European Journal of Wildlife Research (2024) 70:66
https://doi.org/10.1007/s10344-024-01816-0

RESEARCH

A newly emerging trade in New Guinea's butcherbirds (*Cracticinae*) in Indonesia

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Received: 7 December 2023 / Revised: 17 May 2024 / Accepted: 28 May 2024 / Published online: 20 June 2024

Abstract

The very large demand for songbirds in Indonesia undermines the efforts of the Government of Indonesia to regulate and control harvest and trade. As more species become increasingly rare, new species are sought after and included in the trade to supply demand from hobbyists, traders and songbird competition participants. One such group of species is the butcherbirds. Four species of butcherbirds are native to Indonesia and prior to 2016 these birds were hardly found in trade. Since then, the trade has grown rapidly and during 57 surveys of bird markets in 12 cities on Java, Bali and Lombok, we recorded 235 butcherbirds. We found 43 advertisements online offering butcherbirds for sale. The highest numbers were recorded in the easternmost cities we surveyed (Mataram, 11.5 birds/survey; Denpasar 9.0 birds/survey) and we recorded higher numbers of butcherbirds for sale nearer to their natural distribution range. Compared to other species, butcherbirds command high prices (hooded butcherbird: US$185; black butcherbird: US$122). Despite the authorities attempting to regulate the exploitation of butcherbirds with annual harvest and trade quotas (set at zero for 2022), the trade evidently is challenging to control and may pose a threat to the conservation of these species in the wild.

Keywords Asian songbird crisis · Birds · Poaching · Quotas · Red list · Songbird trade

Introduction

The poaching of songbirds for the cage bird trade across Southeast Asia, dubbed the Asian songbird crisis (Sykes 2017; Lees and Yuda 2022), has seen an increase in bird taxa going extinct in the wild and even more becoming regionally or locally extinct over recent years (Eaton et al. 2015; Ng et al. 2021; Al Fashaa et al. 2023). An increasing body of evidence of the threat posed by illegal and/or unsustainable songbird trade has been acquired from surveys of physical and online bird markets in Southeast Asia, especially Indonesia (Sykes 2017).

Indonesia's wild bird trade involves hundreds of species and millions of individuals, many of which are highly threatened with extinction (Nash 1993; Jepson and Ladle 2005; Lee et al. 2016; Juergens et al. 2021). Bird-keeping is a very popular pastime in Indonesia and has deep cultural roots (Nash 1993; Jepson and Ladle 2005; Mirin and Klinck 2021). The trade in birds affects many species that are native to the country as well as those species that use the archipelago as a stopover on their north-south or south-north migration (Chng et al. 2015; Rentschlar et al. 2018; Marshall et al. 2020a). Bird-keeping is a highly popular pastime and especially in western Indonesia most larger (and many smaller) cities have one or more bird markets that are open to the public on a daily basis. In addition, there are more, often smaller, markets selling birds that open only on specific days of the Javanese calendar (e.g., Wage, Pon). In recent years there has been much focus on how to characterise this trade in songbirds (Jepson and Ladle 2011; Fink et al. 2021;

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Marshall et al. 2020b, 2021; Okarda et al. 2022), the effect this trade has on the conservation status of imperilled birdlife (Jepson and Ladle 2005; Harris et al. 2015, 2017; Nijman et al. 2018, 2020; Setiyani and Ahmadi 2020; Shepherd et al. 2020), and what drives this trade (Burivalova et al. 2017; Miller et al. 2019; Marshall et al. 2021). The passion for keeping songbirds is driven primarily by the aesthetic appreciation of song. Most consumers buy birds to be kept at home, but a small but important minority enter their songbirds into song contests (Jepson and Ladle 2009; Marshall et al. 2020a; Mirin and Klinck 2021). In addition to the appreciation of song, birds may be appreciated for their physical appearance and colourful plumage (Nijman 2020), their ability for speech (e.g., parrots: Pires et al. 2021), their links to popular culture (e.g., owls: Nijman and Nekaris 2017), or their perceived rarity and/or protected status (e.g., eagles: Nijman et al. 2009). In these cases, both songbirds and non-songbirds are traded. Most of the research and conservation efforts have focused on western Indonesia and, in particular, the island of Java as the centre of songbird trade in Indonesia (Jepson and Ladle 2011; Sykes 2017; Marshall et al. 2020a; Lees and Yuda 2022). Here there is persistent high and potentially increasing demand for 'new' or 'novelty' species, i.e., species that have been hitherto rarely or never recorded in trade. It is becoming increasingly clear that the songbird trade in western Indonesia now also affects species confined to the eastern parts of the country, including those found on the island of New Guinea.

