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*Research Article*

# A Brief Overview of the Online Bird Trade in Vietnam

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## ABSTRACT

Unsustainable commercial exploitation poses a serious threat to many of Vietnam's native bird species. Here we report on a survey of the country's online bird trade, conducted across four major online platforms. Between 9 March and 3 April 2020, a total of 434 posts were recorded, accounting for 834 individuals of at least 50 species, ten of which have not been recorded in Vietnamese trade before. Ninety-two percent of the recorded species were native to Vietnam and 18% (n=9) of the species, accounting for 15% (n=115) of the recorded individuals, are protected under Vietnamese law. Recorded prices ranged between VND16,667 (~US$0.7) and VND7 million (~US$303), depending on the species and on a bird's specific singing qualities. The highest trade numbers were found on Chợ Tốt (186 posts, 335 birds), followed by Facebook (161 posts, 325 birds), Chợ Vinh (82 posts, 169 birds) and Chim Cảnh Đất Việt (5 posts, 5 birds). The scale of the observed trade appears to confirm a partial shift towards online platforms in Vietnam's bird trade, or at least an increase in the use of online platforms to trade wild birds. In anticipation of a further development of this trend, we urge the Government of Vietnam to improve regulations and to take greater enforcement action against illegal online trading practices.

**Key words**: Asian songbird crisis, Bird conservation, Illegal wildlife trade, Social media, Songbird trade

## INTRODUCTION

The exploitation of birds for commercial trade is one of the greatest threats to an ever-increasing number of bird species across the globe (Eaton *et al*., 2015; de Oliveira 2020; Sykes, 2017). In Southeast Asia, wild birds are traded in astounding volumes (Brooks-Moizer *et al*., 2009; Chng, Shepherd & Eaton, 2018; Lee, Chng & Eaton, 2016), with much of this trade being illegal, unregulated and/or unsustainable (Eaton *et al*., 2015; Harris *et al*., 2017). Trapping for the cage bird trade, fuelled by deeply-rooted cultural practices involving the keeping of birds for their song, remarkable plumage and/or perceived rarity, has been identified as one of the major forces behind Southeast Asia's bird declines and extinctions in the 21st century (Capotosto & Shepherd, 2015; Eaton *et al*., 2015; Sykes, 2017) and has heavily contributed to what has been dubbed the 'Asian songbird crisis' (Marshall *et al*., 2019; Sykes, 2017). In recent years, experts from the fields of conservation and ornithology have made concerted efforts to address this crisis through multi-disciplinary research and evidence-based conservation efforts (Capostosto & Shepherd, 2015; Shepherd & Chng, 2017), culminating in a 2016 'Conservation Strategy for Southeast Asian Songbirds in Trade' (Lee *et al*., 2016) and the formation of an IUCN SSC Asian Songbird Trade Specialist Group (ASTSG) in 2017. Under the Conservation Strategy, which includes a list of priority species, the need for trade research to establish baseline knowledge and/or robust datasets to inform policy decisions and conservation interventions is acknowledged. Although considerable research into the trade has been carried out over the past few years, most of these studies have focused on Southeast Asia's principal bird trade hotspot Indonesia. For other Southeast Asian countries, baseline knowledge and structural bird trade monitoring efforts are still needed. Vietnam is a case in point. Much of the country's bird trade is reportedly shifting to online platforms (Eaton *et al*., 2017; Nguyen & Willemsen, 2016), yet our understanding of the scope and scale of this trade remains limited. This lack of data is an impediment to efforts to strengthen policy and regulation, and the design and prioritising of strategic conservation actions. Here we provide baseline knowledge of the country's online bird trade to facilitate further research and conservation interventions.

Numerous bird species are traded in Vietnam, including as cage birds (Eaton *et al*., 2017; Edmunds *et al*., 2011; Le & Craik, 2016). Domestic cage bird trade levels in Vietnam have fluctuated throughout the years, with Nash (1993) noting that most trade activity in the early 1990s focused on the international market. In the late 1990s and early 2000s, domestic trade was reportedly more prevalent (Craik, 1998; Morris, 2001), while the 2007 implementation of a trade ban on wild and ornamental birds in cities (Decree 69/2005/TT-BNN, later replaced by Circular 07/2016) following avian influenza H5N1 outbreaks saw trade levels fall again (Brooks-Moizer *et al*., 2009). More recent studies, conducted after the ban, found trade numbers to be increasing in various bird markets across the country (Eaton *et al*., 2017; Edmunds *et al*., 2011). Although Vietnam's cage bird trade has been shown to predominantly consist

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of native species, the country is known to be an important international wildlife trade hub (Cao Ngoc & Wyatt, 2013) and some foreign-sourced birds can be found in its markets.

The international trade in wild animals is regulated by the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES). Species covered under CITES are listed in one of three appendices, with Appendix I effectively prohibiting commercial international trade (with some exceptions) and Appendix II requiring export permits for cross-border transactions. An Appendix III species can be traded without an export permit if the exporting party has not included it in Appendix III, but a certificate of origin is required for all imports. At the time of our research, CITES implementation, as well as the protection of native wildlife in Vietnam, were laid down in *Decree No.06/2019/ND-CP On management of endangered, precious and rare species of forest fauna and flora and observation of convention on international trade in endangered species of wild fauna* (hereafter Decree 06) (effective from 10 March 2019). Parts of Decree 06 were later amended by *Decree 84 Amending certain provisions of Decree No.06/2019/ND-CP On management of endangered, precious and rare species of forest fauna and flora and observation of convention on international trade in endangered species of wild fauna* (hereafter Decree 84). In Decree 06 and Decree 84, species are classified according to threat level (Class I for species threatened with extinction and Class II for species that are not currently threatened with extinction but may become so without strict regulation of their exploitation). Within each class, a distinction is made between species of flora (group A) and species of fauna (group B). Class I species are banned from commercial exploitation and use, while Class II species require special permits to be traded. Penalties for administrative violations of the country's wildlife legislation are stipulated in *Decree 35/2019/ND-CP on Administrative Penalties in the field of forestry* (hereafter Decree 35), with maximum fines of VND500 million (~US$21,621) and VND1 billion (~US$43,241) for individuals and legal entities respectively. Criminal violations are stipulated in the *Penal Code 100/2015/QH13* (hereafter Penal Code 100) and *Law 12/2017/QH14 Amending and Supplementing articles in Penal Code No. 100/2015/QH13* (hereafter Law 12) and, for individuals, may lead to a maximum jail sentence of 15 years or a VND5 billion (~US$216,205) fine. Legal entities may be fined up to VND15 billion (~US$648,614) and could face suspensions of six months to three years. Additionally, since 1 January 2021, the commercial advertisement of wildlife is regulated under *Law on Investment No.61/2020/QH14 dated 17 June 2020*. Penalties under this law range between VND70 million (~US$3,027) and VND100 million (~US$4,324) for Class IB species and between VND1 million (~US$43) and VND1.5 (~US$65) million for Class IIB species.

