

# In the market for extinction: the cage bird trade in Bali

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This paper is the first known complete inventory of birds sold in two of the largest bird markets in Denpasar, Bali, Indonesia. Two inventories were compiled one year apart, in 2017 and 2018. A total of 5,228 individuals of 129 species were recorded in 2017 and 7,258 individuals of 144 species in 2018, including eight threatened species, seven in both years and one additional species in 2018 only. Most of the birds recorded are believed to be wild-sourced. A higher proportion (7.8%) of birds from eastern Indonesia (those only distributed on the Lesser Sundas, Sulawesi, Maluku and Papua) were found for sale in Bali in 2018 compared with 2017 (2.8%), and compared with markets in Jakarta (0.7%) and eastern and central Java (1.9%). Continued monitoring of key markets is needed to verify whether the supply of some species in the markets is declining owing to trapping pressure in the wild, and if this leads to other species, such as eastern Indonesian and montane species, being increasingly sought to supply the bird trade in Bali and elsewhere in Indonesia. We urge the Indonesian authorities to utilise information from such trade surveys to make informed decisions regarding species protection and trade regulation, including a periodic review of P.92/2018, Indonesia's newly released species protection legislation. This will be particularly important for species whose wild populations are dwindling, and for which capture and trade from the wild should be prohibited to prevent extinction in the wild, a fate that some Javanese bird species already face.

## INTRODUCTION

Situated at the easternmost end of the Greater Sunda Islands of Indonesia, the island of Bali is one of the smallest provinces in the country. There is active wildlife trade in Bali, mirroring trade patterns in other parts of the country (Shepherd *et al.* 2004, UNODC 2013, Nijman & Nekaris 2014, Lee & Nijman 2015, Nijman & Lee 2016). Trading has been reported in recent decades for pets, meat, decorative and ornamental purposes, and traditional medicine, and involves a wide range of taxa, including marine molluscs, marine turtles, birds and mammals (Malone *et al.* 2003, ProFauna Indonesia 2003, Nijman 2005, Jensen 2009, Curwin 2011, Nijman *et al.* 2015, Freitas & Krishnasamy 2016, Nijman & Nekaris 2017, Nijman *et al.* 2018).

Indonesia is the largest producer and consumer in the South-East Asian cagebird trade, with up to 16,000 birds recorded in major markets at any point in time (Nash 1993, Shepherd *et al.* 2004, Chng *et al.* 2015, 2017, 2018, Chng & Eaton 2016). The live animal markets that exist throughout the country facilitate this domestic trade (Shepherd 2007, 2010, 2012, Chng *et al.* 2015, 2016, Morgan 2018), much of which is illegal. Indonesia's primary wildlife protection legislation is the 'Act of the Republic of Indonesia (No.5) of 1990 concerning Conservation of Living Resources and their Ecosystems', known as the 'Conservation Act (No. 5) of 1990'. Under the Act, protected species are not allowed to be captured, kept, destroyed, traded or transported, within or out of Indonesia, without permission from the Ministry of Forestry's Department of Conservation of Natural Resources and Ecosystems (*Konservasi Sumber Daya Alam dan Ekosistem*), and those convicted of a violation may be liable to imprisonment for a maximum of five years or a fine of up to IDR 100 million (USD 8,584). This conservation act is a framework law that is considered in conjunction with other government regulations and ministerial decrees.

Protected species were previously listed under Government Regulation (No. 7) of 1999 'Concerning the Preservation of Flora and Fauna' (PP No.7/1999). This was repealed by Government Regulation (No. 20) of 2018 (P.20/2018) when the Indonesian government revised and updated its list of protected species in July 2018 (Anon. 2018a). This saw the expansion of its protected species list from 677 to 921 plants and animals. Overall this was a positive move, but some species that were previously protected at the family level (e.g. sunbirds Nectariniidae) were removed. However, shortly after this regulation was passed, the list of bird species was revised in September 2018 (Anon. 2018b) under the Government Regulation (No 92) of 2018 (P.92/2018), as a result of lobbying by hobbyists and traders (Gokkon 2018) and five species were removed from this list:

White-rumped Shama *Kittacincla malabarica*, Javan Pied Starling *Gracupica jalla*, Straw-headed Bulbul *Pycnonotus zeylanicus*, Sangahe Whistler *Coracornis sangihe* and Little Shrikethrush *Colluricincla megarhyncha*. Although captive breeding of these species may now be permitted, their capture and trade from the wild remains illegal without government permit, as there is no quota for wild harvest. Any violation for capturing and trading wild-caught birds, however, is not punishable under Conservation Act (No. 5) of 1990.

Government Regulation (No. 8) of 1999, on 'wild flora and fauna exploitation', states that only unprotected wildlife may be harvested and traded, that traders must submit trade records annually, and that all trade in plants and animals must be accompanied by legal documents. A quota system regulates the collection and trade of unprotected species, including captive-bred specimens, which are set annually by *Lembaga Ilmu Pengetahuan Indonesia* (LIPI, the Indonesian Institute of Sciences: CITES Scientific Authority for Indonesia). Only second and subsequent generations of captive-bred protected animals may be traded. Harvest and export quotas are set annually for non-protected native species; native protected species or those listed under CITES Appendix I are prohibited from harvest or trade except under special circumstances where permits can be granted. Additionally, under this regulation, the transportation of any species (protected or otherwise) within Indonesia requires documentation from the Natural Resources Conservation Agency of Indonesia (*Balai Konservasi Sumber Daya Alam*) at provincial level.