New Guinea and its surrounding islands are home to several species of butcherbirds and allies (Family *Artamidae*, subfamily *Cracticinae*). There are a total of eleven species in this subfamily (composed of the genera *Strepera*, *Melloria*, *Gymnorhina* and *Cracticus*), four of which occur in Indonesian territory; hooded butcherbird *Cracticus cassicus*, black-backed butcherbird *C. mentalis*, black butcherbird *Melloria quoyi* and Australian magpie *Gymnorhina tibicen*. Of these, the latter two are also found in parts of Australia. The seven species that do not occur in Indonesia are found only in Australia and the Solomon Islands. The species occurring in Indonesia are currently classified as Least Concern on the IUCN Red List of Threatened Species (hereafter the Red List) (IUCN 2023).

Butcherbirds require fairly large breeding territories of 2 to 5 hectares (Segal et al. 2021), and some populations are targeted by hunting (BirdLife International 2020). Further, Segal et al. (2021) report that they are highly mobile and often visible in the landscape although at low densities, which could lead to population declines being overseen. Therefore, we conservatively consider them potentially sensitive to targeted persecution. Commercial trade is not listed as a threat to any of the *Cracticinae* species in their respective Red List assessments and is only mentioned briefly in the assessment of the Tagula butcherbird *Cracticus louisiadensis* (listed as Near Threatened) (BirdLife International 2016ab, 2018, 2020).

Indonesia has a comprehensive system in place to ban, regulate and for certain species stimulate trade. More than 500 species of birds are legally protected in Indonesia, meaning these species cannot be harvested or traded, although permission may be given to trade some species if they have been captive bred. Butcherbirds are not included on Indonesia's protected species list. Species native to Indonesia that are not legally protected cannot legally be traded for commercial purposes, unless a quota has been allocated. For a non-protected species to be traded commercially, a request for a harvest or capture quota needs to be made by the regional natural resource management agency (BKSDA) to the Ministry of Forestry. When this permission is granted, and a harvest quota has been allocated, a non-protected species can enter the commercial trade. But this only allows a small number of non-protected species to be traded: in 2016 a harvest quota was available for only ~ 80 bird species for all of Indonesia, with a median harvest quota was 140 birds per species for the entire year (Nijman et al. 2020). Trade in physical markets do require the traders to be in possession of a business permit and permanent shops need to have a place of business permit: Miller et al. (2019) found that 63% of bird shop owners had no permits, 24% lacked one of the two permits and only 13% possessed both permits.

Despite limited evidence that butcherbirds have been traded, given the unique songs and singing behaviour of butcherbirds and other attractive traits such as their ability to mimic, it seems highly unlikely that these birds would be exempt from the voracious demand for songbirds that is decimating bird populations across the Indonesian archipelago (Eaton et al. 2015) and beyond (Sykes 2017). Recent attention towards keeping and trapping butcherbirds and Australian magpies in popular media, such as YouTube channels, could drive the trade interest even further.

We here report on a base line of the trade and sale of butcherbirds, mostly by presenting evidence of their trade, rather than a quantitative assessment of their trade (Fig. 1).

We analysed published and unpublished literature and bird trade surveys carried out in Southeast Asia, with a greater focus on Indonesia, extracting records of trade in the four butcherbird species from Indonesia dating back to 1990. Much of this data is biased or constrained by it focussing on surveys or reports that found evidence of at least one butcherbird in trade; reports that did not report on their trade (which would be many, given this is a newly emerging trade) were not included. We also obtained data from e-commerce sites and Facebook groups offering butcherbirds for sale, and these, by their very nature, suffer from the same bias: only adverts and platforms that do offer these birds for sale

