

IN FULL SWING:

**ASSESSMENT OF TRADE IN
ORANGUTANS AND GIBBONS ON
JAVA AND BALI, INDONESIA**

VINCENT NIJMAN

A TRAFFIC SOUTHEAST ASIA REPORT

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IN FULL SWING:

ASSESSMENT OF TRADE IN ORANGUTANS AND GIBBONS ON JAVA AND BALI, INDONESIA

by Vincent Nijman



Credit: Julia Ng/TRAFFIC Southeast Asia

**Confiscated Orangutan in Cikananga Rescue
Centre, Java, Indonesia**

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Obviously, it is not always easy to collect data on a sensitive issue such as illegal trade, and this extends to when information is being solicited from secondary sources. Of those people interviewed or spoken to, some were very open and clearly spoke their mind, whereas others were much more cautious and did not reveal all that they knew. Most of the interviews and discussions were conducted in Bahasa Indonesia, and only a few in English or my native Dutch. More so than English, Bahasa Indonesia has many ways of saying yes, some of which actually mean no, or the other way around. The interpretation of what was actually meant is mine. Although I have made an attempt to present the data I collected in an objective manner, for some parts of this report, little hard data were available and what is presented is thus partially based on my own interpretation of the available information. I take full responsibility for the contents of this report and any mistakes are mine.

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EXECUTIVE SUMMARY

This report presents an assessment of the trade in seven species of gibbon and two species of orang-utan on the islands of Java and Bali. Java and Bali are the economic, industrial and political centres of the Republic of Indonesia. Both islands are densely populated, with an average population density of around 900 people / km², and although small in area compared to many other islands in the republic, half of the nation's human population resides on Java and Bali.

Several species of gibbon in Indonesia, for instance Kloss' Gibbon *Hylobates klossi* of the Mentawai Islands or the Javan Gibbon *H. moloch*, are threatened by habitat loss, hunting and capturing, as are both the Sumatran Orang-utan *Pongo abelii* and Bornean Orang-utan *P. pygmaeus*. Since Indonesia's transition from the autocracy of Soeharto to a democracy, illegal logging has accelerated and in large parts of the country, forest is being lost at an alarming rate. This puts the survival of those species that fully depend on forest at risk, including all species of gibbon and both species of orang-utan. Trade in these species, and the associated loss of individuals in the process of capturing and trade, may exacerbate these risks.

On Java, and to a lesser extent Bali, protected species are widely kept as pets, and, despite being legally protected since 1931, gibbons and orang-utans are no exceptions. Given the precarious situation of gibbons and orang-utans in Indonesia, and the economic importance of Java and Bali, it was considered imperative to gain a greater insight into the severity of the trade in these primates, as well as how the Indonesian conservation authorities and local Non-Governmental Organizations (NGOs), try to curb this trade. To this end, data was collected from a variety of sources: bird markets (where despite the name, a large range of wildlife species other than birds are traded, including gibbons and orang-utans); from the regional offices for the conservation of natural resources (data on confiscations, prosecutions, and pets that are registered); wildlife rescue centres, rehabilitation centres and zoological gardens (as the facilitator for confiscated and donated gibbons and orang-utans); and local NGOs (as monitors of the trade). In all, data was collected on 559 individuals from at least nine species (249 *Hylobates* gibbons, 142 Siamangs *Sympalangus syndactylus* and 168 orang-utans).

In the period August-October 2003, surveys were conducted at bird markets (to quantify the trade) and data were collected on market surveys conducted by others for the period 1994-2003. In all, data was collected from 35 bird markets in 22 cities, representing 355 market visits during 197 individual months. Data from 2003 total 11 gibbons and 7 Siamangs, while the total number of gibbons encountered at these bird markets in the period 1994-2003 was 89. All seven species of gibbon that occur in Indonesia, which are the Javan Gibbon *Hylobates moloch*, Agile Gibbon *H. agilis*, Bornean White-bearded Gibbon *H. albicularis*, Müller's Gibbon *H. muelleri*, White-handed Gibbon *H. lar*, Kloss' Gibbon *H. klossi* and Siamang *Sympalangus syndactylus* were at one time or another encountered at one or more bird markets. Least abundant were the White-handed Gibbon (*H. lar*, 1 individual) and Kloss' Gibbon (3 individuals), whereas the Agile Gibbon (19 individuals) and the Siamang (25 individuals) were most abundant. In 2003, five orang-utans were encountered at bird markets, all presumed to originate from Borneo, while surveys from the period 1994-2002 combined yielded data on an additional 13 individuals. There was no relation between IUCN Red List status and abundance at bird markets (i.e., the more threatened species were not proportionally more or less traded), nor were there regional differences in abundance of the respective species. The number of individuals encountered at bird markets showed a strong inverse correlation with the distance to the species' original distribution range.

For all species, the prices of infants were considerably higher than those of adults. Prices of the different species of gibbon differed only slightly, with an average requested price of USD88±44 (IDR750,394±375,197 at 2003 rates), n=24. The two rarest species (Javan and Kloss' Gibbon), however, were approximately 20% more expensive than the other gibbons. Siamangs were considerably more expensive than the smaller species of gibbon (USD157±48 <IDR1,338,770±409,306 at 2003 rates>, n=11), and Bornean Orang-utans were yet more expensive (USD406±48

<IDR3,462,043±409,306 at 2003 rates>, n=10). For three species for which data was available (Agile Gibbon, Siamang and Bornean Orang-utan), there were few temporal changes in the requested prices over the period 1996-2003. In the combined data set, there was no relation between survey effort and number of gibbons or orang-utans encountered. Over the period 1994-2003, there was, however, a consistent and significant increase in the number of gibbons offered for sale at bird markets on Java, and this pattern of increase was observed for West, Central and East Java. The data for orang-utans was inconclusive, with an increase observed in West and Central Java, but a decrease in East Java. Data on estimates of turnover of gibbons and/or orang-utans were difficult to obtain, but on average, one in every three visits to a bird market yields a positive record of these species, and at the larger bird markets (Jakarta, Yogyakarta and Surabaya) even one in two visits. On Java and Bali, gibbons and orang-utans are mostly traded as pets; a small number may be bought to be used for medicinal purposes but little evidence was obtained during this survey. Unlike some other areas in Indonesia, no evidence was found on Java or Bali for the use of gibbons or orang-utans as sources of meat.