This paper provides a complete inventory of wild birds sold openly in two of the main bird markets in Denpasar, the capital of Bali, surveyed a year apart, in 2017 and 2018. It highlights the scale of the trade in birds in these markets and aims to establish a baseline to guide future conservation and research efforts.

## METHODS

TRAFFIC researchers carried out a survey of all shops selling birds at Pasar Burung Sanglah (Sanglah bird market) and Pasar Burung Satria (Satria bird market) in Denpasar, Bali, on 16 October 2017 and 8 October 2018. Numbers of every species of wild bird were counted. Domesticated animals, defined as those that show a significant proportion of mutations, either with colour pigmentations differing from wild specimens or hybridisation with other species (e.g. canaries *Serinus* sp., lovebirds *Agapornis* sp., Budgerigar *Melopsittacus undulatus* and Java Sparrow *Lonchura oryzivora*), were excluded from the inventory.

Where possible, individuals were recorded to subspecies level, and this was used to identify the geographic source of the birds in question. For example, Oriental Magpie Robin *Copsychus saularis* of the subspecies *amoenus* were recorded as originating from East Java and Bali, while those of subspecies *musicus* were recorded as originating from Sumatra, West Java and Kalimantan. Taxonomy follows BirdLife International (del Hoyo & Collar 2014, 2016), with scientific names of birds given in Appendix I (and hereafter omitted from the text).

Observers only counted openly displayed wildlife; birds in brown paper bags, commonly on sale in one area of Satria bird market, were not counted. No attempts were made to purchase wildlife. Price data were obtained opportunistically when it was possible to engage with dealers without appearing too suspicious or by noting openly advertised prices. Additional information, such as the source and origin of birds, was also solicited from dealers in conversation.

## RESULTS

In 2017, 5,228 birds of 129 species were recorded from 26 shops, while 7,258 birds of 144 species were recorded from 30 shops in 2018. The higher number of birds recorded in 2018 is due to 2,963 Scaly-breasted Munias, compared to 690 in 2017 (Appendix 1). Fewer individuals assessed as threatened in the IUCN Red List of Threatened Species (Critically Endangered, Endangered and Vulnerable) were recorded in 2018 (570 individuals of 8 species, or 8% of the total number of individual birds) than in 2017 (1,093 individuals of 8 species, or 20% of the total number of individual birds). This was mainly due to smaller numbers of Sumatran Laughingthrush and Javan Myna (Appendix 1).

### Geographic origins of birds

As with all other surveys of the Indonesian bird markets, almost all the birds observed in trade in both years were native to (i.e. sourced within) the country (99.3% in 2017 and 95.9% in 2018). In 2017, 1,311 individuals of 28 species were endemic to Indonesia, while a further 325 individuals were of 20 subspecies endemic to Indonesia. In 2018 there were 1,440 individuals of 43 endemic species, and a further 347 individuals of 20 endemic subspecies.

The bulk of birds and species recorded originated from the Greater Sunda Islands, particularly Java and Bali, which is as expected considering their close proximity to the Bali markets. If Scaly-breasted Munia (41% of birds recorded in 2018) are excluded from the analysis, it becomes more apparent that more birds from the Lesser Sundas, Sulawesi and Maluku were recorded in 2018 than in 2017. Lesser Sunda species such as Barred Dove, Yellow-spectacled White-eye, Red-chested Flowerpecker and Olive-headed Lorikeet were recorded in 2018 but not in 2017, and higher numbers of Wallacean Drongo were recorded in 2018 (Appendix I). All the Black-naped Orioles observed in both years were of the subspecies found in the Lesser Sundas (*broderipi*), indicating trading links between there and Bali. On the other hand, Thick-billed White-eye and Chestnut-backed Thrush were recorded in lower numbers in 2018.

Birds from Java and Bali included species occupying similar habitat and altitudinal niches and did not appear to show any obvious differences between surveys, with the exception of an increase in montane forest species recorded in 2018—34 species (574 individuals) compared with 25 (352 individuals) in 2017. More submontane and montane birds were recorded in 2018, such as Mountain White-eye, Indigo Flycatcher, Javan Bulbul, Flame-throated Barbet, Lesser Shortwing, Blue Nuthatch, White-bibbed Babbler, Javan Grey-throated White-eye, Pied Shrike-babbler and White-flanked Sunbird.

### Protected species

Overall, 216 individuals of 11 species (9% of all species) recorded in trade in 2017 were protected at the time under PP No.7/1999, meaning that trade in these species was illegal. In 2018, a higher number of protected species (289 individuals of 25 species or 17% of the total number of species) were in trade, largely due to the fact that a higher number of avian species were afforded protection under P.92/2018. This included 18 species that were previously not protected under PP No.7/1999. Conversely, the P.92/2018 also resulted in the loss of protection for 10 species recorded in 2018, totalling 79 individuals. These included four species (Brown Honeyeater, Brown-throated Sunbird, Crescent-chested Babbler and Olive-backed Sunbird) which were recorded in trade in both years.

