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In the market for extinction: birds for sale at selected outlets in Sumatra

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INTRODUCTION

Indonesia has long been recognised as the largest consumer of cage birds in South-east Asia, with bird markets in virtually all major towns and cities selling both legally and illegally obtained species (Nash, 1993; Shepherd *et al.*, 2004). Recent reports of the trade have largely focused on bird markets in major cities on the island of Java (e.g. Profauna, 2009; Chng *et al.*, 2015; Chng and Eaton, 2016; Chng *et al.*, 2016) and studies carried out on Sumatra largely focused on the bird markets in Medan, the largest city on Sumatra and the capital of North Sumatra province (see Nash, 1993; Shepherd, 2006; Harris *et al.*, 2015).

Much of the trade observed in the markets of Medan and recorded in these earlier reports consisted of birds native to Sumatra and locally-caught, and also indicated substantial levels of trade between markets in Sumatra and Java. Species endemic to Sumatra, such as the Sumatran Laughingthrush *Garrulax bicolor* are regularly found in Javanese markets (Shepherd, 2007; Chng *et al.*, 2015; Chng and Eaton, 2016; Shepherd *et al.*, 2016) and, conversely, the Javan endemic Rufous-fronted Laughingthrush *G. rufifrons* has been observed in the bird markets of Medan, in North Sumatra (Shepherd, 2010), as have other Indonesian endemics from islands other than Sumatra (Shepherd *et al.*, 2004).

Having documented the extent of trade through market inventories in Bandung, Jakarta, Malang, Medan, Surabaya and Yogyakarta (Shepherd *et al.*, 2004; Chng *et al.*, 2015; Chng and Eaton, 2016; Chng *et al.*, 2016), the authors here examine bird markets in four major Sumatran cities to obtain a better grasp of the current levels of trade, species composition and legality, and the extent of the trade between Sumatra and Java.

▲ **Sumatran Laughingthrush *Garrulax bicolor*.** The species has been identified as being in need of immediate conservation action, and is classified as Endangered. One specimen was recorded for sale at Pekanbaru during the survey period.

METHODS

Between 9 and 12 February 2017, TRAFFIC surveyors carried out inventories of markets and retail outlets selling birds in Jambi, Medan, Palembang and Pekanbaru—four major cities in Sumatra that are known to be substantial centres of the bird trade. It should be noted that these surveys provide a snapshot in a particular point in time, and the composition of birds in the markets and stalls may vary. For example, in Palembang, the mobile market apparently consists of 20–30 temporary stalls but was found to be open only on weekends, and as the surveyors were there on a weekday, only two permanent shops were selling birds. The record for Palembang therefore was not complete. Nonetheless, the results are included here to provide information on the species and volumes available in these two shops during the survey period.

Individuals of every species of wild bird were counted. Where possible, individuals were recorded to subspecies level. Domesticated birds, defined as those that show a significant proportion of non-natural characteristics achieved through selective breeding, either with colour pigmentations differing from wild specimens or hybridization with other species, were not included in the inventory. Examples included canaries *Serinus* spp., lovebirds *Agapornis* spp., Budgerigars *Melopsittacus undulatus* and colour mutations of Java Sparrows *Lonchura oryzivora*. The surveyors only counted wildlife openly displayed. Price data were obtained opportunistically when it was possible to engage with dealers in an informal manner, or in some instances, by observing openly advertised prices. Additional information, such as the source and origin of birds, was also opportunistically solicited from dealers. An exchange rate of USD1=IDR13,300 was used (February 2017 historical rate, XE Currency). Bird names and taxonomy follow BirdLife International/IUCN (which follow del Hoyo *et al.*, 2018).



Fig. 1.
No. of species, birds and stalls recorded in each of the survey locations in Sumatra.

*Temporary stalls were not present/open during the survey period.

