca fascicularis*, *M. nemestrina*, and *Hylobates lar*, were assessed as Not Threatened in Malaysia (Bennett 1991). However, in 2025, most Malaysian species (23 of 26) are listed as Threatened (i.e., Vulnerable, Endangered, or Critically Endangered), and the remaining three species are Near Threatened (Table 3; Figure 4). In 1991, no Malaysian primate was Critically Endangered, but by 2025, three species are in this highest threat category. The nocturnal primate species known to occur in Malaysia were not included in Bennett's (1991) assessment, and three of these species (*Nycticebus coucang*, *N. kayan*, and *N. menagensis*) were not assessed by the IUCN before 2020, when they were assessed as Vulnerable. *Cephalopachus bancanus* was first assessed in 1996 as "Lower Risk" (a category that corresponds with the category "Least Concern" in post-2000 assessments and is abbreviated as "LC" in Table 3) but is currently listed as Vulnerable. *Nycticebus bengalensis* was listed as Data Deficient in 2000, Vulnerable in 2008, and Endangered in 2015, so additional survey effort to determine the occurrence of *N. bengalensis* in Malaysia is needed for conservation planning.

**Table 3.** Malaysian primate species, organised by area of occurrence and family, with their Malaysian conservation status in 1991 (Malaysia), 1996 (global), the most recent IUCN global assessments available in 2025, main threats globally in 2025, and protection status in each Malaysian legal framework (Peninsular Malaysia, Sabah, and Sarawak). The 1991 evaluations are national assessments generated by Bennett (1991) using IUCN Categories and Criteria v. 1.0. The 1996 (v. 2.3; IUCN 1994) and 2025 (v. 3.1; IUCN 2001) statuses are IUCN Red List Categories (IUCN 2025). Abbreviations: CR = Critically Endangered; DD = Data Deficient; EN = Endangered; LC = Least Concern[1]; N = Not Threatened (categorised by Bennett 1991); NT = Near Threatened[1]; P = Protected; PM = Peninsular Malaysia; SB = Sabah; SW = Sarawak; TP = Totally Protected; VU = Vulnerable.

| Family | Species (common name) | 1991 *Malaysian status according to Bennett 1991 (following IUCN Categories and Criteria v. 1.0.)* | 1996 *Global IUCN Red List Categories (v. 2.3[1])* | 2025 *Global IUCN Red List Categories (v. 3.1)* | Main threats in 2025 *(following Global IUCN Red List)* | Legal protection in Malaysia[2] |
|---|---|---|---|---|---|---|
| **Peninsular Malaysia, Sabah and Sarawak** | | | | | | |
| Cercopithecidae | *Macaca fascicularis* (Long-tailed macaque) | N | NT | EN (A2cd+3cd+4cd) | Habitat loss, hunting, human-wildlife conflict, pet trade, trade for biomedical research, roadkill | P (all) |
| | *M. nemestrina* (Southern pig-tailed macaque) | N | VU | EN (A2cde+3cde) | Habitat loss, hunting, human-wildlife conflict, pet trade, agricultural pesticides | P (all) |
| **Peninsular Malaysia only** | | | | | | |
| Cercopithecidae | *M. arctoides* (Stump-tailed macaque) | Possibly extinct in PM | VU | VU (A2cd+3cd) | Habitat loss, hunting | TP (PM) |
| | *Presbytis femoralis*[3] (Raffles banded langur) | N (assessed as *P. melalophos*[3]) | NT (assessed as *P. femoralis*, a taxon that also included *P. percura* and *P. robinsoni*) | CR (C2a(i) | Habitat loss, habitat fragmentation, low genetic variability | TP (SW), P (PM, SB) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | *P. robinsoni*[3] (Robinson's banded langur) | N (assessed as *P. melalophos*[3]) | NT (assessed as *P. femoralis*, a taxon that also included *P. percura* and *P. robinsoni*) | NT (A2cd) | Habitat loss, pet trade | TP (SW), P (PM, SB) |
| | *P. siamensis*[3] (White-thighed surili/ Malayan pale-thighed langur) | N (assessed as *P. melalophos*[3]) | LC | NT (A2cd) | Habitat loss | TP (SW), P (PM, SB) |
| | *Trachypithecus obscurus*[4] (Dusky langur) | N (*P. obscura*[4]) | LC | EN (A2cd) | Habitat loss, hunting, roadkill | P (PM, SW) |
| | *T. selangorensis*[5] (Selangor silvery langur) | EN (assessed as *P. cristata*[5]) | NT (assessed as *T. cristatus*[4]) | NT (A2c) | Habitat loss, hunting, fires | P (PM, SW) |
| Hylobatidae | *Hylobates agilis* (Agile gibbon/ Black-handed gibbon) | VU | NT | EN (A2cd+4cd) | Habitat loss, hunting, pet trade | TP (PM, SW), P (SB) |
| | *H. lar* (White-handed gibbon/ Lar gibbon) | N | NT | EN (A2cd+3cd) | Habitat loss, habitat fragmentation, hunting, pet trade | TP (PM, SW), P (SB) |
| | *Symphalangus syndactylus*[6] (Siamang) | VU (*Hylobates syndactylus*[6]) | NT (*Hylobates syndactylus*[6]) | EN (A4cd) | Habitat loss, hunting, pet trade, disease | TP (PM, SW), P (SB) |
| Lorisidae | *Nycticebus bengalensis* (Bengal slow loris) | - | - (first assessed as DD in 2000) | EN (A2acd+3cd+4acd) | Habitat loss, fires, human-wildlife conflict, pet trade | TP (PM, SW), P (SB) |
| | *N. coucang* (Greater slow loris) | - | - | EN (A2acde+4acde) | Habitat loss, human-wildlife conflict, pet trade, invasive species | TP (PM, SW), P (SB) |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Sabah and Sarawak only** | | | | | | |
| Cercopithecidae | *Nasalis larvatus* (Proboscis monkey) | EN | VU | EN (A2acd+4acd) | Habitat loss, hunting | TP (all) |
| | *Presbytis chrysomelas*[3] (Bornean banded langur) (SW only) | N (assessed as *P. melalophos*[3]) | - | CR (A2ac+3c) | Habitat loss | TP (SW), P (PM, SB) |
| | *P. frontata* (White-fronted langur) (SW only) | VU | DD | VU (A2cd+3cd) | Habitat loss, hunting | TP (SW), P (PM, SB) |
| | *P. hosei*[7] (Hose's langur) | VU | - | VU (A2cd+3cd) | Habitat loss, hunting | TP (SW), P (PM, SB) |
| | *P. rubicunda* (Maroon langur/ Red langur) | VU | LC | VU (A4acd) | Habitat loss, hunting | TP (SW), P (PM, SB) |
| | *P. sabana*[7] (Sabah grizzled langur) (SB only) | VU (assessed as *P. hosei*[7]) | - | EN (A2acd+4acd) | Habitat loss, hunting | TP (SW), P (PM, SB) |
| | *Trachypithecus cristatus*[5] (Silvery langur) | EN (*P. cristata*[5]) | NT | VU (A2cd+3cd) | Habitat loss, hunting | P (PM, SW) |
| Hylobatidae | *Hylobates abbotti*[8] (Abbott's gray gibbon) (SW only) | VU (assessed as *H. muelleri*[8]) | NT (assessed as *H. muelleri*[8]) | EN (A4cd) | Habitat loss, hunting, fires, pet trade | TP (PM, SW), P (SB) |
| | *H. funereus*[8] (Northern gray gibbon) | VU (assessed as *H. muelleri*[8]) | NT (assessed as *H. muelleri*[8]) | EN (A4cd) | Habitat loss, hunting, fires, pet trade | TP (PM, SW), P (SB) |
| Hominidae | *Pongo pygmaeus* (Bornean orangutan) | VU | EN | CR (A4abcd) | Habitat loss, hunting, fires, habitat fragmentation, lack of awareness, climate change | TP (all) |
| Lorisidae | *Nycticebus kayan* (Kayan River slow loris) | - | - | VU (A2cde+3cde) | Habitat loss, pet trade, fires | TP (PM, SW), P (SB) |
| | *N. menagensis* (Philippine slow loris) | - | - | VU (A2cd+3cd) | Habitat loss, pet trade, fires | TP (PM, SW), P (SB) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tarsiidae | *Cephalopachus bancanus*[9] (Horsfield's tarsier) | - | LR (*Tarsius bancanus*[9]) | VU (A2cde+3cde) | Habitat loss, human-wildlife conflict, pet trade, agricultural pesticides | P (PM, SB), TP (SW) |