Most of the gibbons and orang-utans encountered at Javan and Balinese bird markets originate from either Sumatra or Kalimantan (Indonesian Borneo). The species from Sumatra are mostly transported overland to Java across the Sunda Strait, whereas the majority of the Bornean species arrive by sea, normally aboard ships that carry other cargoes (e.g., timber). The large harbours along Java's north coast (Jakarta, Tegal, Semarang, Surabaya) are the main ports through which the species arrive. Gibbons and orang-utans arriving on Bali have mostly been transported overland (and by ferry) from Java. Most of the gibbons and orang-utans that are being smuggled to other countries from Java go by air, with the Soekarno-Hatta airport in Cengkareng (outside Jakarta) being the main exit point.

Bird markets, where most of the trading of gibbons and orang-utans takes place, can be considered a loose network where animals are being transported from larger markets to smaller and from one side of the island to the other. The ready availability of gibbons and orang-utans (at most bird markets these can be ordered and delivered within a matter of days or weeks at the most) suggests that the connections already exist to transport animals both to, and within, Java and Bali.

Almost 100 individuals of six species of gibbon and both species of orang-utan arrived at seven wildlife rescue centres in Java and Bali between 2001 and 2003. About two-thirds of these were the result of confiscations and the remainder were received as donations. Many of the individuals arrived from the surrounding regencies (*kabupaten*) in which the wildlife rescue centres were situated, or from neighbouring regencies. Thus, gibbons and orang-utans at the wildlife rescue centres originated from only 17 out of 90 total regencies. This suggests that had confiscations and donations been more equally distributed over the islands, the number of individuals in the wildlife rescue centres could easily have been five times higher than they were.

Data from 11 zoological gardens included in the assessment revealed that they had a total of >300 individuals in their care with fewer than half being adults. Of those individuals whose origins were known (50%), a small proportion (c. 10%) of these were said to be the result of captive breeding and an almost equal proportion were said to be the result of confiscations (26%) and donations (32%).

Comparing the three data sets (bird markets, wildlife rescue centres, and zoological gardens) shows a high consistency in species composition and relative abundance. Orang-utans do not occur naturally on Java or Bali, and hence all are imported to the islands. For the gibbons, when taking into account their origin, it becomes clear that over 75% of the gibbons encountered on Java and Bali have been imported to these islands. Thus, of 533 individuals, 78 individuals (of one species) originated from Java, 234 from Sumatra (5 species) and 219 from Indonesian Borneo (3 species).

An exploratory model incorporating data from bird markets, wildlife rescue centres and zoos, and using a conservative range of parameter values such as turnover and loss rates suggests that for the Javan Gibbons and Bornean Orang-utans total annual loss to the wild population as a result of trade on Java and Bali alone may be more than one per cent of this total wild population. The same model suggests that for the other orang-utan and gibbon species in trade on Java and Bali, there is not the same significance in terms of wild population loss

Despite the high number of gibbons and orang-utans that have been confiscated by government authorities, only a small proportion of the offenders (<10%) is sentenced. Prison terms and fines imposed are relatively lenient, with maximum prison terms of one year (out of a possible maximum of 5 years) and maximum fines of USD120 (out of a possible IDR100 000 000 (USD12 000 at 2004 rates) under existing legislation). It is unlikely that this low degree of sentencing (and the lenient sentences imposed) will act as sufficient deterrents for future offenders.

In order to curb the trade in gibbons and orang-utans on Java and Bali, and indeed Indonesia as a whole, the following recommendations can be made:

- it is imperative that a more intensive (bird) market monitoring programme should be initiated, ideally with standardised methodology used for data collection to enable more accurate analysis by NGOs working on illegal wildlife trade and collaboration with the Indonesian Government
- a large-scale public awareness and education programme should be set up to increase the understanding of the protected status of wildlife by the Indonesian Government and relevant NGOs, combined with more stringent law enforcement and the implementation of effective penalties and deterrents to discourage repeat offenders
- a review should be conducted in regards to the legal follow-up (prosecution) of offenders charged under relevant laws pertaining to hunting, trade and keeping of protected wildlife species by TRAFFIC, with collaboration from other NGOs and the Indonesian Government
- range States concerned with the conservation of orang-utans should support the recommendations from the adopted Resolution Conf13.4 – ‘Conservation of and trade in great apes’ during COP13 of CITES in Bangkok, which include the adoption and implementation of comprehensive legislation to protect great apes, strengthening enforcement controls, limiting the international use of great apes and promoting the protection of great ape habitats.

INTRODUCTION

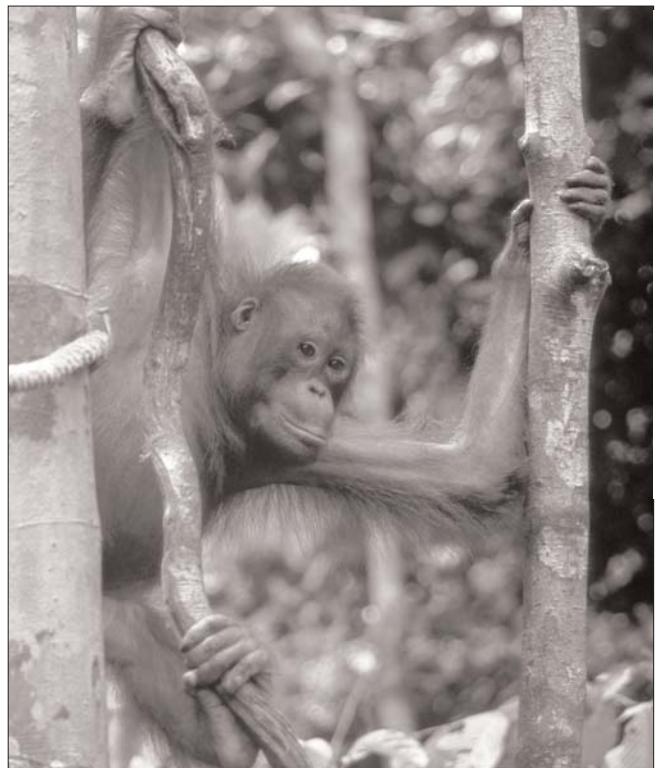
Background

From the Snub-nosed Monkeys of China to the Lion Tamarins of the Amazon and the Indris of Madagascar, nearly half of all the world's primates are threatened with extinction. Among the apes - the chimpanzees, bonobos, gorillas, orang-utans and gibbons – two-thirds are included on the IUCN Red List of Threatened Species (Anon, 2004b).

