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CHAPTER 4

State of waterbirds in Malaysia

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Abstract: Natural and man-made wetlands provide crucial habitats and resources to many resident and migratory waterbird species globally. In Malaysia, at least 14 waterbird families, dominated by Scolopacidae, Charadriidae, Laridae, Ardeidae and Anatidae, depend on coastal and freshwater wetlands such as the intertidal mudflat, peat swamp forest and others throughout the country. Waterbird populations and wetlands in Malaysia are monitored primarily and consistently through the Asian Waterbird Census (AWC) since 1989, currently coordinated nationally by the Malaysian Nature Society (MNS) with the support from Department of Wildlife and National Parks (PERHILITAN) Peninsular Malaysia, Sarawak Forestry Corporation and Sabah Wildlife Department. Accumulated long-term AWC data showed that intertidal coastal mudflats on the west coast of Peninsular Malaysia and western Sarawak including the Bako-Buntal Bay, North-Central Selangor Coast (NCSC) and Teluk Air Tawar-Kuala Muda (TAT-KM) Coast are important wintering/staging sites for migratory waterbirds and several globally threatened and near-threatened species. Resident waterbird population trends in the country vary, and few species such as the White-winged Duck (*Asarcornis scutulata*) and Sarus Crane (*Antigone antigone*) have been locally extirpated. The Lesser Adjutants (*Leptoptilos javanicus*) are still present in their stronghold sites, but fewer sightings of Storm's Stork (*Ciconia stormi*) in Peninsular Malaysia have been reported indicating a possible decline. Colonial waterbirds including the migratory Asian Openbill (*Anastomus oscitans*) and the introduced Painted Stork (*Mycteria leucocephala*) have colonised Malaysia in recent years and expanded its distribution range and even breeding in Peninsular Malaysia. In terms of waterbird research, local universities and researchers are showing increasing interest, culminating in more dissertations and published papers on short-term surveys, feeding ecology and behaviour. Waterbirds and wetlands continue to be threatened by habitat loss and degradation, pollution, hunting and trapping, and climate change in Asia affecting many waterbird species and sites along the East Asian-Australasian Flyway (EAAF). The Curlew Sandpiper (*Calidris ferruginea*), a 'common' shorebird which was formerly listed as Least Concern (2012), has been upgraded to Vulnerable (2024) in the Red List within a decade. Conservation actions on waterbirds and wetlands are now actively pursued within the ambit of the East Asian-Australasian Flyway Partnership (EAAFP) and the ASEAN Flyway Network (AFN) Programme to prevent their further decline.

INTRODUCTION

Malaysia's natural wetlands span across a significant area of approximately 5.1 million hectares (Ismail *et al.* 2021). The documentation of wetlands in Malaysia has revealed 90 major lakes and approximately 100 river systems from 31 types of wetlands in Malaysia. Both natural and man-made wetlands in Malaysia are recognised as crucial habitats in providing resources and shelters to many resident and migratory waterbird species. In the 1980s, the implementation of the INTERWADER programme set in motion Malaysia's first

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Malaysia's first comprehensive wetland and waterbirds surveys (Yeap 2020). The programme has provided a foundation of our best understanding of the waterbird population trends, distribution and utilization across the wetlands in Malaysia.

Wetlands from the coasts and floodplains of Malaysia support a significant number of waterbird species. Coastal wetlands including the intertidal mudflat and mangrove forest are known to provide more than 30 species of migratory shorebirds, terns and stork species. Waterbird populations and wetlands in Malaysia are monitored primarily and consistently through the AWC since 1989, currently coordinated nationally by MNS with support from PERHILITAN, Sarawak Forestry Corporation and Sabah Wildlife Department.

The last comprehensive review of waterbird species in Malaysia by Li *et al.* (2009) recorded a total of 106 waterbird species between 1987 to 2007, and ten globally threatened species recorded. Since then, the AWC result in Malaysia compiled by See *et al.* (2026) continue to record 150 waterbird species in Malaysia with 14 waterbird families dominated by the sandpipers (Scolopacidae), plovers (Charadriidae), terns (Laridae) and herons (Ardeidae) (Figure 1).