In both surveys, vendors seemed unperturbed about photography of animals on sale and, when asked, were unconcerned about the wildlife legislation or about the new protected species list. Although P.92/2018 is effective immediately (LIPI *in litt* November 2018), there is a two-year grace period for captive breeders and owners of protected species to register their birds (Gokkon 2018), meaning that trade in these newly protected species will technically continue until then.

### Source

Most of the birds are believed to be from the wild, based on two considerations—their poor condition, and the fact that there are no known breeding facilities for most of the species. There are a few exceptions such as the Javan Pied Starling, which is close to extinction in the wild, with no records since 2013, and birds observed in trade are therefore believed to be from captive sources (Eaton *et al.* 2015). Such large numbers of Javan Myna are unlikely to be all from wild sources as it is now scarce in the wild in its native range (Eaton *et al.* 2015). Commercial breeding of Zebra Dove and Spotted Dove is also widespread (Nash 1993, Jepson & Ladle 2005). Many of the leg rings observed on birds such as Orange-headed Thrush were not closed and therefore do not confirm that a bird was captive-bred, as they could have been placed on wild-caught adult birds.

## DISCUSSION

### Species of conservation concern

Javan Pied Starling, White-rumped Shama, Sumatran Laughingthrush and Greater Green Leafbird—302 individuals in 2017 and 202 individuals in 2018—are all listed as top-tier priority species in the IUCN SSC Asian Songbird Trade Specialist Group's 'Conservation Strategy for Southeast Asian Songbirds in Trade' (Lee *et al.* 2016).

#### Javan Pied Starling *Gracupica jalla* CR

This Critically Endangered species, popular in bird keeping and bird singing competitions in Indonesia, was removed from P.20/2018 in September 2018 following fierce lobbying by songbird-keeping groups (Gokkon 2018). The Javan Pied Starling was the twelfth most numerous bird in this survey, with a combined two-year total of 197 individuals.

#### White-rumped Shama *Kittacincla malabarica*

The White-rumped Shama was also removed from P.20/2018, although permits are required for capture and trade, and those who flout the law could be prosecuted. The species is highly sought after by bird-keepers for its melodious song and, although assessed as Least Concern due to its wide range across most of Asia (BirdLife International 2018a), in Indonesia populations are plummeting while demand remains high (Leupen *et al.* 2018). Burivalova *et al.* (2017) found that wild White-rumped Shammas were preferred

for their superior song, and that only 11% of birds were reportedly captive-bred.

### Sumatran Laughingthrush *Garrulax bicolor* EN

In 2017 Sumatran Laughingthrush was the tenth most numerous species, with 116 individuals recorded, the highest number in any published inventory outside Sumatra; the previous highest was 71 found at Pramuka Market, Jakarta, in 2014 (Chng *et al.* 2015). In 2018 only 32 individuals were recorded, a smaller number but still substantial for a species facing intense pressure from trade, and perhaps reflecting increasing scarcity. The species was recently listed on P.92/2018 and is assessed as Endangered (BirdLife International 2018b).

### Other species from Sumatra

In the 2018 survey there were fewer threatened birds from Sumatra: Sumatran Mesia, Sumatran Bulbul and the Sumatran race of Sunda Laughingthrush were recorded in smaller numbers compared with 2017. This fall could be due to the increasing scarcity of these species in the wild and the greater difficulty in obtaining them, and observations from the field in Sumatra indicate that some of these traded species are disappearing from areas where they have been observed even within the past year (A. Nurza pers. comm. 2018, JAE pers. obs. 2018); but further study is needed. In contrast, the numbers of other Sumatran species recorded in 2018 were similar to or higher than in 2017 (Black-capped White-eye, Long-tailed Sibia, Chestnut-capped Laughingthrush). This may indicate that there is a fairly consistent level of trade in some species from Sumatra.

### Greater Green Leafbird *Chloropsis sonnerati* VU

A total of 94 individuals were counted in the two years. This Vulnerable species (BirdLife International 2018c) is not native to Bali but is found throughout the rest of the Greater Sunda Islands. This is the most in demand and traded leafbird species in Indonesia (Chng *et al.* 2017). A survey by TRAFFIC in 2014 recorded 1,248 individuals, the fourth most numerous species recorded in the Jakarta bird markets (Chng *et al.* 2015). All native leafbirds were recently listed on P.92/2018.

### Orange-headed Thrush *Geokichla citrina rubecula*

We recorded 10 and 13 birds in 2017 and 2018 respectively, while surveys by others in Satria market found from 12 to 111 birds between May 2017 and July 2018 (V. Nijman *in litt.* 2018). However, Kristianto & Jepson (2011) concluded that each year no fewer than 116,000 Orange-headed Thrush were harvested and hand-raised for trade in an area close to the two Denpasar bird markets. Based on this, much higher numbers of Orange-headed Thrush in the Bali markets would have been expected; a further study is needed to check if the practice is still taking place and is sustainable.