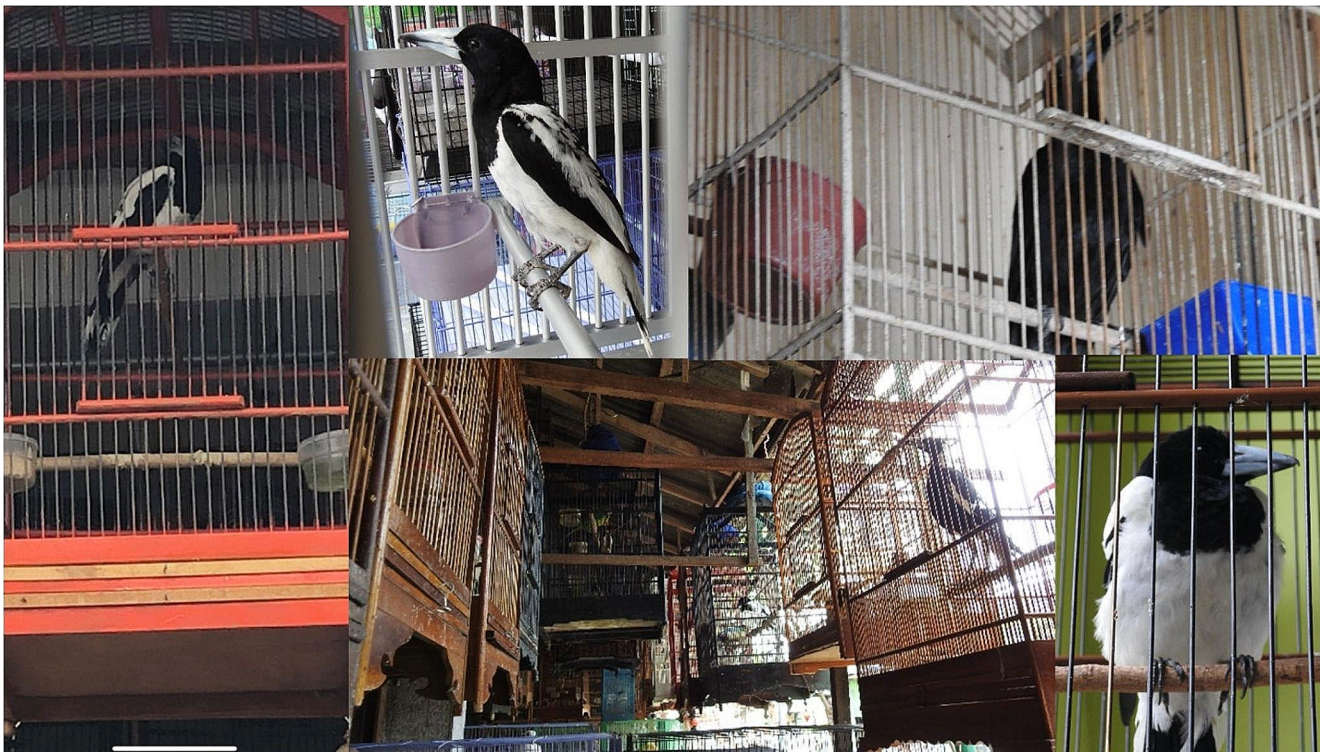

Fig. 1 Trade in butcherbirds in Indonesia. From top left clockwise: hooded butcherbird at Splindit bird market Malang, Java (S. Sunny Nelson); hooded butcherbird, Surabaya, Java (Simon Bruslund); black butcherbird in Surabaya (Simon Bruslund); hooded butcherbird in Malang (Simon Bruslund); hooded butcherbird and Australian magpie in Denpasar, Bali (Simon Bruslund)

were included in the analysis. Finally, we reviewed Indonesia's annual harvest and trade quotas and the legal status of the four species under Indonesia's national legislation, to put our observations in a broader, legal, context.

Methods

Data collection

We have conducted bird market surveys in Java and Bali since 2012, and later in Lombok (2018 onwards) and Sulawesi (2019 onwards); for details see Chng et al. (2015), Nijman et al. (2018), Shepherd et al. (2020) and Shepherd and Leupen (2021). When butcherbirds were offered for sale, they were traded openly in the wildlife markets so undercover techniques were not needed. Surveyors walked through markets slowly, recording butcherbirds by entering the observed species and quantities into a mobile phone or by memorising the data and recording them in a notebook directly upon leaving the market. Here we report on those surveys that yielded at least one record of a butcherbird. We additionally obtained data from the Songbirds in Trade Database (SiTDB) which contains records of trade activity in live songbird globally since 2006 (Juergens et al. 2021).

In February 2022, we conducted a survey of online trade platforms and dedicated Facebook groups that offer birds for sale, including ones for which no harvest quotas are present and ones that are legally protected. Based on past research (Nijman et al. 2018, 2020; Shepherd et al. 2020; Fink et al. 2021; Nijman 2022), we are familiar with these platforms and groups in Indonesia and have observed trade in dedicated to pheasants, owls, bulbuls and many more. The e-commerce platforms we searched were Bukalapak, Shopee, OLX, Kaskus and Tokopedia (there are other platforms where birds are traded, as well as social media sites, but these five capture a significant part of the online trade). Using the search term 'Jagal Papua' (which refers generically to butcherbirds in Indonesian), we recorded any advertisements with the target species offered for sale. These advertisements usually, but not always, contained information on the number of birds a trader had on offer (often verifiable through photographs) and the asking price. We also conducted a search to locate earlier advertisements dating back to 2010, to obtain information on when the online trade in butcherbirds emerged.

