OPEN SEASON:

An analysis of the pet trade in Medan, Sumatra 1997 - 2001

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Photograph credit (cover): Black-capped Lory *Lorius lory,* for sale in Medan, Sumatra
(Chris R. Shepherd/TRAFIC Southeast Asia)

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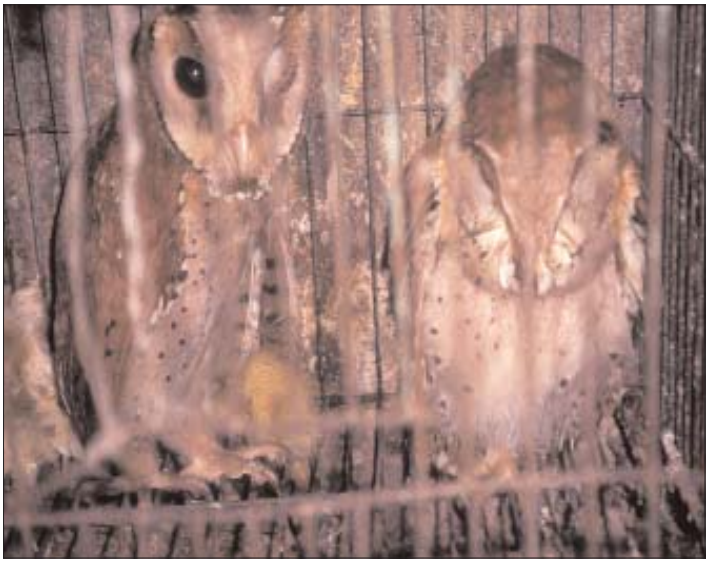

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Oriental Bay Owls *Phodilus badius*

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EXECUTIVE SUMMARY

This is the first thorough investigation into the very large and diverse trade in live wild animals for pets in Medan, Sumatra, Indonesia. Monthly surveys of the wildlife markets conducted between 1997 and 2001, supported by interviews with various stakeholders (harvesters, merchants and consumers), were used to produce a comprehensive inventory of the bird, mammal and reptile species found in the live animal trade in Medan, as well as information regarding harvest methods and consumer uses. A total of 300 species of birds from 54 families, 34 species of mammals from 15 families and 15 species of reptiles from 11 families were recorded during the five years of this study.

Legislative analysis determined that a significant portion of the trade was illegal, violating Indonesian wildlife protection laws. It was also found that the bulk of the trade fell outside the scope of CITES[1], either because it was of domestic origin and not destined for export, or because the species concerned were not listed under the Convention, or both. Much of the wildlife was harvested locally, especially from the nearby Gunung Leuser National Park, and the trade has likely had some adverse impacts on Indonesia's biological diversity – although very little is known about the status of wild populations in Sumatra. This report documents the large volume of wild-caught specimens traded in the markets, and makes indirect conclusions concerning the impact on wild populations, with the understanding that further research is required to better quantify this impact.

Improved protection under national legislation or by listing in the CITES Appendices is required for certain species. Furthermore, enforcement agencies should be encouraged to better enforce national legislation and CITES regulations. While legislation in Indonesia is relatively comprehensive, enforcement effort and efficiency remain insufficient to combat the current levels of wildlife trade.

More comprehensive law enforcement at ports of entry (airports and seaports) and exit is crucial, and therefore capacity building is essential for enforcement personnel based at all entry and exit-points. Lack of species identification skills within the local enforcement agencies greatly restricts law enforcement efforts.

Regular monitoring of the wildlife markets in Medan should continue so that further trends in the trade may be identified. Establishment of an efficient and accurate monitoring mechanism would facilitate management and law enforcement, leading to better compliance with national and international legislation, and by extension, greater conservation benefit.

[1] CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora

INTRODUCTION

The city of Medan, in the province of North Sumatra, Indonesia, is one of Southeast Asia's major centres for domestic and international trade in wildlife. However, despite the large volume of wildlife that passes through the markets of Medan, the trade has not been documented in any detail. This report attempts to address this gap, and presents the findings of a five-year investigation, from January 1997 to December 2001, into the trade dynamics of Medan's live wild animal markets.

Objectives

The main objectives of this survey were to document: (i) the species being traded in the live wild animal markets of Medan; (ii) how many of the species that were traded were protected by law; and (iii) trade routes and other market dynamics. In addition, supplementary information was collected regarding the reasons for trading various species, the most heavily traded species, harvesting techniques, and local consumer demand and types of use. The investigation was limited to the pet markets, and as such, excluded from consideration businesses in Medan that collected and exported species to supply foreign meat or leather markets, such as the massive exports of freshwater turtles and tortoises to China (Shepherd, 2000) and the python and monitor lizard skin trade to Europe, Japan and elsewhere.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Cages of animals outside the shops in the Jalan Bintang market

Ultimately, it is hoped that this report will bring attention to the scale and extent of the wildlife trade in Medan, and the adverse impacts that it has on the region's biodiversity. With the information and recommendations presented, this report should significantly contribute to the planning and implementation of initiatives on multiple levels, and by multiple parties, to redress the wholesale and illegal loss of Southeast Asian biodiversity to wildlife trade.

Rationale

Undocumented TRAFFIC observations had suggested that the trade in wildlife for the pet market in Medan was extensive and possibly of conservation concern. The study reported here was carried out to document the scope and extent of this trade objectively.

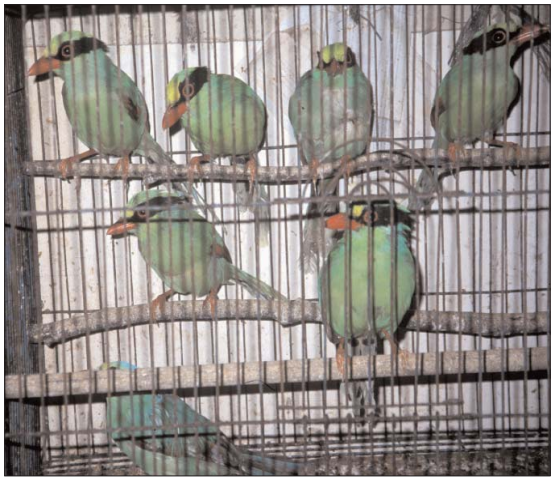
It was also suspected that the pet trade in Medan was having impacts on the wildlife of Gunung Leuser National Park (GLNP). Much of the wildlife in Medan's pet markets was, according to wild animal dealers in Medan, being harvested from this park. Better knowledge of the pet trade and the areas supplying it would permit an evaluation of its effects on GLNP, which may have important implications for the management and protection of the Park.

The issues and problems encountered when considering the illegal wildlife trade in Medan are not unique to the city or the country. The results, conclusions and recommendations presented in this report have wider applications to Indonesia and elsewhere. Furthermore, it is hoped that the methods used can provide a model for conducting accurate market surveys and analysis of trade dynamics in other areas.

BACKGROUND

Wildlife trade in Indonesia

The trade in wildlife is a direct threat to wild populations of many species throughout Indonesia. While some of the trade is international, the majority is domestic. Indonesia is by far the largest producer and consumer in the Southeast Asian bird trade, and the domestic trade dwarfs the internal trade of any other country in Southeast Asia, and perhaps even its own export trade (Nash, 1993). Keeping birds and other animals is very popular in Indonesia, with birds being the most popular household pet (Jepson, 2002). Many people keep endangered and protected species as symbols of the owners' status, with endangered species indicating that the owner is above the law. Jepson (2002) found that higher-income households were more likely to keep species of conservation concern. Almost every town or city has a bird market, or at least stalls selling birds within the main markets; and in places where no such markets exist, sellers peddle birds door-to-door (Nash, 1993). Unfortunately, little is known of this domestic trade and even less of how the trade is affecting wild populations.



Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Green magpies *Cissa chinensis in the* Jalan Bintang Market

Declines of certain species as a result of trade have been noted by various authors in the past (these are referenced in the species observations – see section on *Species recorded in trade*). However, the trade was poorly documented, and there has been very little research looking at the overall effects of the wildlife trade on the conservation status of wildlife.

Medan and its surroundings

Medan

Medan is the capital of North Sumatra Province, on the Indonesian island of Sumatra. With a population of more than two million inhabitants, Medan is the largest city in Sumatra and the third largest in Indonesia. The city has an international airport and an international seaport, and serves as Sumatra's primary port of entry and exit.

Gunung Leuser National Park

Gunung Leuser National Park encompasses much of the forest system that is closest to Medan. At approximately 9 000 km^2 in size, it is one of the largest tropical rainforest reserves in the world (Wind, 1996),

and is the second largest protected area in Sumatra. The park is situated within a larger area, known as the Leuser Ecosystem, which includes the buffer zone areas around the park. It is extremely rich in wildlife. Of the 602 species of birds recorded from Sumatra, approximately 380 species of birds (of which more than 350 are resident) are found in the park, including all of the Sumatran species listed in the IUCN's Red Data Book (Wind, 1993). Sumatra has a recorded list of 205 mammal species, 129 of which are thought to live in the Gunung Leuser National Park (van Strien, 1996). Very little is currently known of the numerous reptile and amphibian species inhabiting the park.

Gunung Leuser National Park is situated north-west of Medan and the eastern edge of the park is less than 100 km from the city, and a number of major roads provide easy access into the park and along its borders. The park's rich biodiversity makes it a prime source for wildlife species found in Medan's wildlife markets, while its size makes protection and policing of its boundaries extremely challenging. The integrity of the park is being eroded at a rapidly increasing rate, mainly through illegal logging and poaching. Logging inside the park is widespread. Apart from the well-documented primary impacts of logging, logging operations and the associated creation of roads and other routes facilitate increased access into formerly remote areas of the park for poaching.

Medan as a centre for the wildlife trade

Medan is an important centre for the domestic and international trade of wildlife, because:

- local demand for wildlife and wildlife products in Medan is large;
- the international airport and seaport make Medan a central node in local, national, regional and global commercial wildlife trafficking routes;
- enforcement of existing legislation and regulations is insufficient;
- the proximity to the Gunung Leuser National Park and other forested areas means that there is a convenient, regular and high-volume local supply of wildlife for the markets.

Wildlife markets of Medan

Medan has three major wildlife markets which all deal in live birds. Two of the three also sell mammals and one occasionally deals in reptiles.

The first of these markets, located on Jalan Bintang (also called Dr. F. L. Tobing Street), is the largest wildlife market in Medan, made up of approximately 32 permanent shops. This market was also surveyed by Nash in 1993, at which time only 19 shops were selling birds. This market has the greatest variety in Medan of species which are sourced locally, from other parts of Indonesia, as well as from other Southeast Asian countries and globally.

The second market, Petisah, is smaller with approximately nine permanent shops. This market deals only in birds. While some of the species sold here are purchased from Jalan Bintang, others are supplied by local trappers or purchased directly from the large wildlife markets in Jakarta, Indonesia's capital on the island of Java.

The third wildlife market is on the northern outskirts of Medan in a community called Sembahe and is made up of approximately six roadside shops. Sembahe is situated very near the south-western edge of the Gunung

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Juvenile eagles awaiting sale in Sembahe market

Leuser National Park. According to the dealers, the majority of the mammal and bird species offered in this market are captured in the surrounding area, many from within the park boundaries. This market all but closed down in the beginning of 2000 due, according to dealers, to a decline in ease of supply for species in the surrounding area.

Legislation regulating wildlife trade in Indonesia

Domestic legislation

The *Act of the Republic of Indonesia on Conservation of Living Resources and Ecosystems* was passed in 1990. This Act, commonly known as the *Conservation Act* (*No. 5*) *of 1990*, provides the legal basis for the control and regulation of the wildlife trade (Nash, 1993). Intentional violations of this Act are punishable by imprisonment of up to five years and/or fines up to IDR 100 000 000 (USD 10 000 at 2000 rates). Violations through negligence are punishable by imprisonment of up to one year and/or fines up to IDR 50 000 000 (USD 5 000 at 2000 rates). Indonesian legislation allows the government to seize and confiscate specimens of protected animals involved in violations.

The agency responsible for implementing this legislation is the Department of Forest Protection and Nature Conservation, Indonesian Ministry of Forestry (*Perlindungan Hutan dan Konservasi Alam*) (PHKA). PHKA was formerly known as PHPA – *Direktorate Jenderal Perlindungan Hutan dan Pelestarian Alam* (Directorate General of Forest Protection and Nature Conservation). The agency under PHKA responsible for enforcing the *Conservation* (*No. 5*) *of 1990* is the Natural Resources Conservation Agency (KSDA). KSDA works with police, Customs and other relevant enforcement agencies and is responsible for tackling all forms of wildlife crimes.

Enforcement of the *Conservation Act* is severely lacking. Traders are fully aware of the law but continue to trade protected species. According to one member of KSDA in Medan, enforcement is difficult as very few, if any, KSDA staff members are trained in species identification. Lack of overall capacity and incentive is another obstacle. Furthermore, dealers in the bird markets claim that some members of the PHKA are involved in the trade themselves which, if true, would further complicate the issue.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Indonesia has been a Party to CITES since its accession to the Convention in December 1978, which entered into force in Indonesia in March 1979. While CITES regulations do not affect domestic trade, they do control international trade of CITES-listed species. National protection of species does not always correspond to CITES trade regulations.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Goffin's Cockatoos *Cacatua goffini* awaiting export

MATERIALS AND METHODS

Rapport with dealers

Probably the most important element in this study was the establishment of good relationships and rapport with the animal dealers. This rapport greatly facilitated the entire investigation on a number of levels. Not only did it allow for a significant channel of information through casual conversations and informal dialogues, but it also meant that when large, rare or other notable stock passed through the markets, dealers would inform the investigators in advance, sometimes holding on to the stock until the investigator had the opportunity to see and document it.

Visual surveys

The basis of this investigation was a series of surveys, carried out once a month between January 1997 and December 2001. A total of 59 surveys were conducted over the five-year period, with July 1997 being the only month where a trade survey could not be conducted. During each survey, every shop in the three wildlife markets of Medan was visited individually, and the various species and numbers of the wildlife offered for sale were recorded. If a particular species was common in the market, numerous *and* legally unprotected, then numbers were often estimated. Otherwise, if the species was uncommon, or protected (even if common), then accurate counts were done. Where possible, all specimens were identified to the subspecies level. Species identification was made on the basis of available field guides, personal knowledge, and consultations with experts. Photographs were taken whenever possible.

While this method notes the occurrence of species in the trade, it is only an indication of the actual volume or value of the trade and does not give an accurate estimation of market turnover.

Interviews

Various bird dealers who had been operating in Medan for a long period of time were interviewed in the wildlife markets, mostly through informal and casual conversation. All the interviews and surveys in this

study were conducted by the same TRAFFIC investigator (who was of foreign nationality). The investigator posed as someone with an interest in birds (e.g. collector or student), to ask questions about where and when the birds were captured, the reasons for trade, trends, sources, and capture methods. In general, dealers were quite straightforward with their replies. Very often, they did not know the answers to the queries, and were interested in learning more from the investigator and his field guides. Information gained through these informal interviews was verified through various means, including photographs and cross-verification (i.e. checking with other dealers, or re-questioning the same dealer later).

RESULTS

Harvesting techniques

Various techniques are employed in capturing live animals for trade. Most are indiscriminate as to what species are caught. This does not pose a problem to the trapper, as all species are accepted by dealers, no matter how inappropriate they may be as a cage bird or pet. Indeed, according to dealers, the rarer and more unusual a species is, the more the prestige is raised for both the buyer and the store that sells them. In general, wildlife is harvested and traded opportunistically, and there need not be a high demand for a particular species for it to be captured and sold into trade.

Live capture of birds

Three basic techniques are employed in the live capture of birds – lime, nets, and leg-snares. Additionally, some species such as Magpie Robin *Copsychus saularis*, eagles, hawks, owls, hornbills and parrots are often taken as chicks from nests. Bird trappers often know the locations of nests and harvest the offspring annually.

Lime

Bird lime is a glue-like substance. Trappers set a decoy bird, either tied to a tree or in a cage, in a chosen area. The lime is then spread on branches, the ground and other surfaces around the decoy. When the decoy bird calls, other birds in the area come, either to attempt to chase out the intruder or to investigate a possible feeding location. Either way, the birds are trapped by the lime. The stuck birds are then pried off the adhesive lime, and some injury can be caused to the bird in this process. Examples of species commonly trapped using lime are: Magpie Robin, White-rumped Shama *Copsychus malabaricus*, Orange-headed Thrush *Zoothera citrina* and Black-naped Oriole *Oriolus chinensis*.

Nets

Nets are put up in strategic locations such as near fruiting trees or over waterways, catching birds in flight. For ground or water feeding species such as ducks and rails, low nets are set up in reed areas. The birds are then driven into the nets and caught. Examples of birds captured with nets are: whistling duck species *Dendrocygna* spp., White-crested Laughingthrush *Garrulax leucolophu,* Hill Myna *Gracula religiosa* and munias *Lonchura* spp.

Snares

Snares made of string or fine wire are set along paths or in places frequented by large ground birds. The snares are deliberately set at a height that will catch the birds by their legs and not kill them. Snares may also be set in the nests of raptors to catch the adult birds. Examples of birds harvested with snares are: partridges and pheasants, and Changeable Hawk-eagle *Spizaetus cirrhatus*.