### White-eyes (Zosteropidae)

White-eyes are commonly observed in trade in large numbers throughout the region (Chng *et al.* 2015, Eaton *et al.* 2017a,b). Overall, Oriental White-eye was the third most numerous species recorded in both years—785 recorded in 2017 and 283 in 2018. All birds were of either the taxon *buxtoni* or *melanurus*, which is of significance as a recent study elevated these taxa to species level, making the proposed ‘Sangkar White-eye’ *Z. melanurus*, confined to Java and Bali, the most heavily traded species on earth (Lim *et al.* 2018). The 64% drop in Oriental White-eye numbers from 2017 to 2018 was offset by an increase in other white-eyes, most notably Lemon-bellied White-eye (from 6 to 207 individuals) and Mountain White-eye (from 0 to 126 individuals).

### Sunbirds (Nectariniidae)

Six species of sunbird (a total of 65 birds) were recorded in all. While

these are not large numbers, previously a total of 394 sunbirds from five species was recorded during the TRAFFIC bird market inventory of 11 markets in Java and Sumatra between 2014 and 2017, of which 258 were Maroon-bellied Sunbird (Chng *et al.* 2015, 2016, 2018, Chng & Eaton 2016). Basuni & Setiyani (1989) recorded none in surveys of Pramuka Market, Jakarta, but sunbirds were mentioned by Nash (1993) as a protected species regularly seen in trade (albeit not the most numerous or frequently recorded). Shepherd *et al.* (2004) recorded only 22 sunbirds of four species in monthly surveys in Medan, Sumatra, from 1997 to 2001. The recent rise of sunbirds in trade is a measure of their increasing popularity—some have now been added to bird singing competitions as a competition class species, leading to higher demand (Om Kicau 2015). Sunbirds were previously protected under PP No.7/1999 as a family, but in P.92/2018 all but five species were removed and all the species recorded in Bali shops in 2018 are no longer protected.

### Prinias and tailorbirds (Cisticolidae)

Demand for prinias and tailorbirds seems to be rising, with Bar-winged Prinia recently being added as a competition class in bird singing competitions (Om Kicau 2012). In our two Bali surveys, 263 cisticolids were recorded. Thousands of cisticolids have been seized in numerous incidents in the past few years, including three recent seizures in November 2018 by Indonesian quarantine officers (Agus 2016, Suriyani 2017, Lesmana 2018, TRAFFIC 2018). Bar-winged Prinia, the commonest prinia species in Sumatra, Java and Bali (Eaton *et al.* 2016), was recorded by Nash (1993) in bird market surveys across Indonesia and is suspected to be in steep decline. It is probably being substituted by other prinia species as it becomes scarce, with Brown and Plain Prinias, both poor songsters, also recorded in these surveys.

### Bali's role in the Indonesian bird trade

Although definitive conclusions cannot be drawn from these two surveys, the species composition in 2018 appears to have moved towards more novel species (those not typically seen in trade) from less accessible locations such as montane habitats, compared with those recorded in 2017. For example, when looking into species groups, the large increase in Mountain and Lemon-bellied White-eye may indicate that Oriental White-eye populations have been depleted and that trappers are now substituting them with other *Zosterops* species from further afield—Lemon-bellied White-eye, found in the Lesser Sundas, Sulawesi, Maluku and some isolated islands off Java, Sumatra and Kalimantan (van Balen 2018a)—and less accessible habitats—Mountain White-eye, found in the same geographic regions as Oriental White-eye but generally above 900 m (van Balen 2018b).

Relatively high proportions of birds from eastern Indonesia (only found on the Lesser Sundas, Sulawesi, Maluku and Papua) were recorded in Bali markets compared with inventories in Javanese markets. The Bali surveys found that 2.8% of all birds in 2017 and 7.8% in 2018 originated from eastern Indonesia, compared with only 0.7% of all birds in Jakarta (Chng *et al.* 2015) and 1.9% of all birds recorded in trade in eastern and central Java (Chng & Eaton 2016). Indonesia has started a huge infrastructure development programme, which includes the expansion of air, road and rail networks as part of a US\$327 billion plan (Anon. 2018c, Ariffin 2018). For example, development in the Papuan lowlands, which includes increased scheduled flights there, could lead to greater access to previously unexploited areas and stimulate more trapping and trade. Easier access to species has already facilitated illegal trade in a number of cases, assisted by the growth of transportation routes on which wildlife can be smuggled (Laurance *et al.* 2005, Shepherd *et al.* 2007, Duckworth *et al.* 2012).

Movement of species from the Lesser Sundas to supply the bird trade in Bali, probably via Lombok, is reflected in the much

greater numbers of Lemon-bellied White-eye and Timor Zebra Finch and the observation of a new trade in Barred Dove in 2018. Interceptions of shipments of birds in recent years confirm the use of this trade route. Of note were three large confiscations in 2017 and 2018, each of over a thousand songbirds, at Lembar Port in west Lombok (Suriyani 2017, Turmuzi 2017, Rachmawati 2018). Many of these were species native to the Lesser Sundas, including honeyeaters, the *broderipi* subspecies of Black-naped Oriole and Horsfield's Bushlark. Two seizures of birds on Sumba destined for Lombok in 2018 provide further evidence of this trafficking within the Lesser Sundas (Anon 2018a, Ropo 2018). This is backed up by accounts from confidential sources of notable traders on Lombok who trade in birds from middlemen and trappers across the Lesser Sundas, namely Sumbawa and Lombok, and then sell them to Java and Bali.