Over the last decade, there has been a global rise in online wildlife trade (Di Minin *et al*., 2018; Harrison, Roberts & Hernandez-Castro, 2016; Lavorgna, 2014; Siriwat & Nijman, 2020), including trade in birds (Alves, Ribamar de Farias Lima & Araujo, 2013; Gunawan, Paridi & Noske, 2017; Iqbal, 2016; Martin, Senni & D'Cruze, 2018; Nijman, 2020). In Vietnam too, wildlife trade is increasingly conducted online (Indraswari *et al*., 2020a; Nguyen & Willemsen, 2016) and during a rapid assessment across eight different Vietnamese e-commerce websites in 2016, Nguyen & Willemsen (2016) found that 74% of the recorded advertisements offered live birds. Eaton *et al*. (2017) also noted that online bird trade was on the rise in Vietnam, stating that this form of trade poses a significant challenge to enforcement efforts. Nevertheless, published data on the subject remains scarce. In order to start closing this data gap, we report on a four-week survey conducted across four major Vietnamese online platforms.

## MATERIALS AND METHODS

Online surveys were conducted during a four-week period from 9 March to 3 April 2020. Surveyed platforms were selected through a general Google search, using a variety of search terms in the Vietnamese language relevant to bird trade (Table 1). Several specific species names were included based on their known popularity in the Vietnamese bird trade. Four online platforms on which bird trade was found to take place were then selected; Facebook (www.facebook.com; social media platform), Chợ Tốt (www.chotot.com; E-commerce website), Chim Cảnh Đất Việt (www.chimcanhviet.vn; online bird forum) and Chợ Vinh (www.chovinh.com; online bird forum). The same search terms that were used to select the four websites were subsequently used to manually search for relevant posts on each of these platforms. Survey effort encompassed one hour of searching each day for five days a week throughout the research period, accounting for a total of 20 survey hours. Surveying time was divided across the different platforms based on encountered trade activity (Table 2). Most time was spent surveying Facebook (10 days), followed by Chợ Tốt (6 days) and Chợ Vinh (4 days). Trade activity was found to be so low on Chim Cảnh Đất Việt that only one day was spent surveying that platform. Through backtracking (the collection of data from posts that were posted before the first day of our

**Table 1.** Search terms used to select platforms and to search for relevant posts.

| Vietnamese search terms | English (translation) |
|---|---|
| Chim | Bird |
| Bán chim | Sell bird |
| Mua bán chim | Buy-sell bird |
| Chim cảnh | Pet bird |
| Sưu tầm chim | Collect bird |
| Chim hót | Songbird |
| Vẹt | Parrot |
| Cú | Owl |
| Chim di | Munia |
| Chim khuyên | White-eye |
| Chào mào | Bulbul |
| Chim cu | Dove |
| Chim sẻ | Sparrow |
| Họa mi | Hwamei |
| Chích chòe | Shama |
| Chim yểng | Myna |
| Chim nhồng | Myna (alternative) |
| Chim yến phụng | Parakeet |

**Table 2.** Surveyed online platforms (only open access groups) in 2020.

| Platform | Type | Survey effort | Period(s) covered**** |
|---|---|---|---|
| Facebook* | Social media | 10 days | 5 February, 3 March, 9 – 12 March, 17 – 26 March |
| Chợ Tốt** | E-commerce website | 6 days | 1 March, 15 March – 17 March, 30 March – 1 April |
| Chim Cảnh Đất Việt | Online forum | 1 day*** | 11 February – 1 March |
| Chợ Vinh | Online forum | 4 days*** | 2 January – 2 April |

**Five Facebook groups were surveyed, with membership ranging from over 12,000 to over 27,000.*
***In 2020, Chợ Tốt had more than 6 million visitors per month (source: https://vecom.vn/cong-ty-tnhh-cho-tot-1).*
****One day overlap between surveys on Chim Cảnh Đất Việt and Chợ Vinh, accounting for a total of four survey days between the two platforms.*
*****Periods include backtracking where possible. There was less opportunity for backtracking on platforms with high volumes of new daily posts. Stand-alone dates represent older posts that appeared in threads because they were commented on during the research period or through links in other posts.*

survey), all relevant posts on each platform were collected for as far back as possible. Due to the large number of daily posts, no substantive backtracking could be done on Facebook and Chợ Tốt. In several cases, older posts came to the surface because they were commented on and therefore appeared in a thread during the research period or through links in other posts. These posts were included in our dataset as well. Across the four platforms, only open access groups and threads were surveyed. Although additional trade is highly likely to occur in closed groups, our survey exclusively assessed open online trade in – and availability of – birds.

Data extracted from each post included the location/base of operation of the seller (if available), the species of bird(s) for sale (accepted as stated where no pictures were provided), the quantity of birds offered for sale in each post (where this was not provided, a minimum number of one was recorded, unless the post included a picture showing more than one bird, in which case the depicted number of birds was recorded) and the price of each bird (where provided, including if provided by the original poster in the comment section under a post). All gathered information was translated into English by the surveyor (MN). Birds that could not be identified to a species level (including by external reviewers with a high expertise in Asian ornithology) were identified to a family level instead. These unidentified species were not included in species counts when species of the same family were already included in a data (sub-)set, to avoid possible double counting. A total of six birds, recorded across two different posts, were advertised as Hill Blue-flycatchers (*Cyornis banyumas*). Based on the accompanying photos and videos, none of these individuals could confidently be identified as such, and in one post, involving a single individual, the bird offered for sale was in fact identified as Indochinese Blue-flycatcher (*Cyornis sumatrensis*). The remaining five individuals could not be identified to a species level and were therefore recorded as Muscicapidae sp.

To avoid inflation of trade numbers, posts made by the same owner or posts sharing similar details or photos were compared to eliminate duplicate advertisements. In some instances, the same advertisement was (re) posted on several different dates. These duplicate posts were excluded from the dataset. Posts without intent of sale, requesting rather than selling birds, were also excluded from the analysis, as were posts offering domesticated birds including poultry, Budgerigars (*Melopsitta undulatus*), canaries, birds with selectively bred colour morphs and hybrids.

Price data was collected in VND and subsequently converted to USD, using a conversion rate of VND23,124 = US$1 (https://www1.oanda.com/currency/converter, accessed on 21 December 2020). In cases where multiple birds were offered for sale and only a total price was given, unity prices were calculated by dividing the total price by the number of advertised birds. We calculated the Spearman's rank correlation coefficient to assess the correlation between the number of ads per species and price, as well as between the number of advertised individuals per species and price.