For the successful conservation of primates, it is essential that the root causes of the threats that the different species face, are properly understood. The primary extrinsic threats to the majority of primates are unquestionably habitat destruction (Eudey, 1987) and hunting (Robinson & Bennett, 2000), but as remaining populations become increasingly smaller, the impacts of secondary threats become more and more important. Trade in primates, be it trade in live animals or trade in primate products to be used as medicine or as ornaments, can have a dramatic impact on the last surviving populations of already rare primates (Eudey, 1999).

The trade in live primates is driven by both domestic and international markets. Within many countries of origin, most live primates are traded as pets. In contrast, the international trade is largely driven by biomedical research, although trade for pets, zoo animals, and circus exhibits also contribute, as does the trade in primate parts for traditional medicines (Cowlishaw & Dunbar, 2000). Furthermore, the relative importance of these types of trade demand differs greatly between regions and between species.

Although a great many studies have been conducted on the effects of habitat destruction and hunting on primate populations (reviewed in e.g., Johns 1992, 1987; Skuropa, 1986), comparatively few data on the severity of trade have been collected. This, in part, has to do with the difficulties associated with the data collection. Data on domestic trade are often difficult to obtain (Mittermeier, 1987). Although trade and hunting are tightly linked, the former almost by definition involves the latter, whereas the latter can occur in the absence of the former. In other words, no trade occurs without hunting, but hunting can occur without trade. Especially in those species where the infant is the main target, including gibbons and orang-utans, mothers are normally killed in order to obtain the young and hunting is an integral part of trade. For those species where both the young and adults have commercial value, e.g. macaques and langurs, capturing can be done with nets and as such trade can occur in the absence of hunting. Where trade occurs as a by-product of subsistence hunting, for instance when infants are captured when their mothers are killed, its impact might be limited to the selective targeting of the mothers during normal subsistence hunting (Mitttermeier, 1987). However, the demand for infants may intensify hunting pressure. In contrast, when domestic trade in live animals is the result of demand for meat and medicinal ingredients, its impact is likely to be of the same magnitude as bushmeat hunting (Oates, 1999). Bushmeat hunting, especially when it concerns primates, is traditionally associated with west



Orangutan *Pongo pygmaeus*

Credit: WWF-Malaysia/Wildtrack Photography

and central Africa, where it is indeed a serious problem, but increasingly, data from areas of Southeast Asia (e.g., Vietnam) suggest that the seriousness of primate hunting may approach that of Africa (T. Geissmann, pers. comm.). When the capturing of primates is to satisfy the pet trade

specifically, the impact greatly depends on which species are targeted and the intensity of capturing. Clearly for some species or some small populations, the impact of capturing can be quite dramatic, and may well lead to local extinctions.

Data on international trade are more widely available but are fraught with problems since records of official exports are often incomplete. Data on illegal trade, by their very nature, are even less complete. The overall picture is that international trade has declined since the 1960s and, especially since the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) came into effect in 1975, international trade has become exceedingly less of a threat to primates. However, a 1987 study by Kavanagh, *et al.* revealed that the primate trade is rather dynamic in nature, particularly with respect to the identity of the species traded. The sobering lesson here is that a demand will always elicit a supply; national bans may simply shift the burden of demand from one country to an alternative elsewhere (Cowlishaw & Dunbar, 2000). As such, international trade can still pose a significant threat to those species that are specifically targeted (e.g., Duarte-Quiroga, & Estrada, 2003).

An illustrative example is the illegal export of gibbons and orang-utans to Taiwan in the early 1980's (Chen *et al.*, 2004). In that period, many primates, ranging from small monkeys to gibbons and orang-utans, were kept in private homes in Taiwan. The primary cause seemed to be that baby gibbons, and especially orang-utans, were widely popularised by the media as adorable pets. In most, if not all, countries where gibbons and orang-utans occur in the wild, these species are legally protected, and trade is not allowed. Once smuggled out of these countries into Taiwan, the picture changes. At that time, primates were not legally protected in Taiwan and primate conservation was not on the top of the agenda for most Taiwanese. Pet apes became sort of a status symbol and a great many infant gibbons and orang-utans were openly offered for sale in pet shops. Although in the mid-1980s the authorities in Taiwan started addressing the problems associated with the primate trade, in the absence of legislation protecting primates and because of the lure of big money (it was not uncommon for an orang-utan to be sold in Taiwan for more than a hundred times the price for which it was bought in its country of origin), the illicit (although not illegal) trade of apes continued. Only in 1989 did the authorities in Taiwan enact the Wildlife Conservation Act, and this drastically curbed the primate trade. As a result, many owners, whose cute baby monkeys by this time had grown to adulthood and were no longer adorable, began discarding their pets. Over this time period it has been claimed that several hundred, if not thousands, of gibbons and orang-utans must have been captured from the wild to meet the Taiwanese demand (Chen *et al.*, 2004 and Anon, 1998a).

It is important to appreciate that obtaining a single live primate does very often reflect the loss of more than one individual from the wild population. There is a substantial loss associated with mortality during capture (and this is not limited to just the mother as to obtain the infant), storage, and transport. Especially when adult females are killed, or captured in the process, or when breeding is otherwise disrupted, recruitment in the remaining wild population will be lowered. Although large differences will exist between species, between regions, and admitting that the available data is scant, it is probably justified to assume that for each gibbon or each orang-utan kept in private hands, at least two or three individuals were lost from the wild population, and quite possibly, many more.