Live capture of mammals and reptiles

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Young Agile Gibbon *Hylobates agilis* with dealer

Many species of mammals and reptiles are captured opportunistically by plantation workers, loggers and others working in the forest. Sales of wildlife provide a welcome supplementary income. Any and all species captured will be purchased by the dealers in Medan. Most reptiles, such as snakes and turtles, are generally not sold to the local market dealers but instead to exporters in the meat and skin business. Some reptiles, usually young animals or rare species, are sold in the markets as novelty pets. Pet turtles are usually sold in aquarium shops, which are not included in this report. Dealers in the markets alleged that they could arrange sales of large mammals such as Orangutan *Pongo* spp., Sumatran Tiger *Panthera tigris*, Siamang *Symphalangus syndactylus*, Sun Bear *Helarctos malayanus* and others upon request. As one dealer stated: "Any animal is available, if you've got the money!" However, species not observed in the markets are not included in this report.

Some mammals are specifically targeted by hunters, including Slow Loris *Nycticebus coucang*, macaques and leaf monkeys, squirrels and fruit bats. Primates, with the exception of the Slow Loris, are often captured as young by killing the mother to take the offspring which stays clinging to its dead parent. Shooting the mother often results in the death of the young as they are sometimes mistakenly shot, or are killed when the parent falls to the ground. Often surviving offspring are very young and have little chance of survival.

Traps are also set for many of these species. To capture fruit bats, large nets are strung in trees near roosting sites. Another method of catching bats is attaching long strings with weighted hooks on the end of long poles. The hooked lines are swung around by a hunter, standing on the ground near a bat roost. The disturbed bats are then snagged by the hooks. This method would appear to be much less effective than the use of nets. On the Indonesian island of Sulawesi and in Sarawak (Malaysia) fruit bats are also caught using kites with hooks on the string (Dr. Elizabeth L. Bennett *in litt.* to TRAFFIC, 2004), but it is not known if this technique is used in Sumatra.

Species recorded in trade

The wildlife markets of Medan displayed large quantities of specimens for sale, with each survey on average counting 3549 specimens available in the markets on one day. There was not only a significant volume of trade, but there was also a high diversity of species available for sale in the Medan wildlife markets with 349 species of birds, mammals and reptiles being recorded over the five-year period. Various species of birds represented 86% of the species available, while mammal and reptile species accounted for only 9.7% and 4.3% of market variety, respectively.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Fire-tufted Barbet *Psilopogon phyrolophus* and Javan Myna *Acridotheres javanicus* are taken to markets in Jalarta in large numbers

The vast majority of the species offered for sale in these markets were to supply local demand for pets. Keeping songbirds is very popular in Medan, as it is throughout much of Indonesia and South-east Asia. Keeping rare and unusual species as novelty pets and status symbols is also very popular. It appears that the rarer the animal, the more in demand by collectors, especially if it is a protected species. Furthermore, harvesting techniques are not species-specific and wildlife dealers do not discriminate, and therefore whatever is trapped goes to the market for sale.

The following gives an account of the various taxonomic family groups which were recorded in the markets and details the diversity of species, their potential value to consumers and other points of interest.

Birds

All species discussed in the report were known to be wild-harvested unless explicitly noted in the report. Six other species were recorded during the study but were not included in the following accounts or in any of the analyses presented in this report because they are known to be captive-bred in large quantities. These species are: Helmeted Guinea Fowl *Numida melegris,* Budgerigar *Melopsittacus undulatus,* Cockatiel *Nymphicus hollandicus*, Peach-faced Lovebird *Agapornis roseicollis,* Canary Society Finch *Lonchura striatus var. domestica* and Zebra Finch *Taeniopygia guttata.*

A total of 300 species of birds (identified at least to the genus level) from 54 families were recorded during the five years of this study (see **Appendix I**). Sixteen species were recorded but could not be taxonomically classified to the species-level for a variety of reasons, including age, poor condition, damaged plumage or being an unfamiliar or exotic species. Since 94.6% of the species recorded in the trade could be reliably identified, this survey provides a comprehensive report of the bird species found in the live animal markets of Medan.

Table 1
List of bird species which appeared in 100% of the trade survey counts of the Medan wildlife markets, January 1997 – December 2001

Common Name	Scientific Name	Numbers observed
Scaly-breasted Munia	*Lonchura punctulata*	30 850
Javan Myna	*Acridotheres javanicus*	19 519
Magpie Robin	*Copsychus saularis musicus*	12 495
Zebra Dove	*Geopelia striata*	10 990
White-rumped Shama	*Copsychus malabaricus*	10 320
White-crested Laughingthrush	*Garrulax leucolophus*	3 392
Black-throated Laughingthrush	*Garrulax chinensis*	2 507
Rainbow Lory	*Trichoglossus haematodus*	2 374
Sunda Laughingthrush	*Garrulax palliates*	2 333
Spotted Dove	*Streptopelia chinensis*	2 304
Hill Myna	*Gracula religiosa*	2 156
Straw-headed Bulbul	*Pycnonotus zeylanicus*	1 469
Common Myna	*Acridotheres tristis*	1 413
Black-crested Bulbul	*Pycnonotus melanicterus*	1 373
Orange-spotted Bulbul	*Pycnonotus bimaculatus*	1 322
Black-naped Oriole	*Oriolus chinensis*	1 304
Island Collared-dove	*Streptopelia bitorquata*	1 111

** Long-tailed Macaque was the only other species in the market to be recorded on every survey, with a total number of 737 specimens observed.*

Of the bird species known to have been harvested from the wild, 17 bird species were observed on every survey and were therefore the most frequently encountered species in the trade (see Table 1). As there was no reliable estimate of market turnover, it was possible that some of these counts were of the same individuals.

Family Casuariidae – Cassowaries

Four Southern Cassowary *Casuarius casuarius* individuals were recorded, all during 1998. These were all juveniles, although, according to dealers, adult birds were sometimes available too. Adult birds were not kept on site in the markets as they were too large and potentially dangerous. The birds were purchased from dealers in Jakarta and brought to Medan by truck. This species was sold as a novelty animal for collections.

Family Sulidae – Boobies

Three juvenile Brown Booby *Sula leucogaster* were recorded, which would suggest that they were taken from nests. These were sold as a novelty species to collections. (Another specimen was observed in a private wildlife collection in Medan in 1999; Shepherd, pers. obs., 1999).

Family Ardeidae – Herons

Five species were recorded, two of which were identified only to genus level due to their young age. Black-crowned Night-heron *Nycticorax nycticorax* juveniles were seen in the markets, and reportedly came from nearby mangroves in North Sumatra. This information was significant as MacKinnon & Phillipps (1993) recorded this species as a non-breeding visitor to Sumatra. Birds from this family were usually taken from nests as young and sold as novelty birds for collections and possibly for meat.

Family Dendrocygnidae – Perching or Whistling Ducks

Two species were recorded, Lesser Whistling Duck *Dendrocygna javanica* and Wandering Whistling Duck *D. arcuata*. Both species were usually sold in restaurants, which did not fall under the scope of this report, but were sometimes available in the bird markets. These birds were captured with nets and sold for consumption.

Family Anatidae – Ducks, Swans and Geese

One Wood Duck *Aix sponsa*, was recorded. This exotic bird is native to North America and was being sold as a novelty pet for collectors. It was likely that this species was being bred in captivity.

Family Accipitridae – Hawks and Eagles

Fifteen species were identified, at least to a genus level. An additional three species were recorded, but due to their young age they were not identified, though they were recognised as being different species. The majority of these species were taken from nests or captured opportunistically in nets usually set to capture fruit bats. Availability of some species in trade varied seasonally due to migration patterns. These species were sold as novelty pets and valued as a status symbol.

Family Phasianidae – Pheasants

Twelve species were recorded. The majority were reported to have been captured locally, many from Gunung Leuser National Park. Others were brought to Medan from Jakarta. Two species, Lady Amherst's Pheasant *Chrysolophus amhersttiae* and Golden Pheasant *C. pictus* were also recorded, but are not native to Indonesia. Many of these species were considered very rare, such as Green Peafowl *Pavo muticus muticus* (a sub-species endemic to Java) and Hoogerwerf's Pheasant *Lophura hoogerwerfi*. The male of the latter species was a significant record, as this was the first documented sighting of the male Hoogerwerf's Pheasant. Birds from this family were usually caught in nets or snares, or sometimes captured as young (e.g. Green Peafowl) and sold for collections, and in the case of the more common species, for meat.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

The male Hoogerwerf's Pheasant *Lophura hoogerwerfi* was not described before being observed during this study in the Jalan Bintang market

Two of the species recorded, Sumatran Peacock-pheasant *Polyplectron chalcurum* and Hoogerwerf's Pheasant are endemic to Sumatra. To date, all specimens of these two species recorded in the markets were said to have originated from the Gunung Leuser National Park. This Park is the only known locality for Hoogerwerf's Pheasant (McGowan and Garson, 1995).

Family Turnicidae – Buttonquails

One species, Barred Buttonquail *Turnix suscitator* was recorded. This species was captured in Sumatra using nets, and sold for collections and as food.

Family Rallidae – Rails

Seven species were recorded. All were captured locally with the use of nets. This family of birds was more commonly sold in restaurants but some were sold in the bird markets. These birds were sold for consumption, with the most numerous being White-breasted Waterhen *Amaurornis phoenicurus*.

Family Scolopacidae – Sandpipers

Two were recorded but not identified to species level due to their poor condition.

Family Laridae (subfamily Sterninae) – Terns

One was recorded but not identified to species level due to its poor condition.

Family Columbidae – Pigeons and Doves

Seventeen species were recorded, plus an additional five unidentified species. While some of these species were sold for food (*Treron* spp.), others were sold as songbirds (*Streptopelia* spp. and *Geopelia* spp.) or novelty birds for collections. Dealers stated that some species, such as the Nicobar Pigeon *Caloenas nicobarica* were becoming very difficult to acquire. These birds were often captured with nets or using lime. The Zebra Dove *Geopelia striata* while locally taken from the wild, according to dealers was also captive-bred in both Indonesia and Thailand. The birds from Thailand were in much higher demand, and therefore more expensive, due to their 'superior' song. Spotted Doves *Streptopelia chinensis* and Island Collared Doves *S. bitorquata* were also sometimes bred in captivity. The Spotted Dove was sold both as a songbird and for consumption.

Credit: Steve Broad/TRAFFIC Southeast Asia

Nicobar Pigeons *Caloenas nicobaricus*

Family Psittacidae – Parrots

Forty-one species were recorded in the Medan markets. The vast majority of these species were native, mostly from eastern Indonesia, and were very common in trade. Sumatra itself only has four species of parrots, all of which were recorded during this study. Nearly all Indonesian parrot species recorded were reported as captured from the wild.

The three most numerically available species were Rainbow Lory *Trichoglossus haematodus,* Chattering Lory *Lorius garrulus* and Blue-crowned Hanging-parrot *Loriculus galgulus*, with totals of 2535, 1279 and 1150 birds respectively over the entire survey period.

Some of these species were exported from Medan, especially cockatoos. Buyers from Singapore and Malaysia were observed buying relatively large numbers of these birds in the markets. Birds destined for Singapore were often transported via Malaysia. Increasingly, traders were reporting that species not native to Indonesia were being imported into Medan from Singapore.

• Sumatran species - Two species of parakeets native to Sumatra, Red-breasted Parakeet *Psittacula alexandri* and Long-tailed Parakeet *P. longicauda* were recorded. According to dealers, these two species were becoming scarce in the wild in Sumatra and therefore difficult to obtain. These were some of the least expensive of the parrots, costing approximately IDR 25 000 each (USD 2.50 at 2000 rates) in 2000. Blue-crowned Hanging-parrot was the most commonly traded Sumatran species from this family. The last of Sumatra's four native parrot species, Blue-rumped Parrot *Psittinus cyanurus* was much less common in the trade, with only 32 recorded over the same period. There were three subspecies of Blue-rumped Parrot but only one, *P. c. cyanurus*, which is native to Sumatra was recorded.

• Palm Cockatoo *Probosciger aterrimus*, one of the rarer and more expensive species, was occasionally available but never numerous; only five were recorded during this study. However, dealers claimed that it could be supplied upon demand. Due to high prices, dealers would often advertise birds, but only bring them into Medan from Jakarta when there was an order. Dealers claimed that many Palm Cockatoos available in the markets in Jakarta were exported to Thailand.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

The Palm Cockatoo *Probosciger aterrimus* is a rare and expensive species

• There are four subspecies of Lesser Sulphur-crested Cockatoo *Cacatua sulphurea* (Forshaw, 1989; PHPA/LIPI, BirdLife International-IP, 1998), but all have been treated as one in this report, with the exception of one distinct subspecies, Citron-crested Cockatoo *C. s. citrinocristata.* This subspecies is easily differentiated from the others by its orange rather than yellow crest. Fourteen of this subspecies were recorded during this study. Wild populations of the Lesser Sulphur-crested Cockatoo have declined drastically in the last 10-15 years due to excessive trapping for the high demand of the pet trade (Coates and Bishop, 1997; Anon, 1998). It is now rare or extirpated throughout much of its range, with some subspecies nearing extinction. It is categorized by the IUCN as "Critically Endangered". A total of 413 were recorded during this study. Dealers told us that this species was often exported illegally to Malaysia and Singapore. This species was observed in Singapore on numerous occasions during the period of this study (Shepherd, pers. obs., 1997-2001).

• Salmon-crested Cockatoo *Cacatua moluccensis* was also common in trade in Medan, with 71 birds being recorded. This species is totally protected by Indonesian legislation and is listed on Appendix I of CITES. It

is endemic to the southern Moluccas where it was once common, but is now considered uncommon to rare as a result of excessive trapping for the pet trade (Coates and Bishop, 1997). It was sometimes purchased from the markets in Medan by dealers in Malaysia and Singapore, who, according to Medan dealers, in turn, sold some to dealers in Bangkok, Thailand. It had also been recorded for sale in Bangkok, Thailand, where dealers said they were from Indonesia (Shepherd, pers. obs., 2000).

• There are 21 subspecies of Rainbow Lory *Trichoglossus haematodus* (Forshaw, 1989). Only three subspecies were recorded in the markets of Medan during this survey, although it was difficult to verify which subspecies due to lack of field identification guides and expertise.

• There are four subspecies of Black Lory *Chalcopsitta atra*, only one of which was recorded during this study: *C. a. atra* (based on Forshaw, 1989) with a total of 282 recorded.

• The numbers of Red Lory *Eos bornea* being traded in Medan had declined over the period of the study, with 362 recorded in 1997, 160 in 1998, 74 in 1999, 47 in 2000, and 69 in 2001 (see **Figure 4**). According to Coates & Bishop (1997), this species is becoming locally scarce in parts of its range due to trapping for the pet trade. Another *Eos* species, Blue-streaked Lory *E. reticulata*, although less numerous than Red Lory in trade in Medan (97 birds recorded), is also a potentially threatened species due to trapping for the pet trade (Coates and Bishop, 1997).

Family Cuculidae – Cuckoos

Five were recorded, and all were apparently locally captured. None of these species were common in trade and one species, Chestnut-winged Cuckoo *Clamator coromandus,* is a winter-visiting migrant and therefore was only seasonally available. These birds were sold as novelties to collectors.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

A young Scop's Owl *Otus* sp. taken from its nest for sale

Family Centropodidae – Coucals

Two species were recorded, Greater Coucal *Centropus sinensis* and Lesser Coucal *C. bengalensis*. They were usually available, although never numerous, with 74 and 18 specimens of each species respectively recorded during this study. These birds were locally captured and sold for both pets and medicinal purposes. Both species are native to Sumatra.

Family Tytonidae – Barn Owls

Two species were recorded, Barn Owl *Tyto alba* and Oriental Bay Owl *Phodilus badius* both of which were captured locally and sold as novelty pets and possibly for medicinal purposes. According to one dealer, the Barn Owl might also have been purchased by plantation owners for rat control purposes. These species were usually taken from the nest and sold as juveniles, although some adults, most likely accidentally caught in bat nets, were also available. These birds were sold for relatively low prices, as they were not expected to survive long in captivity.

Family Strigidae – True Owls

At least seven species were recorded, although only four could be identified to species. Many of the Scops Owls *Otus* spp. were not identified as these birds were usually young, still in their downy juvenile plumage, and therefore difficult to classify. At least three Scops Owl species were recorded. These were determined to be different species due to varying characteristics. They were sold as novelty pets and possibly for medicinal purposes. Owls were usually sold for relatively low prices, as they were not expected to survive long. All were reported to be captured locally, many being taken from nests, others captured in nets.

Family Caprimulgidae – Nightjars

Two birds of the genus *Caprimulgus* were recorded once during the study. They were young and could not be identified. These were reported to be captured locally, taken from their nest, and sold as novelty pets.

Family Trogonidae – Trogons

One adult Diard's Trogon *Harpactes diardii*, was recorded for sale as a novelty pet.

Family Halcyonidae – Wood Kingfishers

Two species were recorded, Ruddy Kingfisher *Halcyon coromanda* and White-throated Kingfisher *H. smyrnensis*, with nine of each recorded. Captured locally, taken from the nests, these species were sold inexpensively as novelty pets as they were not expected to survive long in captivity.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Young White-throated Kingfishers *Halcyon smyrnensis*

Family Alcedinidae – Small Kingfishers

One Blue-eared Kingfisher *Alcedo meninting* was recorded once during the study. It had reportedly been captured locally and was sold as a novelty pet.