We searched for Facebook groups in Indonesia that specialise in the trade in butcherbirds, again using the search term 'Jagal Papua'. We did not attempt to count all butcherbirds observed in the Facebook groups, as many posts are removed over time, and the volumes pictured were not

always indicative of the actual numbers available. Instead, we noted how many groups there were specialising in the trade of these species. Where possible, we recorded where these groups were based (either city, regency or province) and to some extent, what species appeared to be most frequently advertised for sale.

Analysis

Prices were given in Indonesian rupiah; these were corrected for inflation (so that IDR1,000 in February 2015 is worth IDR 1,191 in February 2022) and then converted to USD at the exchange rate of February 2022 (1 USD equals IDR 14,323). One reviewer of an earlier draft of this paper noted that asking prices collected by foreigners, sometimes perceived to be wealthy, are higher than when these data are collected by Indonesians, and therefore that all subsequent analysis of price data would be affected by this. The available data from physical market surveys in Indonesia, both for birds and small mammals, does not support this assertion: asking prices may show a large amount of variation but this seems to be more linked to the (perceived) 'quality' or age of the animal or the city's citizen's purchasing power rather than the nationality of the surveyors (Nijman et al. 2020, 2024). In the present context it is largely irrelevant as the price data were obtained from online advertisements and these are not affected by the nationality or socio-economic status of the recorder.

The Indonesian government, annually, presents recommended minimum monthly wages for each of its regencies and major cities, reflecting the cost of living in these areas (for 2022 the lowest was for Banjarnegara in Central Java at US$133 to a high of US$336 for Bekasi in West Java). Asking prices for some species reflect these differences (rufous-fronted laughingthrush *Garrulax rufifrons*: Nijman et al. 2020) but not others (e.g., Sunda laughingthrush *G. palliatus*: Leupen et al. 2020; Chinese hwamei *G. canorus*: Shepherd et al. 2020); we tested this price / purchasing power for the butcherbirds that were offered for sale using a Pearson's Product Moment Correlation. We also tested whether butcherbirds offered for sale closer to their natural geographic range (using the city of Sorong as a centre point) differed in price compared to ones that were offered for sale further away (and that may have incurred higher transport costs), again using a Pearson's Product Moment Correlation. We compared the number of butcherbirds we observed within markets with a one-way ANOVA. Statistics were run in Social Science Statistics, and we accepted significance when $P < 0.05$ in a two-tailed test.

Results

Market surveys carried out in Indonesia

We did not find any butcherbirds for sale during market surveys between 2012 and 2015. We recorded the first hooded butcherbird in Sukahaji bird market in Bandung in August 2016 (one bird) followed by four birds at the same market in February 2017. The same month, one bird was recorded in Pramuka market, Jakarta. In total, we have recorded 235 butcherbirds in 12 cities on Java, Bali and Lombok in 57 surveys. When present, on average 4.2 ± 3.2 butcherbirds were recorded, with high mean numbers in Mataram (11.5 birds survey^{-1}), Denpasar (9.0 birds survey^{-1}), Surakarta (6.8 survey^{-1}) and Surabaya (5.2 survey^{-1}) (Table 1). For those five cities where we observed butcherbirds at least six times, we found no significant difference in the number of birds we observed (one-way ANOVA, $F_{4,35}=2.01$, $P=0.114$).

Online trade

We found 43 advertisements for butcherbirds in February 2022, all from western Indonesia. Nineteen were found on

Table 1 Butcherbirds observed in Indonesia in trade, showing total number of birds (number of surveys butcherbirds were detected) years of recording. Cities are listed from west to east. DKI = Daerah Khusus Ibukota / Special Capital Region; DI = Daerah Istimewa / Special Region

City, province	Hooded	Black	Black-backed	Australian
Jakarta, DKI Jakarta	12 (5) 2017–2020			
Bandung, West Java	17 (9) 2016–2020			1 (1) 2017–2018
Tasikmalaya, West Java	2 (2) 2018–2019			
Cirebon, West Java	1 (1) 2017			
Semarang, Central Java	10 (6) 2017–2019			
Surakarta, Central Java	41 (6) 2017–2019			
Yogyakarta, DI Yogyakarta	5 (3) 2017, 2019			
Surabaya, East Java	59 (13) 2018–2020	4 (2) 2019	4 (2) 2019	
Sidoarjo, East Java	2 (1) 2019			
Malang, East Java	7 (2) 2018, 2020			
Denpasar, Bali	37 (5) 2017–2021	8 (2) 2017–2018		2 (1) 2017–2018
Mataram, Lombok	23 (2) 2018–2019			
Total	216 (55) 2012–2021	12 (4) 2012–2021	4 (2) 2012–2021	3 (2) 2017–2018

Shopee, 13 on Tokopedia, nine on OXL, two on Bukalapak and none on Kaskus. The earliest advertisements we found dated from February 2015 (Kaskus, trader based in Jakarta), March 2015 (Shopee, trader based in Surabaya) and December 2015 (OLX, trader based in Denpasar), but the availability of butcherbirds in trade was discussed as early as June 2010, and more frequently after 2012, on specialised online songbird forums such as OmKicau.

