

# Incidence of protected and illegally sourced birds at bird markets in Makassar, Sulawesi

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Bird trade has led to increasing endangerment of species throughout South-East Asia. An opportunistic survey of two bird markets in Makassar, Sulawesi, Indonesia, highlights continuing problems with illegal trade. In June 2019, a total of 63 species, accounting for 6,352 birds, were observed in two Makassar bird markets. The majority of the birds observed were native to Indonesia, but not necessarily native to Sulawesi, illustrating the movement of birds for commercial trade across the archipelago. Fifteen of the species observed are protected under Indonesian legislation, and the vast majority of the rest were likely to have been taken from the wild outside of Indonesia's annual harvest and trade quota system. Such illegal trade is a major contributing driver to the decline in wild populations and undermines national legislation and conservation efforts.

## INTRODUCTION

The commercial trade in wild birds poses a serious threat to the survival of a growing number of species in Asia (Eaton *et al.* 2015, Lee *et al.* 2016). In Indonesia, a wide variety of species are sold in bird markets, which can be found in virtually all major towns and cities as well as in many smaller villages (Chng *et al.* 2018a, Rentschlar *et al.* 2018). Most of these birds are traded for their song or as novelty pets. The quality of song, attractive appearance and/or perceived rarity are all drivers behind the demand for these species (Nash 1993, Nijman *et al.* 2009, Krishna *et al.* 2019). Other species, though considerably fewer, are sold for meat or use in traditional medicines (Shepherd *et al.* 2004).

A total of 557 bird species are currently designated as protected in Indonesia under the *Regulation of the Minister of Environment and Forestry no. P.106/MENLHK/SETJEN/KUM.1/12/2018*. Violation of the law stipulates a five-year prison sentence and a fine of IDR 100 million (USD 6,275) under the *Act of the Republic of Indonesia No.5 of 1990 Concerning conservation of living resources and their ecosystem*. The *Government Regulation No.8 1999 Concerning the utilization of wild plants and animals* of this Act, however, allows the trade of a protected species provided that the individuals are captive-bred second (F2) and subsequent generations. Indonesia has an extensive harvest and export quota system for non-protected species to supply both domestic and international markets, regardless of their inclusion in any appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). There are no export quotas for species listed in Appendix I of CITES (all commercial international trade in these species is prohibited) or protected by Indonesia's national legislation. Quotas for the capture of totally protected species may be granted to registered traders to obtain breeding stock, but this excludes species that are in Appendix I of CITES. If no quotas are set for a species, its capture and trade is effectively prohibited. As Indonesia's CITES Scientific Authority, the Indonesian Institute of Sciences (Lembaga Ilmu Pengetahuan Indonesia, or LIPI) sets quotas for harvest and export after consultations with various stakeholders, including traders. The Directorate General of Forest Protection and Nature Conservation, as Indonesia's CITES Management Authority, enforces the established quotas, which is largely carried out via the provincial offices of the Natural Resources Conservation Agency (BKSDA).

Despite these legal safeguards, Indonesia's harvest and trade quotas are frequently ignored by wildlife traders in practice (Schoppe 2009, Nijman *et al.* 2012, Shepherd *et al.* 2016). High trade volumes of species with no quotas, or exceeding existing quotas for other species, are frequently observed in markets (Chng *et al.* 2015, Shepherd *et al.* 2016, Nijman *et al.* 2019, Indraswari *et al.* 2020).

Similarly, protected species can often be found openly for sale, many of which are obviously wild caught, with traders often stating they were. Such open illegal trade is indicative of general disregard for the country's laws by both traders and consumers.

