which is crucial to informing future conservation efforts. Assurance colonies have also grown for a number of priority species, with more breeding stock acquired and breeding facilities expanded.

From 19 to 21 February 2017, the second Asian Songbird Trade Crisis Summit, organized by Wildlife Reserves Singapore and TRAFFIC, took place at Jurong Bird Park, Singapore. Approximately 60 experts came together to discuss this progress and to look ahead to the implementation of the strategy. Participants discussed a variety of future actions ranging from advocating the closure of illegal markets, motivating enforcement actions, breeding highly threatened species in captivity for eventual release in the wild, and the need for further research and monitoring of trade and wild populations. Opportunities to raise global awareness of this crisis through campaigns by zoos were also discussed at length.

Other priority action areas included improving knowledge on wild populations, community-based interventions to reduce poaching and reduce demand for wild birds, supporting law enforcement successes along the trade chain and developing a plan for the rehabilitation and release of confiscated birds.

The Government of Indonesia is strongly encouraged to take immediate action to close down the markets facilitating the illegal and unsustainable trade in songbirds. It is also vital that the governments of other South-east Asian nations take stronger measures to protect songbirds from unsustainable over-exploitation and shut down pet shops and markets facilitating illegal trade.

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GREATER GREEN LEAFBIRDS: the trade in South-east Asia

It is widely known that the greatest threats to Indonesia’s avian species are illegal and unsustainable wildlife trade and habitat loss largely due to conversion of forest to agricultural production (Sodhi and Brook, 2006). Yet, our understanding of the nature and severity of these impacts on most species is limited, with basic information on the current population status of avian species in Indonesia lacking (Lee et al., 2017). Over 169 avian species in Indonesia are now listed as globally threatened by the International Union for Conservation of Nature (IUCN) and BirdLife International (2016a), with harvest and trade to meet national demand amongst the leading threats. A number of these species are in demand in Indonesia for the popular hobby of bird keeping, which is also seen as a sign of wealth, sophistication, and status (Jepson and Ladle, 2005; Jepson et al., 2011), and it is this practice which is driving demand for the capture of wild birds.

Monitoring bird markets is an important tool to gain insights into the dynamics of the wild bird trade and to identify species of concern (Courchamp et al., 2006; Wilcove et al., 2013; Harris et al., 2015). Of the over 300 species traded in Indonesia, the volume of trade in one species in particular has shown a rapid increase. The Greater Green Leafbird Chloropsis sonnerati, the largest of the leafbirds, is native to Sundaland, including Brunei Darussalam, Indonesia (Sumatra, Borneo, Java and the outlying islands of Natuna, Riau archipelago, Nias, Bangka and Belitung), Malaysia, south Myanmar, Singapore and south Thailand (Wells, 2016). The race zosterops was previously considered to be common where habitat remains, in lowland forest and occasionally heavily wooded parkland and tree-shaded plantations, up to 1100 m (Wells, 2016), but both this and the race sonnerati are now thought to be uncommon, becoming scarce (Eaton et al., 2016).

The capture of and trade in the Greater Green Leafbird is banned in parts of its native range (Malaysia, Singapore, Thailand) but not others (Brunei, Indonesia, Myanmar). Although the Greater Green Leafbird is currently not listed as a protected species in Indonesia, only species with a harvest quota are permitted to be harvested from the wild; as there is no harvest quota for the Greater Green Leafbird, in theory trapping is not permitted.

This species has been observed in trade for decades. Nash (1993) noted that the Greater Green Leafbird was the 19th most numerous bird on sale in Singapore in
IUCN Red List of Threatened Species from Least Concern to Vulnerable, with a decreasing population trend, due to evidence that trade is a far greater threat to the species than previously thought (BirdLife International, 2016a). This paper consolidates existing knowledge from recent research on the rise of poaching and trade of this species in South-east Asia, and proposes steps to prevent further declines.

**METHODS**

Information on wild populations was obtained through informal discussion with experts in the field, including professional bird-watching tour leaders, field researchers and wildlife trade experts. Questions covered whether there was any anecdotal evidence of poaching, the frequency in sightings and any population trends at individual localities or range of the species.

A two-month field study in June and July 2015 across 119 point counts in Gunung Palung National Park, West Kalimantan, was also carried out by a team of two (A.E. Miller, and a field assistant) to investigate the impacts of trade on wild bird populations. The data presented here form part of a larger study including additional counts and areas in 2017.