In February 2022, most sellers were found to advertise single birds for sale (or at least did not indicate that more than one bird was available), but some had up to seven birds for sale. We obtained 43 independent asking prices (or 59 when batch size was considered) for hooded butcherbirds and one for a black butcherbird. The one asking price for a black butcherbird was US$122. The asking price for hooded butcherbirds ranged from US$84 to US$296, with two very high asking prices of US$680 and US$1,046 for two individual birds that were advertised as having exceptional singing abilities. Excluding these two high asking prices, the mean asking price was US$185 ± 163. We obtained asking prices from traders based in the provinces of Lampung (one city), Banten (one city), Jakarta (one city), West Java (three cities), Yogyakarta (two cities), Central Java (one city), East Java (two cities) and South Kalimantan (one city). The government recommended minimum monthly wage differs substantially between these cities, ranging from a low of US$133 to a high of US$336. We found a positive relationship between a city's recommended minimum monthly wage (reflecting purchasing power) and the asking price for butcherbirds (Pearson's Product Moment Correlation $R = 0.742$, $N = 12$, $P = 0.006$) (Fig. 2).

In February 2022, we found ten Indonesian Facebook groups dedicated to the trade in butcherbirds based on the islands of Batam, Java, Bali and Papua. The earliest were established in 2015 (Denpasar, Semarang, Madiun and East Java), and the most recent one in 2021 (Surabaya). The number of members average 1400 and the Facebook group with the largest number of members, 3300, based in Semarang. Given that people can be a member of multiple Facebook groups, it is difficult to gauge the total number of people that are interested in buying and selling butcherbirds.

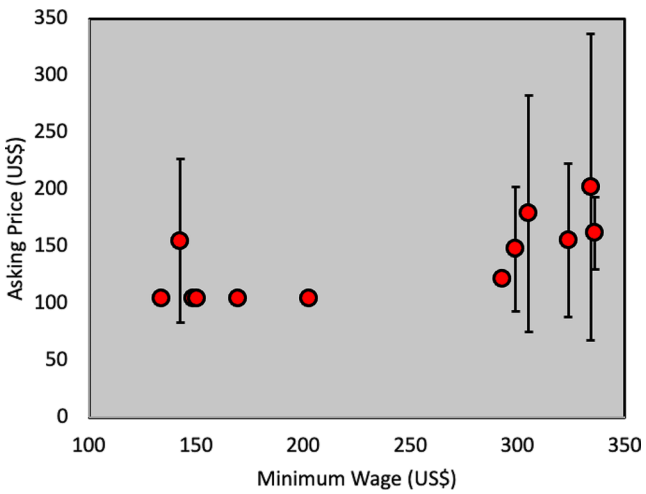

Fig. 2 Relationship between a city's government recommended monthly minimum wage for 2022 and the asking price for butcherbirds (mean ± sd), showing that prices differ in relation to an areas' spending power

Combining data from the online platforms and market surveys, there is a negative relationship between the mean number of butcherbirds on offer and the distance to Sorong, the capital of West Papua, and the main commercial center within the area where butcherbirds occur (Pearson's R=-0.694, $N = 21$, $P = 0.0005$, based on log-transformed data) (Fig. 3). Thus, on average, higher numbers of butcherbirds are observed for sale the nearer to these species' natural distribution range.

Indonesia's annual harvest and trade quotas

Indonesia sets a harvest and export quota annually for all non-protected species in the country that may be taken from the wild for domestic trade and for commercial export. The quotas stipulate the number of individuals of each species allowed to be removed from the wild, the province or district from which they may be taken, and the purpose of the trade (pets, consumption, etc.) (Table 2).

Prior to 2019, there have not been any annual quotas for the removal of butcherbirds from the wild in Indonesia (dating back to at least 2010 – we do not have access to quotas before then). In 2016, however, hooded butcherbird was mentioned in the quotas, with a zero quota but with a note stating that population studies are required for species endemic to Papua (Kementerian Lingkungan Hidup dan Kehutanan 2016). It is not known, however, if any such studies have been carried out.

Of the four species of butcherbird native to Indonesia, quotas have only been set for hooded and black butcherbirds. Over the three-year period, a total of 430 hooded butcherbirds and a total of 50 black butcherbirds were allowed to be captured from the wild per harvest quotas (Table 2). No quotas were set for the capture of the other two Indonesian butcherbird species. The 2022 quotas do not allow for the legal capture of any butcherbird species (Kementerian Lingkungan Hidup dan Kehutanan 2022).