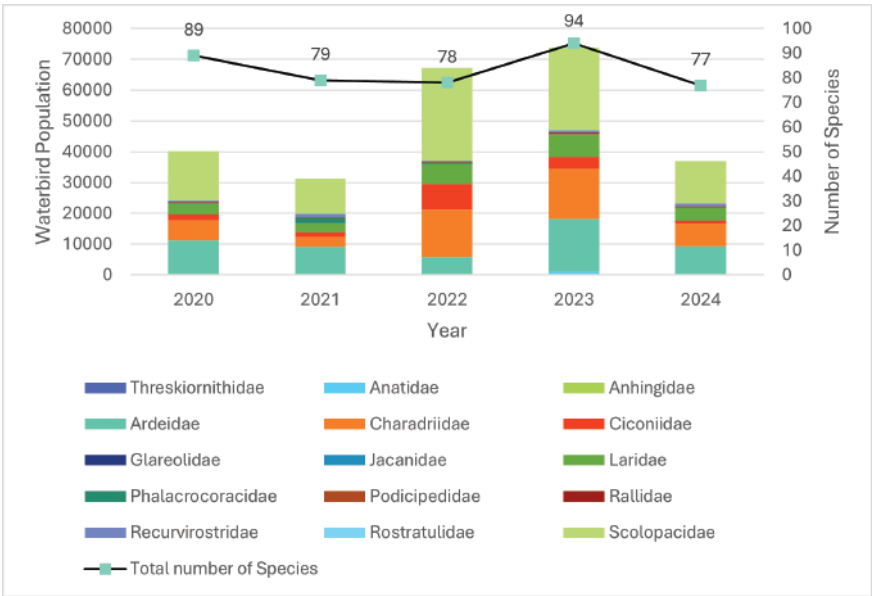

Figure 1. Waterbird population in Malaysia between 2020 to 2024 based on Asian Waterbird Census monitoring results.

Across Malaysia, the migratory waterbirds rely on coastal intertidal mudflat as foraging habitat and adjacent man-made wetlands including the aquaculture ponds and ash ponds as high tide roosts (Yong *et al.* 2022). Among 150 waterbird species recorded in wetlands of Malaysia, three species are Critically Endangered, five species are Endangered, and six species are Vulnerable (IUCN 2025). Due to differences in species community and diversity, the number of species that are globally threatened vary across Peninsular Malaysia and Malaysian Borneo (MNS-Bird Conservational Council 2021), and the breakdown of the species list summarised in Table 2.

Among the two largest groups of waterbirds monitored, shorebirds are represented by at least 24 species, including four that are globally threatened (Table 2). Notably, the Nordmann's Greenshank (*Tringa guttifer*), Great Knot (*Calidris tenuirostris*), and Far Eastern Curlew (*Numenius madagascariensis*) which was all classified as Endangered are

known to regularly winter in Malaysia. The species status review by Li *et al.* (2009) concluded that shorebird populations (families Scolocipadae and Charadriidae) in Malaysia have declined by 22.4%. The AWC data showed worrying trends for populations of Vulnerable species such the Curlew Sandpiper (*Calidris ferruginea*), Grey Plover (*Pluvialis squatarola*), and Chinese Egret (*Egretta eulophotes*) which are continuously declining (Langendoen *et al.* 2021).

Table 2. Global conservation status of threatened waterbird species in Malaysia. Species denoted with an asterisk (*) are currently considered extirpated from the regions where they were formerly recorded.

Conservation Status (IUCN 2025)	Common Name	Species Name	Peninsular Malaysia	Sarawak	Sabah
Critically Endangered (CR)	Masked Finfoot	*Heliopais personatus*	√	√	
	Spoon-billed Sandpiper	*Calidris pygmea*	√	√	
	Chinese Crested Tern	*Thalasseus bernsteini*		√	√
	White-winged Duck*	*Asarcornis scutulata*	-		
	White-shouldered Ibis*	*Pseudibis davisoni*		-	
Endangered (EN)	Storm's Stork	*Ciconia stormi*	√	√	√
	Nordmann's Greenshank	*Tringa guttifer*	√	√	√
	Far Eastern Curlew	*Numenius madagascariensis*	√	√	√
	Great Knot	*Calidris tenuirostris*	√	√	√
	Siberian Sand Plover	*Anarhynchus mongolus*		√	√
	Milky Stork*	*Mycteria cinerea*	-		
Vulnerable (VU)	Chinese Egret	*Egretta eulophotes*	√	√	√
	Christmas Island Frigatebird	*Fregata andrewsi*	√	√	√
	Grey Plover	*Pluvialis squatarola*	√	√	√
	Broad-billed Sandpiper	*Calidris falcinellus*	√	√	√
	Curlew Sandpiper	*Calidris ferruginea*	√	√	√
	Aleutian Tern	*Onychoprion aleuticus*	√	√	√
	Sarus Crane*	*Antigone antigone*	-		
Near Threatened (NT)	Beach Stone-curlew*	*Esacus magnirostris*	-		

In 2024, both the Grey Plover and the Curlew Sandpiper were uplisted from Least Concern to Vulnerable due to significant global population declines (IUCN 2025). While the globally flyway population of the Curlew Sandpiper has decreased by 12% (Langendoen *et al.* 2021), Malaysia appears to maintain a steady wintering population (Yeap 2020; See *et al.* 2026) as shown in Figure 2. Conversely, the Grey Plover maintains a steady global population and wintering population in Malaysia (Figure 3). However, Chinese Egret has experienced the most critical situation with 9% flyway population decline over the last 16 years and the declining trend is projected to reach 17% (Figure 4). Malaysia continues to support 30 to 50% of the wintering Chinese Egret population.