Full inventories of markets in Indonesia were carried out in July 2014 in Barito, Pramuka, Jatinegara (Jakarta) (Chng et al., 2015); surveys in June 2015 were undertaken in Yogyakarta (Central Java), Bratang, Kupang, Turi (Surabaya, East Java) and Malang (East Java) (Chng and Eaton, 2016a); and in Bandung (West Java) in September 2016 (Chng et al., 2017). In West Kalimantan, three large surveys were conducted from July to December 2015, February to March 2016, and June to August 2016, from which data on Greater Green Leafbirds were extracted and analysed. Each consisted of four sub-surveys to cover all major cities and provincial roads within the province: one survey involved four separate teams working in: (a) Pontianak (capital of province), (b) north-west coast (Pontianak to Sambas), (c) the interior of West Kalimantan (Pontianak to Kapuas Hulu), and (d) the south-west coast (Pontianak to Ketapang). Provincial roads were used to map out markets, where species were identified and data collected on prices, volumes, and place of origin. Additionally, in August 2016, one survey was conducted in Palangkaraya, the capital city of Central Kalimantan.

Additionally, as part of the Kalimantan research, informal interviews were conducted with shopkeepers to gain insight into the socio-economic dynamics of the trade, and to identify any rise in demand for and price of species over the past five years. Price has been shown to be an accurate indicator of species status in the wild as increasing prices and corresponding decreasing trade volumes may indicate species rarity (Harris et al., 2015).

Information was also obtained from other published and unpublished literature on the bird trade in this region, from open media and from enforcement agencies.

The exchange rates used were: USD1=IDR11 650 (July 2014); USD1=IDR12 500 (July 2015 to August 2016); and USD1=IDR13 100 (September 2016). The inflation calculator at fxtop.com was used to account for inflation for historical prices.
Results

Field observations

The field survey in Gunung Palung National Park found Greater Green Leafbirds present at only nine of 119 point count sites in two months of sampling. As this species should be common in the lowland forests of Gunung Palung, its lack of appearance across point counts raises cause for concern. In the past five years of birding in the lowland forests in Peninsular Malaysia by one of the authors, the species is now rarely encountered (in the States of Johor, Pahang, Kedah and Perak), and is vastly outnumbered by Lesser Green Leafbird; both used to be observed regularly. Where once it was recorded almost as regularly as Lesser Green Leafbird, on most birding days the species is no longer seen (J.A. Eaton, pers. obs.). Recent visits to Sumatra reveal the same, and it is the species is no longer seen (J.A. Eaton, pers. obs.). Another field expert noted that bird trappers in Kalimantan, the authors found 13 498 individuals from 123 species in over 90 shops. The Greater Green Leafbird was the fifth most commonly traded species in this area, with 720 individuals for sale.

Prices for this species appear to have increased over time. In 1987, a specimen cost IDR27 500 (equivalent to IDR345 816 in 2014) (Basuni and Setiyani, 1989). Then, it was of similar value to other popular songbirds such as Straw-headed Bulbul and Chinese Hwamei Garrulax canorus. Contemporary prices have risen slightly to IDR512 600 (USD44) in 2014 (Chng et al., 2015) and ranged between IDR350 006 and IDR1 296 900 (USD28 and USD99) in 2016. However, there appear to be multiple factors determining the value of birds, based mostly on the quality of their song and singing abilities. Interestingly, female Greater Green Leafbirds were also offered for sale, despite their lack of singing prowess; one vendor claimed that an adult female bird was a young male, suggesting that sellers may try to pass the females off as more valuable males.

Additionally, when 20 shop owners in West Kalimantan were asked which five species had increased the most in price over the past five years, the Greater Green Leafbird and White-rumped Shama were the species most commonly cited, with 75% of shop owners indicating a price increase. When asked which three species were the hardest to find in West Kalimantan, 58% of respondents indicated the White-rumped Shama, 33% the Oriental Magpie-robin Copsychus saularis and 25% noted the Greater Green Leafbird and Straw-headed Bulbul. Demand for this species is clearly high and increasing. Greater Green Leafbirds from Kalimantan were also deemed to be more prized than those from Sumatra or Java; the winner of the “president cup bird competition”, the most prestigious bird-singing competition award in Indonesia, was a Greater Green Leafbird from Kapuas Hulu in West Kalimantan.