Discussion

International trade records for butcherbirds are scarce, but there have been some indications of early trade, such as a study by Nash (1993), who reported an unspecified number

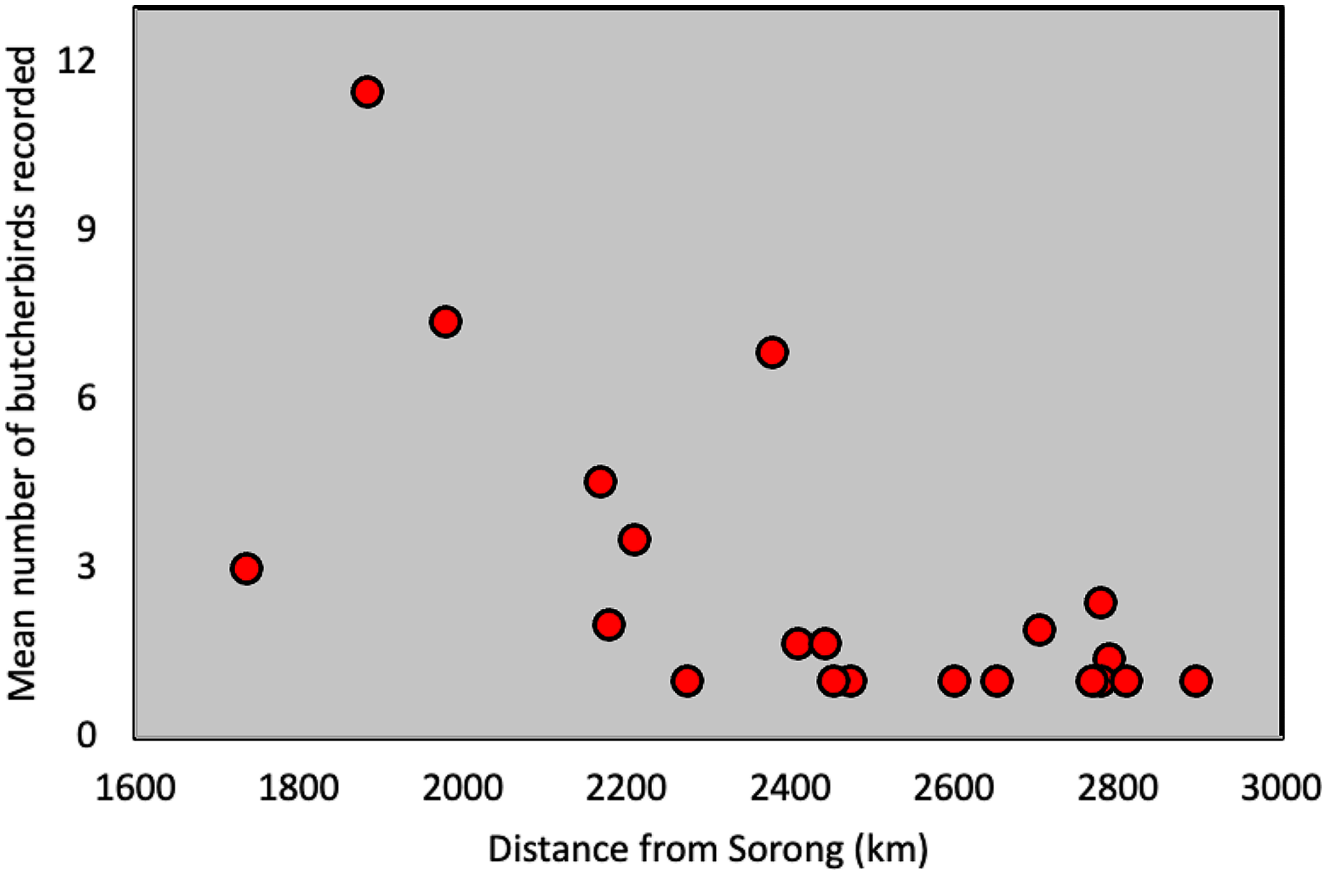

Fig. 3 Relationship between the number of butcherbirds for sale in a city in western Indonesia and its straight-line distance to Sorong in West Papua, part of the natural distribution range of butcherbirds