Previous research into the cage-bird trade in Indonesia has largely focused on the islands of Java (Chng *et al.* 2015, 2016, Chng & Eaton 2016) and Sumatra (Shepherd *et al.* 2004, Harris *et al.* 2017, Chng *et al.* 2018a). Here we report on bird trade in Makassar (formerly Ujung Pandang), the capital of the province of South Sulawesi on the island of Sulawesi. With more than 2.5 million people residing in its metropolitan area, Makassar is the largest city in the eastern Indonesian region and the fifth largest in Indonesia. Makassar has been identified as an important transit point in Indonesia's country-wide network of illegal bird trade (Indraswari *et al.* 2020). Being home to what is likely the largest wildlife market and the largest port in the eastern Indonesian region, Makassar functions as an important bird trade portal between east and west Indonesia (Indraswari *et al.* 2020). Assessing the Makassar bird trade will contribute to a better understanding of Indonesian bird trade dynamics and networks. Understanding wildlife trade networks is essential to efforts to combat illicit trade and the spread of avian and zoonotic disease (Brown & Bevins 2017). We used data from a one-off opportunistic survey to provide an indication of the trade in Makassar's bird markets. Based on our findings, we make recommendations for further actions to support efforts to ensure that the songbird trade in Makassar is not carried out in violation of Indonesian laws and policies, and ultimately to prevent declines or extinctions of bird species due to the illegal and unsustainable trade.

## METHODS

Two of Makassar's main bird markets, *Pasar Hobi* and the market along *Jalan Wage Rudolf* (hereafter referred to as *Wage Rudolf*), were surveyed on 4 June 2019. The sole surveyor is a bird expert based in Indonesia with several years of ornithological experience across the Indonesian archipelago, including Sulawesi. A full inventory of the species and individuals for sale was made in each market. Due to an unstructured layout and a lack of clearly defined shop boundaries, it was impossible to determine the total number of visited shops in *Pasar Hobi*. A total of six shops were visited in *Wage Rudolf*. Only birds on open display were recorded. All birds were identified to species level and where possible to subspecies level. All individuals were counted except where accurate counts could not be made due to overcrowded cages or poor lighting, in which case estimates were made. No formal interviews were carried out with traders and no purchases were made.

For each of the recorded species, we examined the legal status according to national legislation and conservation status as assessed by the IUCN Red List of Threatened Species (hereafter referred to as the Red List) (IUCN 2021). Additionally, we ascertained the natural range of the birds in the markets, allowing us to assess the proportions of birds that were locally caught or obtained from other locations in Indonesia or from outside the country. Species names and baseline taxonomy largely follow the Handbook of the Birds of the World (HBW) and BirdLife International Checklist of the Birds of the World Version 4 (2019) and species identification was aided with field guides such as Eaton *et al.* (2016).

Based on our analysis, we make recommendations for further actions to support the government's efforts to ensure that the bird trade in Makassar does not persist in violation of Indonesian laws and policies, and ultimately to prevent declines or extinctions of bird species currently driven by the illegal and unsustainable trade.

## RESULTS

A total of 63 species, accounting for 6,352 birds, were observed during the survey (Appendix 1). Of these, 4,713 individuals were recorded in *Pasar Hobi* and 1,639 in *Wage Rudolf*. Only three of the observed species are not native to Indonesia: Common Myna *Acridotheres tristis* (n=7), Crested Myna *Acridotheres cristatellus* (n=3) and Red Turtle-dove *Streptopelia tranquebarica* (n=14). It must be noted, however, that all three of these species now have established populations in Indonesia (Eaton *et al.* 2016). Of 60 species (n=6,328) detected, 25 (n=4,007) are endemic to Indonesia and four (n=76) represented endemic subspecies.

Of the species native to Indonesia, 35 (n=3,697) do not occur on Sulawesi. Of these, 10 (n=1,885) are country-endemics and three (n=75) are endemic subspecies. The majority of these species occur on Sumatra (21 species, n=2,349), Java (20 species, n=3,469), Bali (16 species, n=3,331) and Kalimantan (14 species, n=662) (Figure 1). Four Sumatran (n=11) and one Bali (n=2) island-endemics were

recorded. Twenty-five (n=2,631) of the encountered native species occur on Sulawesi, of which 12 (n=1,164) are Sulawesi endemics (Appendix 1).