LEGISLATION

Under Indonesian legislation (*Act of the Republic of Indonesia No. 5 of 1990 concerning Conservation of Living Resources and their Ecosystems; Government Regulation No. 8, 1999, concerning the utilization of wild plants and animal species; Government Regulation No. 7, 1999, concerning the Preservation of Flora and Fauna*), protected species are not allowed to be harvested, traded or possessed. Only non-protected native wildlife may be collected and traded for which province-specific annual quotas are set by the Indonesian Directorate General of Conservation of Natural Resources and Ecosystem (KSDAE). The trade in wild-caught birds that do not have harvest quotas or have zero quotas—whether the species is listed as protected or not—is considered to be an administrative violation of ministerial regulation and policies. Under the 2016 quota (KSDAE, 2015), all bird species with allocated harvest quotas are for export only, which means domestic trade is technically not allowed. The movement of birds between provinces is also illegal if the birds are protected or illegally sourced, and permits issued by the provincial wildlife authority (BKSDA) are required to move birds across provincial borders. Species of birds not native to Indonesia are not effectively regulated under current legislation. The list of species that are protected has not been updated since 1997. Indonesia initiated a process to revise its legislation to update this list and to include species not native to Indonesia; this process is ongoing.

RESULTS AND OBSERVATIONS

A total of 7,279 birds of 130 species were recorded from the four cities, with the most birds recorded in Medan (79% of all birds) (Fig. 1).

Composition of birds in trade

Of all birds observed in trade, the Black-winged Myna *Acridotheres melanopterus* (one individual) and Javan Pied Starling *Gracupica jalla* (30) are assessed as Critically Endangered on the IUCN Red List of Threatened Species (IUCN, 2017); both are thus also priority species under the Asian Species Action Partnership (ASAP) established to address the extinction risk among the most threatened land and freshwater vertebrates of South-east Asia. A further three Endangered species (Java Sparrow *Padda oryzivora*, Straw-headed Bulbul *Pycnonotus zeylanicus* and Sumatran Laughingthrush *Garrulax bicolor*) and four species listed as Vulnerable (Javan Myna *Acridotheres javanicus*, Greater Green Leafbird *Chloropsis sonnerati*, Sumatran Leafbird *Chloropsis media* and Chattering Lory *Lorius garrulus*) were recorded.

The most numerous species overall was the Scaly-breasted Munia *Lonchura punctulata*, accounting for over half of the birds counted (3,222 individuals), followed by the White-headed Munia *Lonchura maja* (941) and the Yellow-vented Bulbul *Pycnonotus goiavier* (509). However, there was significant variation in species for sale between the different cities (see Discussion).

Almost all the birds recorded were native to Indonesia (7,231 individuals of 122 species, or 99.5%). Of these, 491 birds of 20 species were endemic to Indonesia, with a further 191 birds of 15 species belonging to subspecies that were endemic to Indonesia. A total of 6,555 birds of 104 species were native to Sumatra, and of these, 142 birds of 17 species were endemic to Sumatra. Of the Indonesian native species, 169 birds of six species were migrants (i.e. do not breed in Indonesia). Most of these consisted of Daurian Starlings *Agropsar sturninus*, which gather in flocks, often in and around cities, and can be easily trapped and traded in large numbers.

Protection status of native birds in trade

A total of 50 birds from 12 species listed as protected under Indonesian law were observed. Referencing the 2016 quotas, 12 of the species recorded have a zero harvest quota across the country, three have no harvest allocation from any Sumatran province, and 76 are not listed in the 2016 quotas (KSDAE, 2015; Table 1). Individuals of five species observed in this survey exceed the 2016 national harvest quotas. In other words, only 1,109 birds (15% of native birds) of 15 species were possibly legally harvested under the quota system. However, as all bird species with allocated harvest quotas are intended for export only, their sale still violates ministerial regulation.

Most of the protected birds observed are believed to be sourced from the wild, as sunbirds, pittas, Black-winged Kite *Elanus caeruleus* and Malayan Pied Fantail *Rhipidura javanica* are not known to be commercially bred. Many of the Asian Pied Starlings *Gracupica contra* and endemic Javan Pied Starlings were said to be sourced from breeders in Klaten, in Central Java. The single Black-winged Myna seen was reportedly bought from a trader in Bali, and the seller did not know if it was captive-bred or not. While Common Hill Mynas *Gracula religiosa* can be bred in captivity, there were no closed leg rings observed on any of the birds, and some specimens were in poor condition with frayed feathers and visible wounds, suggesting that they were trapped from the wild. One of the Common Hill Mynas was reportedly from Mentawai Islands, off the west coast of Sumatra, where there are high levels of endemic species and subspecies, but this could not be verified. It is possible that the trader said this to increase the value of the bird, as the Mentawai birds are larger, rarer and said to be better singers.