Greater Green Leafbirds have also been recorded for sale in Thailand and Singapore albeit in much smaller volumes (TRAFFIC data). The source of these birds is unclear. Outside Indonesia, just 12 individuals were observed in Bangkok, Thailand, in four surveys between March 2015 and February 2016 (23 surveys between 1999 and 2016; Chng and Eaton, 2016b; Chng and Shepherd, in prep.) and seven in Singapore (survey of pet shops in November to December 2015; Eaton et al., 2017). None was observed in a 2016 survey of bird shops in Ho Chi Minh City and Hanoi, Viet Nam (Eaton et al., in prep.). It is clear that the epicentre of this trade is in Indonesia.

Seizures

Worrying volumes of Greater Green Leafbirds have been confiscated, especially in Indonesia. Between October 2014 and September 2016, 13 seizures of at least 2244 Greater Green Leafbirds were seized in Indonesia, apart from a single individual in Malaysia. Based on seizures information, most shipments originate from Kalimantan and Sumatra, and are destined for major cities in Java; 2019 of the birds were seized by port
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SHORT REPORT

Yogyakarta, traders indicated that the birds originated both from Sumatra and Kalimantan, along with other species such as White-rumped Shama and Oriental Magpie-robin. In West Kalimantan, traders interviewed suggested that Greater Green Leafbirds are sourced locally; they are then either sold to local shops or transported to major port cities for onward transport to Java. Traders in Bengkayang district in Indonesia were found to be actively smuggling birds across the border with Malaysia, one trader dealing in as many as 6000 Greater Green Leafbirds a month from Malaysian Borneo to Kalimantan. Anecdotal evidence from locals indicated that many individuals along the Indonesian-Malaysian border in Borneo have traded large volumes of Greater Green Leafbirds, indicating that the species has declined greatly in or even been extirpated from West Kalimantan and that trappers are seeking new forests to target this species. Eaton et al. (2016) states that 5000 individuals a month are currently being imported into Kalimantan from Sarawak.

Conclusions and Recommendations

The illegal harvest from domestic and cross-border sources and trade to supply the growing demand in this species is of increasing concern. It is clear that over the past decade or so the extent of occurrence of the Greater Green Leafbird has been greatly reduced, with declines noted in parts of its range, and extirpations a possibility in many other areas. Increasing levels of exploitation are demonstrated from market data, which, judging by other species similarly in demand for and heavily hit by the caged bird trade such as Straw-headed Bulbul (BirdLife International, 2016b), will eventually plateau as a result of rising prices and a difficulty in obtaining wild-caught Greater Green Leafbirds owing to its rarity. The authors believe that high demand and the medium-to-high (but potentially decreasing) supply, has placed this species at a tipping point.

The following steps need to be taken immediately if the Greater Green Leafbird is not to be terminally affected by current trade levels: while the reclassification of this

<table>
<thead>
<tr>
<th>Province</th>
<th>Market</th>
<th>Date</th>
<th>No. of individuals</th>
<th>No. of stalls/shops</th>
<th>% of total birds</th>
<th>Price USD</th>
<th>Price IDR</th>
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<tbody>
<tr>
<td>West Java</td>
<td>Jakarta</td>
<td>21–22 July 2014</td>
<td>1248</td>
<td>72</td>
<td>6.60</td>
<td>44.00</td>
<td>512 600</td>
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<tr>
<td>Central Java</td>
<td>Yogyakarta</td>
<td>24 June 2015</td>
<td>89</td>
<td>17</td>
<td>2.20</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>East Java</td>
<td>Malang</td>
<td>23 June 2015</td>
<td>193</td>
<td>23</td>
<td>4.00</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>East Java</td>
<td>Surabaya</td>
<td>22 June 2015</td>
<td>378</td>
<td>58</td>
<td>2.70</td>
<td>NA</td>
<td>NA</td>
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<td>West Kalimantan</td>
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<td>July–December 2015</td>
<td>325</td>
<td>86</td>
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<td>68.00</td>
<td>850 000</td>
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<tr>
<td>West Kalimantan</td>
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<td>February–March 2016</td>
<td>226</td>
<td>118</td>
<td>4.10</td>
<td>65.80</td>
<td>822 500</td>
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<td>West Kalimantan</td>
<td>Pontianak, NW Coast, Interior, SW Coast</td>
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<td>7.50</td>
<td>44.00</td>
<td>550 000</td>
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<td>Palangkaraya</td>
<td>August 2016</td>
<td>70</td>
<td>16</td>
<td>8.50</td>
<td>28.00</td>
<td>350 000</td>
</tr>
<tr>
<td>West Java</td>
<td>Bandung</td>
<td>3 September 2016</td>
<td>17</td>
<td>13</td>
<td>0.53</td>
<td>99.00</td>
<td>1 296 900</td>
</tr>
</tbody>
</table>

Table 1. No. of Greater Green Leafbirds observed at various market locations in Indonesia. Prices cited are the first prices given by the vendors.