More than 100 individuals were recorded for 12 of the encountered species, with the most numerous being Orange-spotted Bulbul *Pycnonotus bimaculatus* (n=1,254), followed by Lemon-bellied White-eye *Zosterops chloris* (n=915) and Grosbeak Starling *Scissirostrum dubium* (n=622) (Appendix 1). All three species are Indonesian endemics, with the latter being endemic to Sulawesi.

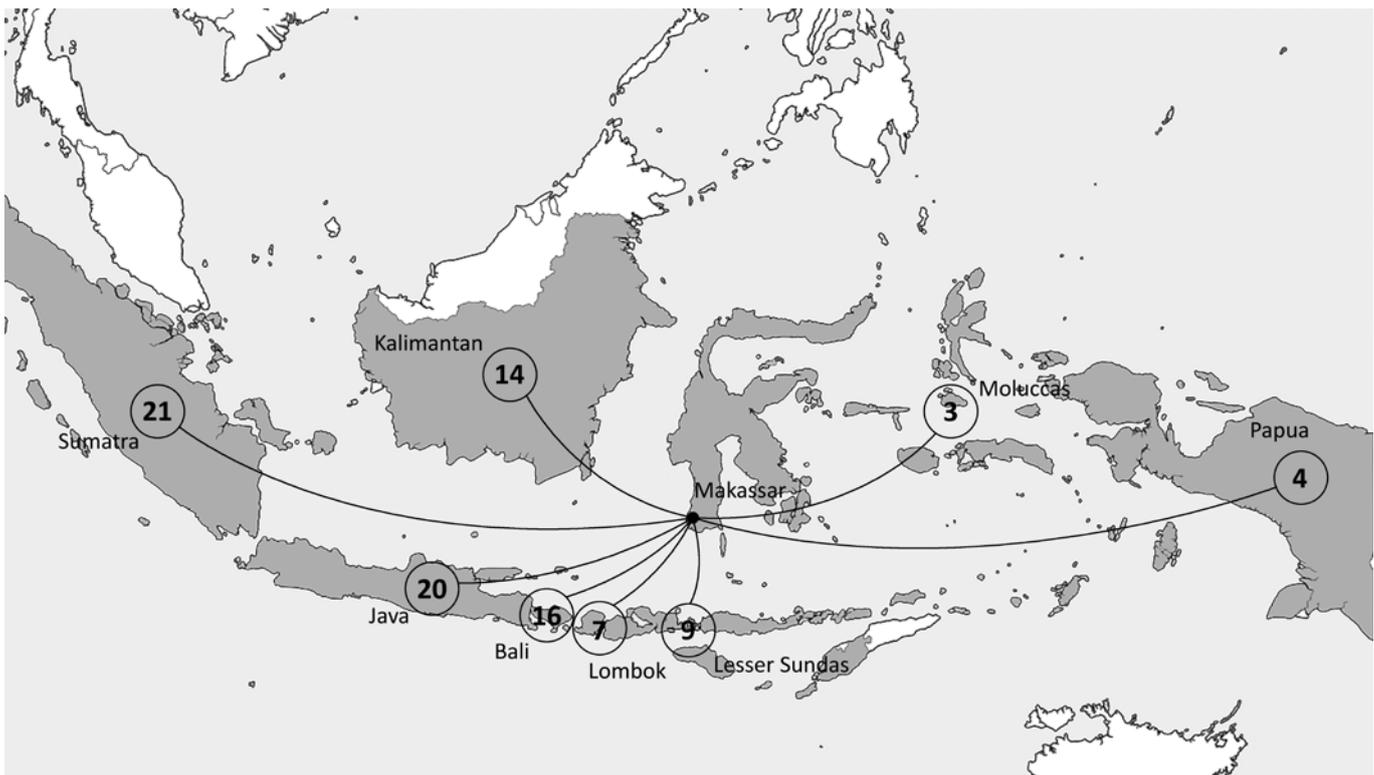
Nine of the species detected during this survey are considered Threatened by the Red List, with three assessed as Critically Endangered (Appendix 1). Four are listed as Endangered and two as Vulnerable. Of the remaining species, seven are classified as Near Threatened and 47 as Least Concern.