Twenty-two species from the list of 28 priority species identified in the *Conservation Strategy for Southeast Asian Songbirds in Trade* (Lee *et al.*, 2016) were recorded during this study (Table 1). This included six species (a total of 36 individuals) identified as in need of immediate conservation action (Black-winged Myna, Javan Pied Starling, Common Hill Myna, Straw-headed Bulbul, Java Sparrow and Sumatran Laughingthrush).

Price data

Price information was obtained for 28 species, ranging from IDR3000 (USD0.23) for a Scaly-breasted Munia,

to IDR12 million (USD902) for a Straw-headed Bulbul. The most expensive individual birds where prices were obtained were Straw-headed Buleuls (one going for USD902 and two for USD752 each). Some species, particularly birds used in singing competitions, were offered for a wide range of prices, with the value dependent on its singing abilities. For instance, White-rumped Shamas *Kittacincla malabarica tricolor* were offered for USD38 up to USD263.

DISCUSSION

Sumatra—main source for Indonesian bird trade?

Observations indicate that there is a significant amount of trapping (much of it illegal) of local birds to supply Indonesia's thriving bird markets, both within Sumatra, as well as movement of birds from Sumatra to Java. When asked about the source of the birds, several traders said that the birds were acquired from forests in West Sumatra, North Sumatra and Aceh. This was corroborated by a local bird guide, who shared that trapping was rife in Aceh's forests, and that encounters with Sumatran Laughingthrush in the wild had drastically declined in recent years. One trader in Jambi, who was offering Sumatran native bird species for sale, also apologised for how few birds were available in the shop, explaining that they had sent 600 birds the day before to Java.

Taking into account the incomplete inventory in Palembang, there was an unexpected lack of high-value species present in the markets, especially of species largely restricted to Sumatra. This indicates that such high-value species are likely transported to other parts of Indonesia, particularly Java, where there is greater demand and the birds fetch higher prices. For example, only one Sumatran Laughingthrush, a sought-after species seen with regularity in trade in Java (Shepherd *et al.*, 2016) was recorded from Pekanbaru in this study; by contrast, inventories carried out by the authors in Java found at least 89 individuals for sale in four out of five Javan cities surveyed (Bandung, Jakarta, Surabayaya and Yogyakarta). Furthermore, a number of the 57 Straw-headed Buleuls recorded in Java were said to be sourced from "Lampung" (thought to refer to the general area of southern Sumatra rather than the actual province of Lampung) (Bergin *et al.*, 2017), yet in this survey only three individuals were recorded.

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SEVERAL TRADERS SAID THAT THE BIRDS WERE ACQUIRED FROM FORESTS IN WEST SUMATRA, NORTH SUMATRA AND ACEH, A FACT CORROBORATED BY A LOCAL BIRD GUIDE, WHO STATED THAT TRAPPING WAS RIFE IN ACEH'S FORESTS.