Family Bucerotidae – Hornbills

Four species were recorded, Wreathed Hornbill *Aceros undulatus,* White-crowned Hornbill *A. comatus*, Rhinoceros Hornbill *Buceros rhinoceros* and Oriental Pied Hornbill *Anthracoceros albirostris*. Hornbills were not often available, with a total of 11 birds of these four species recorded. They were captured locally, sometimes being taken from their nests, but usually captured opportunistically in nets set for fruit bats. They were sold as both novelty pets and for medicinal use.

Family Capitonidae – Barbets

Ten species were recorded. The majority of these were frequently available, but in low numbers, with the exception of Fire-tufted Barbet *Psilopogon pyrolophus* of which 4480 birds were recorded. This particular species was sent to Jakarta to supply the demand in the bird markets there. According to dealers, up to 500 Fire-tufted Barbets were exported per week, although this was not a fixed amount. Two species of barbets from Africa were also recorded in May 2001, including a pair of Crested Barbets *Trachyphonus vaillantii* and a pair of unidentified *Lybius* sp. Dealers said that these birds came from other dealers in Singapore. Barbets were sold as cage birds.

Family Picidae – Woodpeckers

Four species were recorded, Common Goldenback *Dinopium javanense*, White-bellied Woodpecker *Dryocopus javensis*, Sunda Woodpecker *Picoides moluccensis* and Greater Yellownape *Picus flavinucha*. The most common of these was Common Goldenback, with 453 recorded. Woodpeckers were most likely captured using nets, as no young were recorded. They were sold as novelty cage birds and for medicinal purposes. Apparently, these species have a short life span in captivity, possibly due to their specialized dietary requirements.

Family Eurylaimidae – Broadbills

One Black-and-red Broadbill *Cymbirhynchus macrorhynchus* was recorded. This bird was captured locally in a net, according to the dealer, and sold as a cage bird.

Family Pittidae – Pittas

Two species were recorded, Hooded Pitta *Pitta sordida* and Blue-winged Pitta *P. moluccensis*, with 12 and three birds recorded, respectively. They were reportedly captured locally and sold as novelty pets.

Family Alaudidae – Larks

Two species were recorded. At least one of these species, Mongolian Lark *Melanocorypha mongolica*, was imported from mainland Southeast Asia. They were sold as cage birds.

Family Hirundinidae – Swallows

Two species were recorded, Pacific Swallow *Hirundo tahitica* and Barn Swallow *Hirundo rustica* with two and one of each species recorded, respectively, during the survey. They were reported to be captured locally and sold as novelty pets.

Family Motacillidae – Wagtails

Two species were recorded, Grey Wagtail *Motacilla cinerea* and Forest Wagtail *Dendronanthus indicus*. These migratory birds were seasonally available. They were captured locally to be released for religious purposes. They appeared to suffer very high mortality rates in the markets, probably amounting to more than fifty percent.

Family Campephagidae – Minivets

Two species were recorded, Small Minivet *Pericrocotus cinnamomeus* and a second specimen only identified as a *Pericrocotus* sp. The latter was captured locally, however Small Minivet was brought to Medan from the markets in Jakarta (Small Minivet is not found on Sumatra). These birds were rarely available and never numerous in the markets, and sold as cage birds.

Family Chloropseidae – Leafbirds

Seven species were recorded, the most common being Blue-winged Leafbird *Chloropsis cochinchinensis* with 1364 recorded. These birds were mostly captured locally and sold as cage birds.

Family Pycnonotidae – Bulbuls

Nineteen species were recorded; all sold as cage birds, with some being highly prized as songsters.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

The Straw-headed Bulbul *Pycnonotus zeylanicus* is becoming increasingly rare, and is one of the most sought-after song birds

• Of considerable concern was Straw-headed Bulbul *Pycnonotus zeylanicus*. This species is very popular due to its brilliant song. Newly captured birds were far less expensive than those that had been in captivity for some time, as the former did not sing readily. In the past, Straw-headed Bulbuls captured in Sumatra were sold to the markets in Java, where the species had already been depleted (MacKinnon & Phillipps, 1993). Local dealers stated that this bird was now all but extinct in Sumatra and that practically all specimens recorded were from Peninsular Malaysia. Although the Straw-headed Bulbul is protected in Peninsular Malaysia and is listed on Appendix II of CITES, birds were said to be smuggled across the Straits of Malacca to Medan from the port of Penang. During this study 1469 Straw-headed Bulbuls were observed.

• Sooty-headed Bulbul *P. aurigaster* was one of the most heavily traded birds. Although not native to Sumatra, escaped or released birds have established themselves in Sumatra and are now quite common. This species is native to Indonesia, found on Java, Bali and Sulawesi.

• Red-whiskered Bulbul *P. jocosus* was another heavily traded species in Medan, although it is not a native species. According to dealers, shipments of this species came regularly to Medan from Thailand, via Penang, Malaysia. Red-whiskered Bulbul is a protected species in Thailand. In the 1993 TRAFFIC report, *Sold for a Song,* it was recommended that this species be included on Appendix III of CITES to assist Thailand's efforts in stopping illegal exports (Nash, 1993), but to date this has not been done.

Family Dicruridae – Drongos

Five species were recorded, including Lesser Racket-tailed Drongo *Dicrurus remifer*, Greater Racket-tailed Drongo *D. paradiseus*, Black Drongo *D. macrocercus*, Ashy Drongo *D. leucophaeus* and a fifth that was identified to genus level only. These species were often difficult to identify to a species level in the market as they were often in very poor condition, having damaged tails and plumage. Apparently, all were captured locally and sold as cage birds.

Family Oriolidae – Orioles

Four species were recorded. The Black-naped Oriole *Oriolus chinensis* was by far the most numerous of this family recorded in the trade. According to dealers, Black-naped Oriole was becoming difficult to acquire in some areas due to over-harvesting. These birds were captured using nets and lime, as well as often being taken from the nest. Birds of this family were sold as cage birds.

Family Corvidae – Crows and Jays

Seven species were recorded, most being sold as cage birds. Slender-billed Crow *Corvus enca* was sometimes sold for medicinal purposes. House Crow *C. splendens* is not native to Indonesia but may have established itself, as it has done in neighbouring countries, such as Singapore and Malaysia. This species,

native to Iran through to India, Southwest China and Myanmar, has spread throughout much of Southeast Asia, probably via ships (Shepherd, 1998). Two subspecies of Crested Jay *Platylophus galericulatus coronatus* and *P. g. galericulatus* were recorded. During this study, 15 specimens of the former (which occurs in Sumatra) and nine of the latter (which does not occur in Sumatra) were recorded.

Family Paradisaeidae – Birds-of-paradise

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Female King Bird-of-paradise *Cicinnurus regius*

Two species were recorded, Lesser Bird-of-paradise *Paradisaea minor* and King Bird-of-paradise *Cicinnurus regius*. These species are found in eastern Indonesia and Papua New Guinea, and individuals were brought to Medan from the bird markets in Jakarta. King Bird-of-paradise was more common than Lesser Bird-of-paradise, which was only recorded once. Apparently, the latter was also quite popular as a dried wall ornament, although both species recorded were for sale as cage birds. Female King Birds-of-paradise were more common than males. It was likely that the females were less often sold in the Jakarta markets as they are less attractive and therefore more readily available to be sent on to Medan.

Family Paridae – Tits

One species was recorded, Great Tit *Parus major*. It was captured locally and usually available in the markets, sold as a cage bird.

Family Sittidae – Nuthatches

One species was recorded, Velvet-fronted Nuthatch *Sitta frontalis*, which was sold as a novelty cage bird.

Family Timaliidae – Babblers

Nineteen species were recorded. Laughingthrushes (*Garrulax* spp.) were by far the most numerous of this family recorded. While many were native to Sumatra, some were imported from other Asian countries. Large numbers of Black-throated Laughingthrush *G. chinensis* and White-crested Laughingthrush *G. leucolophus* were imported. The latter species is native to Sumatra but is a different colour variety to those that were being sold; the Sumatran birds being much darker.

Family Turdidae – Thrushes

Twelve species were recorded. The most numerous species of this family in the markets were Magpie Robin *Copsychus saularis* and White-rumped Shama *C. malabaricus*. The latter was of concern as it had been traded in such high volumes that traders claimed it had vanished from many areas throughout Sumatra. These two species were also subject to major export, many apparently going to Europe. Dealers claimed that buyers often purchased these birds from Medan for export, as there was virtually no control over it. During surveys in 2000, a buyer from Holland was recorded purchasing many Magpie Robins and White-rumped Shamas, claiming they were for export to Europe.

Some species of this family are only winter visitors, such as Siberian Thrush *Zoothera sibirica* and Eyebrowed Thrush *Turdus obscurus*, and were therefore only available seasonally.

• Two subspecies of Magpie Robin were found in trade in Medan's markets: *Copsychus saularis musicus* and *C. s. pluto*, the former native to Sumatra, the latter from East Java and East Borneo (MacKinnon, 1993). During this study, all Magpie Robins recorded were *C. s. musicus* with the exception of 16 specimens of *C. s. pluto* recorded between 1999 and 2001.

• Orange-headed Thrush *Zoothera citrina* is a popular songbird sometimes featured in singing competitions. Dealers in Medan claimed that this species was becoming scarce in many areas, based on increasing difficulty in finding and trapping it. Further research needs to be focused on this species.

Family Sylviidae – Old World Warblers

Six species were recorded. These species appeared increasingly commonly in trade; only one of these species was recorded in trade in 1997, but by 2000 six species were often available. They appeared to have a very high mortality rate in the markets and were therefore available at relatively low prices. They were sold as cage birds.

Family Muscicapidae – Old World Flycatchers

Three species were recorded, Yellow-rumped Flycatcher *Ficedula zanthopygia*, Verditer Flycatcher *Eumyias thalassina* and an unidentified blue flycatcher *Cyornis* sp. A few other species were sometimes recorded but were not positively identified and are therefore not included here. These birds were sold as novelty cage birds.

Family Rhipiduridae – Fantails

One species was recorded, Pied Fantail *Rhipidura javanica*. This species was sometimes available, but never numerous. It was reportedly captured locally and sold as a cage bird.

Family Artamidae – Wood-swallows

Two White-breasted Wood-swallows *Artamus leucorhynchus* were recorded on one occasion being sold as novelty pets.

Family Laniidae – Shrikes

Two species were recorded, Long-tailed Shrike *Lanius schach* and Brown Shrike *L. cristatus*. Long-tailed Shrike was reasonably common. The majority were immature, taken from their nests. They were probably all captured locally, and were sold as cage birds.

Family Sturnidae – Starlings and Mynas

Seventeen species were recorded. Some were local but many originated from eastern parts of Indonesia, as well as other countries. Javan Myna *Acridotheres javanicus* was the most numerous. It is not native to Sumatra but has been introduced; however, dealers in Medan claimed to send approximately 500–1000 to Jakarta per week.

Hill Myna *Gracula religiosa* is the most expensive myna and one of the most popular cage birds in Southeast Asia. According to local dealers, this species been greatly depleted throughout Sumatra due to excessive

trapping, and individuals were now being imported from Malaysia. From the accounts of the dealers, the birds from Malaysia, in turn, might have originated in Vietnam. Malaysia reported importing 13 859 wild-caught Hill Mynas from Vietnam between 1997 and 2000 (UNEP-WCMC CITES trade database, 2004). Only 27 Hill Mynas were reported to have been legally exported from Malaysia to Indonesia during this same period. The Nias Island subspecies of Hill Myna *G. r. robusta* was also popular among wealthy collectors but, according to dealers, was now extremely rare; it was recorded on only 14 occasions with a total of 65 birds. Only one bird was recorded from 1997 – 1999, while the rest were seen in 2000 and 2001 (see **Figure 5**). Hill Mynas were sometimes offered to interested buyers, but they were not always kept in the markets, as dealers feared losing such expensive birds to diseases in the crowded and unhygienic conditions in the markets. The Nias sub-species is protected by Indonesian law but the mainland Sumatran subspecies is not.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

The Hill Myna *Gracula religiosa* is becoming increasingly rare in Sumatra

Family Bombycillidae - Waxwings

One species was recorded, *Bombycilla* sp. It was rarely available and was sold as a novelty pet.

Family Meliphagidae – Honeyeaters (Friarbirds)

Two species were recorded, Helmeted Friarbird *Philemon buceroides* and Black-faced Friarbird *P. moluccensis*. These birds, which were captured in eastern Indonesia, were frequently available but never in large numbers. They were sold as novelty pets.

Family Nectariniidae – Sunbirds and Spiderhunters

Four species were recorded, Plain-throated Sunbird *Anthreptes malaccensis,* Olive-backed Sunbird *Necterinia jugularis,* Copper-throated Sunbird *N. calcostetha* and an unidentified spiderhunter *Arachnothera* sp. They were occasionally available as novelty cage birds, but were never numerous in trade.

Family Dicaeidae – Flowerpeckers

Three species were recorded, the Yellow-vented Flowerpecker *Dicaeum chrysorrheum*, Orange-bellied Flowerpecker *D. trigonostigma* and Scarlet-backed Flowerpecker *D. cruentatum*. Orange-bellied Flowerpecker was commonly available but appeared to suffer high mortality rates in the markets. They were sold as cage birds.

Family Zosteropidae – White-eyes

One species was recorded, Oriental White-eye *Zosterops palpebrosus*. It was common and sometimes quite numerous in the markets, with a total of 2324 birds being counted during this survey. They were popular as songbirds.

Family Passeridae – Weavers

Twenty-three species were recorded. Especially common and numerous were Baya Weaver *Ploceus philippinus*, Scaly-breasted Munia *Lonchura punctulata* and White-headed Munia *L. maja*. These particular birds were usually bought for release as part of religious practice. However, they had an extremely high mortality rate in captivity; according to dealers, more than 50% died in the markets during their first 24 hours. Some other observed species of this family were not native to Indonesia and were sold as cage birds to collectors. Many of these species, excluding those sold for release, may have been captive-bred.

Java Sparrow *Padda oryzivora* is known to have declined as a direct result of the pet trade (Holmes, 1989; Nash, 1993; MacKinnon and Phillipps, 1993). A total of 1513 Java Sparrows were recorded during this survey. Some of these may have been captive-bred. Additionally, many white colour mutants (all captive-bred) were recorded, but were not counted and are not included in the results of this report.

Family Fringillidae – Finches

Three species were recorded: Green Singing Finch *Serinus mozambicus,* Yellow-rumped Serin *S. atrogularis* and European Goldfinch *Carduelis carduelis*. All were sold as songbirds.

Mammals

Thirty-four species were recorded; representing 15 families (see **Appendix II**). Species were identified at least to genus level and those that could not be identified to that level were omitted from the report. All of the mammals recorded during this study were, according to dealers, taken from the wild.

Long-tailed Macaque *Macaca fascicularis* was the only mammal species recorded on every market survey (100% of survey counts). Common Palm Civet *Paradoxurus hermaphroditus*, Slow Loris, Pig-tailed Macaque *Macaca nemestrina* and Plantain Squirrel *Callosciurus nonatus* were also commonly observed for sale in the markets, being recorded in more than 90% of the survey counts. Most species of mammals were recorded on less than 10 surveys (17% of survey counts), while the rarer mammal species in the markets including all species of leaf monkey, gibbons and Flying Lemur *Cynocephalus variegatus* were recorded on only a few surveys.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Long-tailed Macaques, *Macaca fascicularis* were recorded on every market survey

Family Tupaiidae – Treeshrews

Two species were recorded, Common Treeshrew *Tupaia glis* and a second unidentified *Tupaia* species. Tree shrews were often available, although never numerous, and were probably sold as food.

Family Cynocephalidae – Flying Lemur or Colugo

One Colugo *Cynocephalus variegatus* was recorded in 1997, which due to its very complex dietary needs, could not be expected to live long in captivity. It was being sold as a novelty pet. According to the dealer, a second Colugo had been sold to a buyer from a zoo in North Sumatra a few days previously.

Family Pteropodidae – Fruit Bats

One species was recorded, Large Fruit Bat *Pteropus vampyrus*. These were often sold outside the markets, as food and as a traditional medicine to treat asthma. The bats were kept in the markets alive, but usually butchered on the spot upon being sold. A decrease in the numbers of fruit bats in the markets was recorded during this survey from 1997 (431), 1998 (246), to 1999 (136), 2000 (14) and none were recorded in 2001. When dealers were questioned about this decline, they stated that the bats were becoming rare in many of the easily accessible habitats due to over-harvesting.

Family Lorisidae – Loris

One species was recorded, Slow Loris *Nycticebus coucang*. It was very common and often relatively numerous in markets. Some were sold for medicinal use, others, after having their teeth pulled out with pliers, were sold as "tame" pets. All were reportedly captured locally with the exception of one dark-coloured (possibly melanistic) individual said to have come from Kalimantan.