Table 2 Harvest and trade quotas for butcherbirds in Indonesia 2010–2022

Year	Species	Total removed from the wild	Number of birds permitted to be captured	Province where capture may take place
2010–2018	none	N/A	N/A	N/A
2019	hooded butcherbird	130	30	Papua
			100	West Papua
2020	hooded butcherbird	150	50	Papua
			100	West Papua
	black butcherbird	50	50	Papua
2021	hooded butcherbird	150	50	Papua
			150	West Papua
2022	none			

of hooded butcherbirds for sale in Singapore during surveys carried out in 1991–1993. The trade in butcherbirds in Indonesia seems to have come into fashion around 2015, which is when they first emerged in the country's markets and Facebook groups. Rapidly shifting trade trends and sudden rises in species' popularity have previously been observed in Indonesia (Chng et al. 2017). The reasons behind sharp species-specific trade increases can be manifold. In some cases, new species are used as substitutes for popular species that have become scarce in the wild due to overexploitation (Eaton et al. 2015). In other cases, trade trends are dictated by popular culture and/or collectors' and hobbyists' desire for novelty (Nijman and Nekaris 2017). Once a species or a species group gains a highly devoted or even a "die-hard" group of enthusiasts, demand can quickly rise exponentially. In the case of butcherbirds, highly popular (or "viral") videos – where video clips are shared rapidly over the Internet to a wide audience – of duetting pairs are likely to have played a role in driving trade interest and demand. A better understanding of the dynamics behind bird trade trends is of crucial importance as it may help us pre-emptively identify potential target species and anticipate trade surges, which can then be managed before trade reaches levels of overexploitation.

The butcherbirds we recorded in physical markets were often offered in conjunction with other Papuan songbird species like friarbirds *Philemon* spp. and pitohuis *Pitohui* spp. This suggests a degree of opportunistic poaching and

likely shared trade routes, but the multiple online communities we found dedicated exclusively to butcherbirds suggest that groups of specialized fanciers have been established. For all but the Australian magpie, there is no evidence of any captive breeding, and the difficulty of captive breeding is assessed as "hard" for all four species (Juergens et al. 2021). Even if commercial captive-breeding becomes an economic viable possibility, there is a good chance that wild-caught birds remain more valued because of their more varied songs. Without evidence of captive breeding, this specialised interest is likely to lead to ongoing demand for wild-caught butcherbirds for the foreseeable future.

The trade in butcherbirds has been recorded by other research teams, but identification to the species level may have been incorrect such as records of the Tagula butcherbird that are likely to have been a misidentification of the similar-looking black butcherbird (Indraswari et al. 2020). The SITDB contains evidence of trade in the black butcherbird, Australian magpie, hooded butcherbird and black-backed butcherbird (Bruslund et al. 2023). Okarda et al. (2022) recorded 235 hooded butcherbirds in the online trade and asking prices between US$17 and US$420. The same study also recorded trade in five Australian magpies. The upper end of this price range agrees with our findings reported here, but the lower end is considerably less than what we observed.

The bird trade in Indonesia is largely carried out in contravention of the country's laws and regulations (Eaton et al. 2015; Nijman et al. 2019; Shepherd and Leupen 2021). Indonesia's bird markets, among the biggest in the world (Nash 1993; Chng et al. 2015), are largely stocked with birds captured outside this quota system, numbering in the hundreds of thousands annually (Chng et al. 2015). The encountered butcherbird trade was carried out openly, illustrating a clear disregard for laws or risk of enforcement action. Lack of enforcement may be attributed to various factors; however, the scale of the trade may make enforcement in Indonesia's bird markets even more challenging considering the cost of enforcement, which as stated by Keane et al. (2008) includes training and salary support for enforcement staff, supplies and potentially other costs. Online trade was similarly carried out openly, with traders appearing in photos with the birds and with their names and contact details included. Facebook's terms and policies state that listings may not promote the buying or selling of animals or animal products, and this includes live animals, livestock, and pets. This policy dates to at least 2017 but it is evident that in the case of butcherbirds in Indonesia this policy is not adhered to. Similarly, the e-commerce site where butcherbirds were found to be offered for sale explicitly forbid their sale (no pets; no animals are allowed to be sold; no animals and wildlife products, including without limitations wild animals). Non-compliance of social media sites and e-commerce platforms to violations of their own terms and conditions have been noted in previous research (summarised in Nijman 2022) and with enforcement of this being completely in the hands of the social media companies, it is challenging to curb the online trade in animals such as butcherbirds.

Although Indonesia's butcherbirds are currently classified as Least Concern on the Red List, the potential impact of the illegal or unsustainable trade should not be underestimated or dismissed. Birds once considered very common in Indonesia, such as the Oriental magpie-robin *Copsychus saularis* and the Javan myna *Acridotheres javanicus*, have now been all but extirpated from their Indonesian ranges due to high and continuous demand from the cage bird industry (Mittermeier et al. 2014; Chng et al. 2017; Chng et al. 2021). Birds with outstanding singing abilities are in greatest demand (Jepson 2008; Marshall et al. 2020a; Shepherd et al. 2020; Mirin and Klinck 2021; this study). Given their unique song, mimicking abilities, and duetting behaviour, it would not be surprising if the popularity of butcherbirds continues to increase. Wild populations are likely to suffer if illegal, quota-exceeding trade continues, with range-restricted subspecies such as black-backed butcherbird *C. mentalis mentalis* and Australian magpie *G. tibicen papuana*, both of which occur in the southern and lowland parts of the Trans-Fly region of New Guinea, being at particular risk.