This report aims to address the trade in gibbons and orang-utans on the islands of Java and Bali. Java (and to a lesser extent, Bali) is the economic, industrial and political centre of the Republic of Indonesia. It is one of the most densely populated areas in the world with a total of some 120 million people (approximately half of the country's total) living at an average population density of almost 900 people km² (Whitten *et al.*, 1996). On Java, keeping animals in a cage or tethered on a string, is popular. A horse, a house, a spouse, a *kris* (a ceremonial dagger) and a bird in a cage -- these are the five symbols of a good Javanese. The first four are self-explanatory and the bird in a cage symbolizes the need for



Baby Orang-utan *Pongo pygmaeus* in petshop window, Taiwan, July 1990

a hobby in a well-balanced life. For many Javanese it is normal for wild animals to be kept in a cage. At an early age, many Javanese start with keeping the more common (and thus less expensive) species in cages (especially songbirds), and as one advances in life, many people will purchase more and more expensive species. The vast majority of these are extracted from the wild. In effect, what should symbolize the balance of life becomes a goal in itself and increasingly, animals have become status symbols. With this in mind, it is not surprising to see a great many endangered species being kept as pets, and, although legally protected, gibbons and orang-utans are no exception to this. As only one species of gibbon – the endemic Javan Gibbon, *Hylobates moloch* – occurs in small numbers in western Java, the majority of these apes have been transported from other islands. As such, every year, hundreds of

gibbons and orang-utans are transported from Sumatra and Kalimantan (Indonesian Borneo) to Java and Bali to meet the demand.

With this in mind, and given the precarious conservation status of a great many species of gibbon and both species of orang-utan, it is imperative to gain a greater insight into the severity of the trade in these species. Although the wildlife trade in Java and Bali is by no means restricted to gibbons and orang-utans (in fact these make up only a tiny proportion of the total number of wild animals traded), these apes are well-known to the Indonesian and international public, as are the problems they face. They have been legally protected since the first legislation for wildlife protection came into effect in 1925, and as such, the lessons learned from a trade assessment in gibbons and orang-utans can hopefully be used for other wildlife as well. A thorough evaluation of the scale of trade, the species involved and the effectiveness of current strategies to curb this trade is therefore timely.

Objectives of the assessment

Information on the trade in gibbons and orang-utans is lacking at present and whatever information available has yet to be consolidated properly. TRAFFIC's overall goal for this study was to create an overview on all aspects of the trade and 'uses' of these species throughout Java and Bali, and present it to the relevant authorities as a report or action plan with recommendations to improve conservation efforts for each of the species above. Subsequent studies are planned for the trade in Borneo and Sumatra.

As such, more specifically, TRAFFIC's objectives for this particular report were to:

1. Gather, compile and analyse trade dynamics of the seven species of gibbon and two species of orang-utan (sources, destinations, availability, current prices, and turnover of these species in the pet trade).
2. Assess and document the number of gibbons and orang-utans that are in zoological gardens and rescued / confiscated from the pet trade and placed in rehabilitation or wildlife rescue centres.
3. Determine the extent of the trade in gibbons and orang-utans other than that for pets, e.g., ornamental and (traditional) medicinal purposes or the meat trade.

This report deals exclusively with the trade in gibbons and orang-utans on the islands of Java and Bali. All but one of the species included in this assessment do not occur naturally on Java and Bali. The lone exception is the Javan Gibbon, a species confined to the forests of western Java. The assessment deals with all species of gibbon and both species of orang-utan, irrespective of where they occur naturally, but is restricted to those individuals that are traded on, kept on, or transported over Java and/or Bali. In terms of Indonesia's wildlife trade dynamics, Java, and to a lesser extent Bali, can be seen as the 'import' or consumer regions, whereas Sumatra and Kalimantan (the Indonesian part of the island of Borneo) are the 'export' or producer regions. Obtaining a complete picture of trade in gibbons and orang-utans requires data from both import and export regions. However, since the dynamics of trade differ considerably between the two, as do the amount and quality of data that can be collected, this report focuses exclusively on Java and Bali.

The species of interest

Of the 13 species of gibbon that are distributed in Southeast Asia, seven are present within Indonesia, as are both species of orang-utan (Table 1). Both in terms of number of species and size of their populations worldwide, Indonesia ranks first, and as such, the country has a large responsibility for the conservation of gibbons and orang-utans.

With respect to gibbons, no records of any species other than those that occur naturally in Indonesia were encountered in the process of data compilation, and indeed, none of them are present in Indonesian zoos. For brevity, this report, therefore, only provides information on the seven species of gibbon that occur in Indonesia and that are more or less regularly encountered in bird markets¹ or in zoos. Taxonomy and nomenclature of primates follows Groves (2001); when referring to gibbons, this includes the Siamang, unless the particular analysis mentions the Siamang separately in the same sentence, in which case the Siamang is excluded.

The gibbons are collectively known as the lesser or smaller ape. They split from the other apes between 12-20 million years ago. It is the most species-rich group of apes with some 13 extant species currently recognized. All live in Southeast Asia, and many have restricted ranges on (parts of) islands. The northernmost part of their present distribution is in southern China and Hainan, but even in historic times, their distribution range extended as far north as the Yellow River (Geissmann, 1995).

The following seven species occur in Indonesia:

Javan Gibbon *Hylobates moloch*: Endemic to the western part of Java, it occurs in the last fragments of lowland and hill forest. MacKinnon (1987) estimated that some 98% of the habitat of the Javan Gibbon has been destroyed, much of it in the second half of the 19th and the first half of the 20th century. Populations are severely scattered and there are



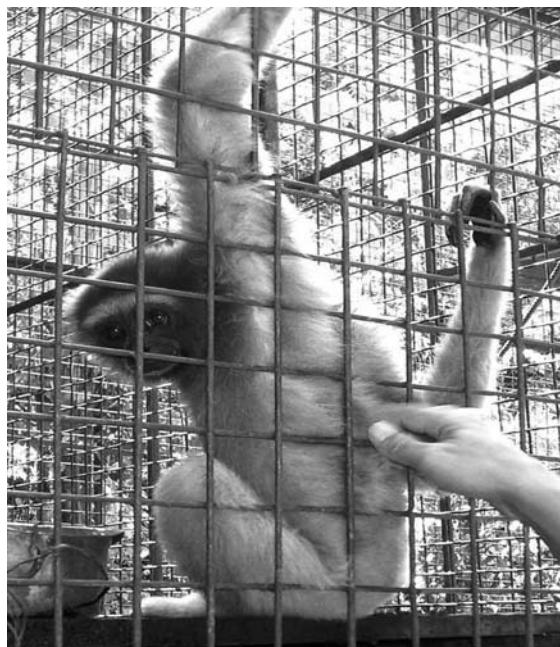
Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

¹ In most of the larger cities on Java and Bali, but also in any of the smaller ones, a large range of animals are traded at what is commonly known as bird markets (*pasar burung*) or wildlife markets (*pasar satwa*). At some of these bird markets, the vast majority of animals traded are indeed birds, but some of them also have relatively large quantities of other animal groups on offer. Although the term "bird market" does not perhaps adequately describe the fact that not just birds are traded, as it is widely used in Indonesian, in this report the term is retained.

a great many small isolated populations. On the basis of the small population size and reduction of habitat, the species is considered Critically Endangered by the IUCN Red List (Anon, 2004b).