Family Cercopithecidae – Macaques and Leaf Monkeys (Langurs)

Seven species were recorded. Many were sold as pets, although some were sold as food, and observed individuals were often very young. The most common was Long-tailed Macaque *Macaca fascicularis* which was found to be available on every market survey, with a total of 737 recorded between January 1997 and December 2001. A total of 355 Pig-tailed Macaques *M. nemestrina* were also recorded during this period. While the numbers of Thomas' Leaf Monkey *Presbytis thomasi* in the trade were low (seven recorded during this study), this species is endemic to northern Sumatra, making pressure from trade a potentially serious threat.

Family Hylobatidae – Gibbons and Siamang

Two Siamang *Symphalangus syndactylus*, three Agile Gibbon *H. agilis* and one White-handed Gibbon *H. lar* were recorded. Agile Gibbon is not native to North Sumatra, although it is found further south on the island, which indicates inter-provincial trade. Dealers in the Medan markets stated that the animals were purchased from other wildlife dealers in the province of Riau. Agile Gibbon is also found in Malaysia, but there was no evidence that any of the animals recorded during this study came from Malaysia. Observed individuals were often young, the mother having been shot in order to catch the offspring.

Family Manidae – Pangolin

One species was recorded, Malayan Pangolin *Manis javanica*. Often available, although never numerous; 66 pangolins were recorded during this survey. While live animals were usually available, tongues and scales were often all the dealers had available. The species was sold primarily for medicinal use.

Family Sciuridae – Squirrels

Seven species were recorded. The more unusual or attractive species (e.g. *Callosciurus prevostii)* were sold as novelty pets, while the more common species were sold as food. All observed individuals were reported to be locally caught.

Family Muridae – Bamboo Rats

One species was recorded, Sumatran Bamboo Rat *Rhizomys sumatrensis,* to be sold as novelty pets. There did not seem to be any trade in this species for food as was the case in some other South-east Asian countries.

Family Hystricidae – Porcupines

One species was recorded, Common Porcupine *Hystrix brachyura*. It was sometimes available but never numerous. These were sold for medicinal use, as well as for food.

Family Mustelidae – Otters

Otters were recorded occasionally for sale as novelty pets. All individuals were juveniles, so young that identification was difficult; their eyes were either yet to open, or had only just opened. None were able to feed themselves and it was very likely that none would survive in the markets. At least one species was recorded, with all being sold as novelty pets.

Family Viverridae – Mongoose and Civets

Five species were recorded. Most were sold as novelty pets but possibly for food as well.

Family Felidae – Cats

One species, Leopard Cat *Prionailurus bengalensis* was common. While adults were sometimes available, the majority were extremely young, many of whose eyes had yet to open. They were sold as novelty pets, many having their teeth already removed. Other species of cats, such as young Sumatran Tiger *Panthera tigris* and Clouded Leopard *Neofelis nebulosa* were known to be sometimes available from dealers in the Jalan Bintang market but were not kept in the markets themselves and none were recorded during this study.

Family Tragulidae – Mouse Deer

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Leopard Cat *Prionailurus bengalensis*

One species was recorded, Lesser Mouse Deer *Tragulus javanicus*. Often hunted for meat, some were occasionally brought to the market to be sold as novelty pets. According to dealers, a zoo in North Sumatra outside of Medan sometimes ordered this species for its collection.

Family Petauridae – Sugar Gliders

One species was recorded, Sugar Glider *Petaurus breviceps*. These are not native to Sumatra, but to eastern Indonesia and Australia.

Reptiles

Fifteen species representing eleven families were recorded during this study (see **Appendix III**). Additional species were recorded but as they were not identified at least to the genus level, they have been omitted from this report.

All species of reptiles recorded in the markets, with the probable exception of imported Green Iguana *Iguana iguana,* were reported as taken from the wild.

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Blood Pythons *Python curtus* were rarely observed in the Medan pet market as they are usually sold in the skin trade

Family Boidae – Pythons

Two species were recorded, Reticulated Python *Python reticulatus* and Blood Python *P. curtus*. These were small specimens, sold as novelty pets. Larger specimens were sold to skin traders, where the profit to the collector was much higher. There is a capture quota system in place in Indonesia for the skin trade both for domestic and international trade, but the dealers in the markets surveyed were not participants in the legal trade.

Family Viperidae – Vipers

One species was recorded, although it could only be identified to genus level, *Trimeresurus* sp. It was sold as a novelty pet.

Family Elapidae

One species of cobra *Naja* sp. was recorded, which was sold as a novelty pet. People often captured cobras for export to China for meat and medicinal use, and therefore very few were sold as pets since the demand and profit from the Indonesian pet trade were low.

Family Colubridae

One species was recorded, Mangrove Snake *Boiga dendrophila*. Six specimens of two other species were recorded but not identified. These animals were captured opportunistically and sold as novelty pets.

Family Agamidae – Agamid Lizards

One Garden Fence Lizard *Calotes versicolor* was recorded on one occasion, sold as a novelty pet.

Family Varanidae – Monitor Lizards

One species was recorded, Water Monitor Lizard *Varanus salvator*. Only small specimens were recorded; larger animals were sold to large skin-exporting companies for a higher price. These young were locally caught and sold as novelty pets.

Family Scincidae – Skinks

One species was recorded, Many-lined Sun Skink *Mabuya multifasciata*. It was locally caught and sold for medicinal use.

Family Iguanidae – Iguanas

One species was recorded, Green Iguana *Iguana iguana*. It is native to South America, and although many were bred in captivity for the pet trade, they were imported from Singapore and Malaysia, sometimes coming to Medan via Jakarta.

Family Crocodylidae – Crocodiles

One species was recorded, Estuarine Crocodile *Crocodylus porosus*, of which only hatchlings were observed. Dealers suggested that some hatchlings came from a local crocodile farm, however the owner of that facility claimed that no live animals were sold.

Family Bataguridae – Freshwater Turtles

Two species were recorded, Asian Box Turtle *Cuora amboinensis* and Spiny Turtle *Heosemys spinosa*. Turtles were usually exported on a massive scale to China and Singapore for food (Shepherd, 2000), many leaving Sumatra via Medan's international airport. Some small specimens were sometimes sold locally as pets, but usually at aquarium shops which are not included in this report.

Family Trionychidae – Softshell Turtles

One Asiatic Softshell Turtle *Amyda cartilaginea* was recorded. Softshell turtles were usually exported to China or Singapore for the food market, although some were also consumed locally (Shepherd, 2000).

Consumer Demand

The vast majority of the species observed in the Medan markets were sold as live pets. In addition to the keeping of animals for pets, some species in the markets were also used locally as food and in traditional medicine practices, although overall numbers of animals used for these purposes were far less than for the pet trade, with 4.0% of the species recorded also retailing for consumption (n = 14) and 10.3% for traditional practices (n = 36). Ultimately, all species in the markets were sold as live specimens, suggesting that edible and ceremonial species may also have potentially been purchased for live pet keeping and collections.

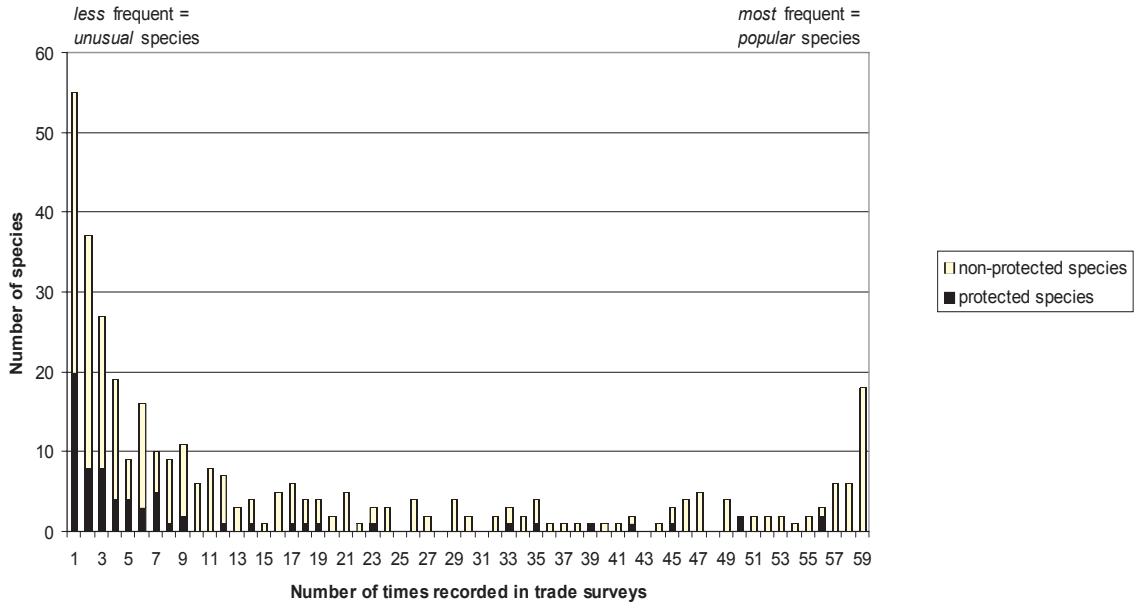
The Medan wildlife markets appeared to largely supply the local consumer demand for pets. The demand for species in the markets encompassed huge scope and volume, with a significant variety of bird species being widely traded which were the most sought after animals in the live trade. Birds are very popular pets in Indonesia, with species being kept for their song, aesthetic value and often for the social status they bring.

Trade for pets

A 'pet' takes on many definitions and forms in Medan and the environs of North Sumatra. Popular bird species are sold as *songbirds* for their notable song, or as ornamental *cage birds* for their beauty and plumage. Unusual species are sold as *novelty pets* because of their opportunistic availability, or as private *status symbols* valued for their rarity or legally protected status.

The bulk of the trade consisted of some very popular species which were frequently available in large numbers. Eighteen species were recorded on all of the 59 surveys (100% of survey counts), which included the Long-tailed Macaque and the 17 species of birds listed in **Table 1**. These popular species included doves, laughingthrushes, mynas and bulbuls, which were desired as perch birds for their song, coloration or character. These most frequently observed species represented 5.1% of the species diversity (n = 18) in the markets, but accounted for 51.6% of the total number of specimens recorded over all the surveys (n = 107 969). At the other extreme of the trade were the species less frequently observed in the wildlife markets - more unusual species encountered in trade, which appeared according to their availability, including some species sighted only once during the five year survey period (see **Figure 1**). These more unusual sightings in trade included such species as herons, egrets, raptors, sunbirds, flycatchers, swallows, bee-eaters, kingfishers, woodpeckers and leaf monkeys. These unusual species accounted for a high diversity of species in the markets, which was congruent with the unpredictable availability and indiscriminate capture for retail: any animal captured had a potential market demand. These species were kept in low numbers in the markets and were often considered as novelties. Furthermore, a significant proportion of these infrequently recorded species are listed as protected under Indonesian law.

Figure 1
Occurrence of each species in Medan's wildlife markets; relating results from 59 surveys conducted monthly (1997–2001) and their protected status under Indonesian law



Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Dead birds in Jalan Bintang. Mortalities are very high

The trade in novelty species is concerning as many species in this category are difficult to keep in captivity and therefore likely suffer a high mortality rate. Novelty species usually showed very strict diets (often requiring live food), aggressive natures, and were often sourced as juveniles. Many specimens were obtained by stealing the fledglings out of the nest (e.g. shorebirds, raptors, hornbills) or by killing the mother to capture the offspring (e.g. gibbons and wild cats). The survival of these young animals was doubtful, with many observed for sale at such an immature age that their eyes were not yet opened (e.g. otters and wild cats). Some species had their teeth extracted in an attempt by dealers to improve their suitability as pets and were retailed as 'tame' (e.g. Slow Loris and wild cats).

Unusual species may have commanded a high price owing to their rarity or legal protection status which imparts a perceived social status on the owner, though this mainly involved species widely recognised to be protected (such as raptors, hornbills, pittas and sunbirds). For species which may have been traded only occasionally and in small numbers, the conservation impact was likely to be small or negligible. However, absolute numbers are not necessarily the best indicator in judging conservation impact, as a small off-take of a rare or restricted-range species may have a much greater significance than the capture of large numbers of common species.

There was also a high number of unusual bird species not afforded legal protection (such as woodpeckers, kingfishers, bee-eaters, flycatchers, swallows and shrikes). These particular species could often be purchased inexpensively for a short period, because they rarely survived beyond a few weeks in captivity. These birds were sold entirely for their novelty value and buyers usually could not provide an adequate diet (therefore their likelihood of survival was very low). Nash (1993) refered to these species as 'cut-flowers' because of the inevitable mortality and disposable element of this trade.

Trade for food, traditional medicine, magic and religion

Many wild animals were hunted solely for food. While the majority were consumed in rural areas or by the families of the collectors, some were taken to markets in Medan for sale (see **Table 2**). Except for the Red Junglefowl *Gallus gallus* and the Sumatran Peacock-pheasant, which were captured using snares, the majority of birds captured for food were captured using nets. Primates, which were often eaten by certain local ethnic groups, were taken using traps or guns and were usually eaten by the hunter and his family. Some primates available in the markets were purchased for consumption, but the majority were sold as pets. Some restaurants in Medan specialized in wild animals, but hunters would usually take their catches directly to them rather than to the surveyed markets.

Some species were sold for their perceived medicinal benefits or for use in magic (see **Table 3**). Some species were more frequently utilised than others, such as pangolin, Large Fruit Bat and rails. Use of species for medicinal purposes was more common than use in indigenous magic.

Medan has a large ethnic Chinese Buddhist population. Releasing captive birds and other animals, such as freshwater turtles, is practiced by many people of this religion, and this practice fuels a large market demand. Species most commonly sold for release for religious reasons included Scaly-breasted Munia, White-headed Munia, Black-headed Munia *Lonchura malacca*, Baya Weaver, Eurasian Tree Sparrow *Passer montanus*, Forest Wagtail and Grey Wagtail. The latter two were seasonally available. Scaly-breasted Munia, White-headed Munia and Baya Weaver were by far the most numerous (see **Appendix 1**) and according to one of the largest dealers of these species in Medan, between 30% and 50% of these birds died in the first 24 hours before being sold. Very high mortalities were witnessed during this study. Munias were not usually sold as pets. Additionally, dealers all claimed that many of the munias were exported to Malaysia and Singapore.

Dealers in the markets in Medan were asked which species were used for these purposes (see **Table 3**). According to those interviewed, many of the traditional medicinal beliefs were being practiced less frequently than in the past, especially in the more urban areas, as people were turning to modern medicine. It would also appear that younger generations were less inclined to follow such traditional practices, especially those claiming to be magic. However, rural people living in villages near to the forest often still subscribed to these traditional beliefs. As dealers claimed to be able to sell all food species immediately, it would suggest that any decrease in the numbers in the market was probably due to lack of supply, not lack of demand.

Table 2
Species traded for food in Medan's wildlife markets

Common name	Scientific name	Price (IDR)	Price (USD)
Lesser Whistling-duck	*Dendrocygna javanica*	20 000	2.00
Wandering Whistling-duck	*D. arcuata*	20 000	2.00
Red Junglefowl	*Gallus gallus*	25 000	2.50
Sumatran Peacock-pheasant	*Polyplectron chalcurum*	20 000	2.00
Slaty-breasted Rail	*Gallirallus striatus*	8 000	0.80
White-breasted Waterhen	*Amaurornis phoenicurus*	7 000	0.70
Watercock	*Gallicrex cinerea*	8 000	0.80
Common Moorhen	*Gallinula chloropus*	8 000	0.80
Purple Swamphen	*Porphyrio porphyrio*	25 000	2.50
Pink-necked Green-pigeon	*Treron vernans*	6 000 – 10 000	0.60 – 1.00
Emerald Dove	*Chalcophaps indica*	10 000	1.00
Long-tailed Macaque	*Macaca fascicularis*	25 000 – 50 000	2.50 – 5.00
Pig-tailed Macaque	*M. nemistrina*	50 000 – 100 000	5.00 – 10.00
Silvered Leaf Monkey	*Presbytis cristata*	50 000 – 100 000	5.00 – 10.00

Exchange rate used - USD 1.00 = IDR 10 000 (2000)

Table 3
Species used in traditional medicine and magic

Common name	Scientific name	Part used	Use
Red Junglefowl	*Gallus gallus*	Meat from a male specimen	Eaten by men to attract women
quails	*Turnix* and *Coturnix* sp.		To keep a husband faithful
green-pigeons	*Treron* sp.	Meat	To be eaten by pregnant women so that their baby will be beautiful
Island Collared Dove	*Streptopelia bitorquata*		To treat asthma. Water is given to the bird. After the bird's bill has touched the water several times, the water is taken and drunk by the ailing person.
Greater Coucal	*Centropus sinensis*	Broken bones	
Common Goldenback	*Dinopium javanense*	Live	Kept in some bird shops to attract buyers (a form of magic)
Straw-headed Bulbul	*Pycnonotus zeylanicus*	Meat	To assist people with speaking disorders to speak
Black-naped Oriole	*Oriolus chinensis*	Meat	To be eaten by pregnant women so that their baby will be beautiful
crows	*Corvus* sp.	Blood	A remedy using magic to treat liver disorders
Magpie Robin	*Copsychus saularis*	Meat	To assist people with speaking disorders to speak
shrikes	*Lanius* spp.		Omen – when this species is heard calling near a village, someone in that village will die
wagtails	*Motacilla* spp.	Release	Released for religious purposes (Buddhist belief)
Common and Javan Myna	*Acridotheres tristis* and *A. javanicus*	Meat	To treat impotence, breathing difficulties,
		Oil	To treat speech impediments in children
Hill Myna	*Gracula religiosa*	Meat	To assist people with speaking disorders to speak
Java Sparrow	*Padda oryzivora*	Release	To assist a man in meeting a girl
munias	*Lonchura* spp.	Release	Released for religious purposes (Buddhist belief)
Eurasian Tree Sparrow	*Passer montanus*	Release	Released to cleanse people sins (Buddhist belief)
		Meat	Treatment for impotence

Table 3 ***(continued)***
Species used in traditional medicine and magic

Common name	Scientific name	Part used	Use
Baya Weaver	*Ploceus philippinus*	Release	Released for religious purposes (Buddhist belief)
Large Fruitbat	*Pteropus vampyrus*	Meat and organs	Treatment for asthma
Slow Loris	*Nycticebus coucang*	Meat	Treatment for asthma
Malayan Pangolin	*Manis javanica*	Tongue (carried in one's pocket)	Protection against black magic
		Scales	Protection against disease, magic
Common Porcupine	*Hystrix brachyura*	Quills (carried by person or kept in home)	Protection against magic

Trade dynamics

Trade Turnover

This report provides evidence of significant wildlife exploitation and shows that the number of animals harvested to be sold in Medan for the pet trade was vast, and included an extremely wide range of species. It is not possible, however, to evaluate the effects of the trade on wild populations from this study. The methods used to document the trade did not allow for a precise measure of turnover in the Medan market. Presence of species and a level of abundance were measured, but actual new stock counts and frequencies were not quantified, as surveys were carried out only once each month to count those specimens available for retail. Therefore, any turnover of stock within the monthly period was unrecorded. Each species count should be considered a "snap-shot", where it is unknown whether new stock was acquired between observations. Figures presented in this report should be regarded as an underestimation of the retail trade in Medan. Turnover appears to have been high, and therefore, counts given in this report do not adequately account for the volume of trade in the markets. However, when monthly figures are examined, the turnover becomes slightly more obvious, as fluctuations are evident. The following graphs of representative species give an illustration of the monthly breakdown of totals and the fluctuations in quantities in the markets, thereby giving a better insight into the likely turnover rates (see **Figures 2-5**). The species presented are all indigenous to Indonesia and are considered to have been captured from the wild. Thus a high market trade turnover will have negatively impacted wild population viability.