[1] Version 2.3 of the IUCN Red List Criteria and Categories (IUCN 1994) used a single "Lower Risk" Category, which included three ordered subcategories: "Lower Risk (conservation dependent) (LR/cd), "Lower Risk (near threatened) (LR/nt), and Lower Risk (least concern) (LR/lc). To facilitate longitudinal comparisons of threatened status, here we treat a designation of LR/nt under version 2.3 (IUCN 1994) as equivalent to the category "Near Threatened (NT)" in version 3.1 (IUCN 2001), and treat a designation of "LR/lc" under version 2.3 (IUCN 1994) as equivalent to the category "Least Concern (LC)" in version 3.1 (IUCN 2001).

[2] Wildlife in Malaysia is protected under different regulations in different regions. In Peninsular Malaysia, protection is under the Wildlife Conservation Act 2010 (Act 716; Laws of Malaysia 2010) and its 2022 amendment (Wildlife Conservation (Amendment) Act 2022 (Act A 1646; Laws of Malaysia 2022) in Sabah, protection is under the Wildlife Conservation Enactment 1997 (State of Sabah 1997). In Sarawak, protection is under the Wild Life Protection Ordinance 1998 (Laws of Sarawak 1998).

[3] Revision of *Presbytis taxonomy* resulted in the elevation of *Presbytis chrysomelas*, *P. femoralis*, *P. robinsoni*, and *P. siamensis*, formerly within *P. melalophos*, to full species level (Osterholz *et al.* 2008; Meyer *et al.* 2011; Ang *et al.* 2020a, 2024). This revision means that *P. melalophos* does not occur in Malaysia.

[4] *Trachypithecus obscurus* was listed as *Presbytis obscurus* in Bennett (1991).

[5] *Trachypithecus cristatus* was listed as *Presbytis cristata* in Bennett (1991). *Trachypithecus selangorensis*, formerly a subspecies of *T. cristatus*, was subsequently elevated to full species level (Osterholz *et al.* 2008).

[6] *Symphalangus syndactylus* was listed as *Hylobates syndactylus* in Bennett (1991) and IUCN (1996).

[7] *Presbytis sabana* was included within *P. hosei* in Bennett (1991).

[8] Revision of *Hylobates* taxonomy resulted in the elevation of *Hylobates abbotti* and *H. funereus*, formerly within *H. muelleri*, to full species level (Thinh 2010; Chan *et al.* 2013; Matsudaira and Ishida 2021). This revision means that *H. muelleri* is not known to occur in Malaysia.

[9] *Cephalopachus bancanus* was assessed as *Tarsius bancanus* in IUCN (1996). Taxonomic revision of lorises in Sarawak placed *Nycticebus kayan* and *N. menagensis*, formerly under *N. coucang*, under the same Totally Protected status in the Wild Life Protection Ordinance 1998.

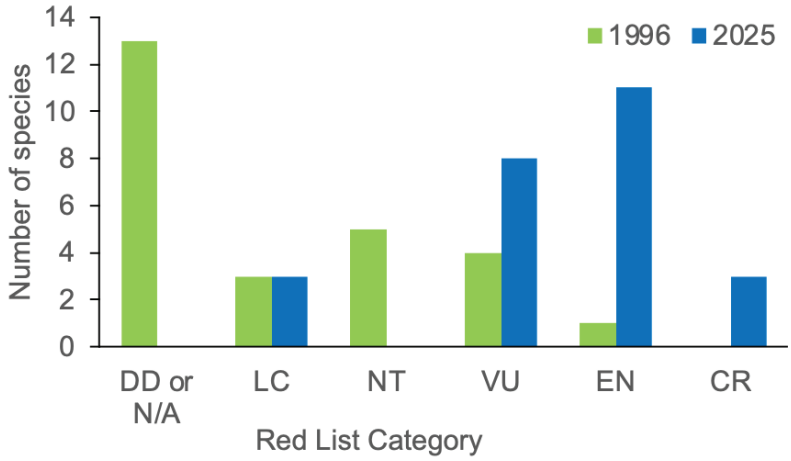


**Figure 4.** IUCN Red List Categories for 25 primate species with confirmed occurrence in Malaysia in 1996 and 2025. DD = Data Deficient, N/A = No assessment was available in 1996, LC = Least Concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered.

## STATUS OF MALAYSIAN PRIMATES IN 2025

All Malaysian primates were listed as Threatened (i.e., Vulnerable, Endangered, or Critically Endangered) or Near Threatened in the most recent IUCN Red List assessments. While global assessments do not always capture the situation in individual nations, and changes in taxonomy, especially among *Presbytis* (Osterholz *et al*. 2008; Meyer *et al.* 2011; Ang *et al.* 2020a, 2024) and *Hylobates* (Thinh 2010; Chan *et al.* 2013; Matsudaira and Ishida 2021) species, make direct comparisons across years difficult for several taxa, the significant increase in the proportion of Malaysian taxa listed as Endangered and Critically Endangered clearly reflects increasing threats to primates in Malaysia as well as globally.

Below, we briefly review the status of each primate genus in Malaysia. The Bornean orangutan (*Pongo pygmaeus*) is also reviewed more thoroughly in another chapter in the *State of Nature Conservation in Malaysia 2025*.

### 1. *Cephalopachus*

Distribution

In Malaysia, the tarsier population is represented by a single subspecies, *Cephalopachus bancanus borneanus*, which is shared with the neighbouring regions of Kalimantan and Brunei. Its distribution within Malaysia is restricted to Sabah and Sarawak (Shekelle and Yustian 2020).

Population

Population studies on tarsiers in Malaysia are limited and often dated. In Sabah, foundational studies by Crompton and Andau (1987) in Kabili-Sepilok Forest Reserve recorded a density of 12 individuals/km$^2$. Elsewhere in the state, the primary protected forest of Danum Valley supported 15 ind./km$^2$ (Bernard *et al*. 2014), while the mixed riverine forest of the Lower Kinabatangan Wildlife Sanctuary sustained a much lower density of 3 ind./km$^2$ (Munds *et al.* 2013a). In Sarawak, the earliest population assessment reported an exceptionally high -density estimate of 80 ind./km$^2$ in Semenggoh (Niemitz 1979), and more recent research in the secondary and rehabilitated forest patches of Universiti Putra Malaysia (UPM), Bintulu, has documented a density of 36 ind./km$^2$ (Sahimi *et al.* 2018).

Habitat and ecology
The species inhabits lowland and hilly areas in both primary and secondary forests, as well as some cultivated landscapes and coastal zones (Crompton and Andau 1987; Shekelle and Yustian 2020). Its populations are predominantly found in the dense understory of lowland rainforests (Phillipps and Phillipps 2018; Shekelle and Yustian 2020). This preference is driven by its strictly nocturnal and carnivorous foraging ecology, as it hunts insects and small vertebrates primarily in the lower forest stratum (<2 m) (Crompton and Andau 1987; Shekelle and Yustian 2020).