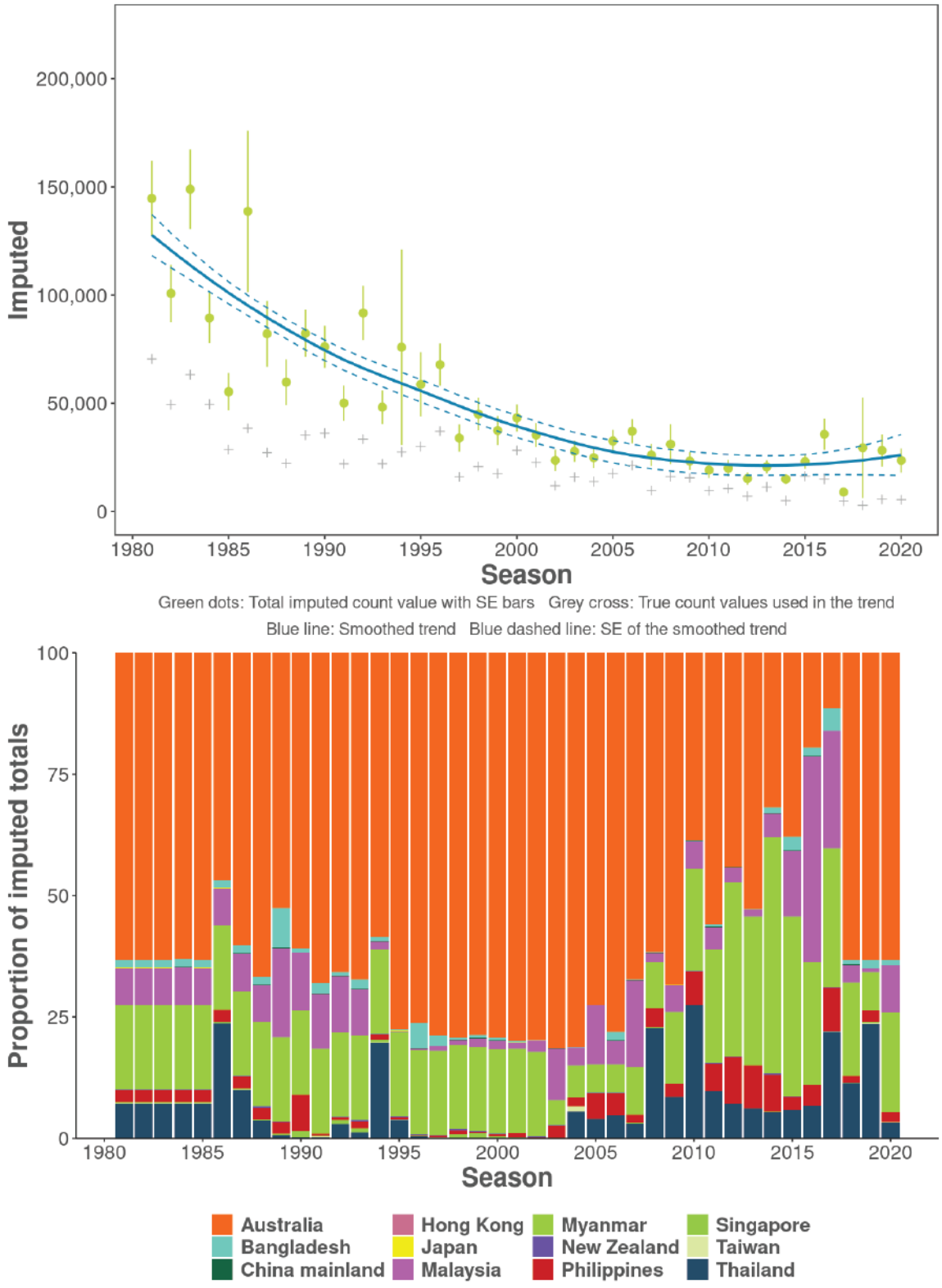

Figure 2. Population trend of Curlew Sandpiper from 1960 to 2020 based on Asian Waterbird Census data (Langendoen *et al.* 2021).