JAVA SPARROWS *Padda oryzivora*



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SHORT REPORT

Species	Scientific name	Jambi	Medan	Palembang	Pekanbaru	Total	◇2016 National Harvest Quota
Scaly-breasted Munia	<i>Lonchura punctulata</i>		3213	9		3222	100
White-headed Munia	<i>Lonchura maja</i>		941			941	100
Yellow-vented Bulbul	<i>Pycnonotus goiavier analis</i>	46	445	8	10	509	600
Zebra Dove	<i>Geopelia striata</i>	67	288	30	6	391	100
Sooty-headed Bulbul	<i>Pycnonotus aurigaster</i>	48	177	48	7	280	1460
* Javan Myna	<i>Acridotheres javanicus</i>	46	106		104	256	180
Baya Weaver	<i>Ploceus philippinus</i>	8	216			224	NL
* Oriental White-eye	<i>Zosterops palpebrosus melanurus/buxtoni</i>		6		183	189	NL
Daurian Starling	<i>Agropsar sturninus</i>		36	122	1	159	NL
Cinereous Tit	<i>Parus cinereus</i>		2		92	94	NL
* Oriental Magpie-robin	<i>Copsychus saularis muticus/pluto</i>	10	5		67	82	150
Spotted Dove	<i>Streptopelia chinensis tigrina</i>	8	59		6	73	50
Bar-winged Prinia	<i>Prinia familiaris</i>	13	3		56	72	NL
Blue-crowned Hanging-parrot	<i>Loriculus galgulus</i>	1	1		56	58	NL
Asian Glossy Starling	<i>Aplonis panayensis strigata</i>	7	42		1	50	50
Common Myna	<i>Acridotheres tristis</i>		41		1	42	500
* Ruby-throated Bulbul	<i>Pycnonotus dispar</i>		5	1	34	40	NL
Finch-billed Myna	<i>Scissirostrum dubium</i>		3	1	33	37	50
Blue-winged Leafbird	<i>Chloropsis moluccensis</i>	2	2	3	22	29	80
Asian Pied Starling	<i>Gracupica contra</i>		13		15	28	NA
* Greater Green Leafbird	<i>Chloropsis sonnerati sonnerati/zosterops</i>	2	6		17	25	95
Ochraceous Bulbul	<i>Alophoixus ochraceus sumatranus</i>		2		22	24	NL
Lesser Green Leafbird	<i>Chloropsis cyanopogon</i>		1	3	20	24	50
* Common Hill Myna	<i>Gracula religiosa religiosa</i>	1	7		13	21	0
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>		19			19	NL
Sumatran Bulbul	<i>Ixos sumatranus</i>		1	5	13	19	NL
Chestnut-capped Laughingthrush	<i>Garrulax mitratus</i>	2	5	2	10	19	0
Red Lory	<i>Eos bornea</i>		18			18	0
* White-rumped Shama	<i>Kittacincla malabarica tricolor</i>	7	3		6	16	160
Blue-masked Leafbird	<i>Chloropsis venusta</i>		1		14	15	NL
Long-tailed Sibia	<i>Heterophasia picaoides</i>		3	2	10	15	0
Chestnut Munia	<i>Lonchura atricapilla</i>	1	7	4		12	NL
Scarlet Minivet	<i>Pericrocotus flammeus siebirs/xanthogaster</i>		2		9	11	NL
Coconut Lorikeet	<i>Trichoglossus haematodus haematodus</i>		10			10	0
Black-capped White-eye	<i>Zosterops atricapilla</i>				8	8	NL
* Java Sparrow	<i>Padda oryzivora</i>	5	3			8	250 ^A
Black-headed Bulbul	<i>Pycnonotus atriceps atriceps</i>	1	5		2	8	250
Olive-winged Bulbul	<i>Pycnonotus plumosus</i>	3			4	7	NL
Common Flameback	<i>Dinopium javanense</i>	7				7	NL
Orange-bellied Flowerpecker	<i>Dicaeum trigonostigma flaviclunis</i>				7	7	NL
* Asian Fairy Bluebird	<i>Irena puella criniger/alturcosa</i>		4		2	6	50 ^A
Olive-backed Sunbird	<i>Cinnyris jugularis</i>				6	6	#
Grey-capped Emerald Dove	<i>Chalcophaps indica</i>	2	1		3	6	100 ^A
Common Iora	<i>Aegithina tiphia scapularis</i>	4			2	6	NL
Streaked Bulbul	<i>Ixos malaccensis</i>		1		5	6	NL
* Long-tailed Shrike	<i>Lanius schach bentet</i>	4			2	6	0
Brown-throated Sunbird	<i>Anthreptes malacensis</i>	4			1	5	#
* Sumatran Leafbird	<i>Chloropsis media</i>		3		2	5	NL
Maroon-bellied Sunbird	<i>Leptocoma brasiliana</i>	1			4	5	#
* Grey-cheeked Bulbul	<i>Alophoixus tephrogenys</i>		3		2	5	50 ^A
* Sunda Laughingthrush	<i>Garrulax palliatus palliatus</i>	3	2			5	NL
Blue-rumped Parrot	<i>Psittinus cyanurus</i>				5	5	NL
* Orange-spotted Bulbul	<i>Pycnonotus b. bimaculatus/tenggerensis</i>	3		2		5	NL
Chattering Lory	<i>Lorius garrulus garrulus/flavopalliatus</i>		4			4	NL
Sunda Pygmy-Woodpecker	<i>Picoides moluccensis</i>	1	2		1	4	NL
Crimson Sunbird	<i>Aethopyga siparaja heliogona</i>				4	4	#
Yellow-bellied Prinia	<i>Prinia flaviventris rafflesi</i>		3			3	NL
Ashy Drongo	<i>Dicrurus leucophaeus leucophaeus</i>		1		2	3	NL
Grey-bellied Bulbul	<i>Pycnonotus cyaniventris</i>				3	3	NL
Chestnut-backed Scimitar Babbler	<i>Pomatorhinus montanus montanus</i>			1	2	3	0
Velvet-fronted Nuthatch	<i>Sitta frontalis</i>		2		1	3	NL
Large-billed Crow	<i>Corvus macrorhynchos macrorhynchos</i>	2	1			3	NL
Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	1			2	3	NL
Mugimaki Flycatcher	<i>Ficedula mugimaki</i>		1		2	3	NL
Scaly-breasted Bulbul	<i>Pycnonotus squamatus</i>				3	3	NL
Straw-headed Bulbul	<i>Pycnonotus zeylanicus</i>		3			3	NL
* Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>		3			3	NL