Some species in the market were readily available throughout the year, e.g., Straw-headed Bulbul (see **Figure 2**), while other species appeared to have a varying availability, e.g., Slow Loris (see **Figure 3**), or were more opportunistically harvested, e.g., Nias Hill Myna (see **Figure 5**). As an indication of turnover, large peaks in numbers observed, followed by a sharp decline in the next month may provide an indication of turnover in that species. For example, 86 specimens of Straw-headed Bulbuls were recorded in March 2001, but in April there was only a count of 11 (see **Figure 2**). Similarly, 150 Red Lories were counted in May 1997, but in June only three were recorded (see **Figure 4**). In the mammal trade, an indication of Slow Loris turnover is the period of June 1997, where 35 Slow Loris were counted and none were seen in the following month (see **Figure 3**).

While these are significant declines in stock within a monthly timeframe, what is unclear from these figures is whether this shows (1) the sale of stock over the month; or (2) if there had been a restock of specimens in the monthly period; or (3) the proportion of specimen mortality in market conditions while waiting for sale.

Figure 2
Straw-headed Bulbul *Pycnonotus zeylanicus* recorded monthly in trade in the Medan markets, 1997-2001

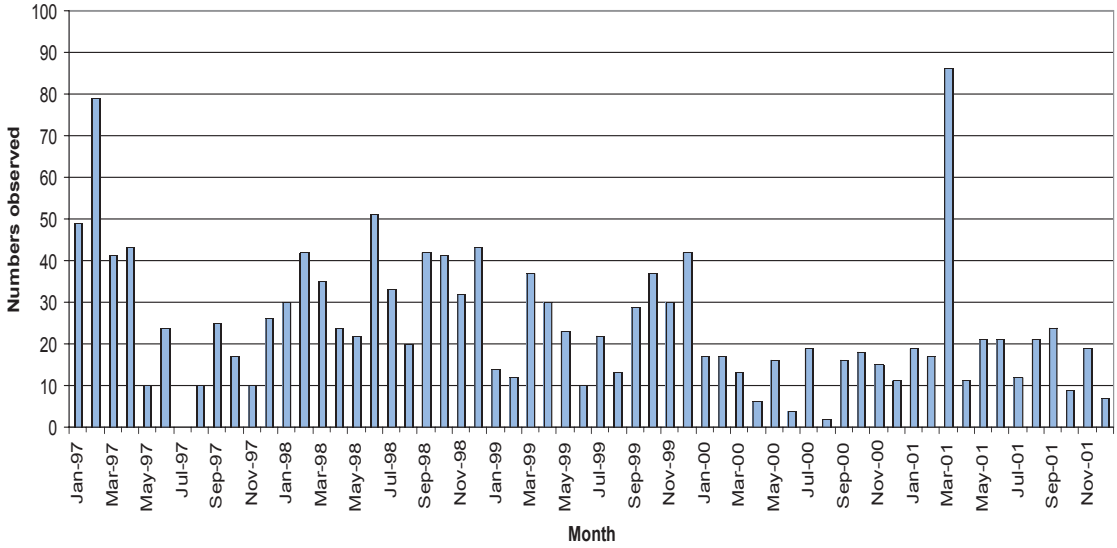


Figure 3
Slow Loris *Nycticebus coucang* recorded monthly in trade in the Medan markets, 1997-2001

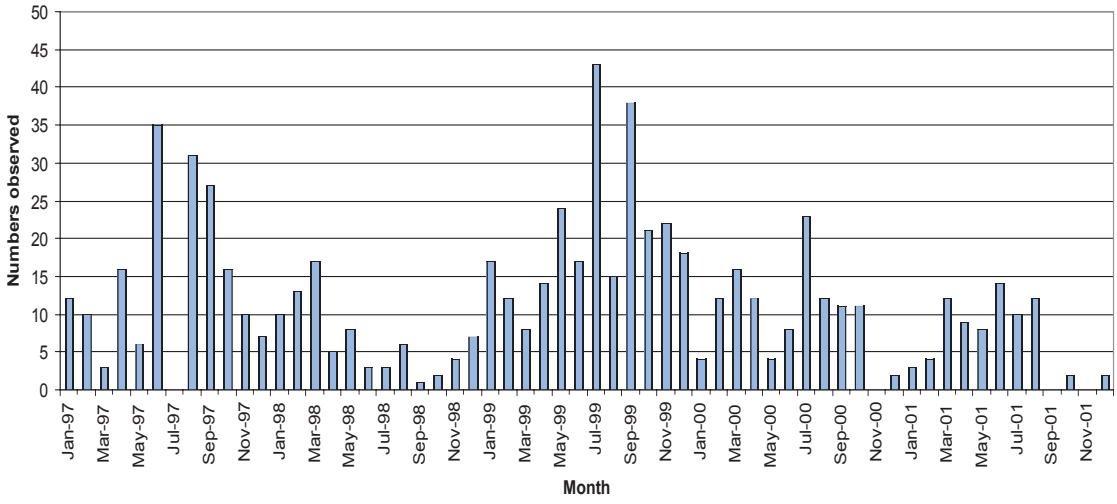


Figure 4
Red Lory *Eos bornea* recorded monthly in trade in the Medan markets, 1997-2001

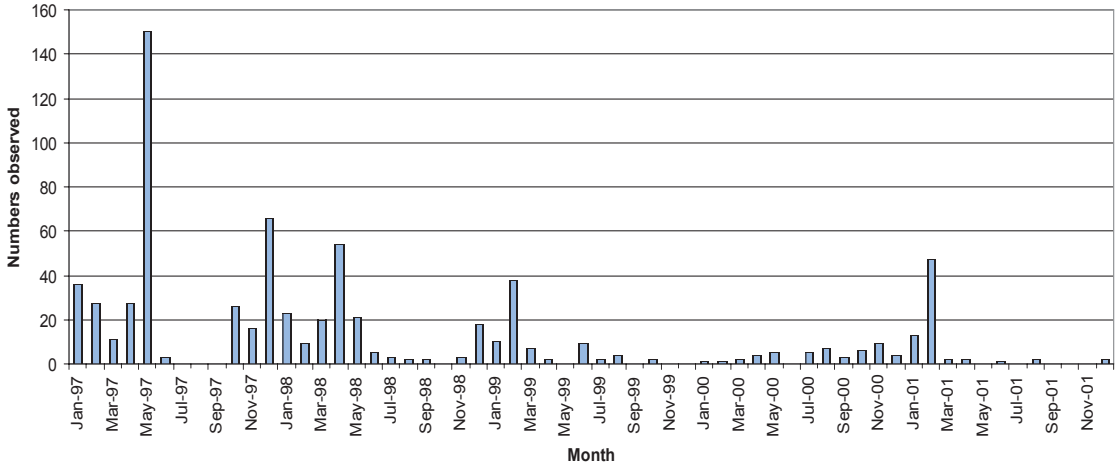
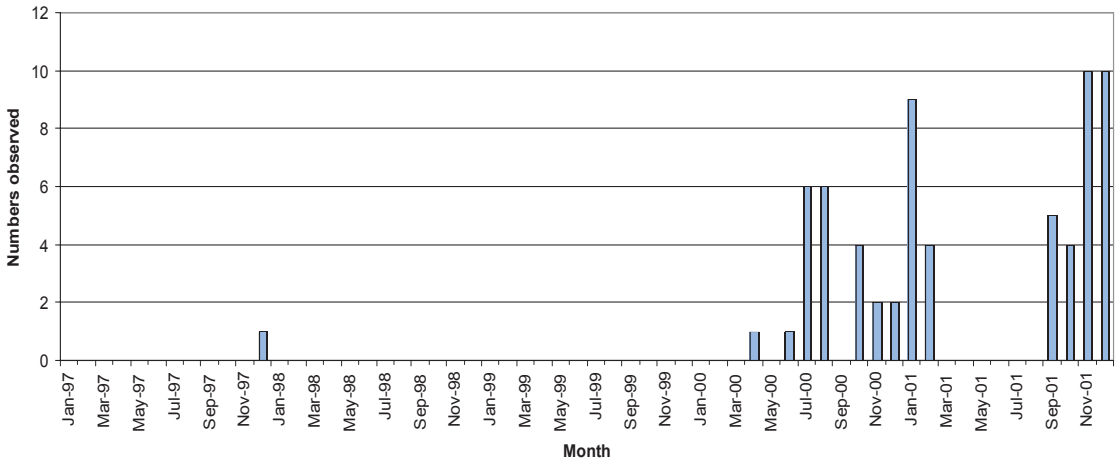


Figure 5
Nias Hill Myna *Gracula religiosa robusta* recorded monthly in trade in the Medan markets, 1997-2001



Parrots were one of the most heavily traded species in the Medan markets (see **Appendix I**) during this study. Red Lory was one species which was observed to show a decline in availability over the five year survey. In May 1997, 150 Red Lories were counted in the markets (see **Figure 4**). The number of Red Lories in trade never reached such high quantities again and remained relatively low throughout the following years. This may have been indicative of an abnormally large shipment of Red Lories that month from its limited range in eastern Indonesia or, considering the popularity of Red Lories, this solitary spike might suggest that the observer witnessed a new shipment of Red Lories and the demand for these birds meant that they sold very quickly to collectors. If such a rapid turnover, in the latter situation, did exist in the trade of Red Lories and 150 specimens is an average estimate of shipment size, then the volume of trade in these birds would have been severely under-estimated in the monthly figures presented.

While the number of observed Red Lories in the markets declined over the five year survey period, the number of Nias Hill Mynas showed an increase. Only one Nias Hill Myna was recorded in the period 1997-1999, but between 2000 and 2001, 65 specimens were counted (see **Figure 5**).

The flux in abundance of particular species in the market was evident throughout the survey. The Medan pet trade appeared to be a very opportunistic market, where any species could potentially be sold. While one species was in abundance, it was exploited in the markets. Then when depleted, another species was targeted for harvest, so that year-round the markets were always stocked – irrespective of what species was available.

Ultimately, each species showed considerable fluctuations in monthly counts, with extreme peaks preceded by dramatic troughs in the graphs, demonstrating that monthly counts do not adequately identify the volume of trade. Considering the extremity of the Medan wildlife trade, to give a reliable indication of turnover in the markets, observations should be made in a shorter timeframe, such as daily or weekly specimen counts.

Export

Medan is an important international export and import centre, having both an international airport and an international seaport. Many species, mostly birds, are exported by sea and by air from Medan to Malaysia, Singapore, Thailand and other global destinations. According to dealers, the sale of species from the Medan markets to Malaysia, Singapore and Thailand was always done without using CITES permits or adhering to other legal procedures. It appears that lack of enforcement and continual demand led to Medan becoming one of the largest wildlife market nodes in western Indonesia.

Birds originating from eastern Indonesia were purchased by Medan dealers from other dealers in the large markets of Jakarta, especially the Pramuka market. Buyers from Malaysia and Singapore, and occasionally other countries, then came to Medan to purchase birds. According to dealers, Medan was one of the easiest places in Indonesia from which to export birds, as controls and regulations were seldom enforced. According to dealers, species that in previous years were smuggled out of Indonesia by air from Jakarta were now being brought to Medan for export, as the security at the Jakarta airport was apparently tighter than it had been previously. The birds were reportedly sent to Malaysia and then on to Singapore or Thailand. Occasionally, specimens were sent to Singapore or Thailand directly. Smugglers used both airlines and ships to move animals. According to dealers, species often exported from Medan included Umbrella Cockatoos *Cacatua alba*, Goffin's Cockatoos *C. goffini*, and Lesser Sulphur-crested Cockatoos. One dealer claimed to have a regular buyer of Siamang in Singapore, and stated that during 1997 he was sending an average of two per month to Singapore. He was questioned again in mid-1999 and stated that, while he still occasionally sent Siamang to Singapore, sales had dropped off. He also mentioned that it was becoming much more difficult to acquire Siamang in Sumatra.

Import

Many of the species available in the markets in Medan were not native to Indonesia. These species were imported into the country, usually to Jakarta, where they were purchased by dealers and brought to Medan for resale. Many originated in China, Singapore, Malaysia and possibly Thailand. While difficult to

quantify precisely, all indications were that many birds were imported into Medan via Penang (Malaysia). While birds imported into Jakarta were sometimes legally brought into the country, birds coming into Medan from Penang seemed to have been imported illegally with dealers claiming that birds from Penang were smuggled into Indonesia through Medan's port, Belawan. Species brought in following this route included Red-whiskered Bulbul from Thailand where they are legally protected, Straw-headed Bulbul from Malaysia where they are legally protected, and Hill Myna from Malaysia. The latter two species are both listed on Appendix II of CITES. CITES records showed that many Hill Mynas had been imported into Malaysia from Vietnam. It seems feasible that the Hill Mynas in the markets in Medan might have originated in Vietnam.

From dealers' accounts, it is also very likely that birds from Singapore were smuggled into Medan by air. One dealer in Medan often had expensive South American birds for sale (reportedly sourced from Singapore) such as Green-winged Macaw *Ara chloroptera* and Blue-and-yellow Macaw *A. ararauna*. According to this dealer, these birds "do not need permits to be imported". As both these species are listed on Appendix II of CITES this is incorrect and they do require permits. This suggests that the birds were smuggled out of Singapore, as well as into Medan. Other dealers said that it was much easier and less expensive to bring birds into Medan illegally than to obtain permits and bring them in legally.

Some of the species imported into Indonesia and then into the markets of Medan were species native to Sumatra. Examples were the Straw-headed Bulbul, Hill Myna and the White-crested Laughingthrush. The fact that they were imported into Indonesia suggests that local populations of these species were no longer large enough to supply the demand, although more investigation is required to verify this.

DISCUSSION

Legal status of the trade

Species protected under Indonesian Law found in trade

Overall, of the 349 species identified in this study, 20.0% (n = 70) were totally protected by Indonesian Law (see **Table 4**). Of the 300 species of birds observed for sale in the markets of Medan, 18.6% (n = 56) of them were listed as being protected by Indonesian law and therefore illegally traded, as all trade or keeping of protected animals is prohibited by the Regulations of the Government of the Republic of Indonesia, No. 8, 1999, on the Utilisation of Wild Plant and Animal Species. Of the 34 species of mammals recorded for sale, 11 (32.3%) were legally protected, and three of the 15 reptile species recorded (20.0%) were legally protected.

The 10 most traded protected species in the Medan markets are listed in **Table 5**. Dealers were aware of the protected status of most species but they did not try to conceal protected species from scrutiny. Conversely, dealers often promoted the sale of protected animals, using the fact that they were protected as a selling point. Many wildlife collectors regarded owning a protected species as a status symbol.

Indonesian legislation specifies that any trade in wildlife, whether protected by law or not, must be done with legal documents, whether the trade is within country, for export, re-export or import. Sending or transporting wildlife from one location to another within Indonesia must be covered by legal documents,

according to Article 42, Chapter X of the Regulations of the Government of the Republic of Indonesia Number 8 (1999). However, when all traders in the wildlife markets in Medan were asked if they used such a permit system when acquiring animals for the trade, all responded that they did not. Thus, even the sale of non-protected wildlife species in Medan should be considered illegal.