## CONCLUSION AND RECOMMENDATIONS

The two surveys and supplementary data presented in this paper furnish evidence of an active bird trade in Bali. Our observations found that four top priority species on the IUCN SSC Asian Songbird Trade Specialist Group's list—Javan Pied Starling, White-rumped Shama, Sumatran Laughingthrush and Greater Green Leafbird—were in the top 30 species traded on Bali, emphasising again that species threatened predominantly by trade are widely found on public display in Indonesian bird markets. Trade in birds sourced from eastern Indonesia appears to be greater in Bali than in other Indonesian bird markets and periodic monitoring of the Bali markets and early analysis and publication of results is needed to determine if this is indicative of a new trend as well as continuing to monitor the IUCN priority species. This monitoring is necessary to determine if supply in the bird markets is declining due to scarcity in the wild, and whether the scarcity leads to replacement by other species. Such information will also be useful to obtain accurate assessments of the population status and threats to these species, thereby providing support and evidence for better protection and conservation efforts.

It remains to be seen how the new revision of the legislation (P.92/2018) will affect the Indonesian bird trade. Although the legislation increased the overall number of species protected from illegal and unsustainable harvest and trade, it also removed the protection of a number of highly sought-after and threatened species, as well as those previously protected at family level, such as sunbirds. Given the active and adaptive nature of the bird trade, as shown by the addition of new species as competition classes in bird singing contests, the trapping of many species will probably continue and even grow in an unsustainable manner to feed the demand. Therefore we recommend that the species listed in P.92/2018 be reviewed regularly in conjunction with information from inventories of all the major Indonesian bird markets, as well as from other sources, including data from seizures and observations in the field. This is particularly important for species where wild populations are already known to be dwindling and for which capture and trade from the wild should be prohibited immediately to prevent species extinctions. It is equally important that there is effective enforcement of the existing national legislation in the bird markets throughout Indonesia to stamp out the current widespread illegal trade.

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**Appendix 1.**

**Numbers of birds recorded in the 2017 and 2018 Bali bird market surveys, listed in order of combined total and indicating their protected status in Indonesia.**

† Protected under PP No.7/1999

\* Protected under P20/2018

\*\* Initially protected under P20/2018 but protection removed in September 2018 (see text)