Threats to survival
*Cephalopachus bancanus* faces significant extinction risk primarily from widespread habitat loss and degradation due to forest conversion for agriculture, logging, and fires across its range in Borneo and Sumatra. This is compounded by localised pressure from illegal capture for the pet trade and potential impacts from invasive species, pathogens, and pollution, collectively driving population declines (Shekelle and Yustian 2020).

Conservation measures
Tarsiers receive formal legal protection across multiple jurisdictions to mitigate extinction risks. Internationally, *C. bancanus* is listed under CITES Appendix II, which regulates and monitors all international commercial trade. Domestically within Malaysia, it is shielded by a framework of federal and state-level legislation. In key areas like Danum Valley and Rainforest Discovery Centre, Sepilok, regulated wildlife tourism generates essential conservation revenue and local economic benefits, while promoting public education under controlled conditions (Shekelle and Yustian 2020).

**2. *Hylobates***
Distribution
Four *Hylobates* species occur in Malaysia: two in Peninsular Malaysia and two in Borneo. *Hylobates abbotti* occurs in western Kalimantan and Sarawak (Roos *et al.* 2014; Cheyne *et al.* 2020a). *Hylobates agilis* is distributed in Peninsular Malaysia, southern Thailand, and Sumatra (Geissmann *et al.* 2020), with its distribution in Malaysia limited to parts of Perak, Kedah, and Kelantan. *Hylobates funereus* occurs in Sabah and eastern Sarawak (Roos *et al.* 2014), although the precise distribution boundary between *H. abbotti* and *H. funereus* remains poorly understood (Nijman *et al*. 2020a). *Hylobates lar* ranges from southern China, Myanmar, Thailand, and Laos to Peninsular Malaysia and Sumatra and is widespread throughout forested areas in Peninsular Malaysia, except in Melaka, Penang, and a narrow zone between the Perak and Muda rivers (Brockelman and Geissmann 2020).

Population
Little is known about the abundance and population trends of most Malaysian *Hylobates* species (Sop *et al.* 2024). While the occurrence of *H. abbotti* in Sarawak has been confirmed, no recent information is available on its abundance or distribution, representing a major knowledge gap (Cheyne *et al.* 2020a; Sop *et al*. 2024). In Ulu Muda Forest Reserve, *H. agilis* densities were estimated at 4.03 ± 0.14 groups/km$^2$, with a total population of approximately 2,927 ± 102 groups (Pang *et al.* 2022), but comparable estimates from other important populations are lacking. For *H. funereus*, a recent assessment estimated approximately 100,000 individuals in Sabah, compared to more than 360,000 individuals in 1980, although this estimate was derived from spatial models of forest loss rather than direct surveys (Sop *et al.* 2024; Shabrani *et al.* 2026). Recent estimates for *H. lar* range from 3.55 ± 0.9 groups/km$^2$ in Sungai Yu and Tanum Forest Reserves (Kamaruzaman *et al*. 2023) to 0.24 – 1.7 groups/km$^2$ in Taman Negara Pahang and adjacent forests (Mohd Rameli 2021), but no national population estimate is available (Brockelman and Geissmann 2020).

Habitat and ecology

Malaysian gibbons primarily inhabit lowland, swamp, and hill dipterocarp forests. They are highly arboreal, spending nearly their entire lives in the forest canopy, where they feed predominantly on fruits supplemented with leaves, flowers, and invertebrates. *Hylobates* spp. like other gibbons, are among the most specialised brachiators, travelling rapidly through the canopy using arm-swinging locomotion. They typically live in small, territorial family groups consisting of an adult pair and their offspring. Pair bonds are maintained through coordinated territorial defence and species-specific loud morning duets, which play important roles in mate bonding, territory advertisement, and population spacing. Due to their dependence on continuous forest canopies and fruit resources, gibbons are particularly sensitive to habitat disturbance and changes in forest composition (Caldecott 1980; Light *et al.* 2021; O'Brien *et al*. 2024).

Threats to survival

Habitat loss, degradation, and fragmentation are the principal threats to all Malaysian gibbons, including *Hylobates* spp. (Brockelman and Geissmann 2020; Cheyne and Nijman 2020, Geissmann *et al*. 2020; Nijman *et al*. 2020). Large areas of suitable habitat have been converted for agriculture, infrastructure, and other land uses, resulting in population declines and range contractions. Gibbons are particularly vulnerable to fragmentation because they rarely descend to the ground and are reluctant to cross canopy gaps. Consequently, roads, railways, and other linear infrastructure can isolate populations even when forest cover remains largely intact (Cheyne *et al*. 2013; Asencio *et al.* 2021; Saralamba *et al*. 2022). As strict arboreal frugivores, they are also highly sensitive to changes in forest structure and tree species composition (Caldecott 1980; Light *et al*. 2021, Hankinson *et al*. 2021; O'Brien *et al*. 2024).

Hunting, trade, and trafficking represent additional and increasingly severe threats to *Hylobates* spp. and other gibbons (Brockelman and Geissmann 2020; Cheyne & Nijman 2020; Geissmann *et al.* 2020; Nijman *et al*. 2020). Malaysia has recently emerged as an important hub for international gibbon trafficking, and *Hylobates* spp. represent a substantial proportion of trafficked gibbons, exceeded only by *Symphalangus syndactylus* (TRAFFIC 2025; Pinto-Rodrigues 2026; Rao 2026). Many trafficked gibbons are wild-caught infants obtained by killing their mothers, making trade particularly damaging to already declining populations (Cheyne 2025).

Conservation measures

All Malaysian *Hylobates* spp. are listed on CITES Appendix I and currently classified as Endangered on the IUCN Red List (Brockelman and Geissmann 2020; Cheyne *et al.* 2020a; Geissmann *et al.* 2020; Nijman *et al*. 2020a). All species also receive legal protection throughout their Malaysian range. All *Hylobates* species are Totally Protected in Peninsular Malaysia (Laws of Malaysia 2010). *Hylobates abbotti* and *H. funereus* are also Totally Protected in Sarawak (as *H. muelleri*; Laws of Sarawak 1998) and Protected (as *H. muelleri*, State of Sabah 1997) in Sabah. Conservation efforts for all species should prioritise the protection of remaining lowland forests, maintenance of canopy connectivity between habitat fragments, and the incorporation of wildlife crossings into infrastructure development. For *H. agilis* and *H. lar*, improved population monitoring and continued protection of key strongholds such as Ulu Muda, Belum-Temenggor, Endau-Rompin, Kenyir, and Taman Negara landscapes are vital.

Malaysia is unique among gibbon range countries in having several urban landscapes (e.g., Kluang, Kuala Lumpur, Kuantan, Taiping) with small forest fragments that continue to support gibbons. Engagement of local communities, close monitoring of small and isolated populations, and enhancement of forest quality and connectivity are crucially important for the persistence of these populations and represent an opportunity for positive

community engagement. For the poorly known *H. abbotti* and *H. funereus*, comprehensive surveys are required to clarify distributions, population sizes, and conservation status. Across all species, public awareness campaigns against pet-keeping and stronger enforcement against illegal trade, improved transboundary cooperation with Indonesia and Thailand, and long-term ecological monitoring are essential to secure viable populations in Malaysia.