## RESULTS

A total of 434 posts were recorded across the four surveyed platforms, accounting for 834 individuals of at least 50 bird species (including one species that could not be identified to a species level but belonged to a different family than those of the identified species). Chợ Tốt accounted for the highest number of posts and birds for sale (186 posts, 335 individuals), followed by Facebook (161 posts, 325 individuals), Chợ Vinh (82 posts, 169 individuals) and Chim Cảnh Đất Việt (5 posts, 5 birds). The locations of sellers were obtained from 254 posts, with Ho Chi Minh City being the most frequently indicated (n=96), followed by Ha Noi (n=39) (Figure 1).

Of the 834 birds offered for sale, 786 were identified to a species level. The 48 unidentified individuals belonged to four different families, i.e., Muscicapidae (n=5), Rhipiduridae (n=1), Timaliidae (n=1) and Zosteropidae (n=41). Red-whiskered Bulbul (*Pycnonotus jocosus*) was the most frequently encountered species offered for sale (162 posts, excluding several that concerned individuals with colour morphs seen in captive-bred birds), followed by Oriental Magpie-robin (*Copsychus saularis*) (46 posts), Chinese Hwamei (*Garrulax canorus*) (45 posts) and Eastern Spotted Dove (*Spilopelia chinensis*) (40 posts, excluding several that concerned individuals with colour morphs) (Table 3). When looking at trade volumes, Red-whiskered

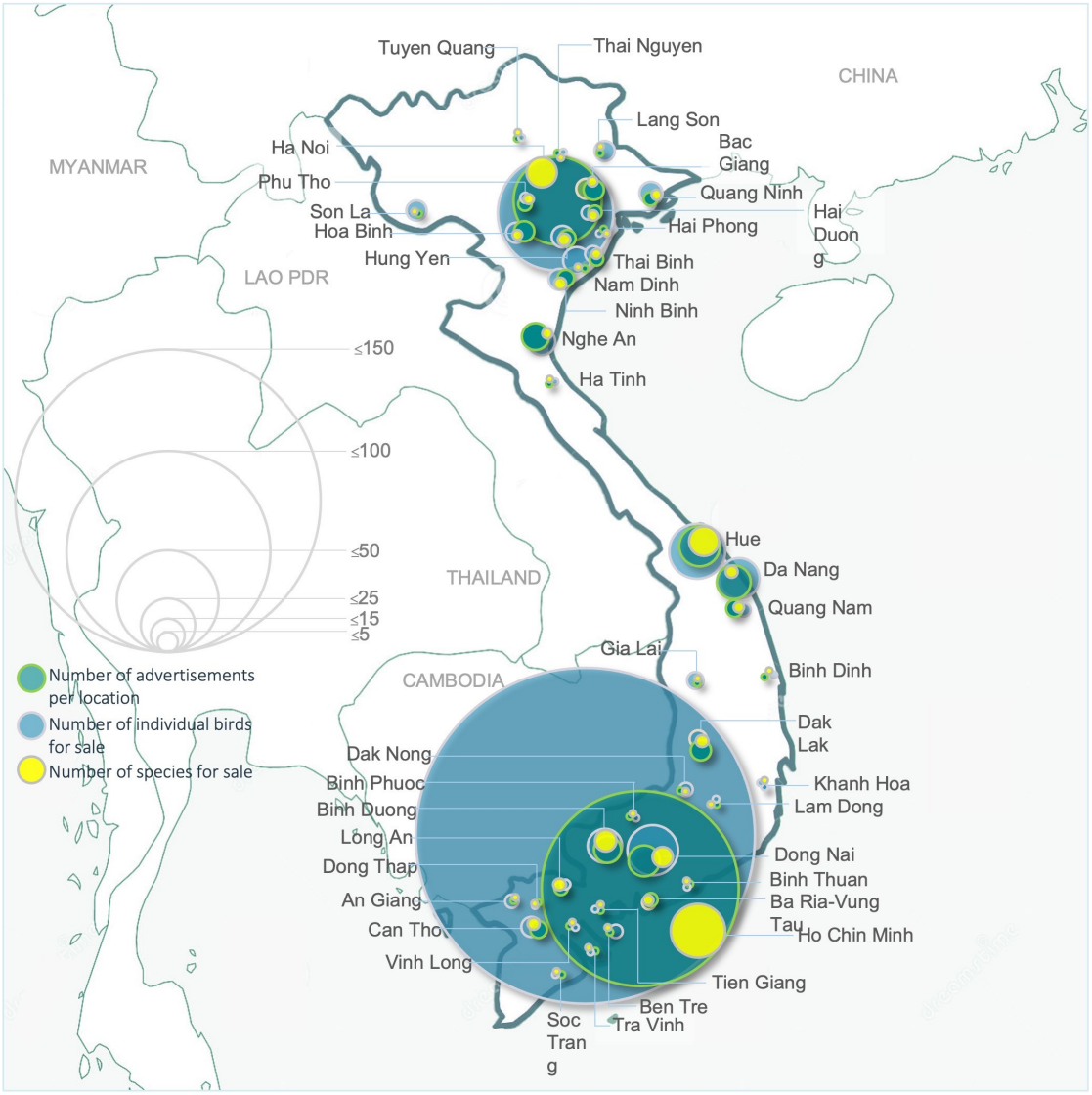


**Figure 1**. The location of sellers obtained from 254 of the 434 posts recorded during the study

**Table 3.** Top ten most advertised species (number of posts) and top ten most abundant species (number of individuals) observed for sale during the online survey.

| | **Species** | **Number of posts** | **Species** | **Number of individuals** |
|---|---|---|---|---|
| 1. | Red-whiskered Bulbul *Pycnonotus jocosus* | 162 | Red-whiskered Bulbul *Pycnonotus jocosus* | 314 |
| 2. | Oriental Magpie-robin *Copsychus saularis* | 46 | Oriental Magpie-robin *Copsychus saularis* | 68 |
| 3. | Chinese Hwamei *Garrulax canorus* | 45 | Eastern Spotted Dove *Spilopelia chinensis* | 64 |
| 4. | Eastern Spotted Dove *Spilopelia chinensis* | 40 | Pied Bushchat *Saxicola caprata* | 50 |
| 5. | White-rumped Shama *Kittacincla malabarica* | 26 | Chinese Hwamei *Garrulax canorus* | 48 |
| 6. | Black-throated Laughingthrush *Garrulax chinensis* | 26 | White-rumped Shama *Kittacincla malabarica* | 41 |
| 7. | Pied Bushchat *Saxicola caprata* | 14 | Oriental Skylark *Alauda gulgula* | 33 |
| 8. | Common Hill Myna *Gracula religiosa* | 8 | Black-throated Laughingthrush *Garrulax chinensis* | 28 |
| 9. | Oriental Skylark *Alauda gulgula* | 7 | Common Hill Myna *Gracula religiosa* | 21 |
| 10. | Red-breasted Parakeet *Psittacula alexandri* | 4 | Yellow-vented Bulbul *Pycnonotus goiaver* | 14 |
| **TOTAL** | | **364*** | | **681** |

*Total number of unique posts, some of which included more than one of the top ten species.