Species	2017	2018	Grand total	Species	2017	2018	Grand total
Scaly-breasted Munia <i>Lonchura punctulata nisoria</i>	670	2,963	3,633	Brown Prinia <i>Prinia polychroa polychroa</i>	12	9	21
Javan Myna <i>Acridotheres javanicus</i> VU	746	330	1,076	* Yellow-spectacled White-eye <i>Heleia wallacei</i>		20	20
Oriental White-eye <i>Zosterops palpebrosus melanurus/buxtoni</i>	785	283	1,068	Wallacean Drongo <i>Dicrurus densus bimaensis</i>	3	16	19
Zebra Dove <i>Geopelia striata</i>	432	245	677	Black-capped White-eye <i>Zosterops atricapilla</i>		18	18
Sooty-headed Bulbul <i>Pycnonotus aurigaster</i>	206	214	420	Lesser Shortwing <i>Brachypteryx leucophris</i>		18	18
Timor Zebra Finch <i>Taeniopygia guttata</i>	16	398	414	Bar-winged Prinia <i>Prinia familiaris</i>	2	14	16
White-headed Munia <i>Lonchura maja</i>	244	115	359	* Blue-crowned Hanging Parrot <i>Loriculus galgulus</i>		16	16
Common Myna <i>Acridotheres tristis</i>	23	272	295	Long-tailed Sibia <i>Heterophasia picaoides</i>	2	14	16
Long-tailed Shrike <i>Lanius schach bentet</i>	148	69	217	† Crescent-chested Babbler <i>Stachyris melanothorax</i>	6	9	15
Lemon-bellied White-eye <i>Zosterops chloris</i>	6	207	213	Grey-capped Emerald Dove <i>Chalcophaps indica</i>		14	14
Eastern Spotted Dove <i>Spilopelia chinensis</i>	106	94	200	Ashy Drongo <i>Dicrurus leucophaeus leucophaeus</i>	4	9	13
** Javan Pied Starling <i>Gracupica jalla</i> CR	104	93	197	Red-chested Flowerpecker <i>Dicaeum maugei neglectum</i>		13	13
Yellow-vented Bulbul <i>Pycnonotus goiavier analis</i>	100	94	194	* White-crested Laughingthrush <i>Garrulax leucolophus</i>	6	7	13
Oriental Magpie Robin <i>Copsychus saularis muticus/amoenus</i>	119	62	181	Blood-breasted Flowerpecker <i>Dicaeum sanguinolentum sanguinolentum</i>	10	2	12
Short-tailed Starling <i>Aplonis minor</i>	85	90	175	Large-billed Crow <i>Corvus macrorhynchos</i>	4	8	12
† Brown Honeyeater <i>Lichmera indistincta limbata</i>	139	34	173	Blue Nuthatch <i>Sitta azurea</i>	1	10	11
* Sumatran Laughingthrush <i>Garrulax bicolor</i> EN	116	32	148	Javan Grey-throated White-eye <i>Heleia javanica</i>	2	9	11
Java Sparrow <i>Lonchura oryzivora</i> EN	80	57	137	* White-bibbed Babbler <i>Stachyris thoracica orientalis</i>		11	11
Chestnut-capped Laughingthrush <i>Garrulax mitratus</i>	66	66	132	Coconut Lorikeet <i>Trichoglossus haematodus</i>	8	2	10
Mountain White-eye <i>Zosterops montanus montanus</i>		126	126	Finch-billed Myna <i>Scissirostrum dubium</i>	6	4	10
Olive-backed Tailorbird <i>Orthotomus sepium</i>	51	68	119	†* Hooded Butcherbird <i>Cracticus cassicus</i>	5	5	10
Plain Prinia <i>Prinia inornata blythi</i>	82	14	96	Pied Shrike Babbler <i>Pteruthius flaviscapis</i>	1	9	10
Orange-spotted Bulbul <i>Pycnonotus bimaculatus</i> NT	49	46	95	Eurasian Tree Sparrow <i>Passer montanus</i>	9		9
* Greater Green Leafbird <i>Chloropsis sonnerati</i> VU	41	53	94	* Racket-tailed Treepeep <i>Crypsirina temia</i>	5	4	9
Streaked Weaver <i>Ploceus manyar</i>	56	23	79	Velvet-fronted Nuthatch <i>Sitta frontalis</i>	1	8	9
Thick-billed White-eye <i>Heleia crassirostris</i>	53	21	74	Ashy Tailorbird <i>Orthotomus ruficeps</i>		8	8
Chestnut-capped Thrush <i>Geokichla interpres</i> NT	56	16	72	* Javan Coucal <i>Centropus nigrorufus</i> VU	5	3	8
Rusty-breasted Whistler <i>Pachycephala fulvotincta javana</i>	2	70	72	Pied Bushchat <i>Saxicola caprata</i>	3	5	8
Chestnut-backed Scimitar Babbler <i>Pomatorhinus montanus montanus</i>	30	35	65	† White-flanked Sunbird <i>Aethopyga eximia</i>		8	8
** White-rumped Shama <i>Kittacincla malabarica</i>	41	24	65	Black-throated Laughingthrush <i>Garrulax chinensis</i>	2	5	7
* Yellow-throated Hanging Parrot <i>Loriculus pusillus</i> NT	11	52	63	Green Junglefowl <i>Gallus varius</i>		7	7
Cinereous Tit <i>Parus cinereus</i>	46	6	52	Horsfield's Babbler <i>Malacocincla sepiaria sepiarius</i>	1	6	7
* Javan Leafbird <i>Chloropsis cochinchinensis</i> NT	28	23	51	Large Wren Babbler <i>Turdinus macrodactylus lepidopleurus</i>	4	3	7
† Olive-backed Sunbird <i>Cinnyris jugularis ornatus</i>	34	17	51	Sunda Scops Owl <i>Otus lempiji</i> NT	7		7
Scarlet Minivet <i>Pericrocotus flammeus</i>	3	47	50	Blue-winged Leafbird <i>Chloropsis moluccensis moluccensis</i>	6		6
Black-naped Monarch <i>Hypothymis azurea</i>	12	37	49	* Cream-vented Bulbul <i>Pycnonotus simplex prillwitzii</i>	1	5	6
Javan Bulbul <i>Ixos virescens virescens</i>	5	42	47	Greater Racket-tailed Drongo <i>Dicrurus paradiseus</i>	3	3	6
Barred Dove <i>Geopelia maugei</i>		45	45	Sulawesi Myna <i>Basilornis celebensis</i>	2	4	6
Horsfield's Bush Lark <i>Mirafra javanica</i>	36	9	45	White-breasted Waterhen <i>Amaurornis phoeniceus</i>	6		6
Sunda Laughingthrush <i>Garrulax palliatus palliatus</i>	29	16	45	White-shouldered Triller <i>Lalage sueurii</i>		6	6
Javan Munia <i>Lonchura leucogastroides</i> NT	6	35	41	Asian Fairy Bluebird <i>Irena puella</i>	4	1	5
Ruby-throated Bulbul <i>Pycnonotus dispar</i>	3	38	41	Asian Pied Starling <i>Gracupica contra</i>	5		5
Small Minivet <i>Pericrocotus cinnamomeus</i>	25	13	38	Blue-and-white Flycatcher <i>Cyanoptila cyanomelana</i>	1	4	5
†* Common Hill Myna <i>Gracula religiosa religiosa</i>	19	18	37	Fire-tufted Barbet <i>Psilopogon pyrolophus</i>	2	3	5
Chestnut-backed Thrush <i>Geokichla dohertyi</i> NT	34	2	36	Lesser Coucal <i>Centropus bengalensis</i>	5		5
Chestnut-capped Babbler <i>Timalia pileata</i>	5	31	36	Little Pied Flycatcher <i>Ficedula westermanni</i>	1	4	5
Indigo Flycatcher <i>Eumyias indigo</i>		34	34	Northern Variable Pitohui <i>Pitohui kirhocephalus meyeri/kirhocephalus</i>	1	4	5
Black-naped Oriole <i>Oriolus chinensis broderipi</i>	12	20	32	Brown-cheeked Bulbul <i>Alphoixus bres</i>	1	3	4
Mountain Warbler <i>Phylloscopus trivirgatus</i>	20	12	32	†* Sunda Pied Fantail <i>Rhipidura javanica</i>	2	2	4
†* Common Iora <i>Aegithina tiphia</i>	7	23	30	Black-collared Starling <i>Sturnus nigricollis</i>		3	3
Flame-fronted Barbet <i>Psilopogon armillaris</i>	2	28	30	Collared Kingfisher <i>Todiramphus chloris</i>	3		3
Orange-bellied Flowerpecker <i>Dicaeum trigonostigma flaviclunis</i>	5	24	29	Common Green Magpie <i>Cissa chinensis minor</i>	2	1	3
Black-headed Bulbul <i>Pycnonotus atriceps</i>	14	12	26	Common Tailorbird <i>Orthotomus sutorius</i>		3	3
Pin-tailed Parrotfinch <i>Erythrura prasina prasina</i>	3	22	25	Fulvous-chested Jungle Flycatcher <i>Gynnis olivaceus</i>	3		3
Large Woodshrike <i>Tephrodornis virgatus virgatus</i>	5	18	23	Grey-cheeked Green Pigeon <i>Treron griseicauda</i>	3		3
Orange-headed Thrush <i>Geokichla citrina rubecula</i>	10	13	23				