**3. *Macaca***

Distribution

Three macaque species occur in Malaysia: *Macaca arctoides*, *M. fascicularis*, and *M. nemestrina*. Within Malaysia, *M. arctoides* is restricted to a small area in Wang Kelian, Perlis, along the border with Thailand, whereas *M. fascicularis* and *M. nemestrina* are widely distributed throughout Peninsular Malaysia and Borneo, although their occurrence may be patchy in some regions. Beyond Malaysia, *M. arctoides* is distributed across South and Southeast Asia, including parts of Cambodia, China, India, Laos, Myanmar, Thailand, and Viet Nam (Chetry *et al*. 2020). *Macaca fascicularis* has one of the broadest distributions of any Southeast Asian primate extant in Brunei, Cambodia, India (Nicobar Island); Indonesia; Lao People's Democratic Republic; Malaysia; Myanmar; Philippines, Singapore, Thailand; Timor-Leste and Viet Nam but recently extinct from Bangladesh (Hansen *et al.* 2025). *Macaca nemestrina* occurs throughout Sumatra, Peninsular Malaysia, and Borneo (Ruppert *et al.* 2022).

Population

Population information for Malaysian macaques remains limited. The only recent estimate for *Macaca arctoides* reported 11 – 176 individuals in Perlis State Park between 2018 and 2019 (Syamil *et al.* 2019), highlighting the species' rarity in Malaysia. For *M. fascicularis*, available evidence suggests a sharply declining trend despite its continued widespread occurrence. Karuppanam *et al.* (2014) estimated 127,050 individuals in Peninsular Malaysia in 2011, whereas Koch Liston *et al*. (2024) estimated 119,499 individuals for the whole of Malaysia in 2024, suggesting a severe reduction. This pattern is consistent with broader regional declines and the estimated 50% reduction across the species' range over the last three generations (Hansen *et al*. 2025). Locally high densities associated with human food provisioning, urban environments, and tourist sites represent exceptions rather than overall population trends (Koch Liston *et al*. 2024). No nationwide population estimates are available for *M. nemestrina*, but declining habitat occupancy and increasing local extinction risk have been documented in disturbed forests, indicating that populations are likely decreasing and becoming increasingly fragmented (Holzner *et al*. 2021).

Habitat and ecology

Malaysian macaques occupy a broad range of habitats, including lowland, hill, and montane forests, mangroves, peat swamps, coastal habitats, and human-modified environments. However, the three species differ markedly in their ecology and adaptability. *Macaca arctoides* is the most forest-dependent species and spends much of its time on the ground, foraging for fruits, seeds, flowers, roots, shoots, and other forest resources. It typically inhabits dense evergreen and semi-evergreen forests, requires extensive home ranges, and depends on suitable forest structure for sleeping sites and daily movements, making it particularly vulnerable to habitat fragmentation (Chetry *et al.* 2020). In Perlis, it is found using oil palm plantations and limestone hills near primary forest (Syamil *et al.* 2019). *Macaca fascicularis* is adaptable, opportunistic, and highly synanthropic. It occupies a wide variety of natural habitats, including mangroves, riverine forests, swamp forests, and lowland forests, but is equally successful in human-dominated environments such as agricultural landscapes, roadsides, temples, parks, villages, and cities (Fooden 1995; Hansen *et al.* 2025). Human-modified habitats form an important component of the species' ecological niche. In contrast, Macaca nemestrina is primarily associated with lowland and hill dipterocarp forests but increasingly exploits agricultural landscapes, particularly oil palm plantations.

Individuals may forage hundreds of metres into plantations while relying on adjacent forest for resting and sleeping (Ruppert *et al*. 2018). This species can provide ecosystem services by reducing rodent pests in plantations (Holzner *et al*. 2019), but altered activity budgets, elevated infant mortality, and dependence on intact forest indicate that agricultural habitats alone cannot sustain viable populations over the long term (Holzner *et al*. 2024).

Threats to survival

Habitat loss, degradation, and fragmentation are the principal threats facing all Malaysian macaques. Due to its highly restricted distribution in Malaysia, *M. arctoides* is especially vulnerable to local extinction from habitat disturbance, infrastructure development, road mortality, and hunting, even at relatively low levels (Chetry *et al*. 2020). Its predominantly terrestrial behaviour further increases its susceptibility to human-related threats. Although often perceived as common, *M. fascicularis* faces substantial conservation pressures. Widespread deforestation, mangrove loss, and urban expansion continue to reduce suitable habitat and increase contact with humans. Human–wildlife conflict is a major issue, frequently resulting in translocations or culling; nearly 494,000 individuals were reportedly culled in Malaysia between 2011 and 2018 (Koch Liston *et al*. 2024).

Additional threats include illegal pet ownership and capture for the trade. Across its range, the species is heavily exploited for biomedical research, with legal and illegal trade contributing to continued removals from wild populations (Hansen *et al*. 2025). For *M. nemestrina*, the expansion of oil palm plantations represents the most significant threat. Large-scale conversion of lowland forests has reduced habitat availability, increased fragmentation, and exposed macaques to agrochemicals and other anthropogenic disturbances. Although the species can utilise plantation landscapes, declining occupancy in disturbed forests and high infant mortality rates suggest that these environments function as suboptimal habitats (Holzner *et al.* 2021, 2024). Human–wildlife conflict, illegal trade, and exploitation for trade further exacerbate population declines.

Conservation measures

All three macaque species are legally protected in Malaysia and benefit from the protection afforded by national parks, wildlife reserves, and other protected areas. The only known Malaysian population of *M. arctoides* occurs within Perlis State Park and adjacent forest reserves, which are connected to the larger Thale Ban National Park in Thailand, making transboundary habitat protection particularly important for the species' persistence in Malaysia (Chetry *et al*. 2020). Continued monitoring and targeted conservation measures are needed to assess population trends and mitigate the impacts of habitat loss and hunting. For *M. fascicularis*, conservation efforts should focus on improving coexistence between humans and macaques. Although local initiatives led by Langur Project Penang and Animal Neighbours Project (see www.primatesmalaysia.org) have demonstrated successful approaches to conflict mitigation through education and community engagement, such programmes remain geographically limited. A nationwide monitoring programme, stronger enforcement against illegal trade and pet ownership, and science-based management strategies are needed to replace reactive culling approaches and ensure long-term population viability.

Conservation of *M. nemestrina* depends largely on maintaining substantial areas of connected forest within agricultural landscapes. Protecting forest fragments, retaining ecological corridors, reducing the use of harmful pesticides, and promoting wildlife-friendly plantation management would benefit the species while maintaining its ecological role as a natural pest controller (Holzner *et al.* 2019). More broadly, comprehensive surveys, long-term monitoring, and research on distribution, abundance, ecology, and threats remain priorities for all three Malaysian macaque species and are essential for evidence-based conservation planning and management.

**4. *Nasalis***

Distribution

*Nasalis larvatus* is the only species in this genus and endemic to Borneo. It occurs in Brunei, Kalimantan, Sabah and Sarawak. Historically, it occupied the entire coastal region of Borneo and was also present on the nearby islands of Berhala, Sebatik, and Pulau Laut (Groves 2001; Boonratana *et al*. 2021).

Population

In Sarawak, fewer than 1,000 individuals remain, scattered across habitat fragments. In Sabah, sizeable populations persist only in the Kinabatangan floodplain and around Dewhurst Bay in the Eastern Deltas, while Brunei maintains a single estuarine population. The species is more numerous in Kalimantan, where population sizes vary widely from >1,000 to <100 individuals depending on local pressures (Meijaard and Nijman 2000), although some formerly large populations, such as those in Pulau Kaget and the Mahakam Delta, have been lost due to habitat conversion, including extensive coastal swamp clearance for shrimp farming (Boonratana *et al*. 2021).

Habitat and ecology

This species is closely tied to riparian and coastal lowland habitats, including mangroves, peat swamps, and freshwater swamp forests, and seldom ranges far from waterways, likely due to mineral-rich diets unavailable in inland soils (Bennett and Sebastian 1988; Boonratana 2000; Meijaard and Nijman 2000). It occurs at low elevations (≤350 m asl) and is primarily folivorous and frugivorous, with seasonal shifts in diet, regularly swimming across major rivers and maintaining home ranges of over 200 ha (Yeager 1989; Boonratana 2000). Although it avoids heavily deforested or agricultural areas, it can persist in secondary forests where hunting pressure is low (Salter and MacKenzie 1985).