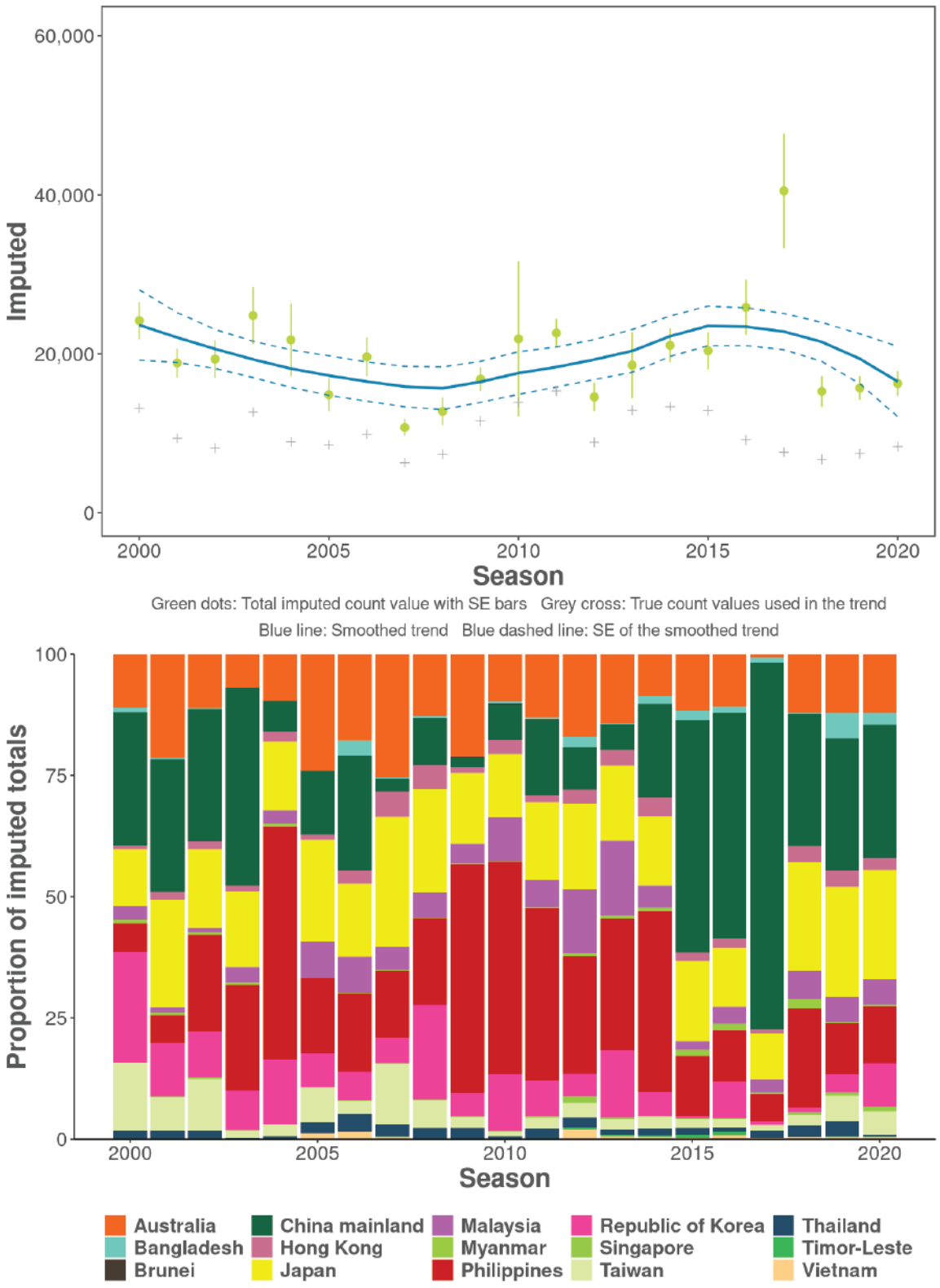

Figure 3. Population trend of Grey Plover from 1960 to 2020 based on Asian Waterbird Census data (Langendoen *et al.* 2021).