Fifteen (n=1,004) of the encountered species are currently protected under Indonesia's wildlife laws (Appendix 1). Of these, the most frequently encountered was the Sulawesi endemic Mustard-capped Lorikeet *Trichoglossus meyeri* (n=448), followed by Java Sparrow *Lonchura oryzivora* (n=217), Red-flanked Lorikeet *Charmosyna placentis* (n=153) and Common Hill Myna *Gracula religiosa* (n=112). The remaining 11 protected species each accounted for less than 100 individual birds.

## DISCUSSION

Sulawesi has been the subject of wildlife trade research, but the majority of studies have focused on wild meat trade in the province of North Sulawesi (O'Brien & Kinnaird 1996, Lee *et al.* 2005, Sheherazade & Tsang 2015, Latinne *et al.* 2020). While South Sulawesi, and Makassar in particular, have been known to be important hubs in Indonesia's domestic wildlife trade network (van Dijk & Shepherd 2004, Indraswari *et al.* 2020), relatively little attention has been given to the wildlife trade there, and the cage-bird trade in particular. One of the few bird trade studies involving Sulawesi markets (Nash 1993) broadly focused on non-CITES

**Figure 1.** Provenance of Sulawesi non-native species encountered in the Makassar bird markets. Note: only five of these species are island endemics; most occur across multiple locations and are therefore included in multiple totals.



songbird trade across South-East Asia, with Sulawesi being only a minor component. During one survey reported by Nash (1993) in a small market in Makassar, 27 species were found, but no exact trade volumes were provided.

More than half of the observed species in the current survey, almost all of which are native to Indonesia, are not native to Sulawesi. This observation highlights the extensive transportation and trade of birds across provincial boundaries and between islands within the archipelago, which technically requires a permit under Indonesian legislation, and underscores Makassar's role as an important hub in Indonesia's domestic trade network. The presence of large numbers of Sulawesi non-native birds in the markets also suggests an increased threat of invasive species, which are often the result of intentional or accidental cage-bird releases, as illustrated by the introduction and establishment of the Grosbeak Starling, endemic to Sulawesi, on Java (Prawira *et al.* 2018).

One significant observation concerns the Sunda Laughingthrush *Garrulax palliatus*, endemic to the islands of Sumatra and Borneo. Although Sunda Laughingthrushes are frequently observed in Indonesian markets, trade records for the Bornean subspecies *G. p. schistochlamys* are very scarce (Shepherd *et al.* 2016, Leupen *et al.* 2020). All 20 Sunda Laughingthrushes observed in the Makassar markets (10 in *Pasar Hobi* and 10 in *Wage Rudolf*) were *G. p. schistochlamys*, constituting, to the authors' knowledge, the largest recent record of this subspecies in trade.

Another remarkable find was the large number of observed Orange-spotted Bulbuls. Endemic to Sumatra, Java and Bali, it was the most frequently recorded taxon of the survey. The 1,254 individuals, recorded across nine stalls (seven in *Pasar Hobi* and two in *Wage Rudolf*), should be considered exceptionally high. In a recent study, 497 individuals were found in market surveys across 10 Indonesian locations between October 2018 and June 2019 (Leupen & Gomez 2019). It remains unclear why such a high number of Orange-spotted Bulbuls was found in Makassar, but a possible reason was that the time of survey coincided with a fresh shipment that may have later been dispersed and transported onwards.