Table 1. Species observed in four major cities in Sumatra between 9 and 12 February 2017 (continued overleaf).


Species	Scientific name					Total	◇2016 National Harvest Quota
		Jambi	Medan	Palembang	Pekanbaru		
Black-naped Oriole	<i>Oriolus chinensis eroderipe/maculatus</i>	1	1			2	85
Sumatran Treepie	<i>Dendrocitta occipitalis</i>		2			2	NL
Hairy-backed Bulbul	<i>Tricholestes criniger</i>				2	2	NL
Blue-winged Pitta	<i>Pitta moluccensis</i>		2			2	#
Thick-billed Green Pigeon	<i>Treron curvirostra</i>		2			2	50
* Orange-headed Thrush	<i>Geokichla citrina</i>		2			2	0
Greater Coucal	<i>Centropus sinensis</i>		2			2	NL
* Buff-vented Bulbul	<i>Iole charlottae</i>				2	2	NL
Ashy Tailorbird	<i>Orthotomus ruficeps</i>				2	2	NL
Pin-tailed Parrotfinch	<i>Erythrura prasina</i>		2			2	100
* Javan Pied Starling	<i>Gracupica jalla</i>	1			1	2	0
Fire-tufted Barbet	<i>Psilopogon pyrolophus</i>		2			2	0
Golden-breasted Starling	<i>Lamprolaima regius</i>		2			2	NA
Red-throated Sunbird	<i>Antheptes rhodolaemus</i>				2	2	#
Yellow-rumped Flycatcher	<i>Ficedula zanthopygia</i>	1			1	2	NL
Grey-throated Babbler	<i>Stachyris nigriceps</i>				2	2	NL
Brown-cheeked Bulbul	<i>Alophoixus bres</i>		2			2	NL
Rufous-tailed Tailorbird	<i>Orthotomus sericeus</i>	1			1	2	NL
Black-and-crimson Oriole	<i>Oriolus cruentus</i>		1		1	2	NL
Coppersmith Barbet	<i>Psilopogon haemacephalus</i>				1	1	NL
Banded Bay Cuckoo	<i>Cacomantis sonneratii</i>	1				1	NL
Red-billed Leiothrix	<i>Leiothrix lutea</i>				1	1	NA
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>		1			1	NA
Yellow-bellied Bulbul	<i>Alophoixus phaeocephalus</i>				1	1	NL
Chinese Paradise-flycatcher	<i>Tersiphone incei</i>				1	1	NL
Crested Jay	<i>Platylophus galericulatus coronatus</i>				1	1	50
Eyebrowed Thrush	<i>Turdus obscurus</i>				1	1	NL
Puff-backed Bulbul	<i>Microtarsus eutilotus</i>				1	1	NL
Rufous Woodpecker	<i>Micropternus brachyurus</i>	1				1	NL
Barn Owl	<i>Tyto alba javanensis</i>		1			1	0
* Black-winged Myna	<i>Acridotheres m. melanopterus/tertius</i>	1				1	NL
Red Junglefowl	<i>Gallus gallus</i>	1				1	NL
Oriental Dollarbird	<i>Eurystomus orientalis</i>	1				1	NL
Eurasian Siskin	<i>Spinus spinus</i>		1			1	NA
* Chestnut-backed Thrush	<i>Geokichla dohertyi</i>		1			1	NL
Sumatran Flowerpecker	<i>Dicaeum beccarii</i>				1	1	NL
Black-browed Barbet	<i>Psilopogon oorti</i>		1			1	NL
Rufous-vented Flycatcher	<i>Eumyias ruficrissa</i>			1		1	NL
Siberian Thrush	<i>Zoothera sibirica</i>				1	1	NL
White-bibbed Babbler	<i>Stachyris thoracica</i>		1			1	NL
* Chestnut-capped Thrush	<i>Geokichla interpres</i>		1			1	0
White-crowned Forktail	<i>Enicurus leschenaulti</i>				1	1	NL
Black-throated Laughingthrush	<i>Garrulax chinensis</i>		1			1	NA
Green Broadbill	<i>Calyptomena viridis</i>	1				1	NL
Western Hooded Pitta	<i>Pitta sordida mulleri/cucullata</i>				1	1	#
Lesser Coucal	<i>Centropus bengalensis</i>	1				1	NL
Oriental Skylark	<i>Alauda gulgula</i>		1			1	NA
Black-shouldered Kite	<i>Elanus caeruleus</i>	1				1	#
Cinereous Bulbul	<i>Hemixos cinereus cinereus</i>				1	1	NL
Cream-vented Bulbul	<i>Pycnonotus simplex</i>		1			1	NL
* Sumatran Laughingthrush	<i>Garrulax bicolor</i>				1	1	NL
Plain Prinia	<i>Prinia inornata blythi</i>		1			1	NL
Asian Golden Weaver	<i>Ploceus hypoxanthus</i>				1	1	NL
Black-and-white Bulbul	<i>Microtarsus melanoleucos</i>				1	1	NL
Brown Prinia	<i>Prinia polychroa polychroa</i>	1				1	NL
Crested Myna	<i>Acridotheres cristatellus</i>		1			1	NA
Pin-striped Tit-babbler	<i>Mixornis gularis</i>				1	1	NL
Blossom-headed Parakeet	<i>Psittacula roseata</i>		1			1	NA
Sunda Scops-owl	<i>Otus lempiji</i>	1				1	NL
Orange-bellied Leafbird	<i>Chloropsis hardwickii</i>		1			1	NA
Brown Shrike	<i>Lanius cristatus</i>		1			1	NL
Spot-necked Bulbul	<i>Alcurus tympanistrigus</i>				1	1	NL
Malayan Pied Fantail	<i>Rhipidura javanica</i>				1	1	#
Chestnut-rumped Babbler	<i>Stachyris maculata</i>				1	1	NL
Ruby-cheeked Sunbird	<i>Chalcoparia singalensis</i>				1	1	#
TOTAL		323	5768	242	936	7269	