Bulbuls were again the most numerous, with 314 individuals, followed by Oriental Magpie-Robin (n=68), Eastern Spotted Dove with (n=64) and Pied Bushchat (*Saxicola caprata*) (n=50) (Table 3).

Almost all identified species (n=45, 92%) and individuals (n=779, 99%) for sale were native to Vietnam. Only four non-native species were observed for sale, all in very small numbers (Table 4). The two non-native dove species; Diamond Dove (*Geopelia cuneata*) (Australian endemic) and Zebra Dove (*Geopelia striata*) (Southeast Asian endemic) were said to have been imported from Thailand (both species) and Indonesia (Zebra Dove). It must nevertheless be noted that zebra doves are widespread in Southern Vietnam, with populations presumably originating from escaped cage birds (J. Eaton in litt.), and it would therefore be possible that the advertised birds were in fact sourced in Vietnam. Although commercial captive breeding is known to occur for all four encountered non-native species, origin was only mentioned in one post, concerning a Sun Parakeet (*Aratinga solstitialis*), native to South America, which was claimed to have been 'home bred'. Across the survey, only five more posts, all concerning Eastern Spotted Doves and accounting for a total of seven individuals, explicitly mentioned that the birds for sale were captive bred. Conversely, 352 (42%) birds of 23 different species across 178 posts of at least 145 different sellers were explicitly mentioned to have been wild caught. For 474 (57%) birds of 42 different species across 258 posts of at least 219 different sellers, no details regarding origin were given.

A total of ten native species recorded in this study were not encountered in any of the nine previously published studies of Vietnam's bird trade in physical markets (Table 5), although it must be noted that Le & Craik (2016) only reported on trade observations of endemic and/or threatened birds. Most of these birds were recorded in low numbers, ranging from 1 to 6 individuals per species and only one species was encountered in more than one post. Only 11 of the 25 species observed in Nguyen & Willemsen's 2016 online survey were also recorded during our survey.

Nine (18%) of the identified species, accounting for 115 (15%) individuals, are currently protected as Class II species under Vietnam's Decree 06 (Table 6), meaning a trade permit is required. Yet, no trade permits were mentioned in the posts advertising these birds. Seven of these protected species are also listed in CITES (all in Appendix II, meaning an export permit is required when international trade is involved). Together

**Table 4.** Non-native species observed for sale across the four surveyed online platforms.

| Species | Number of individuals | Number of posts | IUCN status | Native range | CITES Appendix |
|---|---|---|---|---|---|
| Diamond Dove *Geopelia cuneata* | 2 | 1 | LC | Australia | not listed |
| Rainbow Lorikeet *Trichoglossus moluccanus* | 1 | 1 | LC | Australia | II |
| Sun Parakeet *Aratinga solstitialis* | 2 | 2 | EN | South America | II |
| Zebra Dove* *Geopelia striata* | 2 | 2 | LC | Myanmar through Malay Peninsula to Sumatra and Java | not listed |
| **TOTAL** | **7** | **6** | | | |

*Zebra doves are widespread throughout Southern Vietnam, with populations presumably originating from escaped cage birds.

**Table 5.** Recorded species that were not encountered in any of the previously published studies.

| Species | Number of individuals | Number of posts |
|---|---|---|
| Black-browed Reed-warbler *Acrocephalus bistrigiceps* | 5 | 1 |
| Common Iora *Aegithina tiphia* | 3 | 2 |
| Yellow-eyed Babbler *Chrysomma sinense* | 6 | 1 |
| Olive-backed Sunbird *Cinnyris jugularis* | 4 | 1 |
| Chinese Grosbeak *Eophona migratoria* | 1 | 1 |
| Maroon-bellied Sunbird *Leptocoma sperata* | 1 | 1 |
| Slaty-legged Crake *Rallina eurizonoides* | 1 | 1 |
| Sunda Pied Fantail *Rhipidura javanica* | 3 | 1 |
| Buff-breasted Babbler *Trichastoma tickelli* | 1 | 1 |
| Common Barn Owl *Tyto Alba* | 5 | 1 |
| **TOTAL** | **30** | **11** |

**Table 6.** Protected species observed for sale across the four surveyed online platforms.

| Species | No. of individuals | Decree 06 listing | CITES | IUCN Red List status* | Price range (US$) | Median price (US$) |
|---|---|---|---|---|---|---|
| Chinese Hwamei *Garrulax canorus* | 48 | Class II | II | LC | 26-151 | 56 |
| Common Hill Myna *Gracula religiosa* | 21 | Class II | II | LC | 54-73 | 65 |
| Black-throated Laughingthrush *Garrulax chinensis* | 28 | Class II | not listed | LC | 32-151 | 100 |
| Red-breasted Parakeet *Psittacula alexandri* | 9 | Class II | II | NT | 17-22 | 20 |
| Common Barn Owl *Tyto alba* | 5 | Class II | II | LC | n.a. | n.a. |
| Black-winged Kite *Elanus caeruleus* | 1 | Class II | II | LC | 26 | 26 |
| White-crested Laughingthrush *Garrulax leucolophus* | 1 | Class II | not listed | LC | n.a. | n.a. |
| Silver-eared Mesia *Leiothrix argentauris* | 1 | Class II | II | LC | 9 | 9 |
| Alexandrine Parakeet *Psittacula eupatria* | 1 | Class II | II | NT | 130 | 130 |
| **TOTAL** | **115** | | | | | |

*LC=Least Concern, NT=Near Threatened (see https://www.iucnredlist.org/), note that the IUCN Red List classifications are based on global population estimates and may not be representative a species' population status in Vietnam.

with the two recorded non-native parrot species (Rainbow Lorikeet (*Trichoglossus moluccanus*) and Sun Parakeet, both listed in Appendix II (see Table 4)), these were the only CITES-listed birds encountered in the survey. Forty-six (94%) recorded species, accounting for 774 (93%) individuals, are currently assessed as Least Concern (LC) on the IUCN Red List of Threatened Species. Two are assessed as Near Threatened (NT) i.e., Alexandrine Parakeet (*Psittacula eupatria*) and Red-breasted Parakeet (*P. alexandri*); and one as Endangered (EN) i.e., Sun Parakeet. Of the recorded species assessed as LC, 14 are thought to have decreasing population trends. Populations of the other LC species were either increasing (n=4), stable (n=25), or unknown (n=3).