The fact that a large number of Grosbeak Starlings ( $n=622$ ) was observed is of importance. This Sulawesi endemic is often observed in bird markets outside of Sulawesi, albeit in lower numbers than during our survey (Shepherd 2006, Chng *et al.* 2015, 2016, 2018a,b, Chng & Eaton 2016). Nijman *et al.* (2018) reported a total of 2,149 Grosbeak Starlings observed in 120 surveys conducted across Java, Bali and Lombok between 2016 and 2018. Nevertheless, local and national trade are currently not included in the species' Red List assessment. The fact that such a large number was found during a single market visit suggests that trade may pose a threat to the species. Considering this along with the additional pressure that this species faces due to rapid habitat loss (Maas *et al.* 2015), an uplisting to at least Vulnerable on the Red List is warranted.

A total of six species of parrot, accounting for 656 individuals, were observed during this study. This is of interest as relatively fewer have been observed in recent surveys carried out on Java, Sumatra and Bali (Chng *et al.* 2015, 2016, 2018a,b, Chng & Eaton 2016). Notably, the Mustard-capped Lorikeet was especially numerous in the markets of Makassar, with 448 individual birds observed. This Sulawesi endemic is currently assessed as Least Concern on the Red List and its population is suspected to be stable in the absence of evidence for any declines or substantial threats (BirdLife International 2016a). Trade is not discussed as a threat in the assessment but the fact that so many were observed in a single survey may be cause for concern.

Only nine of the species observed are listed in the Appendices of CITES, and all are native to Indonesia. Eight species are listed in Appendix II and one, the Bali Myna *Leucopsar rothschildi* ( $n=2$ ), in Appendix I. The two species observed that are not native to Indonesia are also not listed in the Appendices of CITES, making

this convention a moot issue for the control of bird trade in this particular market, unless the CITES-listed species were intended for international demand.

Seven species and one subspecies observed are considered Threatened by the Red List. Of the three Critically Endangered birds, Bali Myna and Javan Pied Starling *Gracupica jalla* are both endemic to Indonesia, while Straw-headed Bulbul *Pycnonotus zeylanicus* was formerly distributed across a broader range in South-East Asia. All three species have declined to the point of near extinction in the wild, due largely to commercial trade. The Javan Pied Starling, however, exists in the hands of private commercial breeders, though hybridisation with the Thai Pied Starling *Gracupica floweri*, which is not native to Indonesia, is likely to have further reduced the surviving numbers of this species (Eaton *et al.* 2015, BirdLife International 2016b, Baveja *et al.* 2021). The Straw-headed Bulbul, once found from southern Thailand and Myanmar through Malaysia, Brunei, Singapore and much of western Indonesia, is now largely confined to Singapore (Bergin *et al.* 2017, Chiok *et al.* 2019, 2020). Some captive breeding of this species in private hands in Indonesia supplies birds for the trade, but wild-caught birds, often from Malaysia, continue to appear in Indonesia's markets. Extirpated from the wild, the Bali Myna is bred in captivity in Indonesia and in a number of other countries (Collar *et al.* 2012), and has been reintroduced over time, but reintroduction efforts are hampered by the constant threat of poaching to supply a continual demand.

Impeding conservation efforts is the notion that ownership of rare species is a prestigious symbol of social status (Nijman *et al.* 2009, Collar *et al.* 2012). Clearly, increased efforts to educate bird hobbyists on the fundamental aspects of conservation of threatened bird species is needed, as is stronger enforcement effort by the authorities in Indonesia.