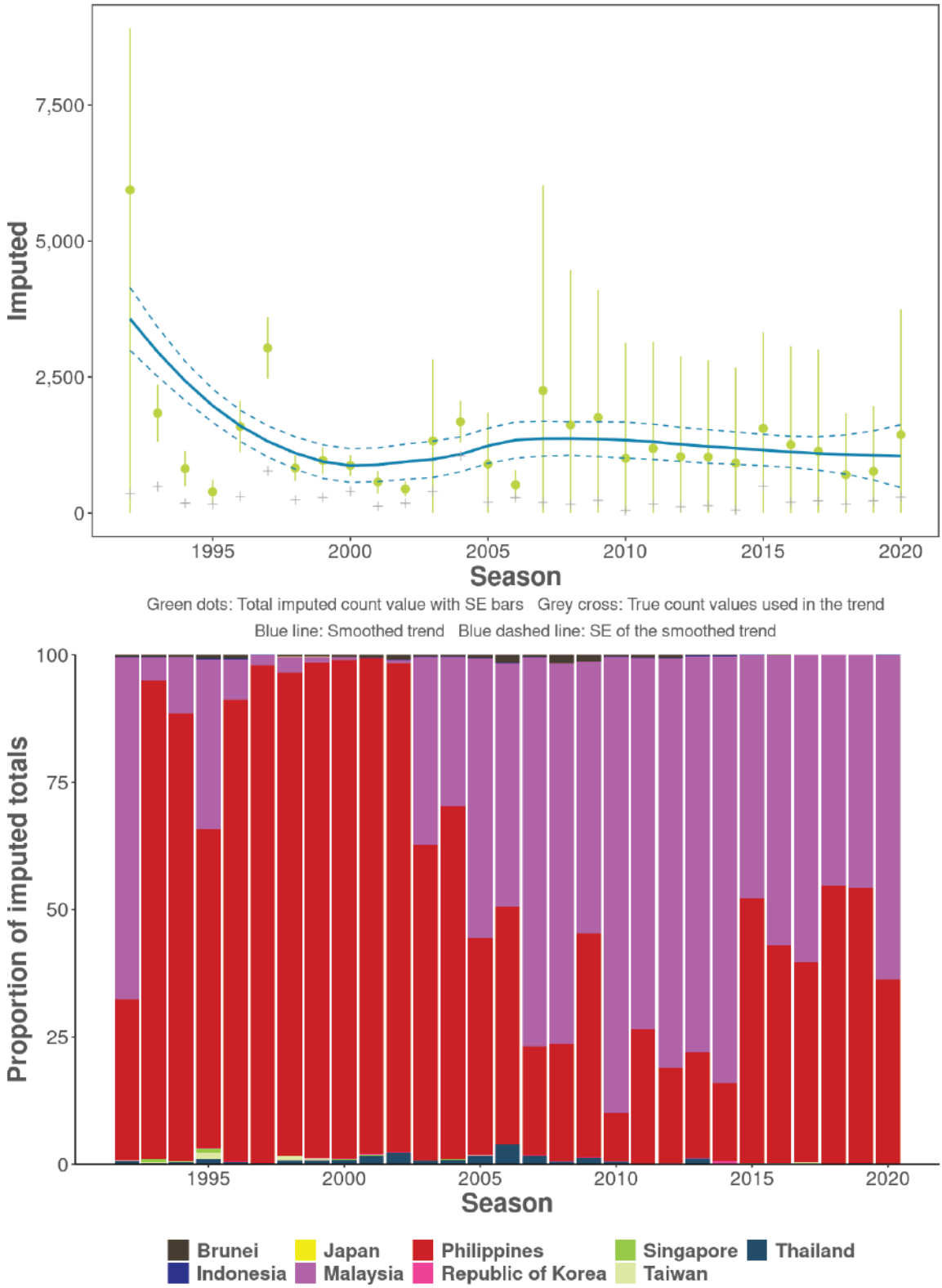

Figure 2. Population trend of Chinese Egret from 1960 to 2020 based on Asian Waterbird Census data (Langendoen *et al.* 2021).

WATERBIRDS IN PENINSULAR MALAYSIA

The coastline on the west coast of Peninsular Malaysia holds extensive areas of mangroves and intertidal mudflat which support a significant wintering congregation of terns (Laridae), sandpipers (Scolopacidae), and plovers (Charadriidae), which constitute the more than half of the waterbird population monitored in Asian Waterbird Census (See *et al.* 2026). Recent surveys continue to confirm the regional importance of key coastal Important Bird and Biodiversity Areas (IBA) along this coastline, specifically the Teluk Air Tawar–Kuala Muda Coast (TAT-KM) in Penang (Effendi *et al.* 2025) and the North-Central Selangor Coast in Selangor (Bakewell 2009; Chin and Khoo 2018; Yeap, 2020; See *et al.* 2026). These sites serve as a global wintering stronghold for the Nordmann's Greenshank with more than 5% of its total flyway population wintering in these sites (Crosby *et al.* 2025).

The broader landscape of wetlands in Peninsular Malaysia has witnessed significant shifts in the spatial distributions of several species of larger waterbirds. The Asian Openbill (*Anastomus oscitans*) was first recorded in northern states of Malaysia (first in Perlis and Penang) with its distribution expanding southward rapidly in recent years (Kamaruddin *et al.* 2015; Kamaruddin *et al.* 2017; Amzah *et al.* 2025), with new breeding colonies established. The expansion of the Asian Openbill was believed to be closely associated with the abundance of golden apple snails (*Pomacea canaliculate*) in paddy fields and other freshwater habitats in Malaysia (Amzah *et al.* 2025). The distribution maps generated from species occurrence map in Global Biodiversity Information Facility (GBIF) indicates that the species has expanded its range since 2008 (Figure 5) and has established breeding colonies in Northern states of Malaysia (Amzah *et al.* 2025).