Prices were given for 466 (56%) birds of at least 39 different species. Prices ranged between VND16,667 (~US$0.7) and VND7 million (~US$303) (Figure 2), with a mean average price of approximately VND766,968 (~US$33) and a median price of VND425,000 (~US$18). Price ranges varied greatly between the species and were large for some species (Figure 3). For example, the Red-whiskered Bulbul was the highest priced species observed for sale at VND7 million (~US$303), while other individuals of the species were advertised for as little as VND100,000 (~US$4). We found a significant positive correlation between the total number of ads per species and mean price ($r(10) = .65$, $p = .021$), but no significant

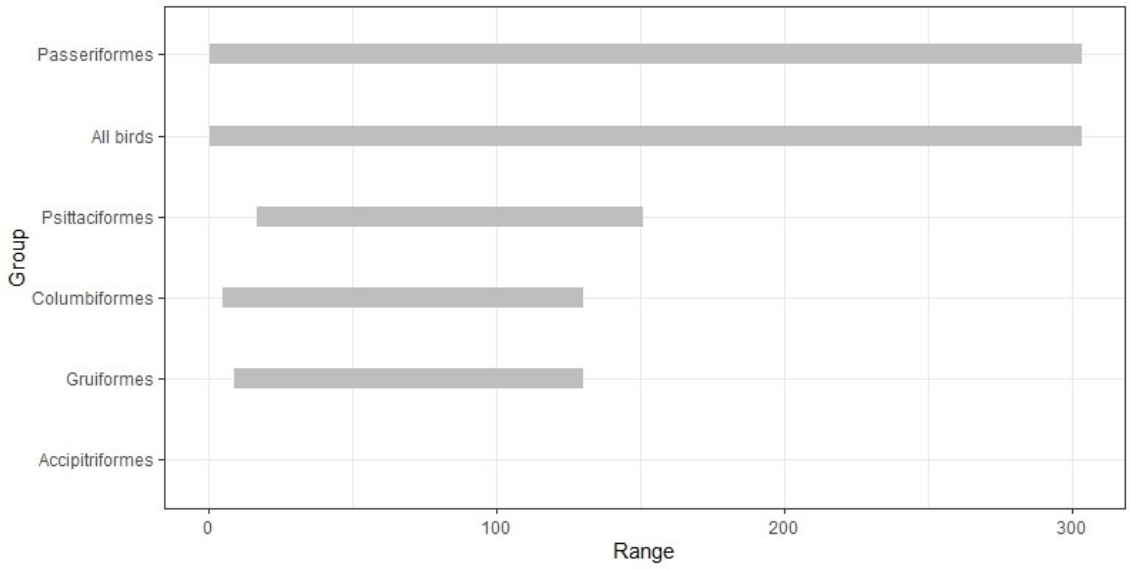


**Figure 2**. Price ranges (US$) across all birds and per order for a total of 466 birds of at least 39 different species, collected across the surveyed online platforms.

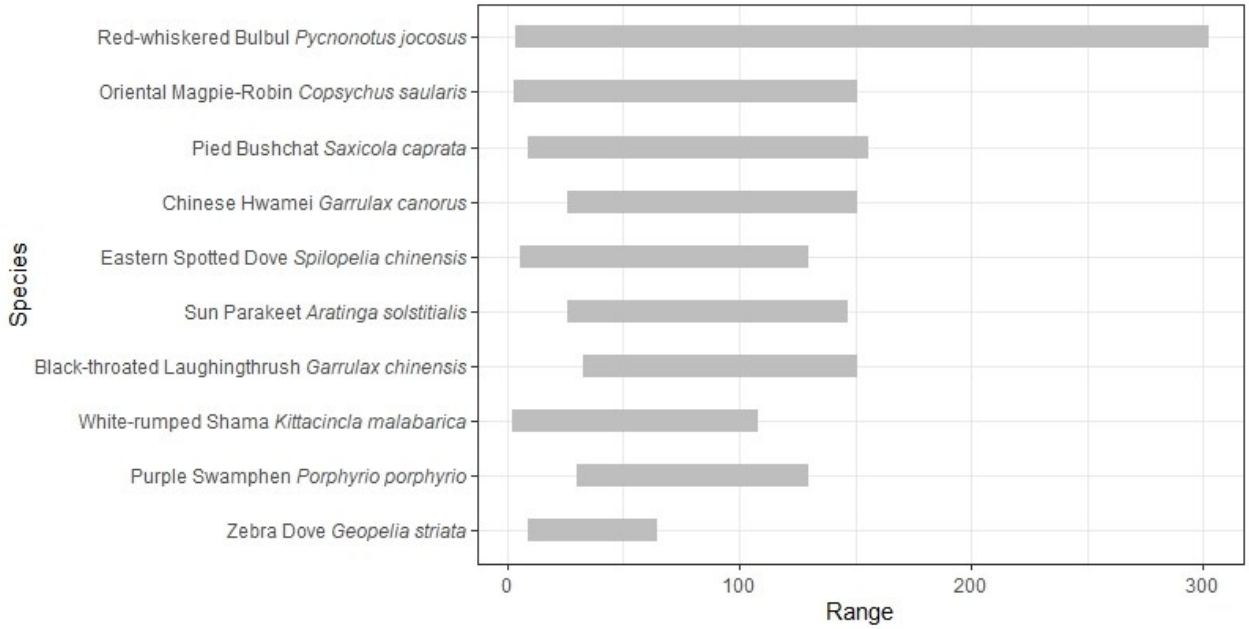


**Figure 3**. Price ranges (US$) of the top-10 species with the largest range, collected across the surveyed online platforms.

correlation between the total number of birds per species and mean price (r (10) = .33, p = .296). Generally, the more common prices for birds ranged between VND50,000 (~US$2) and VND3 million (~US$130). It should also be noted that in at least 14 advertisements, birds were offered in exchange for either money, another bird species, bird cages or bird food. For example, in one post, a White-rumped Shama (*Kittacincla malabarica*) was being sold at VND50,000 (~US$2) or in exchange for a Red-whiskered Bulbul or Oriental Magpie-robin.

## DISCUSSION

The pressure of trade on an increasing number of Asian bird species which are kept for their song and/or plumage has been highlighted in recent years (Capotosto & Shepherd, 2015; Eaton *et al*., 2015; Sykes, 2017). Unsustainable commercial exploitation of wild birds continues to be a main driver behind the Asian songbird crisis. Although much research has focused on bird trade hotspot Indonesia, trade in other Asian countries has remained relatively understudied. Our survey shows that substantial numbers of birds are being openly traded on Vietnam's online platforms and suggests that trade research and monitoring should extend beyond Indonesia to acquire a better understanding of the dynamics and impacts of trade across the wider Asian region.