Table 4
Species protected by Indonesian Law that were recorded in trade in the wildlife markets of Medan between January 1997 and December 2001

Birds (n = 56)	
Southern Cassowary *Casuarius casuarius*	Salmon-crested Cockatoo *C. moluccensis*
Brown Booby *Sula leucogaster*	Palm Cockatoo *Probosciger aterimus*
Cattle Egret *Bubulcus iblis*	Black-capped Lory *Lorius lory*
Egret *Egretta* sp.	Purple-capped Lory *L. domicella*
Black Eagle *Ictinaetus malayensis*	Pesquet's Parrot *Psittrichas fulgidus*
Crested Serpent-eagle *Spilornis cheela*	Diard's Trogon *Harpactes diardii*
Black Baza *aviceda leuphotes*	Ruddy Kingfisher *Halcyon coromanda*
Japanese Sparrowhawk *Accipiter gularis*	White-throated Kingfisher *H. smyrnensis*
Chinese Goshhawk *A. soloensis*	Blue-eared Kingfisher *Alcedo meninting*
Shikra *A. badius*	Wreathed Hornbill *Aceros undulatus*
Black-winged Kite *Elanus caeruleus*	White-crowned Hornbill *A. comatus*
Bat Hawk *Machaeramphus alcinus*	Rhinoceros Hornbill *Buceros rhinoceros*
Kestrel *Falco* sp.	Oriental Pied Hornbill *Anthracoceros albirostris*
White-bellied Fish-eagle *Haliaeetus leucogaster*	Hooded Pitta *Pitta sordida*
Brahminy Kite *Haliastur Indus*	Blue-winged Pitta *P. moluccensis*
Changeable Hawk-eagle *Spizaetus cirrhatus*	Lesser Bird-of-paradise *Paradisaea minor*
Blyth's Hawk-eagle *S. alboniger*	King Bird-of-paradise *Cicinnurus regius*
Wallace's Hawk-eagle *S. nanus*	Cresent-chested Babbler *Stachyris melanothorax*
Bustard *Butastur* sp.	Rufous-fronted Laughing-thrush *Garrulax rufifrons*
Green Peafowl *Pavo muticus*	Pied Fantail *Rhipidura javanica*
Tern *Sterna* sp.	Nias Hill Myna *Gracula religiosa robusta* [1]
Nicobar Pigeon *Caloenas nicobarica*	Black-winged Starling *Sturnus melanopterus*
Ornate Lory *Trichoglossus ornatus*	Helmeted Friarbird *Philemon buceroides*
Eclectus Parrot *Eclectus roratus*	Black-faced Friarbird *P. moluccensis*
Muller's Parrot *Tanygnathus sumatranus*	Plain-throated Sunbird *Anthreptes malacensis*
Lesser Sulphur-crested Cockatoo *Cacatua sulphurea*	Olive-backed Sunbird *Necatinia jugularis*
Goffin's Cockatoo *C. goffini*	Copper-throated Sunbird *N. calcostetha*
Sulphur-crested Cockatoo *C. galerita*	Spiderhunter *Arachnothera* sp.

Table 4 *(continued)*
Species protected by Indonesian Law that were recorded in trade in the wildlife markets of Medan between January 1997 and December 2001

Mammals[2] (n = 11)	
Colugo *Cynocephalus variegatus*	Siamang *H. syndactylus*
Slow Loris *Nycticebus coucang*	Malayan Pangolin *Manis javanica*
Thomas' Leaf Monkey *Presbytis thomasi*	Common Porcupine *Hystrix brachyura*
Javan Silvered Leaf Monkey *Trachypithecus auratus*	Leopard Cat *Prionailurus bengalensis*
Agile Gibbon *Hylobates agilis*	Lesser Mouse Deer *Tragulus javanicus*
White-handed Gibbon *H. lar*	
Reptiles[3] (n = 3)	
Blood Python *Python curtus*	Estuarine Crocodile *Crocodylus porosus*
Reticulated Python *P. reticulatus*	

Notes:

[1] Nias subspecies only – Mainland Sumatra variety remains unprotected

[2] Some species of otters are protected in Indonesia but the otters recorded during this study could not be identified.

[3] *Python* spp. may be legally harvested by licensed individuals for the skin trade, following a quota system. The dealers in this market were not licensed and therefore the species are treated as legally protected for the purposes of this report.

Table 5
Protected species most traded in the wildlife markets of Medan between January 1997 and December 2001

Common name	Scientific name	Quantity recorded
Slow Loris	*Nycticebus coucang*	692
Lesser Sulphur-crested Cockatoo	*Cacatua sulphurea*	413
Goffin's Cockatoo	*C. goffini*	338
Black-capped Lory	*Lorius lory*	378
Eclectus Parrot	*Eclectus roratus*	187
Black-winged Starling	*Sturnus melanopterus*	146
Leopard Cat	*Prionailurus bengalensis*	106
Sulphur-crested Cockatoo	*Cacatua galerita*	95
Salmon-crested Cockatoo	*C. moluccensis*	71
Black-winged Kite	*Elanus caeruleus*	69

Species protected under CITES found in trade

Most of the wildlife traded in Medan fell outside of the scope of CITES due to the fact that the trade was overwhelmingly domestic (i.e. within Indonesia). Furthermore, about 68% of species traded were not listed in the CITES Appendices (see **Table 6**). The Appendix I-listed species observed in trade were birds (Nicobar Pigeon, Goffin's Cockatoo, Salmon-crested Cockatoo and Palm Cockatoo), and mammals (Siamang, Agile Gibbon and White-handed Gibbon). Species of the family Psiittacidae were the most heavily traded CITES-listed species. The regular occurrence of protected species in trade demonstrates that there was insufficient enforcement of controls in place to regulate Indonesia's bird trade.

Table 6
CITES analysis of Medan wildlife trade

Grouping	Number of species recorded	CITES Appendix Listing			Total LISTED	Total UNLISTED
		I	II	III		
Birds	300	4 (1.3%)	70 (23.3%)	8 (2.7%)	**82 (27.3%)**	**218 (72.7%)**
Mammals	34	3 (8.8%)	15 (44.1%)	2 (5.9%)	**20 (58.8%)**	**14 (41.2%)**
Reptiles	15	0	7 (46.7%)	0	**7 (46.7%)**	**8 (53.3%)**
Total	**349**	**7 (2.0%)**	**92 (26.4%)**	**10 (2.8%)**	**109 (31.2%)**	**240 (68.8%)**

Dealers in Medan reported that it was becoming more difficult to smuggle CITES-listed birds out of Jakarta, therefore birds that were usually exported to Malaysia and Singapore from Jakarta were now being brought to Medan for export. According to one bird dealer in Singapore in 2000, it was easier to get birds from Medan than from Jakarta. Another reason for the increase of trade from Medan might have been due to its proximity to Malaysia. According to many dealers, the demand for such birds in Malaysia was increasing. From dealers' accounts and preliminary observations from other investigations, it is highly likely that birds imported illegally into Malaysia were again re-exported to other market destinations.

Sources of harvest

While it was recognized that many of the bird species found in Sumatra also occured in other parts of Indonesia, as well as in other countries, the study results show that most of the species that are native to Sumatra were reported as being captured in Sumatra (see **Table 7**). All mammals recorded during this study were reported to have originated from Sumatra, with the exceptions of Sugar Gliders and Javan Silvered Leaf Monkeys *Trachypithecus auratus*. All reptiles recorded during this study also reportedly originated from Sumatra, with the single exception of Green Iguana.

Much of the domestic trade involved native Indonesian species which lacked protection, though listed protected species were also widely traded in the Medan markets. A substantial portion of Medan's bird trade involved a large number of local forest species which would not have received adequate food and care in captivity and which usually did not survive very long. Thus, much of the Medan wildlife trade in native

Table 7
Geographical origin of bird species found in trade in the wildlife markets of Medan

Geographical origin	Number of bird species	Proportion of bird species recorded
Sumatra	191*	63.7%
rest of Indonesia	45	15.0%
mainland Asia	17	5.7%
Africa	13	4.3%
Australia	11	3.7%
North America	1	0.3%
South America	2	0.7%
South Arabia / Africa	1	0.3%
Europe / Africa	1	0.3%
Unknown	18	6.0%

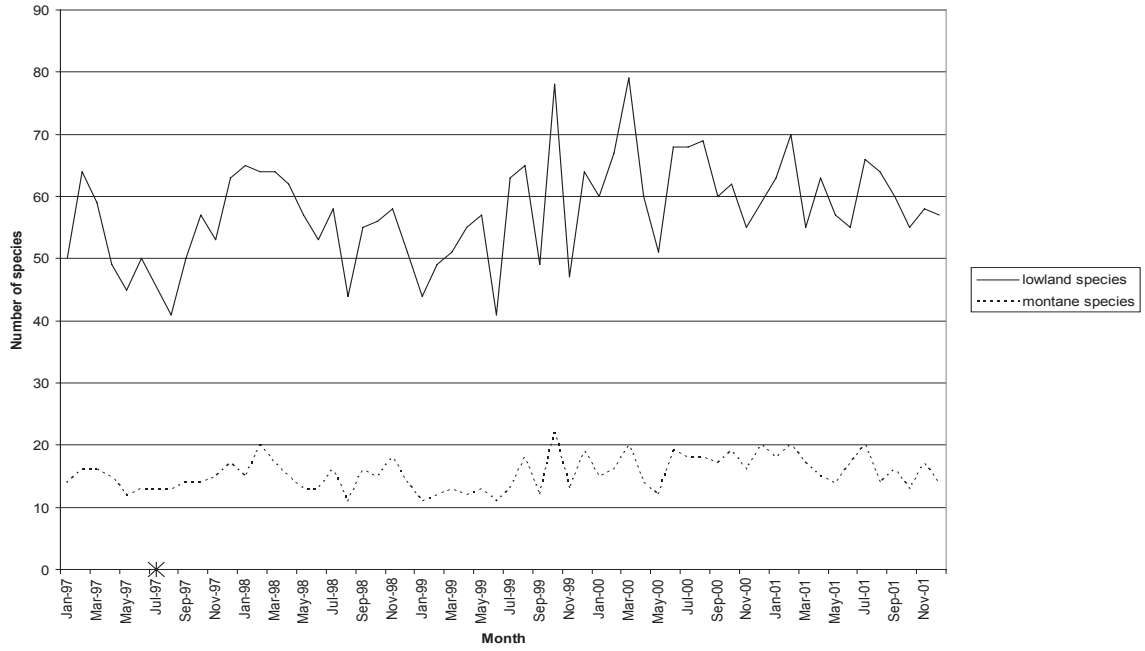
* Seven species included in this total are non-native species, introduced to Sumatra

species was a wasteful 'cut-flower'-type industry requiring the constant collection of short-lived commodities. In the case of local endemics, even a small off-take may have had an impact, if the species' range and habitats were restricted.

Species in trade as indicators of biodiversity and habitat integrity

Species occurring in the markets might be indicators of the state of the natural habitats and ecological communities in the surrounding areas. There was a high diversity of native species observed in trade that had potentially been sourced from local forests in Sumatra. The total number of Sumatran species recorded in the five-year period was 191 (see **Table 7**), with 144 species living in lowland areas (range <1000 m), and 47 species being specialists living at high altitudes in montane habitats (range >1000 m). There was a significant number of lowland species in trade, which might have been directly linked to the over-exploitation and land conversion activities impacting these lowland areas (see **Figure 6**). The diversity of species in trade appears to have shown a gradual increase across the years, perhaps as the forest had been opened up by logging and access roads, and collectors sourced new specimens from more remote habitats. As a direct result of logging development and land conversion depleting much of the lowland forests and moving further up into higher elevations, hunters and collectors increasingly gained access into remoter areas at previously inaccessible elevations, and thus a shift towards montane specialist species could be predicted.

Figure 6
Diversity of Sumatran bird species recorded in the Medan markets from low and high altitude habitats, 1997-2001



* No survey was conducted in July 1997

CONCLUSIONS

This report ultimately provides an inventory of species found in the wildlife trade in Medan. It does *not* give turnover rates or reflect trade volume. This would have been extremely challenging to measure due to time restrictions, requiring daily instead of monthly surveys. The mortality rate of wildlife was known to be substantial due to the poor conditions, with dealers suggesting that mortality rates for some species (e.g., munias) may have been up to 50% in the first 24 hours of captivity. However, this was also difficult to measure by monthly surveys, requiring, instead, close monitoring of stock.

This report concludes that the live animal pet trade in Medan, Sumatra, Indonesia was a very large and diverse trade which exploited birds, mammals and reptiles. Much of the wildlife found within the market was harvested locally, and thus posed a severe threat to the native fauna of Indonesia. A significant portion of the trade was operating illegally, violating Indonesian wildlife protection laws. The bulk of the trade fell outside the scope of CITES, either because it was of domestic origin and not destined for export, or because the species concerned were not listed under the Convention, or both. Improved protection through CITES listing or under national legislation was required for certain species. Efficient and accurate monitoring of the Medan market would facilitate improved law enforcement, leading to better compliance with national and international legislation, and ultimately a greater conservation benefit.

RECOMMENDATIONS

Research on wild populations

Very little is known about the status of wild populations in Sumatra. This report documents the large volume of wild-caught specimens traded in the markets, and makes indirect conclusions concerning the impact on wild populations, with the understanding that further research is required to better quantify this impact. Specific studies are urgently needed to determine the effects that the trade has had on wild populations of certain bird species, such as the Hill Myna and Straw-headed Bulbul that were subject to particularly intense market demand. Umbrella organizations working in the area, such as the Leuser Development Programme or Yayasan Leuser (Leuser Foundation), should encourage further research on these issues.

Scheduling or rescheduling of species on Appendix I or II of CITES

Improved protection through CITES listing or under national legislation is required for certain species. Based on the findings of this report, the following recommendations are made:

- Hoogerwerf's Pheasant *Lophura hoogerwerfi* should be listed on CITES Appendix II or Appendix I. This species should also be given full protection under Indonesian legislation due to its scarcity, its limited distribution and its sudden appearance and disappearance in the trade.

- Red-whiskered Bulbul *Pycnonotus jocosus* should be listed on CITES Appendix II or III to monitor and control the international trade.

- White-rumped Shama *Copsychus malabaricus* should be listed on CITES Appendix II or III to monitor and control the international trade.

- Indonesia should give Straw-headed Bulbul *Pycnonotus zeylanicus* full protection under national legislation.

Improved implementation and enforcement of existing legislation

Enforcement agencies should be encouraged to better enforce the *Conservation Act* (*No. 5*) *of 1990* and CITES regulations. While legislation in Indonesia is relatively good, enforcement remains insufficient. Inter-agency co-operation is essential (e.g. Customs, KSDA, Police) for effective regulation and enforcement and should be encouraged. People caught violating the law should be penalized to the full extent. Enforcement officers should be encouraged to regularly monitor the wildlife markets in Medan and take action when offences are found. Quotas for capture and trade of species in Indonesia should be carefully monitored and enforced.

Capacity building for enforcement agencies

Species identification skills within the local enforcement agencies are seriously lacking. This critically restricts law enforcement even in the cases where sufficient political will and implementation agency effort is present to control the trade. This problem should be addressed through skills-building workshops, training courses, and the production of identification resources such as booklets and posters, produced in the Indonesian language. These materials should be distributed to all levels within the enforcement agencies, and training should be given on a regular basis. More comprehensive law enforcement at ports of entry (airports and seaports) and exit is crucial, and therefore capacity building for enforcement personal based at all entry and exit-points is essential.

Continued monitoring of the trade of wildlife in Medan

Regular monitoring should continue so that further trends in the trade may be identified. Local NGO and Forestry Department staff should be trained to conduct standardised methods of data collection to enable meaningful analysis. Instances of illegal trade recorded during monitoring should be reported to the relevant authorities and interdiction should be encouraged. An efficient and accurate monitoring mechanism would facilitate management and law enforcement, leading to better compliance with national and international legislation, and by extension, greater conservation benefit.

Create rescue centres for confiscated wildlife

It is essential that rescue centres be established for wildlife confiscated from the illegal trade. The absence of such facilities currently acts as a disincentive for effective law enforcement by the authorities. It should be noted that the two zoos in North Sumatra are not suitable as rescue centres based on their current facilities and management practices.

Public awareness campaign

A public awareness campaign focussing on the endemic and endangered species threatened by the trade is urgently needed. The public should be made aware of the legislation protecting wildlife as well as the punishments for violating this legislation. People need to become aware of the significance of the wildlife around them and the importance of its conservation, efforts towards which would benefit from attitudinal and cultural assessments to design appropriate interventions and approaches. Such awareness campaigns could be conducted by local NGOs and zoos, in partnership with government agencies and local media.

Species recovery plans

Certain species and subspecies, such as Nias Hill Myna, have already been pushed to the brink of extinction by trade. Careful studies should be carried out to identify any species in a similar situation of threat and recovery plans should be created and implemented. The BirdLife Indonesia Programme in cooperation with PHKA has in the past few years put together some excellent examples of recovery plans for a few species, including Lesser Sulphur-crested Cockatoo and Javan Hawk-eagle, that could serve as models for subsequent efforts in Sumatra.