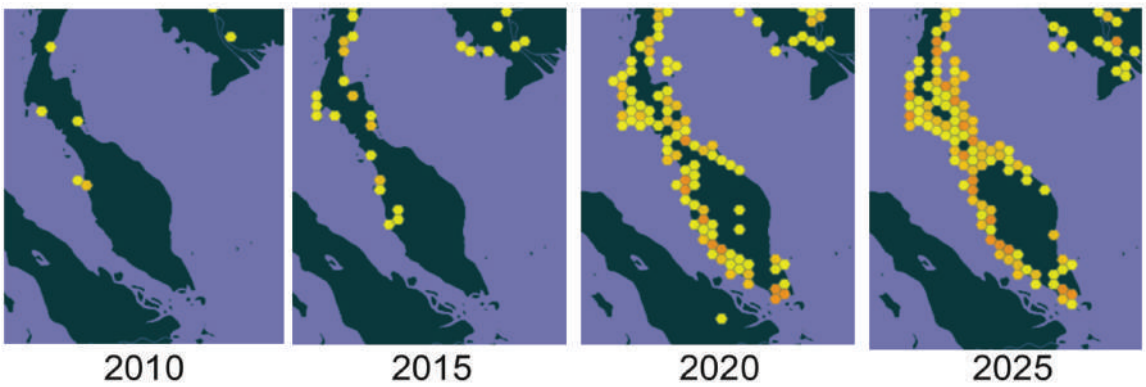

Figure 5. Spatiotemporal distribution of the Asian Openbill occurrence at five-year interval from 2010 to 2025 (GBIF Secretariat 2023a).

In contrast to the rapid expansion of the Asian Openbill in Peninsular Malaysia, the status of other resident storks in Malaysia is more complex. While listed globally as Endangered (IUCN 2026), the Milk Stork (*Mycteria cinerea*) is widely regarded by practitioners as extinct in the wild within Malaysia, as the contemporary records are mainly limited to captive or hybrid individuals (Ismail and Rahman 2012). The only known (wild) breeding colony of the species in Kuala Gula has undergone a sustained population decline for more than 90% (Li *et al.* 2006) with only five wild individuals recorded in 2009 and the wild population was expected to face extinction if the declining trend persists (Ismail and Rahman 2021). In Malaysia, the Matang Forest Reserve remains as the last stronghold for the species with Department of Wildlife and National Parks (PERHILITAN) Peninsular Malaysia leading the reintroduction program. However, the long terms success of the conservation efforts is threatened by the genetic hybridisation with the Painted Stork and mixing with free-flying individuals' collections in Perak, Selangor and Johor which has apparently established small breeding populations (Yee *et al*. 2013; Baveja *et al.* 2019; Tolohah *et al.* 2023).

The Painted Stork (*Mycteria leucocephala*) was first recorded in northern states of Malaysia including Kedah as vagrant (Wells 1999). In 1965, the Painted Stork was brought into Zoo Negara for captive breeding program, and the species was introduced to Malaysia after being released from captivity (Zakaria and Shukor 2019). Since then, the population of the Painted Stork monitored has increased by almost 10% to 13% every year (Zakaria *et al.* 2023) with the rapid species distribution expansion (Figure 6). The expansion of the Painted Stork species distribution is believed to increase habitat overlap with the native Endangered Milk Stork and increase the competition for resources (Zakaria *et al.* 2023) and hybridisation risk (Baveja *et al.* 2019).

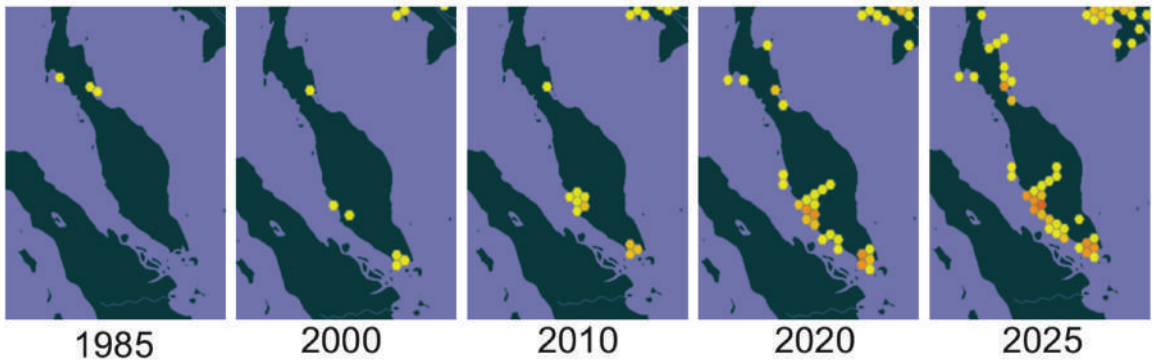

Figure 6. Spatiotemporal distribution of the Painted Stork occurrence at five-year interval from 2010 to 2025 (GBIF Secretariat 2023b).