In other Southeast Asian countries, including Thailand (Siriwat & Nijman, 2020) and Indonesia (Gunawan *et al*., 2017; Iqbal, 2016; Nijman, 2020), increasing levels of online wildlife trade have been observed and a similar trend may be present in Vietnam, although additional research will be needed to confirm this. The highest online trade volumes were recorded around Vietnam's two largest cities, Ha Noi and Ho Chi Minh City. Higher population density in these cities, as well as better internet accessibility, are likely reasons for this. Purchasing power is also likely to be higher in urban areas, which could further explain comparatively high online trade levels there. According to government development plans, Ha Noi and Ho Chi Minh City are forecasted to account for half of Vietnam's e-commerce revenues between 2020 and 2025 (Ngoc, 2020). One of the authors (MN) witnessed pet shops shifting to online trade during physical surveys in Hanoi and Ho Chi Minh City one year prior to our online survey. Whether such shifts are also occurring in smaller cities where internet access may be more restricted and logistics differ, remains unclear. Chợ Tốt and Facebook prove to be important platforms in Vietnam's online open bird trade, with the former accounting for 43% of the recorded posts and 40% of the recorded individual birds and the latter for 37% of the posts and 39% of the individuals. Bird trade levels on Chợ Vinh appeared to be slightly lower than on the two top platforms, while trade on bird forum Chim Cảnh Đất Việt was particularly low.

Most of the species recorded online were native to Vietnam, which corresponds with observations from previously published studies of bird trade in physical markets in Vietnam (Brooks-Moizer *et al*., 2009; Craik, 1998; Eames, 1991; Eaton *et al*., 2017; Edmunds *et al*., 2011; Morris, 2001). No country endemics were found, and it is possible that some of the recorded native birds were sourced from other range states outside of Vietnam. It has been estimated that at least 200 bird species in Vietnam have become locally extinct over the last four decades, mainly due to illegal hunting and trade (Nguyen, 2003). If the commercial exploitation of local bird populations continues to be unsustainable, demand for wild-caught birds will necessarily have to be met with birds from abroad, increasing both legal and illegal trade flows into the country, a phenomenon that has already been observed in other Southeast Asian countries, most notably Indonesia (Bergin *et al*., 2017; Indraswari *et al*., 2020b; Leupen *et al*., 2018). For example, Chinese Hwameis were among the most frequently encountered birds of this study, yet populations of the species in Vietnam are described as being near depleted (BirdLife International, 2018). Moreover, any trade in locally sourced wild individuals would be illegal, as the species is listed as a Class II species under Decree 06, which only allows trade in captive-bred

birds. Forty percent of the recorded native individuals were explicitly claimed to have been wild caught. Traded individuals are likely to have been imported from China or possibly Lao PDR (Eaton *et al*., 2017). Any imports of Chinese Hwameis from China would be illegal, as China established an export ban for the species in 1998. Furthermore, while Chinese Hwameis are listed in CITES Appendix II, meaning that an export permit is needed to trade them internationally, no records of export from China to Vietnam, and no records of import into Vietnam for the species exist in the CITES Trade Database. Illegal and unregulated trade in species such as the Chinese Hwamei that are sourced abroad to compensate for depleted local populations may potentially lead to serious regional and global population declines, be it in the short or the long term. Similar dynamics have been observed for other highly sought-after songbirds such as the Straw-headed Bulbul which has seen range-wide declines, in part due to continuing demand in Indonesia after the extirpation of local populations there (Chiok *et al*., 2020; Chng *et al*., 2015).

Both Eames (1991) and Eaton *et al*. (2017) predicted an influx of non-native species in Vietnam's bird markets as local species become scarcer due to exploitation for trade. In the 1990s, Eames (1991) and Craik (1998) recorded one (Chattering Lory (*Lorius garrulus*)) and no non-native species during their respective surveys in Ho Chi Minh City, while several years later, Morris (2001), Brooks-Moizer *et al*. (2009) and Edmunds *et al*. (2011) all found between 10-15% of their recorded species to be non-native. It must be noted that this included domesticated birds such as Island Canary (*Serinus canaria*), budgerigar and Fischer's Lovebird (*Agapornis fischeri*), traded in large volumes and in a variety of colour morphs. During the most recent large-scale survey of Ha Noi and Ho Chi Minh City's physical bird markets, which specifically excluded domesticated birds, Eaton *et al*. (2017) found 10 % of the encountered species to be non-native to Vietnam. In this study, four (8%) non-native species were observed and of these, two are listed in CITES; the Rainbow Lorikeet and the Sun Parakeet, both in Appendix II, which allows international trade in animals with a valid (re-)export permit. The other two non-native species are not listed in any of the CITES appendices, which means exploitation for international trade is not monitored or regulated. Although it is possible that the encountered non-native birds were bred in Vietnam, this was only explicitly stated in one post involving a Sun Parakeet. Compared to Nguyen and Willemsen's 2016 online survey, which, when domesticated birds are excluded, found 36% of the recorded species to be non-native to Vietnam, the current study's numbers are much lower. It is impossible to confirm or refute an influx of non-native species based on the limited data points available. Consistent long-term monitoring is required to assess changes in Vietnam's physical and online bird trade dynamics, including foreign species trade trends.

Several of the most encountered species in this study, including Oriental Magpie-robin, Pied Bushchat and White-rumped Shama, were also recorded in large numbers in the most recently published study (Eaton *et al*., 2017), while others such as Red-whiskered Bulbul, Eastern Spotted Dove and Chinese Hwamei have been recorded consistently throughout the published literature since the early 2000s (Brooks-Moizer *et al*., 2009; Eaton *et al*., 2017; Edmunds *et al*., 2011; Morris, 2001). One notable difference between the published literature and the current study is the complete absence of munias *Lonchura* spp (particularly Scaly-breasted Munia (*Lonchura punctulata*)) from our online survey, while these birds have steadily been among the most encountered species in physical market surveys (Brooks-Moizer *et al*., 2009; Craik, 1998; Eames, 1991; Eaton *et al*., 2017; Edmunds *et al*., 2011; Morris, 2001). These small birds, which are often sold for merit release, were also absent from Nguyen and Willemsen's 2016 online study. A likely explanation for their absence from online platforms is that these species are often sold for low prices near places of worship, with buyers releasing the birds immediately after purchase. Similarly, white-eyes, several different species of which were among the most frequently recorded birds in all physical surveys from Craik (1998) onwards, appear to be largely absent from the online market. This study found five Swinhoe's White-eyes (*Zosterops simplex*), while Nguyen & Willemsen (2016) recorded no white-eye species *Zosterops* spp during their online survey. Like munias, these are birds of low monetary value (Eaton *et al*., 2017), which may be why they are of little interest to online sellers and buyers. Additionally, their relatively low numbers online may be explained by demographics. White-eyes are often kept by older men (J. Eaton in litt.), who may be less comfortable using the internet to purchase birds and more likely to opt for traditional physical modes of transaction.