Agile Gibbon *H. agilis*: This species occurs throughout Sumatra, apart from the northernmost part (roughly north of Lake Toba) where it is replaced by the White-handed Gibbon. Outside Sumatra, it occurs in a small area on the Thai-Malayan Peninsula. Like the Javan Gibbon, it is most abundant in lowland forest, although it does occur up to c. 1500 m asl. Forest destruction on Sumatra has not yet reached the same level as it has on Java or Bali. In recent years, however, the area of (especially) lowland forest has seen a dramatic reduction largely due to illegal logging (Whitten et al., 2000). Consequently, populations of Agile Gibbons in these habitats must have seen an equal reduction, although little data are available. Populations in the more mountainous parts of the island seem to be more secure, but, as with the Javan Gibbon, densities at these altitudes are considerably lower. At present, the Agile Gibbon is listed as Lower Risk / near threatened by the IUCN Red List (Anon, 2004b).

Bornean White-bearded Gibbon *H. albiventer*: Formerly generally considered a subspecies of the Agile Gibbon, consistent differences in morphological (Groves, 2001), vocal (Geissmann, 1995) and genetic characters (Garza & Woodruff, 1992) clearly suggest the Bornean White-bearded Gibbon represents a unique evolutionary unit. The species is endemic to the south-western quarter of Borneo where it is found in the area south of the Kapuas River and west of the Barito River. In comparison with other gibbons, a relatively large part of the distribution range of the Bornean White-bearded Gibbon is still forested. The majority of this is, however, handed out as logging concessions, bringing the species in ever-closer contact with humans. Especially in the interior of Borneo, hunting of White-bearded Gibbons poses a serious threat to the survival of the species (see also the account for Müller's gibbon). The species has not yet been assigned to a particular threat category by the IUCN Red List (2004) as the species is included as a subspecies of the Agile Gibbon.



Credit: Julia Ng/TRAFFIC Southeast Asia

Müller's Gibbon *Hylobates muelleri*

Müller's Gibbon *H. muelleri*: Müller's Gibbon is endemic to the island of Borneo where it occurs north of the Kapuas River and east of the Barito River, and as such, has been recorded in Sarawak, Sabah, Brunei, East and South Kalimantan, and small parts of West Kalimantan. The remainder of the island is inhabited by the endemic Bornean White-bearded Gibbon. As with the latter species, Müller's Gibbon is mostly threatened by habitat destruction. Although the total area of forest on Borneo is still large compared to other parts of the distribution range of gibbons, every year vast areas are cleared for timber production, transmigration or agriculture and are increasingly lost due to arson (e.g., Rijksen & Meijaard, 1999). Numbers of Bornean Gibbons are declining overall because of habitat disturbance or habitat alteration, and populations in some areas have been greatly reduced or even eliminated by hunting. Borneo's interior is inhabited, by and large, by the Dayak and the Penan / Punan tribes and all animals larger than a rat (hence including all species of primate) are hunted by these tribes (Caldecot, 1988, 1992). Local gibbon populations are easily exterminated by

hunting because of the species' loud songs, which attract attention; monogamy, which easily disrupts breeding; and strong sedentary behaviour, which renders both evasion of hunters and rapid re-colonization of depopulated areas more difficult (Bennett et al., 1987). At present, the Muller Gibbon is listed as Lower Risk / near threatened by the IUCN Red List (Anon, 2004b).

Lar or White-handed Gibbon *H. lar*: Within Indonesia, this species is restricted to the northern part of Sumatra, roughly north of Lake Toba. Its distribution range in Indonesia overlaps almost completely with that of the Sumatran Orang-utan, and although gibbons, in general, occur at far higher densities than orang-utans, at least in part, they suffer from the same problems that threaten the survival of Sumatran Orang-utans (see van Schaik et al., 2001, Robinson & van Schaik, 2001, Wich et al., 2003). Outside Indonesia, the Lar Gibbon occurs throughout the Thai-Malay peninsula, apart from a small stretch south of Sungai Perak and north of Sungai Mudah that is inhabited by the Agile Gibbon, west Thailand and east Myanmar north to southern China. Within Indonesia, on paper, the species seems adequately protected, having a large part of its range included in the Gunung Leuser National Park. However, logging is extensive in these areas and besides the negative impact this will have on the populations of Lar Gibbons, this will also bring gibbons and humans in closer contact, which may well lead to an increase in the hunting and capturing of gibbons. At present, the Lar Gibbon is listed as Lower Risk / near threatened by the IUCN Red List (Anon, 2004b).

Kloss' Gibbon *H. klossi*: Kloss' gibbon is endemic to the islands of Siberut, Sipora and North and South Pagai, collectively known as the Mentawai Islands, off the west coast of Sumatra. This small and fragmented distribution range makes the species especially vulnerable to any outside threats. Kloss' gibbons have been hunted for thousands of years by the indigenous inhabitants of the islands (Whitten, 1982) but in the last few decades, the survival of the species is more and more threatened by logging and conversion of its habitat (Fuentes & Ray, 1995/1996). Few Kloss' Gibbons are present in (international) zoos or are being kept as pets, but for those that recognize its uniqueness, the Kloss' Gibbon might be a particularly interesting collector's item. The Kloss Gibbon is listed as Vulnerable by the IUCN Red List (Anon, 2004b).

Siamang *Sympalangus syndactylus*: The Siamang distribution range is confined to Sumatra and a small part of Peninsular Malaysia (Gittens & Raemaekers, 1980). Siamangs are more folivorous than the *Hylobates* gibbons, and seem to cope better with the effects of habitat degradation. Yet, as completely arboreal, they are confined to forests and deforestation can be considered one of the main threats to the survival of the species. More than the other species of gibbon throughout Sumatra, Siamangs are frequently kept as pets. Siamangs are listed as Lower Risk / near threatened by the IUCN Red List (2004).