WATERBIRDS IN SABAH AND SARAWAK

The western Sarawak coastline remains as one of Malaysia's most significant wintering grounds for the migratory waterbirds and hosts the country's current and only designated Flyway Network Site (FNS), Bako Buntal Bay. A comprehensive survey was conducted along the Sarawak coast and has recorded a minimum of 71,347 birds from 63 species (Bakewell *et al.* 2017). The Flyway Network Site, Buntal Bay and the adjacent Sejingkat ash ponds are documented to support at least 1% of the global population of the Far Eastern Curlew (*Numenius madagascariensis*) (Teepol *et al.* 2021). Additionally, the recent discoveries of the Critically Endangered species, the Spoon-billed Sandpiper (*Calidris pygmaea*) and the Chinese Crested Tern (*Thalasseus bernsteini*), in Sarawak highlighted the need to reassess its coastline (Teepol *et al.* 2023; J.J. Ng, per comms, 2025; D. Bakewell, per comms, 2026).

The coastal regions of Sabah remain the most under surveyed in Malaysia. Recent surveys have shown that some sites possess significant conservation value (Makbul *et al.*, in review). The Marudu Bay and Tawau coastline were found to support notable Far Eastern Curlew numbers. The Chinese Crested Tern was discovered wintering in Sabah with five individuals recorded in 2025 (J. Bakar, pers comms, 2026). This species was once thought to be extinct without confirmed records in Malaysia since the 1900s, but global population assessment now estimates 100 to 150 individuals remain with recent discoveries along the Bornean coast. These significant findings indicate that the conservation value of the Malaysian Bornean coast remains largely under discovery, and further studies are essential to fully understand the importance of the coast for the migratory waterbirds.

THREATS AND CONSERVATION

The primary drivers of the waterbird population decline in Malaysia are habitat loss, degradation, and fragmentation (Wells 1999; MacKinnon *et al*. 2012). The coasts of Johor, Selangor, and Pulau Pinang have undergone rapid changes, where coastal aquaculture, infrastructure and residential development have reduced mangrove coverage in these states (Yeap 2020; Crosby *et al.* 2025). These changes have reduced the foraging and roosting grounds for the migratory waterbirds (Yeap 2020) and essential nesting habitats for the resident waterbirds (See *et al.* 2025).

In 1995, the Malaysia government joined the Convention on Wetlands on Wetlands of International Importance Especially as Waterfowl Habitat (or the Ramsar Convention in short) to iterate its commitment to the conservation and wise use of the wetlands. In 2005, the East Asian-Australasian Flyway Partnership (EAAFP) was adopted as a Ramsar Regional Initiative, thus further strengthening wetland and waterbird conservation in Asia. The EAAFP has a strong focus on conservation of waterbirds, their associated habitats and community whoselivelihood depends on. Malaysia officially joined the EAAFP in 2012 marking a major commitment to migratory waterbird conservation. Soon after, the Bako Buntal Bay (EAAF 112) in Sarawak was accepted as Malaysia's first Flyway Network Site. Since, waterbirds and wetlands are monitored annually through AWC has led to identification and prioritisation of monitoring efforts of eight sites of importance to migratory waterbirds (Figure 7).

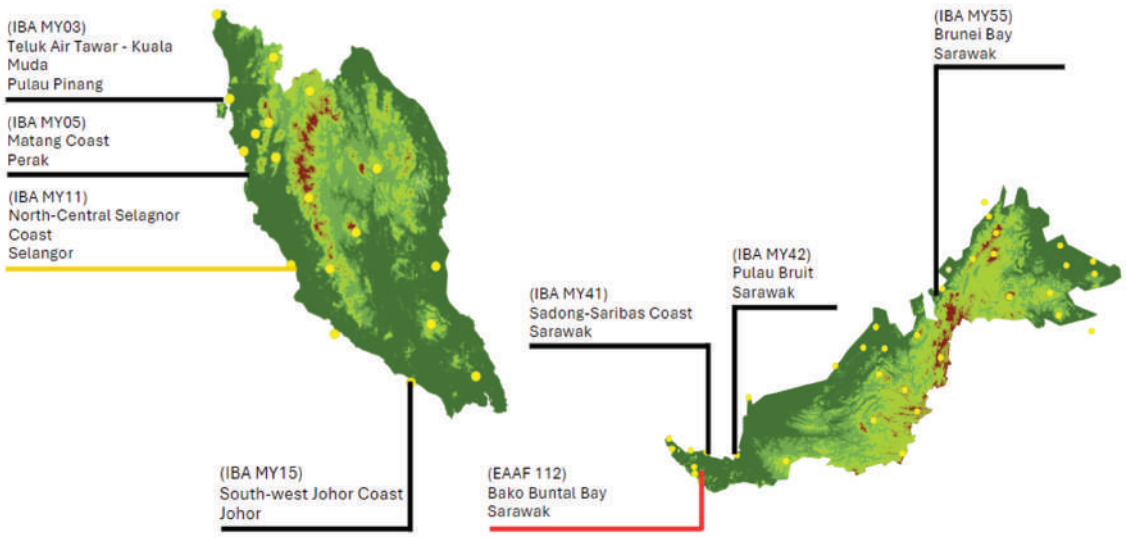

Figure 7. Priority sites of conservation importance for waterbirds monitored by the Asian Waterbird Census.