Threats to survival

This species is declining primarily due to the large-scale loss of its riverine and coastal habitats, which are heavily targeted for logging, agriculture, settlement, and infrastructure development. These activities remove mangroves, clear riverbanks, and intensify the impact of forest fires, such as the extensive 1997–1998 burns in Borneo (Boonratana *et al.* 2021). Because it is slow-moving and easily approached, it is highly vulnerable to hunting for meat and bezoar stones, leading to rapid local extirpations. Although hunting pressure has historically been strongest in the Bornean interior, it is increasingly affecting coastal populations as well (Meijaard and Nijman 2000).

Conservation measures

This species is legally protected across its entire range and listed under CITES Appendix I, yet conservation effectiveness is often limited by inadequate funding, weak enforcement, and insufficient management capacity (Meijaard and Nijman 2000). It is currently known from 16 protected areas across Indonesia and Malaysia, including sites such as Bako National Park, Kabili-Sepilok Forest Reserve, and the Lower Kinabatangan Wildlife Sanctuary, though it has already been lost from areas like Pulau Kaget Nature Reserve. The species is rarely kept in captivity outside Asia due to its highly specialised folivorous diet, which makes long-term maintenance difficult (Boonratana *et al.* 2021).

**5. *Nycticebus***

Distribution

Malaysia is home to four species of slow lorises: *Nycticebus bengalensis* and *N. coucang* in Peninsular Malaysia, and *N. kayan* and *N. menagensis* in Malaysian Borneo. *Nycticebus bengalensis* possesses the genus's largest geographic range, occurring from northeastern India and southern China throughout mainland Southeast Asia (Brandon-Jones *et al*. 2004). Within Peninsular Malaysia, its presence has been confirmed by molecular evidence from

from Langkawi Island, and populations may also occur in the forest remnants of northern Perlis (Md-Zain *et al.* 2019). *Nycticebus coucang* is distributed throughout Peninsular Malaysia and extends into neighbouring Sumatra, Singapore, and Thailand (Nekaris *et al.* 2020b). Its subspecies, *N. c. insularis*, persists on Malaysia's Tioman Island (Rovie-Ryan *et al.* 2018; Md Fauzi *et al.* 2021). *Nycticebus kayan* occurs throughout central and northern Borneo, including both Sabah and Sarawak. Its range extends to the northernmost coast of Sabah, with its southern limits defined by the Rajang River in Sarawak and the Mahakam River in East Kalimantan in Indonesia (Munds *et al.* 2013b, Nekaris and Miard 2020). *Nycticebus menagensis* has a broader distribution, occurring in the coastal regions of northern and eastern Borneo within Sabah and Sarawak, where its range partially overlaps with that of *N. kayan* (Nekaris *et al*. 2020a).

Population

*Nycticebus bengalensis* in Malaysia has only been confirmed through molecular analyses, and population information is not available (Nekaris *et al*. 2020c). *Nycticebus coucang* exhibits variable densities across Peninsular Malaysia. Short-term surveys recorded low densities, such as 0.01 – 0.02 individuals/km$^2$ at Pasoh Forestry Research Centre (Negeri Sembilan) and 0.4 ind./km$^2$ in Petaling Jaya (Selangor) (Nekaris *et al.* 2020b). Similarly, a longer-term, two-year study on island populations recorded low encounter rates of 0.12 and 0.29 ind./km$^2$ on Penang and Langkawi islands, respectively (Miard *et al.* 2024). However, other longer-term mainland studies have found higher densities: Nekaris *et al.* (2020b) found 0.3 – 0.8 ind./km$^2$ in logged forests and 0.5 – 1.2 ind./km$^2$ in unlogged primary forests in Sungai Tekam Forestry Concession (Pahang), 1.6 – 4.0 ind./km$^2$ in primary forests and 0.4 – 1.0 ind./km$^2$ in logged swamp and secondary savanna in Segari, Manjung District (Perak). An earlier report estimated a density of 20 – 80 ind./km$^2$ of slow lorises in Peninsular Malaysia (Wiens 2002). *Nycticebus menagensis* is widespread in Borneo, with 0.12 ind./km$^2$ observed at Danau Girang (Munds *et al.* 2013). *Nycticebus kayan* lacks published wild population data (Nekaris and Miard 2020).

Habitat and ecology

Slow lorises exhibit significant ecological flexibility, inhabiting environments from pristine montane forests to disturbed lowlands and agricultural landscapes (Munds *et al.* 2013; Nekaris *et al.* 2020a, 2020b). *Nycticebus coucang* occupies various forest types, including dipterocarp, swamp, and logged primary forests (Nekaris *et al.* 2020b). Its omnivorous diet encompasses plant exudates, nectar, fruits, and insects (Wiens 2002; Md Fauzi *et al*. 2021). *Nycticebus menagensis* primarily consumes sap, insects, and small vertebrates, supplementing with fruit. All species display characteristically slow, deliberate locomotion and are incapable of jumping (Phillipps and Phillipps 2018; Md Fauzi *et al*. 2021). A defining characteristic of slow lorises is that they are one of few venomous mammals, and one of only two genera of venomous primates (Nekaris *et al.* 2013) with the pygmy lorises, *Xanthonycticebus*.

Threats to survival

Slow lorises face critical threats from widespread habitat loss and illegal trade. They are poached for traditional medicine, fuelled by superstitious beliefs in their healing properties, and captured for the pet market (Miard *et al.* 2017). The subsequent unauthorised release of former pets introduces additional risks to wild populations. These combined pressures have caused substantial population declines throughout their range (Md-Zain *et al.* 2019, Nekaris and Miard 2020).

Conservation measures

All slow loris species are listed on the IUCN Red List, with *N. coucang* and *N. bengalensis* classified as Endangered and the *N. kayan* and *N. menagensis* as Vulnerable. They receive the highest level of international protection under CITES Appendix I, which prohibits commercial trade. Domestically in Malaysia, they are protected by federal and state-level legislation, which prohibits capture or possession without a permit.

## 6. *Pongo*

*Pongo pygmaeus* research and conservation aspects are reviewed in detail in another chapter of this volume.

### Distribution

*Pongo pygmaeus* is confined to the island of Borneo, occurring in Sabah and Sarawak as well as across North, East, Central, and West Kalimantan in Indonesia (Ancrenaz *et al.* 2024). Its distribution is highly fragmented, with the species rare or absent in parts of southeastern Borneo and the region between the Rejang and Padas rivers, including Brunei. Although it is primarily a lowland forest species below 500 m asl, it can range to elevations of about 1,500 m, and its dispersal is strongly constrained by large rivers, which act as barriers to gene flow and population connectivity (Goossens *et al.* 2005).

### Population

Climatic change and human pressures have drastically reduced the range and abundance of *P. pygmaeus*. In Malaysia, Sabah supports the only comprehensively surveyed population, with aerial nest surveys estimating approximately 11,000 individuals (Ancrenaz *et al*. 2005). Across Borneo, population modelling suggests that orangutan numbers declined from approximately 288,500 individuals in 1973 to 104,700 in 2010, with further declines projected under continuing habitat loss and unsustainable mortality (Wich *et al.* 2012). Although much of the modelling data originated from Kalimantan, the widespread impacts of deforestation, habitat fragmentation, and killing across Borneo indicate that Malaysian populations are subject to the same regional pressures (Ancrenaz *et al.* 2024).