Discussion

Much of the demand in Greater Green Leafbirds centres around the cage bird trade in Indonesia, particularly the phenomenon known as kicau mania, as the bird-singing competition is known. In recent years, the species has been included as a category for songbird competitions, which is likely to have increased demand for the species. This bird is an excellent songster, and able to mimic the song of other species such as White-rumped Shama and Asian Fairy Bluebird. The singing ability of other species of leafbirds is deemed to be inferior, but it is possible that demand may be displaced to these species when the Greater Green Leafbird becomes difficult to obtain. Interviews with trappers noted that possession of this species is now “fashionable”. The higher asking prices for good quality birds reflects this, and is likely to continue rising in response to increasing rarity (Harris et al., 2015).

Origin of Greater Green Leafbirds

In Jakarta, traders suggested the Greater Green Leafbirds originated from Sumatra (traders referring to them as “Lampung”, a generic term used to describe birds from Sumatra, which is the nearest port to Java). In Surabaya and Yogyakarta, traders indicated that the birds originated both from Sumatra and Kalimantan, along with other species such as White-rumped Shama and Oriental Magpie-robin.

In West Kalimantan, traders interviewed suggested that Greater Green Leafbirds are sourced locally; they are then either sold to local shops or transported to major port cities for onward transport to Java. Traders in Bengkayang district in Indonesia were found to be actively smuggling birds across the border with Malaysia, one trader dealing in as many as 6000 Greater Green Leafbirds a month from Malaysian Borneo to Kalimantan. Anecdotal evidence from locals indicated that many individuals along the Indonesian-Malaysian border in Borneo have traded large volumes of Greater Green Leafbirds, indicating that the species has declined greatly in or even been extirpated from West Kalimantan and that trappers are seeking new forests to target this species. Eaton et al. (2016) states that 5000 individuals a month are currently being imported into Kalimantan from Sarawak.

Conclusions and Recommendations

The illegal harvest from domestic and cross-border sources and trade to supply the growing demand in this species is of increasing concern. It is clear that over the past decade or so the extent of occurrence of the Greater Green Leafbird has been greatly reduced, with declines noted in parts of its range, and extirpations a possibility in many other areas. Increasing levels of exploitation are demonstrated from market data, which, judging by other species similarly in demand for and heavily hit by the caged bird trade such as Straw-headed Bulbul (BirdLife International, 2016b), will eventually plateau as a result of rising prices and a difficulty in obtaining wild-caught Greater Green Leafbirds owing to its rarity. The authors believe that high demand and the medium-to-high (but potentially decreasing) supply, has placed this species at a tipping point.

The following steps need to be taken immediately if the Greater Green Leafbird is not to be terminally affected by current trade levels: while the reclassification of this
species to Vulnerable is to be welcomed, the authors believe that an Endangered listing would more accurately reflect the rates of decline. A lack of quantitative evidence of rates of population decline hindered the meeting of criteria for listing the species as Endangered (projected decline of >50% over 10 years). Researchers and birdwatchers are therefore urged to share their recent observations of the species in the wild with the authors. More research is also needed into the supply of birds moved from Malaysia to Indonesia for the trade. It is recommended that the Indonesian Government considers adding Greater Green Leafbird to the list of protected species, which will allow for improved regulation of the trapping and trade of the species. The Natural Resources Conservation Agency (BKSDA) under the Directorate General of Forest Protection and Nature Conservation (KKH)—responsible for the regulation of harvest and trade in wildlife in Indonesia—should take action to reduce and eventually eliminate illegal trade of this species in the country’s bird markets. Where confiscations take place, it would be constructive if the authorities can work with local conservation groups and birders to rehabilitate the birds and release them in forests that are well patrolled by rangers and the birds therefore less likely to be hunted.

Education awareness and demand reduction campaigns should be designed and implemented to discourage buyers from purchasing Greater Green Leafbirds. It is recommended that songbird competition groups phase out the use of Greater Green Leafbirds and other wild-caught birds, focusing instead on common avicultural species such as canaries, which are legitimately bred in captivity. Although other leafbird species are not as sought after as the Greater Green Leafbird, they may be increasingly targeted as numbers of this species decline. It is important that bird markets are policed regularly and the trade in all leafbirds monitored closely for early warning signs so that action can be taken to safeguard these increasingly vulnerable species.

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