The majority of the trade in birds in the markets of Makassar is not carried out in accordance with Indonesia's national legislation. Although there are several regulations and policies in place in Indonesia to regulate the trade in birds, these measures are often violated (Bergin *et al.* 2017, Chng *et al.* 2018b, Rentschlar *et al.* 2018, Indraswari *et al.* 2020). The fact that so many protected bird species, as well as birds collected from the wild outside of Indonesia's annual national harvest and trade quota system, continue to be openly available indicates a lack of effort to enforce legislation, and ultimately to protect species from decline and possible extinction. In the absence of effective regulation and enforcement, illegal trade in protected species will continue, as will the harvest and export of numbers of birds greatly exceeding the set quotas, which will result in further declines. We strongly encourage local authorities in Makassar to regularly inspect and investigate the bird markets, traders and buyers in Makassar and to take action against any offenders when they are found selling, buying or possessing protected species and species taken from the wild outside of the annually set harvest quota. Bird trafficking networks within the Indonesian archipelago should be investigated and dismantled, and legislation regulating the trade in birds between provinces should be enforced. Maximum penalties as provided for under the *Act of the Republic of Indonesia No.5 of 1990 Concerning Conservation of Living Resources and their Ecosystems* should be fully utilised to ensure that the law has a deterrent effect and impact. Further, the authorities should utilise other regulations and laws apart from wildlife-centric ones, such as those governing quarantine, trade and hygiene.

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**Appendix 1. Bird species observed during market visits in Makassar, Sulawesi, Indonesia, on 4 June 2019 (protected species in bold, non-native species in italics).**

\*Indonesian endemic, \*\*Sulawesi endemic, ssp.=subspecies.

Species	Pasar Hobi	Wage Rudolf	No. of individuals	IUCN Red List
Orange-spotted Bulbul <i>Pycnonotus bimaculatus</i> *	929	325	1254	NT
Lemon-bellied White-eye <i>Zosterops chloris</i> *	804	111	915	LC
Grosbeak Starling <i>Scissirostrum dubium</i> **	375	247	622	LC
Streaked Weaver <i>Ploceus manyar</i>	500	–	500	LC
<b>Mustard-capped Lorikeet <i>Trichoglossus meyeri</i>**</b>	298	150	448	LC
Zebra Dove <i>Geopelia striata</i>	281	134	415	LC
Mountain White-eye <i>Zosterops japonicus</i>	250	153	403	LC
Javan Myna <i>Acridotheres javanicus</i> *	147	161	308	VU
Yellow-vented Bulbul <i>Pycnonotus goiavier analis</i> (ssp.)	265	27	292	LC
<b>Java Sparrow <i>Lonchura oryzivora</i>*</b>	161	56	217	EN
<b>Red-flanked Lorikeet <i>Charmosyna placensis</i></b>	–	153	153	LC
<b>Common Hill Myna <i>Gracula religiosa</i></b>	67	38	105	LC
White-rumped Shama <i>Kittacincla malabarica</i>	98	–	98	LC
Eastern Spotted Dove <i>Streptopelia chinensis tigrina</i> (ssp.)	68	13	81	LC
Sooty-headed Bulbul <i>Pycnonotus aurigaster aurigaster</i> * (ssp.)	72	–	72	LC
Javan Pied Starling <i>Gracupica jalla</i> *	41	23	64	CR
Short-tailed Starling <i>Aplonis minor</i> *	25	17	42	LC
Olive-backed Sunbird <i>Cinnirys jugularis</i>	40	–	40	LC
<b>Ornate Lorikeet <i>Trichoglossus ornatus</i>**</b>	40	–	40	LC
Black-naped Oriole <i>Oriolus chinensis</i>	20	6	26	LC
Scarlet-headed Flowerpecker <i>Dicaeum trochileum</i> *	25	–	25	LC
Sunda Laughingthrush <i>Garrulax palliatus schistochlamys</i> (ssp.)	10	10	20	NT
<b>Greater Green Leafbird <i>Chloropsis sonnerati</i></b>	14	2	16	EN
Pied Bushchat <i>Saxicola caprata</i>	16	–	16	LC
Sulawesi Myna <i>Basilornis celebensis</i> **	15	–	15	LC
Fiery-browed Starling <i>Enodes erythrophris</i> **	14	–	14	LC
Red Turtle-dove <i>Streptopelia tranquebarica</i>	14	–	14	LC
<b>Coconut Lorikeet <i>Trichoglossus haematodus</i></b>	12	–	12	LC
White-shouldered Triller <i>Lalage sueurii</i>	12	–	12	LC
Pale-bellied Myna <i>Acridotheres cinereus</i> **	11	–	11	VU
Brown Honeyeater <i>Lichmera indistincta ocularis</i> (ssp.)	8	1	9	LC
Bar-winged Prinia <i>Prinia familiaris</i> *	7	–	7	NT
Chestnut-capped Laughingthrush <i>Garrulax mitratus</i>	7	–	7	NT