Given the continual onslaught of poaching and trade to supply the seemingly relentless demand for songbirds in Indonesia and the increasingly obvious cycle of replacing species that have been all but decimated with new species, urgent, preventive actions should be taken now. Specifically, we make the following recommendations:

The authorities in Indonesia, including the police, the forestry police, officers of the regional natural resource management agencies, in Indonesia should take legal action against anyone found involved in poaching, or illegally selling, buying or keeping any of the four species of butcherbirds native to Indonesia. Efforts to disrupt trade should be enhanced, increasing the likelihood of offenders being caught. Offenders should be penalised significantly so as to create a deterrent among the bird trading society in Indonesia; successful prosecutions should be widely publicized (by means of sending out press releases or holding press conferences) to inform the Indonesian public that illegally trading in wildlife has consequences.

The authorities and conservation organisations should collaborate and take steps to ensure deterrents are in place in source areas to persuade local people not to poach this species from the wild, and to reduce demand among bird hobbyists and other potential consumer groups.

Organisations monitoring the bird trade in Indonesia, and in other countries where Indonesian birds are known to be traded, should be vigilant for these species and record observations, prices, sources and destinations where possible, in order to track the dynamics of this trade, to support enforcement efforts, and to catalyse actions to reduce demand.

More research into the dynamics behind sudden shifts in songbird demand should be conducted. An improved understanding into these dynamics will help the conservation community and government authorities to anticipate new trends and design effective preventive interventions. Further research into the species population dynamics in areas where they are trapped will be useful. While at present the quotas for butcherbirds are set at zero it would still be valuable to make a proper non-detriment finding for these species (i.e., how many can be harvested without it negatively affecting the wild population) in case future requests for their trade are made.

Finally, the Red List assessments of the four butcherbird species native to Indonesia should be revised to include commercial trade as a potential threat to their long-term conservation.

Conclusion

The vast majority of birds sold in Indonesia have been taken from the wild and traded in violation of Indonesia's annual harvest and quota system (Nijman et al. 2009, 2018, 2020; Chng et al. 2015, 2017, 2021; Harris et al. 2015, 2017; Burivalova et al. 2017; Miller et al. 2019; Nash 1993; Indrawasari et al. 2020 Marshall et al. 2020a, 2021; Pires et al. 2021; Rentschlar et al. 2018; Setiyani and Ahmadi 2020; Shepherd and Leupen 2021; Nijman 2022; Al Fashaa et al. 2023), undermining the authority's efforts to protect species from over-exploitation. As popular songbird species become increasingly rare, or as local fashions shift, new species appear in the markets, such as the butcherbirds. These shifting trends often lead to the establishment of species group-specific hobbyist groups and singing competitions, which furthers the pressure on the populations of these birds, and the cycle of boom and bust continues, leading to a rapidly growing list of species being pushed towards extinction. Indonesia has adequate legislation to prevent this cycle, and to clamp down on the illegal songbird trade, and we urge the government to enforce these existing laws.

Acknowledgements We thank the the European Association of Zoos and Aquaria (EAZA) and the Cleveland Metroparks Zoo and Zoo Society for their support. We thank Loretta Shepherd, Rachel Boratto and two anonymous reviewers for helpful comments and edits.

Author contributions Chris R. Shepherd - data collection and analysis, writing and preparation of the manuscript for publication.Vincent Nijman - data collection and analysis, and writing of the manuscript. S. Sunny Nelson - data collection and analysis, and writing of the manuscript. Boyd T. C. Leupen - data collection and analysis, and writing of the manuscript. Simon Bruslund - data collection and analysis, and writing of the manuscript.

Funding This project was funded by the European Association of Zoos and Aquaria (EAZA) and the Cleveland Metroparks Zoo and Zoo Society. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Data availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical statement Research was conducted in compliance with Monitor Conservation Research Society?s Code of Ethics, and while we did not require institutional permission for observational research in animal markets, they were added to Oxford Brookes University?s Register of Activities Involving Animals (2016?2023). Discussions with traders followed the ethical guidelines proposed by the Association of Social Anthropologists of the UK and Commonwealth. No identifiable information on individuals or businesses were collected during this study.

Competing interests The authors declare no competing interests.

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