### Habitat and ecology

*Pongo pygmaeus* is largely arboreal but also travels considerable distances on the ground, historically thriving in diverse lowland dipterocarp forest mosaics that buffered seasonal food shortages, with a diet dominated by fruit but supplemented by leaves, bark, flowers, and insects. They are semi-solitary, with males dispersing to establish large territories and females occupying smaller ranges shaped by forest type and food availability. Their extremely slow reproductive rate of only one infant every 6 to 8 years and late female maturity make populations highly vulnerable to any additional mortality or habitat loss (Ancrenaz *et al.* 2024).

### Threats to survival

In Sabah and Sarawak, *P. pygmaeus* faces the same major threats driving declines across Borneo, with rapid deforestation, large-scale forest conversion, and recurrent fires reducing and fragmenting the remaining habitat available to their already patchily distributed populations. Although illegal killing is best documented in Kalimantan, the species' extremely slow reproduction means that any comparable mortality in Malaysian Borneo would quickly undermine population viability, especially in smaller, isolated subpopulations. Climate-change projections further indicate substantial future habitat loss, underscoring the urgency of protecting and managing the remaining strongholds in eastern and northeastern Borneo, including those within Sabah and Sarawak (Ancrenaz *et al.* 2024).

### Conservation measures

*Pongo pygmaeus* is fully protected in both Sabah and Sarawak, yet a substantial share of their habitat (around 20% of the range in Sabah) lies outside protected areas, highlighting the need for conservation strategies that extend beyond formal reserves. Long-term survival in Malaysia will depend on securing large, strictly protected forests where logging and hunting are effectively controlled and where populations are large enough to withstand fires, disease, and climate-driven environmental change. To achieve this, Sabah and Sarawak must implement science-based, landscape-level land-use planning that maintains ecological connectivity and integrates sustainable forest management around core orangutan strongholds (Ancrenaz *et al*. 2024).

**7. *Presbytis***

Only limited information is available for most Malaysian *Presbytis* species. The most comprehensive and up-to-date treatment of the genus is provided by the IUCN Asian Langurs (*Presbytis*) Conservation Action Plan 2024–2034, developed through transboundary collaboration among Malaysia, Indonesia, Thailand, and Brunei (Ang *et al.* 2024). The following summary is largely based on this action plan.

Distribution

Eight species of *Presbytis* occur in Malaysia, three in Peninsular Malaysia (*P. femoralis*, *P. robinsoni*, and *P. siamensis*) and five in Borneo (*P. chrysomelas*, *P. frontata*, *P. hosei*, *P. rubicunda*, and *P. sabana*). Most species exhibit largely allopatric distributions, often separated by major rivers or mountain ranges. *Presbytis femoralis* is restricted to southern Peninsular Malaysia, mainly Johor and southeastern Pahang, and Singapore. *Presbytis robinsoni* occurs in northwestern Peninsular Malaysia, southern Thailand, and southern Myanmar (Ang *et al*. 2021a), while *P. siamensis* has the widest distribution in Peninsular Malaysia, occupying forests between the Perak and Pahang Rivers and extending into southern Thailand and Sumatra (Ang *et al*. 2020b). In Borneo, *P. chrysomelas* has one of the most restricted ranges, occurring along the west coast of Sarawak and West Kalimantan, with two recognised subspecies (Nijman *et al*. 2020b). *Presbytis frontata* is patchily distributed in Sarawak and Kalimantan (Cheyne *et al*. 2020b), *P. hosei* occurs in Sabah, Sarawak, Brunei and Kalimantan, and *P. sabana* is largely confined to Sabah. *Presbytis rubicunda* has the broadest distribution among Bornean *Presbytis*, occurring throughout much of Borneo and on Karimata Island (Cheyne *et al.* 2020c).

Population

No systematic population censuses have been conducted for any Malaysian *Presbytis* species, except *P. femoralis*, and most historical density estimates are outdated due to extensive habitat loss (Ehler-Smith 2014; Hon 2021). All species are believed to be declining (Ang *et al*. 2024). *Presbytis femoralis* is the most threatened species in Peninsular Malaysia, with fewer than 250 mature individuals remaining across its range and isolated populations occurring mainly in fragmented forests in Johor and southeastern Pahang (Ang *et al*. 2022). *Presbytis robinsoni* and *P. siamensis* are considered Near Threatened, but recent information on their abundance is scarce (Ang and Traeholt 2020; Ang *et al*. 2021). In Borneo, *P. frontata*, *P. hosei*, *P. rubicunda*, and *P. sabana* all show declining populations, although reliable estimates are lacking. The current area of occupancy of *P. chrysomelas* is estimated to represent less than 5% of its historical range, and recent records in Sarawak have been extremely scarce (Ang *et al*. 2024). Most Malaysian *Presbytis* populations occur outside protected areas, with important protected strongholds including Royal Belum State Park, Greater Ulu Muda Forest Complex, Danum Valley Conservation Area, Tabin Wildlife Reserve, Gunung Mulu National Park, Usun Apau National Park, and the Kinabatangan landscape (Cheyne *et al.* 2015, 2020; Setiawan and Traeholt 2020; Nijman *et al*. 2021; Ang *et al* 2024).

Habitat and ecology

All *Presbytis* langurs are medium-sized, mostly arboreal colobines specialised for folivory. They possess a unique multi-chambered foregut with symbiotic microflora for fermenting leaves and seeds and molars with pronounced shearing crests for processing tough vegetation. Despite being commonly known as leaf monkeys, they also consume fruits, flowers, and fungi. Adults exhibit diverse colour patterns, whereas infants are generally born with pale grey or white pelage. Most species live in one-male, multi-female groups, although group size and composition vary among species. They inhabit a variety of lowland, hill, montane, riparian, peat swamp and secondary forests and may persist in fragmented landscapes, peri-urban parks, and agricultural mosaics, although long-term viability in such habitats is uncertain (Ang *et al*. 2024).

Threats to survival
Habitat loss, degradation, and fragmentation resulting from agricultural expansion, urbanisation, infrastructure development, and mining are the principal threats to Malaysian *Presbytis* langurs. Fragmentation isolates populations, reduces gene flow, and increases risks from road mortality and electrocution. Additional threats include hunting and poaching, particularly in Borneo where bezoar stones are commercially valuable, human–wildlife conflict, predation by dogs and raptors, and peat swamp fires associated with El Niño events. Small and isolated populations are particularly vulnerable to genetic erosion and local extinction. Notably, the Critically Endangered *P. chrysomelas* and *P. femoralis* are listed among the world's 25 most endangered primates (Ang *et al*. 2022, 2024; Zaini *et al*. 2024).

Conservation measures
Current conservation efforts focus on habitat protection, research, population monitoring, public awareness, and implementation of regional conservation strategies. Protection of key habitats in Royal Belum, Ulu Muda, Danum Valley, Tabin, Kinabatangan, and peat swamp forests remains essential. For *P. femoralis*, maintaining connectivity among fragmented populations and implementing genetic monitoring are priorities. Conservation of *P. chrysomelas* requires urgent research of its distribution and abundance, population monitoring, and protection and fire management in peat swamp forests. For *P. hosei*, *P. frontata*, *P. rubicunda*, and *P. sabana*, increased surveys and improved protection of forests outside protected areas are needed. Across all species, priorities include restoring habitat connectivity, reducing roadkills and electrocution through canopy bridges and wildlife-friendly infrastructure, strengthening anti-poaching enforcement, and expanding long-term ecological and genetic monitoring. Because most species occur across international borders, transboundary implementation of the Asian Langurs (*Presbytis*) Conservation Action Plan 2024–2034 will be essential to safeguard this shared Sundaic natural heritage (Ang *et al.* 2024).