Orang-utans: The orang-utans are the only Great Apes that are confined to Asia. Their present day distribution is restricted to the islands of Sumatra and Borneo although the species is known from Pleistocene fossils from throughout Indochina south to Java (Rijksen & Meijaard, 1999). There are two extant species, i.e., the Sumatran Orang-utan and the Bornean Orang-utan. Orang-utans are more arboreal and generally more solitary than the other apes. Adult females are often accompanied by their offspring, while most adult males only interact with oestrus females. Orang-utans have one of the most prolonged developments of any mammal and sub-adult males, although sexually mature, may not breed until they are between 15-20 years of age. Likewise, females do not start reproducing early, and mostly, their first infant is born when they are between 12-15 years old. Birth intervals are approximately 8 years, but depending on (environmental and physical) conditions, may range from 5-10 years (Yeager, 1999).

Bornean Orang-utan *Pongo pygmaeus*: The Bornean Orang-utan is confined to the island of Borneo where it is found in the Indonesian provinces of West, Central and East Kalimantan (but not South Kalimantan), and the Malaysian States of Sabah and Sarawak. Bornean Orang-utans are confined to altitudes below c. 500 m asl. The main threats to the species are continuing deforestation and increasingly, the forest fires associated with the El Nino Southern Oscillation Event. The species is listed as Endangered by the IUCN Red List (Anon, 2004b).

Sumatran Orang-utan *P. abelii*: The Sumatran Orang-utan was historically present all over Sumatra but at present, the species is found mainly north of Lake Toba, with a small population occurring slightly to the south. Although a large part of the distribution range is included in Gunung Leuser National Park and the Leuser Ecosystem, Sumatran Orang-utans and their habitat are increasingly threatened by illegal logging, and the resultant deforestation. The species is listed as Critically Endangered by the IUCN Red List (Anon, 2004b).

Table 1.

All species of gibbon and orangutan and their distribution within and outside Indonesia.

Species	Indonesian name	Distribution in Indonesia	Distribution elsewhere
Javan Gibbon <i>Hylobates moloch</i>	<i>Owa Jawa</i>	W. and C. Java	-
Agile or Dark-handed Gibbon <i>H. agilis</i>	<i>Ungko, kelawat</i>	Sumatra	Thai-Malay peninsula
Bornean White-bearded Gibbon <i>H. albiventer</i>	<i>Ungko, kelawat, wau-wau</i>	SW Kalimantan	-
Lar or White-handed Gibbon <i>H. lar</i>	<i>Ungko</i>	N. Sumatra	Yunnan (S. China), Myanmar, western Thailand, Thai-Malay peninsula
Bornean or Müller's Gibbon <i>H. muelleri</i>	<i>Kelawat, wa-wa, kelampiau</i>	W., S. and E. Kalimantan	Sabah, Sarawak (Malaysia), Brunei
Pileated Gibbon <i>H. pileatus</i>	--	--	eastern Thailand, Myanmar
Kloss' Gibbon <i>H. klossi</i>	<i>Siamang kerdil, bilou</i>	Mentawai Islands	--
Hoolock Gibbon <i>Brunopithecus hoolock</i>	--	--	Myanmar, Bangladesh, southern China
Black Crested Gibbon <i>Nomascus concolor</i>	--	--	southern China, Vietnam
Yellow-cheeked Gibbon <i>N. gabriellae</i>	--	--	southern Laos, southern Vietnam, western Cambodia
Eastern Black Crested Gibbon <i>N. cf. nasutus</i>	--	--	Hainan (China), northern Vietnam
White-cheeked Gibbon <i>N. leucogenys</i>	--	--	Laos, Vietnam, southern China
Siamang <i>Sympalangus syndactylus</i>	<i>Siamang</i>	Sumatra	Peninsular Malaysia
Bornean Orangutan <i>Pongo pygmaeus</i>	<i>Orangutan</i>	Kalimantan	Sabah, Sarawak (Malaysia)
Sumatran Orangutan <i>P. abelii</i>	<i>Mawas</i>	northern Sumatra	--

Source: Geissmann, 1995, and this present study.

Table 2 provides a summary of the population estimates that have been made for the different species of gibbon and orang-utan found in Indonesia and the Red List status they have been accorded by IUCN (2004). Note that for a number of species no recent population estimates are available and that for most species of gibbon on Borneo and Kalimantan, the estimates are based on the total amount of remaining forest within the species' distribution range multiplied by an average density estimate. Only for the two species of orang-utan and the Javan Gibbon have detailed surveys to assess the size of the populations been conducted.

Table 2.

Estimates of population sizes of gibbons and orang-utans in Indonesia.

Species	Conservation priority\$	IUCN Red List	Population estimate**	Year of Assessment	Reference
<i>H. moloch</i>	Highest	CR	4000-4500	2002	Nijman, 2004
<i>H. agilis</i>		LR/nt	c. 300 000*†	c. 1980	MacKinnon, 1987
<i>H. albipile</i>		[VU]		--	--
<i>H. lar</i>		LR/nt	154 000	c. 1980	MacKinnon, 1987
<i>H. muelleri</i>		LR/nt	250 000–375 000	2003	Nijman & Meijaard, unpubl.
<i>H. klossi</i>	Very High	VU	36 000	c. 1980	MacKinnon, 1987
<i>S. syndactylus</i>		LR/nt	360 000*	c. 1980	MacKinnon, 1987
<i>P. pygmaeus</i>	Very High	EN	40 000	2003	Lacy <i>et al.</i> , 2004
<i>P. abelii</i>	Very High	CR	7300	2002	Van Schaik <i>et al.</i> , 2004

\$ Conservation priority according to the IUCN Primate Specialist Group (Eudey, 1987), but note that the taxonomy used by Eudey (1987) differs from that of the present report.

* Estimate of the Indonesian population only.

† The estimate for this species given by MacKinnon (1987) includes *H. albipile*; here the estimate concerns the Sumatran population only, but should be taken as an indication of total numbers. From MacKinnon's data it can be inferred that the population of *H. albipile* ranges in the order of 100 000 individuals.

Protection of gibbons and orang-utans in Indonesia

Protection of primates in Indonesia began with the prohibition of hunting and killing certain species by Ordinance in 1925, when the country was still under the Dutch colonial administration. Additions to this Ordinance came into effect in 1931 and 1932 which made it illegal to "...catch alive, to disturb, to trade alive or dead, or to hold certain species of primate in captivity...". Included in this limited list were all species of gibbon (listed as Hylobatidae) and the orang-utan (included as *Simia satyrus*).