A recent assessment by BirdLife International identified seven coastal sites of importance to migratory waterbirds in Malaysia of which the Kuala Muda–Teluk Air Tawar coast and North-Central Selangor Coast received the highest priority (Crosby *et al.* 2025). MNS and PERHILITAN are currently advocating the NCSC as the next FNS after Bako Buntal Bay under the EAAFP. Parallel to this effort, the Malaysian government is also supporting the ASEAN Centre for Biodiversity (ACB) programme in identifying ASEAN Flyway Network (AFN) sites as part of a regional effort among ASEAN member states.

RECOMMENDATIONS AND CONCLUSION

Based on the current conservation status of waterbird in Malaysia, there are several priority interventions required to advance the waterbird conservation in Malaysia, and the key recommendations are summarised as below.

Strengthen transboundary and regional conservation networks
While wetlands of ornithological and conservation importance have been identified in Malaysia under several initiatives (e.g. IBAs, EAAFP Flyway Sites), there is a significant disparity between our national inventory and our internally recognised FNS. To bridge this gap, it is important to elevate the conservation status of our important wetlands (Figure 7), strengthen the current wetland site management to be more inclusive of waterbird needs, and advocate for site nomination of the high priority coastlines (including nomination of sites as FNS or Ramsar Sites) as a strategic requirement to ensure that the conservation of wetlands and waterbirds are fully integrated into regional and national conservation framework.

Plan for targeted conservation action for species of conservation concern
Many waterbird species including the Milky Stork, Sarus Crane or Storm's Stork have extirpated or are on the brink of being extirpated, and yet, Malaysia lacks a systematic framework to track this status. A national red list assessment is essential to document the local conservation status of the waterbirds, allowing for timely conservation intervention before more species vanish unnoticed.

While regional single species action plans already exists for priority species such as the Spoon-billed Sandpiper, Chinese Crested Tern, and Far Eastern Curlew, there are limitations. These plans outline the regional and national level for key actions and the stakeholders involved in implementing them, but there is still a need to further develop these strategies into tangible and site-specific actions at the local level. Other species that are experiencing critical decline that currently lack formal conservation frameworks, such as the Chinese Egret, require further attention for targeted conservation interventions on the grounds.

Foster community-led conservation and ethical outreach
Community-based conservation that integrates local knowledge, socio-cultural practices and participatory governance with the Indigenous People and Local Communities (IPLCs) foster greater environmental accountability and long-term success. Important wetlands (Figure 7) often overlap with the livelihood of local fishermen or traditional settlements, such as the Orang Asli Mah Meri in NCSC or the Orang Asli Kuala in the South-west Johor Coast. Integrating Free, Prior, and Informed Consent (FPIC) into all conservation projects and management plans is essential to ensure inclusive and socially equitable outcomes.

Communication, Education and Public Awareness (CEPA) strategies are key for building local stewardship and bridging the gaps between holistic conservation goals and reality on the ground. CEPA empowers the IPCLs to transition from passive supporters to active guardians of their natural heritage. This includes promoting ethical nature-based tourism, to mitigate anthropogenic disturbances to the habitats, such as wildlife feeding and other unethical ecotourism practices.

Conduct systematic surveys in data-poor regions or understudied waterbird group/species
Prioritising conservation actions for waterbirds is currently hindered by the geographical and taxonomic "blind spots", or knowledge gaps essentially. The importance of the coastline of Malaysia Borneo was validated by recent records of the Critically Endangered Chinese Crested Tern and the Endangered Far Eastern Curlew from ongoing studies and citizen science. Consequently, the launching of a systematic, and multi-season surveys across the little-known coastlines of Sabah and Sarawak is very important to identify or reassess previously undocumented sites of international importance. Additionally, for colonial breeding species such as seabirds and resident colonial waterbirds, specialised surveys for colony monitoring will be required to address the gaps in conventional Asian Waterbird Census methods for more meaningful population estimation for each waterbird group.

Advance movement ecology study to understand local movement of waterbirds
While AWC remains as essential tools on understanding local population abundance of most waterbird species, it offers limited insight into how waterbirds utilise the complex mosaic landscape of Malaysia intertidal landscape as foraging, roosting and stopover sites on daily or seasonal basis. To support evidence-based conservation for site conservation, targeted studies to understand the local movement ecology, which can be taxa-specific, allows us to have better understanding on the daily and seasonal movements of the waterbirds between different habitats.

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