The fact that ten of the encountered native species have not been reported in any of the previously published studies may in part be explained by the snapshot nature of the physical market surveys. Most of these studies only surveyed markets once, and high turnover rates in physical markets as well as the opportunistic and indiscriminate nature of bird trapping and selling mean that species composition in markets can change from day to day. One-off surveys are therefore unlikely to capture the full array of species for sale in the markets. There were also large differences in species composition between this study and Nguyen & Willemsen's 2016 online survey, with only 11 of the 25 species that were recorded in 2016 also being recorded in this study. The discrepancies between the two studies indicate that species diversity in Vietnam's online bird trade spans beyond what our survey results show. Differences in species composition may also be indicative of species availability (Chng *et al*., 2015), seasonality, and/or shifts in trade trends and consumer preferences. Sudden increases in demand have affected specific bird species in the past (Chng, Eaton, & Miller, 2017) and consistent trade monitoring is needed to identify such trends.

At least four species were recorded in our study that are identified as being of high priority and conservation concern by the ASTSG (Lee, Chng & Eaton, 2016) due to their persistent exploitation for the songbird trade in Asia. These species are the Common Hill Myna (*Gracula religiosa*), Oriental Magpie-Robin, Silver-eared Mesia (*Leiothrix argentauris*) and White-rumped Shama. The Common Hill Myna is protected (Class II) in Vietnam and listed in Appendix II of CITES. The species is currently listed as LC on the IUCN Red List, mainly due to its large range. Although it was recorded in all previously published physical and online studies, this was always in relatively small numbers, with the species never ranking in the top ten most

frequently observed birds, as it did in this study. Common Hill Mynas are extremely popular songbirds throughout Southeast Asia and beyond, which has resulted in the near depletion of several related Indonesian island endemic species (Ng *et al*., 2021). Almost two decades ago, Morris (2001) highlighted the threat of trade to this species in Vietnam, stating that it is one of the most prestigious and valuable birds in the country and that chicks are often collected from nests by locals before being sold on to middlemen. In the current study, the average price of a Common Hill Myna was VND1,470,000 (~US$64), which is above the average price of all recorded birds for which a price was given (~US$33), and also slightly above the average price (VND1,356,346, ~US$59) of the species for which the most expensive bird of this study was found; the Red-whiskered Bulbul. This is because prices of the latter generally vary heavily based on the physical and singing qualities of individual birds (Techachootert & Round, 2013).

White-rumped Shamas were in the top ten most frequent and abundant species for sale online. This species is hugely popular in the cage bird industry due to its singing abilities. Large numbers are found in trade across Asia and it is frequently identified in seizures across the region, revealing a vast international trade (Leupen *et al*., 2018). While population sizes are unknown, they are reported to be in decline across their range predominantly due to excessive trapping for the cage bird trade (BirdLife International, 2017). Despite this, the species is currently still evaluated as LC because of its wide distribution. However, unsustainable exploitation for trade across their range must be considered, especially since cross-border trafficking, which will impact local populations, is vastly under-reported (Leupen *et al*., 2018). Recognising the potential threat of international trade to the species, a proposal to list the White-rumped Shama in Appendix II of CITES was recently adopted by CITES Parties at the CoP19. This new listing will facilitate the monitoring of international trade and, if properly enfored, ensure a more sustainable future for the species.

At least 42% of the advertised birds (native and non-specified species) in this study were claimed to have been sourced from the wild, while only 1% were claimed to have been captive bred. It is possible that some of these birds were falsely advertised as wild-caught seeing how wild birds are sometimes considered more desirable than their captive-bred counterparts. The high levels of wild birds nevertheless correspond with previous reports of a predominance of wild-caught birds in the Vietnamese bird trade (Brooks-Moizer *et al*., 2009; Eaton *et al*., 2017; Edmunds *et al*., 2011). Ranching, which involves the hand-rearing of captured young wild birds, is also popular in Vietnam. Birds taken from the nest as young, which reportedly include Oriental Skylarks (*Alauda gulgula*), Oriental Magpie-robins, Pied Bush-chats, mynas and parakeets, often fetch higher prices as they are perceived as 'tame' wild birds (Craik, 1998; Eaton *et al*., 2017). During this study, many young birds, including the above-mentioned species, were commonly observed for sale. The fact that this study was conducted at the start of the breeding season further explains the observed high volumes of nests and juveniles for sale, although no additional studies were done during other seasons to compare volumes of young birds. In one of the surveyed Facebook groups, a group member posted a statement urging sellers to cease the trapping and sale of birds during the breeding season, confirming at least some level of public awareness and concern regarding this issue. Increased research into the wild origins of the birds in the Vietnamese market, as well as structured field surveys, are needed to better assess the effects of trade on wild populations.

It remains unclear how Vietnam's online bird trade is being regulated to prevent overexploitation and/or illegal trade. While the country has a strong legal framework in place with at least 18 different laws governing wildlife protection, most native bird species in trade remain unprotected. In 2019, Decree 32-2006-ND-CP was replaced by the abovementioned Decree 06, which included a revised protected species list. Despite the new list, only 18% of the species encountered during this study are currently protected in Vietnam. Similarly, in Eaton *et al*. (2017), only 10% of the recorded native species for sale were listed as protected. The new protected species list includes blanket bans on laughingthrushes and pittas and the addition of songbird species such as Chinese Hwamei, Red-billed Leiothrix (*leiothrix lutea*) and Silver-eared Mesia, but also saw the removal of the White-rumped Shama, a species for which improved protection in Vietnam has previously been recommended (Eaton *et al*., 2017). In total, nine protected (Class II) species were recorded. For one of these species, the Black-throated Laughingthrush, it was explicitly mentioned in multiple posts that the individuals for sale were wild-caught, making their trade illegal. For the other eight species, no information regarding the source was given. These observations give reason to doubt the legality and regulation of at least part of the observed online bird trade.