Species	2017	2018	Grand total	Species	2017	2018	Grand total
Hair-crested Drongo <i>Dicrurus hottentottus jentinki</i>		3	3	Black-winged Flycatcher Shrike <i>Hemipus hirundinaceus</i>	1		1
Hill Blue-flycatcher <i>Cyornis banyumas banyumas</i>	1	2	3	Brown Oriole <i>Oriolus szalayi</i>		1	1
Javan Whistling Thrush <i>Myophonus glaucinus</i>		3	3	Brush Cuckoo <i>Cacomantis variolosus sepulcralis</i>		1	1
† Mangrove Whistler <i>Pachycephala cinerea</i>		3	3	† Cattle Egret <i>Bubulcus ibis</i>	1		1
Olive-winged Bulbul <i>Pycnonotus plumosus plumosus</i>		3	3	Chestnut-fronted Shrike Babbler <i>Pteruthius aenobarbus aenobarbus</i>	1		1
Scarlet-backed Flowerpecker <i>Dicaeum cruentatum</i>	3		3	Chinese Hwamei <i>Garrulax canorus</i>		1	1
Striated Grassbird <i>Megalurus palustris palustris</i>		3	3	Coppersmith Barbet <i>Psilopogon haemacephalus roseus</i>	1		1
Sumatran Treepie <i>Dendrocitta occipitalis</i>	3		3	†* Crested Myna <i>Acridotheres cristatellus</i>		1	1
* Sunda Minivet <i>Pericrocotus miniatus</i>		3	3	Crested White-eye <i>Heleia dohertyi</i>		1	1
* Tawny-breasted Parrotfinch <i>Erythrura hyperythra</i>	3		3	European Goldfinch <i>Carduelis carduelis</i> NT		1	1
Baya Weaver <i>Ploceus philippinus</i>	2		2	Grey-cheeked Bulbul <i>Alophoixus tephrogenys tephrogenys</i>	1		1
Black Butcherbird <i>Melloria quoyi quoyi</i>	1	1	2	Javan Cuckooshrike <i>Coracina javensis</i>		1	1
Black Laughingthrush <i>Garrulax lugubris</i>	1	1	2	Jonquil Parrot <i>Aprosmictus jonquillaceus</i>	1		1
† Brown-throated Sunbird <i>Anthreptes malacensis</i>	1	1	2	Little Cuckoo Dove <i>Macropygia ruficeps ruficeps</i>	1		1
† Copper-throated Sunbird <i>Leptocoma calcostetha</i>		2	2	† Maroon-bellied Sunbird <i>Leptocoma brasiliana</i>	1		1
Crested Jay <i>Platylophus galericulatus galericulatus</i>		2	2	Ochraceous Bulbul <i>Alophoixus ochraceus sumatranus</i> NT	1		1
Dark-throated Oriole <i>Oriolus xanthonotus</i>		2	2	Olive-headed Lorikeet <i>Trichoglossus euteles</i>		1	1
Freckle-breasted Woodpecker <i>Dendrocopos analis</i>		2	2	Orange-breasted Trogon <i>Harpactes oreskios oreskios</i>		1	1
* Greater Coucal <i>Centropus sinensis</i> NT	1	1	2	Oriental Bay Owl <i>Phodilus badius</i>	1		1
Island Thrush <i>Turdus poliocephalus whiteheadi</i>		2	2	* Pale Blue Flycatcher <i>Cyornis unicolor</i>		1	1
Lineated Barbet <i>Psilopogon lineatus</i> EN	1	1	2	Pallas's Grasshopper Warbler <i>Locustella certhiola</i> NT	1		1
* Red Lory <i>Eos bornea</i>		2	2	* Piping Crow <i>Corvus typicus</i>		1	1
Scaly-crowned Babbler <i>Malacopteron cinereum ruffrons</i> NT		2	2	Plaintive Cuckoo <i>Cacomantis merulinus</i>	1		1
* Sumatran Mesia <i>Leiothrix laurinae rookmakeri</i>		2	2	Red-billed Leiothrix <i>Leiothrix lutea</i>	1		1
† Sunda Forktail <i>Enicurus velatus</i>		2	2	Red-billed Malkoha <i>Zanclus tomus javanicus</i>	1		1
* White-bellied Fantail <i>Rhipidura euryura</i>		2	2	† Ruby-cheeked Sunbird <i>Chalcoparia singalensis</i>		1	1
† White-crowned Forktail <i>Enicurus leschenaulti leschenaulti</i>		2	2	Ruddy Cuckoo Dove <i>Macropygia emiliana emiliana</i>	1		1
†* Southern White-necked Myna <i>Streptocitta albigollis</i>		2	2	Scarlet-headed Flowerpecker <i>Dicaeum trochileum</i>		1	1
White-throated Fantail <i>Rhipidura albigollis</i>		2	2	† Sumatran Bulbul <i>Ixos sumatranus</i>	1		1
Asian Glossy Starling <i>Aplonis panayensis</i>	1		1	Sumatran Drongo <i>Dicrurus sumatranus</i>	1		1
Western Koel <i>Eudynamis scolopaceus</i>		1	1	* Timor Figbird <i>Sphecotheres viridis</i> NT	1		1
Barred Cuckoo Dove <i>Macropygia unchall</i> NT		1	1	White-breasted Babbler <i>Stachyris grammiceps</i> VU		1	1
Black Cuckoo Dove <i>Turacoena modesta</i>		1	1	White-breasted Woodswallow <i>Artamus leucoryn</i>		1	1
Black Drongo <i>Dicrurus macrocerus</i>		1	1	†* White-faced Partridge <i>Arborophila orientalis</i>		1	1
†* Black-backed Fruit Dove <i>Ptilinopus cinctus</i>		1	1	<b>Total</b>	<b>5,228</b>	<b>7,258</b>	<b>12,486</b>
Black-banded Barbet <i>Psilopogon javensis</i>	1		1				