Table 1 continued. Species observed in four major cities in Sumatra between 9 and 12 February 2017.

#Protected under Indonesian law; *Priority species for Conservation Strategy for Southeast Asian Songbirds in Trade; ^Quota for non-Sumatran provinces only; NA: non-native species, not covered under current Indonesian quota system; NL: no quotas listed, technically harvest is not permitted; ◇Under the 2016 quota all bird species with allocated harvest quotas are for export only, which means domestic trade is technically not allowed.



SEK JUN-YAN



The most common bird encountered during the survey was the Scaly-breasted Munia *Lonchura punctulata*, accounting for over half the birds recorded.

Shepherd *et al.* (2004) reported that dealers openly discussed sending illegal shipments from Medan to markets in Jakarta. These discussions on the movement of birds from Sumatra to Java, including a high frequency of smuggling, are corroborated by observations of Sumatran endemic birds regularly available in Javan markets, and by dealers in those markets who openly inform visitors and potential buyers that they source birds from Medan and other localities in Sumatra (Chng *et al.*, 2015; Chng and Eaton, 2016; Chng *et al.*, 2016). Further illustrating this inter-island domestic trade, shipments of birds from Sumatra have been intercepted by authorities in recent years en route to Java. For instance, in November 2016 wildlife authorities in Lampung, southern Sumatra, seized hundreds of birds destined for Jakarta (Sutomo, 2016), and yet more shipments of wildlife were intercepted on public buses heading towards Java in September 2016 (Safutra, 2016). Much of this movement across provinces and islands is illegal as the birds lack the accompanying transport permits required.

Sumatra—consumer base for live birds?

Despite the lower volume of birds observed for sale compared with Javan markets, the level of trade in Sumatran markets is considered significant. That more than 7,000 birds were openly displayed in the four cities surveyed within a four-day period indicates a market for local buyers; if the birds were only intended for transport to other demand centres, they would not be displayed.