Species	Pasar Hobi	Wage Rudolf	No. of individuals	IUCN Red List
Common Myna <i>Acridotheres tristis</i>	7	–	7	LC
Red-backed Thrush <i>Geokichla erythronota</i> **	7	–	7	NT
Straw-headed Bulbul <i>Pycnonotus zeylanicus</i>	7	–	7	CR
Oriental Magpie-robin <i>Copsychus saularis musicus</i>	6	–	6	LC
Stephan's Dove <i>Chalcophaps stephani</i>	6	–	6	LC
Grey-cheeked Bulbul <i>Alophoixus tephrogenys</i>	2	3	5	LC
Thick-billed White-eye <i>Heleia crassirostris</i> *	4	–	4	LC
Crested Myna <i>Acridotheres cristatellus</i>	3	–	3	LC
Slender-billed Cuckoo-dove <i>Macropygia amboinensis</i>	3	–	3	LC
<b>Bali Myna <i>Leucopsar rothschildi</i>*</b>	–	2	2	CR
Black-headed Bulbul <i>Brachypodius atriceps</i>	2	–	2	LC
Chestnut-capped Thrush <i>Geokichla interpres</i>	1	1	2	NT
Island Thrush <i>Turdus poliocephalus whiteheadi</i> * (ssp.)	2	–	2	LC
Long-tailed Shrike <i>Lanius schach bentet</i> (ssp.)	2	–	2	LC
<b>Red-cheeked Parrot <i>Geoffroyus geoffroyi</i></b>	–	2	2	LC
Sulawesi Blue-flycatcher <i>Cyornis omisus</i> **	2	–	2	LC
<b>Sulawesi Pitta <i>Erythropitta celebensis</i>**</b>	2	–	2	LC
<b>Sumatran Laughingthrush <i>Garrulax bicolor</i>*</b>	2	–	2	EN
<b>Yellow-spectacled White-eye <i>Heleia wallacei</i>*</b>	2	–	2	LC
Collared Kingfisher <i>Todiramphus chloris palmeri</i> * (ssp.)	1	–	1	LC
Eyebrowed Thrush <i>Turdus obscurus</i>	1	–	1	LC
Golden-headed Cisticola <i>Cisticola exilis</i>	1	–	1	LC
Olive-winged Bulbul <i>Pycnonotus plumosus</i>	1	–	1	LC
Orange-banded Thrush <i>Geokichla peronii</i>	1	–	1	NT
<b>Sulawesi Hanging-parrot <i>Loriculus stigmatus</i>**</b>	–	1	1	LC
<b>Sulawesi Hawk-eagle <i>Nisaetus lanceolatus</i>*</b>	1	–	1	LC
Sulawesi Pygmy Woodpecker <i>Picoides temminckii</i> **	–	1	1	LC
<b>Sumatran Mesia <i>Leiothrix laurinae rookmakeri</i>* (ssp.)</b>	–	1	1	EN
Eurasian Tree Sparrow <i>Passer montanus</i>	–	1	1	LC
Yellow-billed Malkoha <i>Rhamphococcyx calyphorhynchus</i> **	1	–	1	LC
<b>TOTAL</b>			<b>6,352</b>	