An important legal instrument with modern relevance to the protection of primates in Indonesia (*Article 21(2) of the Act of the Republic of Indonesia No 5 (1990) Concerning the Conservation of Natural Resources and their Ecosystems*, -- known widely as *Undang-undang No 5*) states that:

'Any and all persons are prohibited to:

- Catch, injure, care for, transport, and trade in a protected animal in a live condition
- Keep, possess, care for, transport, and trade in a protected animal in a dead condition
- Transfer a protected animal from one place to another, within or outside Indonesia.
- Trade, keep or possess skin, bodies, or other parts of a protected animal or the goods made of parts of the animal, or transfer from one place in Indonesia to another, within or outside Indonesia'.

The only exceptions to these rules are stated under Article 22:

- (1) Any exception from the prohibition pertaining to Article 21 can only be permitted for purposes of research, science, and/or safeguarding those plants or animals
- (2) Safeguarding efforts pertaining to paragraph (1) shall include delivering or exchanging a plant or animal species with foreign institutions, with permit from the Government.
- (3) An exception to the prohibition to catch, to injure, or to kill a protected animal can only be permitted in case the animal endangers human life.

Penalties that can be imposed when these laws are broken can total up to IDR100 000 000 (USD12 000 at 2004 rates) in fines and imprisonment for up to five years.

Up until 1995, there was a possibility to obtain an exemption from the above [under permit Surat Keputusan 301], permitting private owners to keep protected animals. Although these permits are now no longer handed out, given that gibbons and orang-utans can live up to an old age in captivity, a number of these animals may indeed continue to be legally owned by private persons. At the same time, the circulation of these permits creates a loophole as they retain their value after the animal in question is deceased. Although possession of the animal might be illegal, rarely is the age (or even species identity) of the animal as mentioned in the permit checked against the age of the animal that is kept, and as such, legally protected animals could be safely, and illegally, kept by private owners.

With respect to the protected status of gibbons and orang-utans in neighbouring countries, it is worthwhile to note that all species are protected under Malaysian law (apart from Müller's gibbon in Sabah which is classified as a 'protected species', all species of gibbon and orang-utan are 'totally protected species' in Sabah, Sarawak and Peninsular Malaysia). There are no wild populations of gibbon or orang-utan in Singapore.

International treaties

Indonesia acceded to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) on 28 March, 1978. All species of gibbon and both species of orang-utan are listed in Appendix I of CITES, which prohibits all international commercial trade of the species, its parts and derivatives, among contracting parties, except under specific circumstances. It is the responsibility of the Directorate General of Forest Protection and Nature Conservation, as Indonesia's Management Authority for CITES, to ensure that illegal international trade of these species is prevented (Soehartono & Mardiastuti, 2002).

METHODS

Data acquisition

Market surveys

In the period 23 August - 18 October 2003, a total of 23 bird markets (in Sukabumi, Bogor, Jakarta, Bandung, Yogyakarta, Malang, Surabaya, and Denpasar) were visited and data on the presence or absence of gibbons and orang-utans was collected. The surveys were conducted by the author, sometimes accompanied by one or two members of local NGOs. Additional surveys were conducted by three local assistants and covered the cities of Bandung, Sumedang, Cirebon, Indramayu, Tegal, Purwokerto, Banyumas, Semarang, Yogyakarta, Muntilan, and Surakarta. Opportunistic market surveys were conducted by the author over the period 1994-2000, largely in the Jakarta-Bogor area (1994, 1997-

2002) and along Central Java's north coast (1998-2001), and the findings from these are included.

Despite their name, bird markets on Java do not just sell birds, but all kinds of other animals and their parts, as well. Some bird markets have only a few shops or stalls and sell only birds and a few other animals, whereas others consist of over a hundred shops and stalls and offer a wide variety of species. Many vendors sell mostly unprotected species, but clearly some are specialized in offering those that are protected. Unlike the situation 10 years ago, when many protected primates were offered openly for sale, nowadays few protected primates are openly displayed in wildlife markets. When bird markets were visited, special attention was given to those stalls and those traders that offered non-protected primates (mostly Long-tailed Macaques *Macaca fascicularis* and Pig-tailed Macaques *M. nemestrina*, and various Leaf Monkeys *Presbytis* spp.), but also legally protected Slow Loris *Nycticebus coucang* and Ebony Leaf Monkey *Trachypithecus auratus* and protected birds (mostly various species of cockatoos and parrots, and birds of prey), as it was expected that these vendors would most likely also sell gibbons and/or orang-utans, or would have access to them.

Information from market vendors and local conservationists revealed that sometimes primates are offered for sale at private homes. The total volume of primate trade within a city may rotate between individual market locations, and market sellers often keep protected species at private residences (Malone et al. 2002a). In the past few years, it seems that gibbons and orang-utans are increasingly sold from houses nearby the bird markets.

Most shops that display animals sell them as pets, but a few specialized shops, especially at the larger bird markets, do sell animals for medicinal purposes. These animals (mostly fruit bats, squirrels, civets, and macaques) are either sold alive or, upon request, can be slaughtered on the spot. These shops were visited to obtain information on whether or not (parts of) gibbons and/or orang-utans were used as medicine.

Data from market surveys were solicited from various NGOs, students and researchers that were known to have collected data at bird markets or that were otherwise involved in monitoring wildlife trade. These included, amongst others, Yayasan WWF-Indonesia (Jakarta), ProFauna (Jakarta), YPAL and Konus (Bandung), Kutilang (Yogyakarta), *Pteropus vampyrus* (Semarang), ProFauna (Malang), Kelompok Indonesia Hijau-3 (Surabaya), Kokokan and ProFauna Bali (Denpasar).

As such, data was collated from 35 bird markets in 22 cities covering all four Javan provinces and Bali (Figure 1). In all, 355 visits were made to these markets, covering a period of almost 200 months (see Annex I for full details).