Field guides

There currently exist no convenient field guides for mammals or reptiles in Sumatra. Publication of such identification resources would not only be of great assistance when carrying out surveys and further monitoring and law enforcement efforts, but would also encourage others to learn more about Sumatra's wildlife. Field guides should be bilingual, produced in both Bahasa Indonesia and English, as has been done with the *Guide to the Birds of Borneo, Sumatra, Java and Bali* by MacKinnon & Phillipps (1993).

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APPENDICES

Appendix I
Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Casuariidae							
Southern Cassowary	*Casuarius casuarius*	0	4	0	0	0	**4**
Family Sulidae							
Brown Booby	*Sula leucogaster*	0	0	3	0	0	**3**
Family Ardeidae							
Cattle Egret	*Bubulcus ibis*	3	0	2	0	0	**5**
Striated Heron	*Butorides striatus*	0	0	2	0	0	**2**
? egret	*Egretta* sp.	2	0	0	0	0	**2**
Black-crowned Night-heron	*Nycticorax nycticorax*	1	0	0	2	0	**3**
? brown bitterns		8	1	0	0	0	**9**
Family Dendrocygnidae							
Wandering Whistling Duck	*Dendrocygna arcuata*	4	0	7	0	2	**13**
Lesser Whistling Duck	*Dendrocygna javanica*	20	5	55	26	73	**179**
Family Anatidae							
Wood Duck	*Aix sponsa*	0	0	0	2	1	**3**
Family Accipitridae							
Shikra	*Accipiter badius*	4	0	0	0	0	**4**
Japanese Sparrowhawk	*Accipiter gularis*	1	2	1	2	1	**7**
Chinese Goshawk	*Accipiter soloensis*	0	0	0	2	1	**3**
Black Baza	*Aviceda leuphotes*	2	5	0	3	0	**10**
? buzzard	*Butastur* sp.	0	0	1	0	4	**5**
Black-winged Kite	*Elanus caeruleus*	19	2	40	6	2	**69**
? kestrel	*Falco* sp.	3	2	0	0	0	**5**
White-bellied Fish-eagle	*Haliaeetus leucogaster*	0	1	0	0	0	**1**
Brahminy Kite	*Haliastur indus*	0	15	3	11	6	**35**
Black Eagle	*Ictinaetus malayensis*	2	4	0	0	0	**6**
Bat Hawk	*Machaeramphus alcinus*	1	0	0	0	0	**1**

Appendix I *(continued)*

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Accipitridae							
Crested Serpent-eagle	*Spilornis cheela*	1	4	1	2	0	**8**
Blyth's Hawk-eagle	*Spizaetus alboniger*	0	1	0	0	0	**1**
Changeable Hawk-eagle	*Spizaetus cirrhatus*	5	8	0	3	7	**23**
Wallace's Hawk-eagle	*Spizaetus nanus*	0	0	1	0	0	**1**
Family Phasianidae							
Chestnut-bellied Partridge	*Arborophila javanica*	1	2	0	0	0	**3**
Grey-breasted Partridge	*Arborophila orientalis rolli*	7	2	23	10	2	**44**
Ferruginous Partridge	*Caloperdix oculea*	0	0	3	1	0	**4**
Lady Amherst's Pheasant	*Chrysolophus amhersttiae*	1	0	0	0	0	**1**
Golden Pheasant	*Chrysolophus pictus*	0	0	0	0	1	**1**
Blue-breasted Quail	*Corturnix chinensis*	28	2	2	1	0	**33**
Red Junglefowl	*Gallus gallus*	6	12	30	34	36	**118**
Green Junglefowl	*Gallus varius*	0	0	10	3	0	**13**
Hoogerwerf's Pheasant	*Lophura hoogerwerfi*	0	0	16	3	0	**19**
Green Peafowl	*Pavo muticus*	0	2	11	0	5	**18**
Sumatran Peacock-pheasant	*Polyplectron chalcurum*	10	10	33	20	0	**73**
Crested Partridge	*Rollulus rouloul*	2	0	2	2	0	**6**
Family Turnicidae							
Barred Buttonquail	*Turnix suscitator*	30	33	20	10	3	**96**
Family Rallidae							
White-breasted Waterhen	*Amaurornis phoenicurus*	76	28	36	68	53	**261**
Watercock	*Gallicrex cinerea*	0	3	0	0	0	**3**
Common Moorhen	*Gallinula chloropus*	28	0	2	0	4	**34**
Slaty-breasted Rail	*Gallirallus striatus*	0	1	0	0	0	**1**
Purple Swamphen	*Porphyrio porphyrio*	2	26	14	16	11	**69**
Slaty-legged Crake	*Rallina eurizonoides*	1	0	0	0	0	**1**

Appendix 1 ***(continued)***

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Psittacidae							
Goffin's Cockatoo	*Cacatua goffini*	36	145	86	36	35	**338**
Salmon-crested Cockatoo	*Cacatua moluccensis*	0	2	28	36	5	**71**
Lesser Sulphur-crested Cockatoo	*Cacatua sulphurea*	103	83	125	40	49	**400**
Black Lory	*Chalcopsitta atra atra*	102	67	79	12	22	**282**
Duivenbode's Lory	*Chalcopsitta duivenbodei*	0	0	6	46	4	**56**
Yellow-streaked Lory	*Chalcopsitta scintillata*	0	2	17	30	27	**76**
Stella's Lory	*Charmosyna papou goliathina*	0	23	10	0	0	**33**
Red-flanked Lory	*Charmosyna placentis*	0	0	0	0	52	**52**
Eclectus Parrot	*Eclectus roratus*	33	17	97	30	10	**187**
Red Lory	*Eos bornea bornea*	362	160	74	47	69	**712**
Blue-streaked Lory	*Eos reticulata*	0	22	56	0	19	**97**
Violet-naped Lory	*Eos squamata*	0	22	56	150	117	**345**
? black-winged lory	*Eos* sp.	0	2	0	0	0	**2**
Blue-crowned Hanging-parrot	*Loriculus galgulus*	199	176	198	154	423	**1150**
Purple-capped Lory	*Lorius domicella*	1	0	0	2	0	**3**
Chattering Lory	*Lorius garrulus*	406	156	406	153	158	**1279**
Black-capped Lory	*Lorius lory*	37	55	117	78	91	**378**
Bourke's Parrot	*Neopsephotus bourkii*	0	0	0	1	16	**17**
Crimson Rosella	*Platycercus elegans*	0	0	0	4	1	**5**
Eastern Rosella	*Platycercus eximus*	6	0	5	4	3	**18**
Palm Cockatoo	*Probosciger aterimus*	1	1	1	2	0	**5**
Red-rumped Parrot	*Psephotus haematonotus*	0	0	0	12	4	**16**
Dusky Lory	*Pseudeos fuscata*	280	183	96	102	73	**734**
Red-breasted Parakeet	*Psittacula alexandri*	44	11	23	23	19	**120**
Long-tailed Parakeet	*Psittacula longicauda*	86	8	2	46	0	**142**
Desmarest's Fig Parrot	*Psittaculirostris desmarestii desmarestii*	0	0	6	8	3	**17**
African Parrot	*Psittacus erithacus*	4	0	5	14	20	**43**
Goldie's Lorikeet	*Psitteuteles goldiei*	0	74	34	9	5	**122**

Appendix I *(continued)*

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Psittacidae							
Goffin's Cockatoo	*Cacatua goffini*	36	145	86	36	35	**338**
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Black Lory	*Chalcopsitta atra atra*	102	67	79	12	22	**282**
Duivenbode's Lory	*Chalcopsitta duivenbodei*	0	0	6	46	4	**56**
Yellow-streaked Lory	*Chalcopsitta scintillata*	0	2	17	30	27	**76**
Stella's Lory	*Charmosyna papou goliathina*	0	23	10	0	0	**33**
Red-flanked Lory	*Charmosyna placentis*	0	0	0	0	52	**52**
Eclectus Parrot	*Eclectus roratus*	33	17	97	30	10	**187**
Red Lory	*Eos bornea bornea*	362	160	74	47	69	**712**
Blue-streaked Lory	*Eos reticulata*	0	22	56	0	19	**97**
Violet-naped Lory	*Eos squamata*	0	22	56	150	117	**345**
? black-winged lory	*Eos* sp.	0	2	0	0	0	**2**
Blue-crowned Hanging-parrot	*Loriculus galgulus*	199	176	198	154	423	**1150**
Purple-capped Lory	*Lorius domicella*	1	0	0	2	0	**3**
Chattering Lory	*Lorius garrulus*	406	156	406	153	158	**1279**
Black-capped Lory	*Lorius lory*	37	55	117	78	91	**378**
Bourke's Parrot	*Neopsephotus bourkii*	0	0	0	1	16	**17**
Crimson Rosella	*Platycercus elegans*	0	0	0	4	1	**5**
Eastern Rosella	*Platycercus eximus*	6	0	5	4	3	**18**
Palm Cockatoo	*Probosciger aterimus*	1	1	1	2	0	**5**
Red-rumped Parrot	*Psephotus haematonotus*	0	0	0	12	4	**16**
Dusky Lory	*Pseudeos fuscata*	280	183	96	102	73	**734**
Red-breasted Parakeet	*Psittacula alexandri*	44	11	23	23	19	**120**
Long-tailed Parakeet	*Psittacula longicauda*	86	8	2	46	0	**142**
Desmarest's Fig Parrot	*Psittaculirostris desmarestii desmarestii*	0	0	6	8	3	**17**
African Parrot	*Psittacus erithacus*	4	0	5	14	20	**43**
Goldie's Lorikeet	*Psitteuteles goldiei*	0	74	34	9	5	**122**

Appendix 1 ***(continued)***

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Psittacidae							
Blue-rumped Parrot	*Psittinus cyanurus*	4	7	0	20	1	**32**
Pesquet's Parrot	*Psittrichas fulgidus*	0	0	1	3	0	**4**
Muller's Parrot	*Tanygnathus sumatranus*	0	0	1	0	0	**1**
Perfect Lory	*Trichoglossus euteles*	0	9	2	0	0	**11**
Rainbow Lory	*Trichoglossus haematodus*	593	397	466	479	600	**2535**
Iris Lorikeet	*Trichoglossus iris*	0	0	16	0	10	**26**
Ornate Lory	*Trichoglossus ornatus*	0	4	2	0	0	**6**
Family Cuculidae							
Plaintive Cuckoo	*Cacomantis merulinus*	0	0	0	0	3	**3**
Chestnut-winged Cuckoo	*Clamator coromandus*	1	1	0	0	0	**2**
Asian Koel	*Eudynamys scolopacea*	0	0	4	0	1	**5**
Chesnut-breasted Malkoha	*Phaenicophaeus curvirostris*	0	2	0	0	0	**2**
Drongo Cuckoo	*Surniculus lugubris*	0	0	0	1	0	**1**
Family Centropodidae							
Lesser Coucal	*Centropus bengalensis*	0	0	14	0	4	**18**
Greater Coucal	*Centropus sinensis*	15	26	22	7	4	**74**
Family Tytonidae							
Oriental Bay Owl	*Phodilus badius*	4	5	2	1	0	**12**
Barn Owl	*Tyto alba*	9	17	9	4	3	**42**
Family Strigidae							
Barred Eagle-owl	*Bubo sumatranus*	5	7	0	0	0	**12**
Buffy Fish-owl	*Ketupa ketupu*	9	4	7	0	0	**20**
Brown Hawk-owl	*Ninox scutulata*	1	1	0	0	0	**2**
? reddish scops owl	*Otus* sp.	0	2	0	0	0	**2**
? dark-winged scops owl	*Otus* sp.	0	2	0	0	0	**2**

Appendix I *(continued)*

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Strigidae							
? scop's owl	*Otus* sp.	8	9	1	3	0	**21**
Brown Wood-owl	*Strix leptogrammica*	0	1	0	0	0	**1**
Family Caprimulgidae							
? nightjar	*Caprimulgus* sp.	0	2	0	0	0	**2**
Family Trogonidae							
Diard's Trogon	*Harpactes diardii*	0	0	0	1	0	**1**
Family Halcyonidae							
Ruddy Kingfisher	*Halcyon coromanda*	1	8	0	0	0	**9**
White-throated Kingfisher	*Halcyon smyrnensis*	3	0	5	0	1	**9**
Family Alcedinidae							
Blue-eared Kingfisher	*Alcedo meninting*	0	0	1	0	0	**1**
Family Meropidae							
Chestnut-headed Bee-eater	*Merops leschenaulti*	0	0	0	0	3	**3**
Family Bucerotidae							
White-crowned Hornbill	*Aceros comatus*	0	0	1	0	0	**1**
Wreathed Hornbill	*Aceros undulatus*	0	6	2	0	0	**8**
Oriental pied Hornbill	*Anthracoceros albirostris*	0	0	0	1	0	**1**
Rhinoceros Hornbill	*Buceros rhinoceros*	0	0	1	0	0	**1**
Family Capitonidae							
Brown Barbet	*Calorhamphus fuliginosus*	0	0	4	6	1	**11**
? barbet	*Lybius* sp.	0	0	0	2	0	**2**
Blue-eared Barbet	*Megalaima australis*	0	0	2	0	0	**2**
Gold-whiskered Barbet	*Megalaima chrysopogon*	1	0	16	4	8	**29**
Coppersmith Barbet	*Megalaima haemmacephala delica*	2	0	0	0	0	**2**
Red-throated Barbet	*Megalaima mystacophanos*	0	0	11	16	4	**31**
Black-browed Barbet	*Megalaima oorti*	10	40	33	63	186	**332**

Appendix I *(continued)*

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Capitonidae							
Red-crowned Barbet	*Megalaima rafflesii*	0	0	0	10	14	**24**
Fire-tufted Barbet	*Psilopogon pyrolophus*	1200	1163	368	340	1409	**4480**
Crested Barbet	*Trachyphonus vaillantii*	0	0	0	2	0	**2**
Family Picidae							
Common Goldenback	*Dinopium javanense*	87	3	188	98	77	**453**
White-bellied Woodpecker	*Dryocopus javensis*	0	0	0	0	1	**1**
Sunda Woodpecker	*Picoides moluccensis*	0	0	2	0	0	**2**
Greater Yellownape	*Picus flavinucha*	3	0	0	0	0	**3**
Family Eurylaimidae							
Black-and-red Broadbill	*Cymbirhynchus macrorhynchus*	0	1	0	4	0	**5**
Family Pittidae							
Blue-winged Pitta	*Pitta moluccensis*	0	1	0	2	0	**3**
Hooded Pitta	*Pitta sordida*	5	0	4	3	0	**12**
Family Alaudidae							
Mongolian Lark	*Melanocorypha mongolica*	0	27	2	1	0	**30**
? brown lark		121	19	0	31	20	**191**
Family Hirundinidae							
Barn Swallow	*Hirundo rustica*	0	0	0	0	1	**1**
Pacific Swallow	*Hirundo tahitica*	0	0	2	0	0	**2**
Family Motacillidae							
Forest Wagtail	*Dendronanthus indicus*	0	0	3	8	2	**13**
Grey Wagtail	*Motacilla cinerea*	5	100	14	8	0	**127**
Family Campephagidae							
? minivet	*Pericrocotus* sp.	3	2	9	0	0	**14**
Small Minivet	*Pericrocotus cinnamomeus*	0	0	3	0	0	**3**

Appendix I *(continued)*

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Chloropseidae							
Common Iora	*Aegithina tiphia*	3	32	22	20	7	**84**
Golden-fronted Leafbird	*Chloropsis aurifrons*	1	0	0	3	3	**7**
Blue-winged Leafbird	*Chloropsis cochinchinensis*	200	204	220	345	395	**1364**
Orange-bellied Leafbird	*Chloropsis hardwickii*	2	0	0	2	6	**10**
Greater Green Leafbird	*Chloropsis sonnerati*	0	0	5	72	33	**110**
Blue-masked Leafbird	*Chloropsis venusta*	0	0	0	0	8	**8**
? leafbird	*Chloropsis* sp.	10	65	0	20	0	**95**
Family Pycnonotidae							
Grey-cheeked Bulbul	*Alophoixus bres*	0	0	10	17	43	**70**
Ochraceous Bulbul	*Alophoixus ochraceus*	8	60	73	32	2	**175**
Ashy Bulbul	*Hypsipetes flavala*	0	0	0	18	4	**22**
White-headed Bulbul	*Hypsipetes madagascariensis*	24	0	0	43	8	**75**
Sunda Bulbul	*Iole virescens*	0	0	0	16	15	**31**
Black-headed Bulbul	*Pycnonotus atriceps*	10	79	78	138	99	**404**
Sooty-headed Bulbul	*Pycnonotus aurigaster*	500	476	1058	588	905	**3527**
Orange-spotted Bulbul	*Pycnonotus bimaculatus*	240	303	385	170	224	**1322**
Red-eyed Bulbul	*Pycnonotus brunneus*	0	0	0	39	11	**50**
Grey-bellied Bulbul	*Pycnonotus cyaniventris*	20	38	0	6	16	**80**
Yellow-vented Bulbul	*Pycnonotus goiavier*	90	101	186	240	455	**1072**
Red-whiskered Bulbul	*Pycnonotus jocosus*	150	154	610	431	31	**1376**
Cream-striped Bulbul	*Pycnonotus leucogrammicus*	0	0	0	0	15	**15**
Black-crested Bulbul	*Pycnonotus melanicterus*	107	337	371	305	253	**1373**
Olive-winged Bulbul	*Pycnonotus plumosus*	0	0	0	4	1	**5**
Cream-vented Bulbul	*Pycnonotus simplex*	0	0	3	6	18	**27**
Scaly-breasted Bulbul	*Pycnonotus squamatus*	13	128	3	24	26	**194**
Spot-necked Bulbul	*Pycnonotus tympanistrigus*	0	0	0	0	3	**3**
Straw-headed Bulbul	*Pycnonotus zeylanicus*	334	415	299	154	267	**1469**