## CONCLUSION

The increased use of online platforms for wildlife trade poses several challenges to enforcement and regulatory authorities. These platforms drastically lower logistic barriers for individuals who intend to sell wildlife and provide easy access to both legal and illegal markets where potential buyers, even for niche products, are now easier found than ever (Lavorgna, 2014). On social media, the anonymity of sellers and buyers and the use of closed groups and trading networks make trade monitoring more difficult (Indraswari *et al*., 2020a; Martin *et al*., 2018; Yu & Jia, 2015). Monitoring efforts are further complicated by the speed with which illegal transactions can be conducted, leaving only a small window for enforcers to act (Lavorgna, 2014; Siriwat & Nijman, 2018; Yu & Jia, 2015). The fact that some of the most frequently observed birds in this study were protected under Vietnamese law, confirms the low-risk nature of the illegal online trade in Vietnam, previously highlighted by Nguyen & Willemsen (2016). Siriwat & Nijman (2020) state that concerns regarding zoonotic disease may further push physical trade online. The COVID-19 coronavirus pandemic, and the belief that it may have originated from a physical wildlife market in China, may accelerate this process. The fact that such a substantial volume and diversity of species were observed for sale within this study's relatively short time frame highlights the need for further monitoring and research into Vietnam's online bird trade, as well as the potential need for improved regulation and

enforcement. Due to the likely discrepancy between some species' international conservation status which may be favourable, and domestic population status which may be of concern, more field research is needed to provide evidence of population trends in Vietnam and better inform the country's legislative changes. In addition to regulation and enforcement, the Vietnamese Government and the conservation community should aim to realise behaviour change through the conduction of consumer research studies, awareness campaigns, and targeted marketing interventions. Specifically, we recommend the following:

***Recommendations***

Regular and systematic monitoring of Vietnam's online bird trade is needed to improve the understanding of online trade dynamics, detect changing trends and to support enforcement actions. Concurrent field research is needed to determine the impact of this trade on Vietnam's wild bird populations and provide informed recommendations to the Vietnamese Government.

Enforcement of illegal online trade should be prioritised and improved. In addition, investigations into local trade networks should be carried out to map out trade flows from source to end buyer and to support strategic and intelligence-led enforcement efforts to disrupt criminal networks.

Legislation in Vietnam should be amended to enhance protection for Vietnam's native bird species. Decree 06-2019-ND-CP *on the Management of Endangered, Precious, and Rare Species of Wild Plants and Animals* should be updated to reflect the conservation threats faced by the many currently unprotected native species in trade, particularly passerines.

The online platforms used to sell birds illegally should be made aware that they are facilitating wildlife crime. Actions, whether legal or via consumer pressure, should be taken against platforms that do not take effective actions against any illegal trade in birds.

Efforts should be made to raise levels of awareness regarding the bird trade in Vietnam among consumers and the public in general. Additionally, behaviour change will need to be realised through consumer behaviour research and targeted marketing campaigns. Only through tackling the trade at each level of the trade chain can the threat of illegal and unsustainable exploitation be addressed.

## CONFLICT OF INTEREST

No conflict of interest exists in the submission of this manuscript. All authors above have approved of the final manuscript.

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**Annex I.** Species encountered during the online survey (protected species are in bold).

| **Species** | **Total number of individuals** | **Total number of posts** |
|---|---|---|
| **Alexandrine Parakeet *Psittacula eupatria*** | 1 | 1 |
| Black Bulbul *Hypsipetes leucocephalus* | 1 | 1 |
| Black-browed Reed-warbler *Acrocephalus bistrigiceps*** | 5 | 1 |
| Black-collared Starling *Gracupica nigricollis* | 6 | 3 |
| Black-hooded Oriole *Oriolus xanthornus* | 1 | 1 |
| Black-naped Oriole *Oriolus chinensis* | 3 | 2 |
| **Black-throated Laughingthrush *Garrulax Chinensis****** | 28 | 26 |
| **Black-winged Kite *Elanus Caeruleus*** | 1 | 1 |
| Brown-throated Sunbird *Anthreptes malacensis* | 1 | 1 |
| Buff-breasted Babbler *Trichastoma tickelli*** | 1 | 1 |
| Chinese Grosbeak *Eophona migratoria*** | 1 | 1 |
| **Chinese Hwamei *Garrulax canorus*** | 48 | 45 |
| **Common Barn-owl *Tyto Alba***** | 5 | 1 |
| **Common Hill Myna *Gracula religiosa*** | 21 | 8 |
| Common Iora *Aegithina tiphia*** | 3 | 2 |
| Common Myna *Acridotheres tristis* | 4 | 4 |
| Crimson Sunbird *Aethopyga siparaja* | 2 | 2 |
| Diamond Dove *Geopelia cuneata** | 2 | 1 |
| Eastern Spotted Dove *Spilopelia chinensis* | 64 | 40 |
| Great Myna *Acridotheres grandis* | 6 | 5 |
| Greater Coucal *Centropus sinensis* | 2 | 2 |
| Indochinese Blue-Flycatcher *Cyornis sumatrensis* | 1 | 1 |
| Long-tailed Shrike *Lanius schach* | 1 | 1 |
| Maroon-bellied Sunbird *Leptocoma brasiliana*** | 1 | 1 |
| Muscicapidae sp. | 5 | 1 |
| Olive-backed Sunbird *Cinnyris jugularis* | 4 | 1 |
| Oriental Magpie-robin *Copsychus saularis* | 68 | 46 |
| Oriental Skylark *Alauda Gulgula* | 33 | 7 |
| Pied Bushchat *Saxicola caprata* | 50 | 14 |
| Plumbeous Water Redstart *Phoenicurus Fuliginosus* | 1 | 1 |
| Purple Swamphen *Porphyrio porphyrio* | 2 | 2 |
| Rainbow Lorikeet *Trichoglossus moluccanus** | 1 | 1 |

*Continued in next page*

| | | |
|---|---|---|
| **Red-breasted Parakeet *Psittacula alexandri*** | 9 | 4 |
| Red-whiskered Bulbul *Pycnonotus jocosus* | 314 | 162 |
| Rhipiduridae sp. | 1 | 1 |
| Ruby-cheeked Sunbird *Chalcoparia singalensis* | 1 | 1 |
| Scarlet-backed Flowerpecker *Dicaeum cruentatum* | 11 | 3 |
| **Silver-eared Mesia *Leiothrix argentauris*** | 1 | 1 |
| Slaty-legged Crake *Rallina eurizonoides*** | 1 | 1 |
| Sooty-headed Bulbul *Pycnonotus aurigaster* | 2 | 2 |
| Sultan Tit *Melanochlora sultanea* | 2 | 1 |
| Sun Parakeet *Aratinga solstitialis** | 2 | 2 |
| Sunda Pied Fantail *Rhipidura javanica*** | 3 | 1 |
| Swinhoe's White-eye *Zosterops simplex* | 5 | 4 |
| Timaliidae sp. | 1 | 1 |
| **White-crested Laughingthrush *Garrulax leucolophus*** | 1 | 1 |
| White-faced Jay *Garrulus leucotis* | 2 | 1 |
| White-rumped Shama *Kittacincla malabarica* | 41 | 26 |
| White-tailed Blue Robin *Myiomela leucura* | 1 | 1 |
| Yellow-eyed Babbler *Chrysomma sinense*** | 6 | 1 |
| Yellow-vented Bulbul *Pycnonotus goiavier* | 14 | 2 |
| Zebra Dove *Geopelia striata** | 2 | 2 |
| Zosteropidae sp. | 41 | 14 |
| **TOTAL** | **834** | **434** |

*non-native species, **species that were not encountered in any of the previously published studies into Viet Nam's bird trade, ***including 10 individuals of the dark ("lugens") morph.