## Appendix 2.

Geographical origins of all the native birds observed in the surveys. Subspecies are allocated to region.

Range in Indonesia	Number of birds in 2017	Number of species in 2017	Number of birds in 2018	Number of species in 2018	Range in Indonesia	Number of birds in 2017	Number of species in 2017	Number of birds in 2018	Number of species in 2018
Sumatra, Java, Kalimantan, Bali, Lesser Sundas, Sulawesi, Maluku, Papua	14	4			Java, Kalimantan, Bali, Lesser Sundas, Sulawesi, Maluku	6	1	207	1
Sumatra, Java, Kalimantan, Bali, Lesser Sundas, Sulawesi, Maluku	12	3	18	2	Java, Kalimantan, Bali, Lesser Sundas, Sulawesi	3	1		
Sumatra, Java, Kalimantan, Bali, Lesser Sundas, Sulawesi	1	1	1	1	Java, Kalimantan, Bali, Lesser Sundas	706	2	2,972	2
Sumatra, Java, Kalimantan, Bali, Lesser Sundas	531	11	408	15	Java, Kalimantan	5	1	4	1
Sumatra, Java, Kalimantan, Bali, Sulawesi	1	1			Java, Bali, Lesser Sundas, Sulawesi	88	2	101	3
Sumatra, Java, Kalimantan, Bali	162	10	128	8	Java, Bali, Lesser Sundas	57	3	155	5
Sumatra, Java, Kalimantan, Sulawesi	1	1			Java, Bali, Sulawesi	3	1		
Sumatra, Java, Kalimantan	91	7	90	7	Java, Bali	2,016	24	1,250	28
Sumatra, Java, Bali, Lesser Sundas, Sulawesi, Maluku	1	1	126	1	Java	147	12	164	18
Sumatra, Java, Bali, Lesser Sundas			18	1	Bali, Lesser Sundas	139	1	35	2
Sumatra, Java, Bali	738	8	488	8	Lesser Sundas, Maluku			45	1
Sumatra, Java	91	2	63	3	Lesser Sundas	121	8	492	9
Sumatra, Kalimantan	34	3	53	5	Sulawesi	8	2	12	5
Sumatra	199	11	119	6	Maluku, Papua	8	1	2	1
					Maluku	5	1	7	2
					Papua	2	2	6	4
					<b>Totals</b>	<b>5,189</b>	<b>125</b>	<b>6,964</b>	<b>139</b>