**8. *Symphalangus***
Distribution
*Symphalangus* is a monotypic genus, with a single species, *S. syndactylus*, that occurs in Peninsular Malaysia and Sumatra, with a very small population in southern Thailand near the border with Malaysia (Nongkaew *et al*. 2018). In Malaysia, *S. syndactylus* is distributed in forested areas in central Peninsular Malaysia in parts of Kelantan, Negeri Sembilan, Pahang, Perak, Selangor, and Terengganu. A recent genetic study based on mitochondrial DNA suggested Malaysian siamangs may represent a distinct subspecies from Sumatran siamangs (Sariyati *et al*. 2024).

Population
*Symphalangus syndactylus* densities in Malaysia vary across habitats, with very low densities (Mean = 0.18 groups/km$^2$), reported in lowland (<500 m a.s.l.) forests near their distribution boundaries in Taman Negara Pahang (Mohd Rameli 2021), but much higher densities (2.75 groups/km2) in two forest reserves in forests of similar elevation immediately east of Taman Negara (Kamaruzaman *et al.* 2023). Earlier studies in Malaysia reported densities ranging from <1 group/km$^2$ to 1.5 groups/km$^2$ in hill forests in the Titiwangsa Range (450 – 750 m a.s.l.; Chivers 1974). Current data are not adequate to evaluate population trends within specific locations, but substantial areas of forest cover have been lost across the siamang distribution range in Malaysia in the last three decades, which indicates that the population in Malaysia is declining.

Habitat and ecology
*Symphalangus syndactylus* and other gibbons are strictly arboreal and occur only in tropical semi-deciduous and evergreen forest, using all levels of the forest canopy (Nijman *et al*. 2020c). S. syndactylus can persist in degraded and secondary habitats but densities in degraded forests are lower (O'Brien *et al.* 2004; Nijman *et al.* 2020), and *S. syndactylus*

avoids badly degraded areas (Lappan *et al.* 2021). While siamangs occur in montane forests, surveys in lowland primary forests (<500 m asl) in Sumatra (Yanuar 2009) and Malaysia (Kamaruzaman *et al*. 2023) suggest that they may reach their highest densities in this habitat type. Siamangs in intact forests very rarely descend to the ground (S. Lappan, pers. obs.). However, in a few locations in Malaysia, *S. syndactylus* living adjacent to human settlements descend to the ground to cross gaps or in response to human provisioning. This behaviour has resulted in at least one siamang death due to roadkill (Mohan 2023).

*Symphalangus syndactylus* diets are composed primarily of plant parts, including leaves, ripe fruits, and flowers, occasionally supplemented with insects (Chivers 1974; Palombit 1997; Lappan 2009), Small groups, usually including an adult pair with dependent offspring, but occasionally including >2 adults (Lappan 2007, 2008), defend territories ranging in size from 15 ha to >50 ha (Nijman *et al.* 2020c) with very stable boundaries (Lappan *et al.* 2021), which may limit their ability to respond to habitat loss and disturbance. Wild siamangs have very slow life histories, with long interbirth intervals (2.5 – 4 years) and slow maturation. Lifespans of >30 years have been recorded in wild (Lappan *et al.* 2023) and captive (Weigl 2005) populations.

Threats to survival

Forest loss, degradation, and fragmentation have led to the loss of >40% of siamang habitat in Sumatra between 1985 and 2007 (Laumonier *et al.* 2010), and most remaining forests are fragmented. While quantitative estimates of siamang range loss in Malaysia are only approximate, forest loss, fragmentation, and degradation, especially in lower-elevation areas, are high, and pose major threats to this taxon (Nijman *et al.* 2020c). In some landscapes, siamangs have been observed crossing roads on the ground, being provisioned by forest visitors, or otherwise coming into close contact with humans (Lappan *et al*. 2020; Mohan 2023). Outbreaks of an unknown but lethal epizootic disease have been reported in two separate populations of this taxon (Lappan *et al.* 2017), making close human-siamang contact a particular concern because of the two-way potential for disease transmission.

In recent years, commercial pet trade has emerged as a distinct and major threat to *S. syndactylus*, and Malaysia has emerged as a central trafficking hub for this species (Serhadli 2025; TRAFFIC 2025; Pinto-Rodrigues 2026). Because of their slow development and long inter-birth intervals, *S. syndactylus* intrinsic population growth rates are very low (O'Brien *et al.* 2003), making systematic hunting of *S. syndactylus*, or any gibbon species, unsustainable. While most surrendered or confiscated gibbon between 2018 and 2025 were adults (TRAFFIC 2025), many individuals rescued or confiscated from trafficking enforcement are infants and small juveniles, which are thought to have been captured by killing the mother (Serhadli 2025). While little quantitative information is available about this trade from the supply side, evidence from confiscations indicates that the conditions of captivity are associated with high mortality, and every animal reaching the market likely reflects a substantially larger loss from the wild population from which they were sourced (Serhadli 2025). The source of animals trafficked through Malaysia in recent years is not known, but this trade clearly represents a major threat to wild populations, and if stronger protections are not put into place and demand remains high, Malaysian populations will remain vulnerable.

Conservation measures

*Symphalangus syndactylus* is Totally Protected in Peninsular Malaysia and Sarawak and Protected in Sabah. Because most of the species' mainland range occurs within Malaysia, the country has a crucial responsibility for conserving this globally Endangered species (Nijman *et al*. 2020c). Protection, restoration, and reconnection of suitable habitats are essential, particularly within the Central Forest Spine, including the Titiwangsa and Tahan Forest Ranges. Other priority areas include Krau, the southern Belum-Temengor landscape,

and Kledong Saiong. As siamangs are highly arboreal and reluctant to descend to the ground, habitat fragmentation exposes them to road mortality, dogs, electrocution, and unsafe interactions with humans. Consequently, habitat restoration and the installation of canopy bridges are particularly important in fragmented landscapes.

Communication, education, and public awareness (CEPA) programmes are also needed to discourage provisioning, capture, and demand for siamangs and all other primates as pets. Strict enforcement of laws against the killing, capture, keeping, and trafficking of *S. syndactylus* is essential. Transboundary collaboration with Indonesia, Thailand, and countries involved in the illegal trade, such as India (TRAFFIC 2025; Rodrigues 2026), should be strengthened to disrupt trade routes, improve enforcement, and facilitate repatriation of confiscated animals. Demand reduction campaigns for pet primates should also be expanded. Further research on the phylogeography of *S. syndactylus* across Malaysia, Indonesia, and Thailand is needed to identify source populations and guide forensic investigations and reintroductions. In parallel, Malaysia should strengthen its capacity for the rescue, rehabilitation, and reintroduction of confiscated gibbons, although prevention of trafficking should remain the primary conservation priority.

**9. *Trachypithecus***

Distribution

*Trachypithecus obscurus* is distributed across southern Myanmar, southern Thailand, and Peninsular Malaysia, including several offshore islands. Peninsular Malaysia represents a major part of its global range and harbours multiple subspecies (Boonratana *et al.* 2020). The species occurs primarily in lowland forests but can also be found in hill and montane forests where suitable habitat persists. *Trachypithecus selangorensis*, formerly included within *T. cristatus*, was recently recognised as a distinct species (Roos *et al*. 2008, 2014). *Trachypithecus selangorensis* occurs only in Peninsular Malaysia, whereas *T. cristatus* occurs in Borneo and Sumatra (Meijaard and Nijman 2020). Within Malaysia, *T. cristatus* is found throughout coastal and lowland regions of Sabah and Sarawak, including several offshore islands. The species is particularly associated with riverine, mangrove, peat swamp, and other lowland forest habitats. *Trachypithecus selangorensis* is endemic to the west coast of Peninsular Malaysia, ranging from Kedah southwards through Perak, Selangor, Negeri Sembilan, Melaka, and Johor. It is primarily associated with coastal and lowland habitats, particularly mangrove and riparian forests (Ang *et al.* 2021b).