Appendix 1 ***(continued)***

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Dicruridae							
Ashy Drongo	*Dicrurus leucophaeus*	0	0	0	2	5	**7**
Black Drongo	*Dicrurus macrocercus*	0	0	1	1	0	**2**
Greater Racket-tailed Drongo	*Dicrurus paradiseus*	1	1	0	7	57	**66**
Lesser Racket-tailed Drongo	*Dicrurus remifer*	4	9	2	4	0	**19**
? drongo	*Dicrurus* sp.	38	39	4	15	1	**97**
Family Oriolidae							
Asian Fairy-bluebird	*Irena puella*	3	57	44	27	142	**273**
Black-naped Oriole	*Oriolus chinensis*	359	194	250	302	199	**1304**
Black-and-crimson Oriole	*Oriolus cruentus*	2	0	0	0	5	**7**
Dark-throated Oriole	*Oriolus xanthonotus*	0	1	2	0	0	**3**
Family Corvidae							
Green Magpie	*Cissa chinensis*	120	127	135	264	121	**767**
Slender-billed Crow	*Corvus enca*	62	49	11	4	0	**126**
Large-billed Crow	*Corvus macrorhynchos*	0	0	0	1	1	**2**
House Crow	*Corvus splendens*	0	0	0	1	2	**3**
Racket-tailed Treepie	*Crypsirina temia*	0	0	7	2	0	**9**
Sumatran Treepie	*Dendrocitta occipitalis*	2	46	49	39	0	**136**
Crested Jay	*Platylophus galericulatus*	5	0	4	5	11	**25**
Family Paradisaeidae							
King Bird-of-paradise	*Cicinnurus regius*	0	0	7	0	0	**7**
Lesser Bird-of-paradise	*Paradisaea minor*	0	1	0	0	0	**1**
Family Paridae							
Great Tit	*Parus major*	4	302	111	49	6	**472**
Family Sittidae							
Velvet-fronted Nuthatch	*Sitta frontalis*	5	2	2	0	0	**9**
Family Timaliidae							
Hwamei	*Garrulax canorus*	2	0	234	255	131	**622**

Appendix I *(continued)*

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Timaliidae							
Black-throated Laughingthrush	*Garrulax chinensis*	800	924	226	350	207	**2507**
Chestnut-crowned Laughingthrush	*Garrulax erythrocephalus*	0	4	0	0	0	**4**
Red-winged Laughingthrush	*Garrulax formosus*	0	0	1	0	0	**1**
White-crested Laughingthrush	*Garrulax leucolophus*	850	815	645	532	550	**3392**
Black Laughingthrush	*Garrulax lugubris*	6	58	2	18	13	**97**
Chestnut-capped Laughingthrush	*Garrulax mitratus*	550	524	310	252	147	**1783**
Sunda Laughingthrush	*Garrulax palliatus*	400	425	884	364	260	**2333**
Rufous-fronted Laughingthrush	*Garrulax rufifrons*	0	0	1	9	2	**12**
Long-tailed Sibia	*Heterophasia picaoides*	119	22	32	183	383	**739**
Silver-eared Mesia	*Leiothrix argentauris*	203	138	212	138	77	**768**
Pekin Robin	*Leiothrix lutea*	850	740	1116	978	797	**4481**
Striped tit-Babbler	*Macronous gularis*	0	0	0	2	0	**2**
Rufous-crowned Babbler	*Malacopteron magnum*	0	1	1	0	5	**7**
Black-capped Babbler	*Pellorneum capistratum*	0	0	4	0	0	**4**
Chestnut-backed Scimitar-babbler	*Pomatorhinus montanus*	1	1	2	0	0	**4**
Cresent-chested Babbler	*Stachyris melanothorax*	1	0	0	0	0	**1**
Spot-necked Babbler	*Stachyris striolata*	1	0	8	3	0	**12**
Chestnut-capped Babbler	*Timalia pileata*	0	0	0	0	3	**3**
Family Turdidae							
White-rumped Shama	*Copsychus malabaricus*	2500	2586	1979	2055	1200	**10320**
Magpie Robin	*Copsychus saularis*	2500	2565	3478	2433	1519	**12495**
White-crowned Forktail	*Enicurus leschenaulti*	1	0	0	0	0	**1**
Pied Bushchat	*Saxicola caprata*	0	0	1	5	8	**14**
Common Blackbird	*Turdus merula*	0	38	0	8	14	**60**
Eyebrowed Thrush	*Turdus obscurus*	13	6	1	7	20	**47**
Island Thrush	*Turdus poliocephalus*	0	0	0	9	18	**27**

Appendix 1 ***(continued)***

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Turdidae							
Orange-headed Thrush	*Zoothera citrina*	19	46	50	111	149	**375**
Chestnut-backed Thrush	*Zoothera dohereyi*	0	0	13	14	9	**36**
Red-backed Thrush	*Zoothera erythronota*	0	0	0	0	1	**1**
Chestnut-capped Thrush	*Zoothera interpres*	1	8	20	15	12	**56**
Siberian Thrush	*Zoothera sibirica*	11	5	1	6	41	**64**
Family Sylviidae							
Eastern Reed-warbler	*Acrocephalus orientalis*	0	0	0	0	1	**1**
Ashy Tailorbird	*Orthotomus ruficeps*	97	272	156	99	139	**763**
Rufous-tailed Tailorbird	*Orthotomus sericeus*	0	0	30	3	4	**37**
Hill Prinia	*Prinia atrogularis*	0	0	0	13	6	**19**
Bar-winged Prinia	*Prinia familiaris*	0	90	54	48	23	**215**
Yellow-bellied Prinia	*Prinia flaviventris*	0	0	34	44	55	**133**
Family Muscicapidae							
? blue flycatcher	*Cyornis* sp.	0	0	0	13	6	**19**
Verditer Flycatcher	*Eumyias thalassina*	0	0	1	0	0	**1**
Yellow-rumped Flycatcher	*Ficedula zanthopygia*	0	1	2	0	0	**3**
Family Rhipiduridae							
Pied Fantail	*Rhipidura javanica*	6	0	3	1	0	**10**
Family Artamidae							
White-breasted Wood-swallow	*Artamus leucorhynchus*	0	0	2	0	0	**2**
Family Laniidae							
Brown Shrike	*Lanius cristatus*	0	0	0	6	0	**6**
Long-tailed Shrike	*Lanius schach*	1	117	73	138	125	**454**
Family Sturnidae							
Crested Myna	*Acridotheres cristatellus*	87	25	7	23	7	**149**

Appendix I *(continued)*

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Sturnidae							
Javan Myna	*Acridotheres javanicus*	5000	7618	3955	1831	1115	**19519**
Common Myna	*Acridotheres tristis*	23	216	406	353	415	**1413**
Asian Glossy Starling	*Alponis panayensis*	19	422	512	789	337	**2079**
Golden-crested Myna	*Ampeliceps coronatus*	4	1	0	0	0	**5**
Short-crested Myna	*Basilornis celebensis*	7	1	1	2	0	**11**
Hill Myna	*Gracula religiosa*	697	204	348	555	352	**2156**
Golden-breasted Myna	*Mino anais*	13	0	23	31	19	**86**
Yellow-faced Myna	*Mino dumonii*	100	90	108	140	59	**497**
Grosbeak Starling	*Scissirostrum dubium*	23	1	31	0	0	**55**
Spreo/Superb Starling	*Spreo superbus*	3	0	0	0	0	**3**
Vinous-breasted Starling	*Stunus burmannicus*	0	0	1	7	0	**8**
Asian Pied Starling	*Sturnus contra*	83	57	47	33	39	**259**
Black-winged Starling	*Sturnus melanopterus*	18	22	37	41	28	**146**
Black-collared Starling	*Sturnus nigricollis*	174	83	152	224	154	**787**
Chestnut-cheeked Starling	*Sturnus philippensis*	0	0	0	7	0	**7**
Purple-backed Starling	*Sturnus sturninus*	1500	1859	1757	143	1579	**6838**
Family Bombycillidae							
? waxwing	*Bombycilla* sp.	8	0	2	3	0	**13**
Family Meliphagidae							
Helmeted Friarbird	*Philemon buceroides*	7	0	4	0	5	**16**
Black-faced Friarbird	*Philemon moluccensis*	0	0	0	7	1	**8**
Family Nectariniidae							
Plain-throated Sunbird	*Anthreptes malacensis*	0	0	0	3	0	**3**
? spiderhunter	*Arachnothera* sp.	0	0	1	0	0	**1**
Copper-throated Sunbird	*Nectarinia calcostetha*	2	0	0	0	0	**2**
Olive-backed Sunbird	*Nectarinia jugularis*	2	0	13	0	1	**16**

Appendix 1 ***(continued)***

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Dicaeidae							
Yellow-vented Flowerpecker	*Dicaeum chrysorrheum*	0	0	0	1	0	**1**
Scarlet-backed Flowerpecker	*Dicaeum cruentatum*	0	0	3	0	0	**3**
Orange-bellied Flowerpecker	*Dicaeum trigonostigma*	134	49	89	144	85	**501**
Family Zosteropidae							
Oriental White-eye	*Zosterops palpebrosus*	254	213	796	829	232	**2324**
Family Passeridae							
Cherry Finch	*Aidermosyne (poephila) modestra*	0	1	0	0	0	**1**
Red Avadavat	*Amandava amandava*	352	212	117	116	343	**1140**
Cut-throat Finch	*Amandina fasciata*	12	26	0	0	0	**38**
Diamond Sparrow	*Emblema guttata*	46	25	0	0	0	**71**
Pin-tailed Parrot-Finch	*Erythrura prasina*	249	271	251	272	270	**1313**
Orange-cheeked Waxbill	*Estrilda melpoda*	149	18	0	0	0	**167**
? red masked finch	*Estrilda* sp.	49	2	0	0	0	**51**
Peter's Twinspot	*Hypargos niveoguttatus*	4	0	0	0	0	**4**
Silverbill Finch	*Lonchura caniceps*	14	3	0	0	0	**17**
White-headed Munia	*Lonchura maja*	2500	2415	4870	11800	6450	**28035**
Black-headed Munia	*Lonchura malacca*	588	437	225	519	298	**2067**
Scaly-breasted Munia	*Lonchura punctulata*	2500	2555	6925	12600	6270	**30850**
White-rumped Munia	*Lonchura striata*	0	0	4	2	3	**9**
Green-backed Twinspot	*Mandingoa nitidula*	5	0	0	0	0	**5**
Star Finch	*Neochmia ruficauda*	7	39	2	13	0	**61**
Java Sparrow	*Padda oryzivora*	390	193	297	449	184	**1513**
Eurasian Tree Sparrow	*Passer montanus*	8	2	2	2	3	**17**
Baya Weaver	*Ploceus philippinus*	1500	1503	1851	1770	1419	**8043**
Long-tailed Finch	*Poephila acuticauda*	19	6	0	2	0	**27**
Gouldian Finch	*Poephila gouldiae*	50	63	0	0	1	**114**
Double-barred Finch	*Stizoptera bichenovii*	1	0	0	2	0	**3**

Appendix I *(continued)*

Bird species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Passeridae							
Red-cheeked Cordon Bleu	*Uraeginthus bengalus*	2	0	0	0	0	**2**
? black long-tailed whydah	*Vidua* sp.	9	4	0	0	0	**13**
Family Fringillidae							
European Goldfinch	*Carduelis carduelis*	3	0	0	0	0	**3**
Yellow-rumped Serin	*Serinus atrogularis*	2	0	0	35	16	**53**
Green Singing Finch	*Serinus mozambicus*	166	10	15	28	17	**236**

Appendix II
Mammal species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Tupaiidae							
Common Treeshrew	*Tupaia glis*	14	15	5	4	3	**41**
? treeshrew	*Tupaia* sp.	0	0	0	0	13	**13**
Family Cynocephalidae							
Flying Lemur	*Cynocephalus variegatus*	1	0	0	0	0	**1**
Family Pteropodidae							
Large Fruitbat	*Pteropus vampyrus*	431	246	136	14	0	**827**
Family Lorisidae							
Slow Loris	*Nycticebus coucang*	173	79	249	115	76	**692**
Family Cercopithecidae							
Long-tailed Macaque	*Macaca fascicularis*	295	146	131	83	82	**737**
Pig-tailed Macaque	*Macaca nemestrina*	77	29	126	66	57	**355**
Thomas Leaf Monkey	*Prebytis thomasi*	1	3	3	0	0	**7**
Silvered Leaf Monkey	*Presbytis cristata*	36	10	9	4	4	**63**
Banded Leaf Monkey	*Presbytis femoralis*	0	0	0	0	1	**1**
Mitered Leaf Monkey	*Presbytis melalophos*	1	0	1	1	0	**3**
Javan Silvered Leaf Monkey	*Trachypithecus auratus*	0	3	0	0	0	**3**
Family Hylobatidae							
Agile Gibbon	*Hylobates agilis*	1	0	1	1	0	**3**
White-handed Gibbon	*Hylobates lar*	0	0	0	1	0	**1**
Siamang	*Hylobates syndactylus*	1	1	0	0	0	**2**
Family Manidae							
Malayan Pangolin	*Manis javanicus*	17	18	10	14	7	**66**
Family Sciuridae							
Plantain Squirrel	*Callosciurus nonatus*	298	369	352	260	245	**1524**
Prevost`s Squirrel	*Callosciurus prevostii sangguas*	43	3	43	56	79	**224**
? grey squirrel	*Callosciurus* sp.	0	4	0	0	0	**4**

Appendix II *(continued)*
Mammal species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

Family Sciuridae							
? cream-coloured squirrel	*Callosciurus* sp.	3	0	0	0	1	**4**
? small flying squirrel	*Hylopetes* sp.	2	1	5	5	0	**13**
? large brown flying squirrel	*Petaurista* sp.	7	13	4	4	1	**29**
? giant squirrel	*Ratufa* sp.	0	0	0	2	0	**2**
Family Muridae							
Bamboo Rat	*Rhizomys sumatrensis*	0	0	2	2	3	**7**
Family Hystricidae							
Common Porcupine	*Hystrix brachyura*	3	0	6	1	0	**10**
Family Mustelidae							
? otter	*Lutra or Aonyx* sp.	6	4	1	4	1	**16**
Family Viverridae							
Small-toothed Palm Civet	*Arctogalidia trivirgata*	0	2	2	2	0	**6**
Javan Mongoose	*Herpestes javanicus*	95	110	37	41	41	**324**
? red mongoose	*Herpestes* sp.	0	0	1	0	0	**1**
Masked Palm Civet	*Paguma larvata*	2	5	1	0	1	**9**
Common Palm Civet	*Paradoxurus hermaphroditus*	60	33	66	52	53	**264**
Family Felidae							
Leopard Cat	*Prionailurus bengalensis*	30	8	27	20	21	**106**
Family Tragulus							
Lesser Mouse Deer	*Tragulus javanicus*	1	1	0	0	0	**2**
Family Petauridae							
Sugar Glider	*Petaurus breviceps*	0	0	11	5	15	**31**

Appendix III

Reptile species and numbers recorded in monthly surveys of the wildlife markets of Medan, January 1997 – December 2001

COMMON NAME	SCIENTIFIC NAME	1997	1998	1999	2000	2001	Total
Family Boidae							
Blood Python	*Python curtus*	0	0	3	5	1	**9**
Reticulated Python	*Python reticulatus*	3	2	4	1	1	**11**
Family Viperidae							
? pit-viper	*Trimeresurus* sp.	0	0	1	0	2	**3**
Family Elapidae							
Equatorial Spitting Cobra	*Naja sumatrana.*	1	1	2	0	0	**4**
Family Colubridae							
Mangrove Snake	*Boiga dendrophila melanota*	0	0	2	0	0	**2**
Family Agamidae							
Garden Fence Lizard	*Calotes versicolor*	0	0	0	1	0	**1**
Family Varanidae							
Water Monitor	*Varanus salvator*	1	1	1	2	0	**5**
Family Scincidae							
Many-lined Sun Skink	*Mabuya multifasciata*	0	0	3	0	0	**3**
Family Iguanidae							
Green Iguana	*Iguana iguana*	71	23	16	7	19	**136**
Family Crocodylidae							
Estuarine Crocodile	*Crocodylus porosus*	2	0	0	0	0	**2**
Family Bataguridae							
Southeast Asian Box Turtle	*Cuora amboinensis*	0	4	0	0	0	**4**
Spiny Turtle	*Heosemys spinosa*	0	7	0	0	0	**7**
Family Trionychidae							
Southeast Asian Soft-shelled Turtle	*Amyda cartilaginea*	0	1	0	1	0	**2**

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