The highest number of birds observed in these four Sumatran cities was in Medan, with a total of 5,768 birds observed. This is of concern, as it is substantially more than was observed during regular surveys (n=59) carried out between 1997 and 2001, when the average number per survey was 3,549 birds (Shepherd *et al.*, 2004). As in the previous study, munias dominated the species composition here; a total of 99.8% of munias were observed in Medan, where they are sold primarily for merit release to Medan's large Chinese population, with a small proportion destined for the songbird or cage bird trade. The number of shops in Jalan Bintang—the main live animal market street in Medan—dropped from 32 in the late 1990s to 12 in 2008, reportedly because of the impact of avian influenza-related restrictions on the bird trade at that time (Shepherd, 2010). Only four shops were operating there during this survey. Attention drawn to illegal wildlife trade in Medan over the years has appeared to make traders wary, yet protected species were still openly displayed for sale.

In Pekanbaru, birds for sale were recorded in a permanent market with 22 shops. Despite relatively low volumes compared to Medan, it had the largest range of species, including birds from Sulawesi. The bird shops in Jambi were scattered around the city, and at least one of them, whose owner reported sending birds to Java, was functioning as a distributor in addition to selling from the shop. One of the biggest differences between Medan and these two cities is that no Scaly-breasted Munias were recorded; instead the most numerous bird species was the Oriental White-eye *Zosterops palpebrosus* in Pekanbaru (183) and Zebra Dove *Geopelia striata* in Jambi (67 individuals), both species commonly used in bird singing competitions.

Although this survey recorded a small numbers of birds not native to Sumatra, seizure cases of non-Sumatran species shows a demand for them here. For instance, in March 2017 a man was arrested carrying wildlife, including birds endemic to Maluku and Papua, from Jakarta to Pangkal Pinang, an island off the east coast of Sumatra (Siregar, 2017). More recently, two incidents of birds being smuggled from Peninsular Malaysia to Sumatra indicate cross-border trade to supply the demand for birds in Indonesia (Hadi, 2017; TRAFFIC, 2018).

The local demand for cage birds in Sumatra itself is recognised to be a threat to the conservation of many of these species. Burivalova *et al.* (2017) found that bird owners in Medan had a preference for wild-caught birds, with 84% of owners interviewed having at least one wild-caught bird. Some species of birds previously recorded in the markets in Sumatra, such as waders, waterfowl and pigeons were sold for meat, and others

for use in traditional medicines (Shepherd *et al.*, 2004). In this study only one Red Junglefowl *Gallus gallus*, six Grey-capped Emerald Doves *Chalcophaps indica* and two Thick-billed Green Pigeons *Treron curvirostris* that could be sold for meat were recorded. Little is known of the trade in birds for meat and medicine, and of the scale of the trade that takes place outside these markets.

CONCLUSIONS AND RECOMMENDATIONS

Sumatra is a source of birds, including high-value rare and endemic birds, for markets in Java, and for the local consumer base. Two decades of data show that nationally protected birds are still being offered for sale, in addition to their likely illegal export from Sumatra to other Indonesian provinces. This points to a serious need to improve regulation against illegal trade, and raise the awareness of local traders and consumers. The newly formed IUCN SSC Asian Songbird Trade Specialist Group is tasked with catalysing actions to prevent declines and to recover species of songbirds threatened by trade, and may be able to play a role in addressing these issues in Sumatra, for instance, through consolidated efforts to improve understanding of the trade threats facing birds, and to engage with stakeholders. There is an urgent need for the Indonesian government to enforce national legislation and quotas effectively. Without action, these markets will continue to trade birds into extinction (Eaton *et al.*, 2015).

Demand for birds as pets, for songbirds, for singing competitions and for merit release in Sumatra remains a driver behind the illegal harvest and trade and should be addressed. The authors recommend that wildlife authorities take strong and immediate action against traders found selling wild-caught birds, and against those found illegally transporting them to Java and other parts of the country. Improved vigilance along key smuggling routes between Sumatra and Java, particularly those regularly plied by public buses, is required to intercept illegal shipments of birds. Efforts to catalyse grassroots initiatives for improved in-situ protection of key habitats is recommended to curb poaching. Additionally, better understanding of local attitudes of the actors involved in the bird trade is required to guide demand reduction initiatives.

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POSTSCRIPT: Under the 2016 quota, all bird species with allocated harvest quotas can be exported (although authorities at a quota meeting in 2017 agreed verbally that the harvest quota should only be for domestic trade (Irham, M. *in litt.* December 2017)).