Population

All three species show declining population trends, largely driven by habitat loss and fragmentation. *Trachypithecus obscurus* is classified as Endangered on the IUCN Red List, with populations declining throughout its range (Boonratana *et al.* 2020). Although once considered relatively common in Peninsular Malaysia, habitat loss and fragmentation have resulted in local population declines and increasing isolation of groups. *Trachypithecus cristatus* is listed as Vulnerable (Meijaard and Nijman 2020). While comprehensive population estimates are lacking, evidence suggests substantial declines over recent decades due to habitat loss and hunting. Its populations remain locally common in some protected areas but are increasingly fragmented by logging and agricultural expansion. *Trachypithecus selangorensis* is currently classified as Near Threatened (Ang *et al.* 2021b); however, its narrow endemic range along the west coast of Peninsular Malaysia makes it a taxon of particular concern given pressures on its habitat. Although no range-wide population estimate exists, historical surveys indicate substantial declines, and many populations are now restricted to isolated habitat patches. The species remains locally abundant at a few protected and popular tourist sites, such as Kuala Selangor.

Habitat and ecology

All Malaysian *Trachypithecus* species are highly arboreal and predominantly folivorous colobines inhabiting primary and secondary forests, mangroves, coastal forests, and other wooded habitats. Their specialised foregut-fermenting digestive system allows efficient digestion of leaves, although fruits, flowers, seeds, and other plant parts also contribute to the diet. As folivores and seed dispersers, they play important roles in forest ecosystem functioning. Trachypithecus cristatus is strongly associated with mangrove forests, riverine forests, peat swamps, and lowland dipterocarp forests, although it can also occur in secondary and disturbed habitats (Meijaard and Nijman 2020). Studies of *T. obscurus* in Penang have demonstrated its ability to persist in fragmented and human-modified landscapes, utilising secondary forests, coastal vegetation, orchards, and urban-edge habitats (Yap *et al.* 2019). Nevertheless, the species remains dependent on forest cover and habitat connectivity. Trachypithecus selangorensis is most often found in mangrove, riparian, and coastal forests but may also occur in secondary forests and plantation landscapes where sufficient tree cover remains (Ang *et al.* 2021b).

Threats to survival

Habitat loss and fragmentation are the primary threats facing all Malaysian *Trachypithecus* species. Conversion of forests to oil palm plantations, agriculture, urban development, roads, and other infrastructure has reduced and fragmented suitable habitat throughout their ranges. For *T. cristatus*, extensive conversion of lowland forests, peat swamps, and mangroves in Borneo has resulted in increasingly isolated populations. Logging, infrastructure development, hunting, and opportunistic capture for the pet trade further threaten the species (Meijaard and Nijman 2020). In Peninsular Malaysia, *T. obscurus* faces additional threats from increasing urbanisation, which has led to road mortality, electrocution, and human–wildlife conflict (Yap *et al.* 2022). Hunting, poaching, and persecution as agricultural pests continue to affect some populations. Similarly, *T. selangorensis* is threatened by ongoing development of coastal habitats, including urban expansion, tourism infrastructure, and agricultural conversion. Additional threats include forest fires, hunting, road mortality, electrocution, and increasing human–wildlife conflict (Ang *et al.* 2021b).

Conservation measures

All three species are protected under Malaysian wildlife legislation and are listed in Appendix II of CITES. Conservation efforts focus on habitat protection, maintenance of forest connectivity, mitigation of human–wildlife conflict, and improved population monitoring. For *T. cristatus*, conservation priorities include the protection of remaining lowland, riverine, peat swamp, and mangrove forests in Sabah and Sarawak (Meijaard and Nijman 2020). Recent assessments have highlighted the need for greater research and monitoring to inform conservation planning. Conservation of *T. obscurus* includes habitat protection within national parks and forest reserves, as well as targeted initiatives such as the Langur Project Penang, which has implemented canopy bridges, public education programmes, and long-term monitoring to reduce anthropogenic threats (Yap *et al*. 2022; Langur Project Penang 2025). For *T. selangorensis*, priority actions include protecting and restoring mangrove and riparian habitats, maintaining connectivity among fragmented populations, and strengthening community-based conservation and public awareness programmes along the west coast of Peninsular Malaysia (Ang *et al.* 2021b).

## DISCUSSION

Despite considerable advances in primate research over the past six decades, significant taxonomic, geographic, and thematic biases remain in Malaysian primatology. Research effort has focused disproportionately on a small number of species, particularly *Macaca fascicularis*, *M. nemestrina*, *Pongo pygmaeus*, and *Nasalis larvatus*, while many threatened

taxa, especially *Presbytis langurs*, Bornean gibbons, and nocturnal primates remain poorly studied. Most available studies have concentrated on phylogeny, distribution, abundance, and diseases, whereas long-term ecological, behavioural, demographic, and conservation -focused research remains scarce for many taxa. These knowledge gaps limit the development of evidence-based conservation strategies and hinder the evaluation of management interventions.

At the same time, the conservation status of Malaysian primates has deteriorated substantially. Habitat loss, degradation, and fragmentation remain the dominant threats across all primate taxa, driven by agricultural expansion, infrastructure development, logging, and urbanisation. Additional pressures include hunting, illegal wildlife trade, human–wildlife conflict, road mortality, electrocution, forest fires, and emerging threats associated with climate change and disease. The increasing proportion of Malaysian primates classified as Endangered or Critically Endangered highlights the urgent need to integrate research, conservation management, and policy implementation at both national and regional scales.

## MOVING FORWARD: BRIEF POLICY RECOMMENDATIONS

- Strengthen protection of remaining primate habitats including secondary forests.
- Maintain and restore arboreal connectivity through landscape-scale conservation corridors.
- Integrate primate conservation into land-use, infrastructure, and agricultural planning.
- Expand and effectively manage protected areas, particularly in biodiversity hotspots.
- Establish a national primate monitoring programme with standardised survey protocols.
- Prioritise research on poorly known and highly threatened taxa.
- Increase investment in long-term ecological and behavioural primate studies.
- Strengthen enforcement against hunting, illegal wildlife trade, and pet ownership and implement communication, education, and public awareness (CEPA) activities to reduce demand for primates as pets.
- Promote science-based human–primate coexistence programmes and integrative management plans in high-risk areas.
- Reduce roadkill and electrocution through wildlife-friendly infrastructure.
- Encourage wildlife-friendly plantation and forestry management practices.
- Expand One Health monitoring at human–wildlife interfaces.
- Improve data sharing among government agencies, NGOs, and researchers.
- Support community-based conservation and local stakeholder engagement.
- Develop and implement species-specific conservation action plans for threatened taxa.
- Strengthen transboundary conservation initiatives with neighbouring countries.
- Incorporate climate change adaptation into primate conservation planning.
- Increase public awareness of the ecological and conservation importance of primates.

## CONCLUSION

Malaysia harbours one of the richest primate assemblages in Southeast Asia, encompassing 26 taxa that represent an exceptional diversity of ecological, behavioural, and evolutionary adaptations. However, most species are now threatened with extinction, reflecting decades of habitat loss and increasing anthropogenic pressures. While scientific knowledge of Malaysian primates has expanded considerably since the early 1990s, major information gaps remain for many taxa, particularly those with the greatest conservation needs. Future conservation success will depend on strengthening the link between research and management, improving habitat protection and connectivity, and implementing coordinated,

evidence-based conservation actions. Ensuring the long-term persistence of Malaysia's primates will require sustained collaboration among researchers, government agencies, conservation organisations, local communities, and the private sector to safeguard this irreplaceable component of the nation's natural heritage.

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