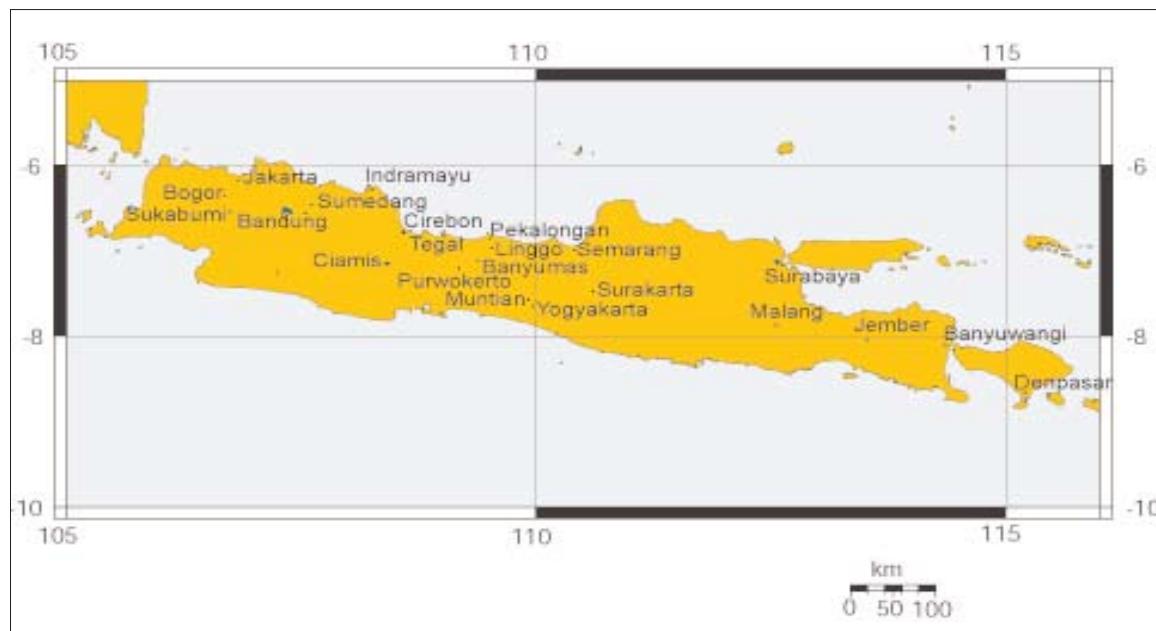


Long-tailed macaques *Macaca fascicularis* for sale

Credit: Chris R. Shepherd/TRAFFIC Southeast Asia

Figure 1.

Locations of all cities where market surveys were conducted during the period 1994-2003 and that were included in the assessment of trade in gibbons and orang-utans.



Wildlife rescue centres

Data were solicited from five wildlife rescue centres (*Pusat Penyelamatan Satwa*) on Java, i.e., Tegal Alur in Cengkareng near Jakarta, Cikanagan, near Sukabumi, and Gadog, near Bogor, all in West Java; Yogyakarta, Central Java; and Petungsewu, near Malang, East Java. These wildlife rescue centres have been established over the past three years, with Tegal Alur and Cikanagan the first to be operational. They all work in close collaboration with the regional offices for the conservation of natural resources ((Sub)Balai Konservasi Sumber Daya Alam, BKSDA). The wildlife rescue centres in Cengkareng and Gadog are small and function as transit points with the majority of primates being quickly transferred to either one of the other wildlife rescue centres or directly to one of several re-introduction programmes in either Sumatra or Kalimantan.

At present, gibbons and orang-utans that are confiscated by the BKSDA in Bali are sent either to the Bali Zoo Park or one of the wildlife rescue centres in Java. Formerly, the gibbons were sent to the Yayasan Gibbon Indonesia in Badung², Bali.

Apart from the (newly established) Gadog wildlife rescue centre, all wildlife rescue centres were visited at least once and data from gibbons and orang-utans that have passed through these centres since they were in operation were requested between 15 September-20 October 2003.

²Note that Yayasan Gibbon Indonesia, at the time of the assessment, was more or less dysfunctional and secondly, it has no connection to the Gibbon Foundation, a Liechtensein-based NGO that provides most of the funding for the above-mentioned wildlife rescue centers.

Reintroduction programmes

The Javan Gibbon Rescue and Rehabilitation Centre has established a facility for Javan Gibbons near the western border of the Gunung Gede-Pangrango National Park. No formal relationship has been established with the regional office for the conservation of natural resources (BKSDA) yet, and as such, confiscated animals are not transferred to the centre. So far, the centre has received its gibbons through donations made by private owners. The facility was not visited, but data on the gibbons in their care was obtained from the manager and studbook keeper of the rehabilitation centre, Ida Yuniati, on 15 October, 2003.

Although several re-introduction programmes have been established in Sumatra (several for Sumatran Orang-utans in northern Sumatra, and more recently, one for Agile Gibbons and Siamangs in West Sumatra) and Kalimantan (Bornean Orang-utans in East and Central Kalimantan, and Bornean White-bearded and Müller's Gibbon in Central Kalimantan), information on the number of individuals sent to these centres was collected on Java only and no attempt was made to verify this information directly with these centres.

Zoological gardens

During the survey, eight zoological gardens were visited, i.e., Ragunan Zoo and Pusat Primata Schmutzer in Jakarta; Taman Safari in Cisarua; Kebun Binatang Bandung; Gembiraloka in Yogyakarta; Taman Safari in Pasuruan; Kebun Binatang Surabaya; and Bali Zoo Park. Yuda (2003) provided additional data on the presence of gibbons and orang-utans in three Central Javan zoos, i.e., Taru Jurug in Surakarta; Kebun Binatang Tinjomoyo in Semarang; and Taman Kaloko Widya Mandhala in Purwokerto.

Information on the occurrence of gibbons and orang-utans in zoos was first collected by simply purchasing an entrance ticket and checking what kinds of animals were on display. When keepers were present, these were informally questioned on the total number of individuals present in their zoo (i.e., including those that were not currently on display), their origin, whether or not breeding had been successful, etc. Whenever possible, the quarantine area was inspected (although formally closed to the public, rarely was it not possible to obtain access to these facilities), and, again, informal information was solicited on the origin of the gibbons and orang-utans under their care.

Only later was a more formal request made to the zoos to obtain data on the origin of their stock. On visits to most of the zoos, the author was accompanied by one or several members of local NGOs who often were either acquainted with some of the zoo's staff or had previously worked in the zoos. This greatly facilitated access, yet detailed information rarely became available.

Although many zoos (both staff and officials) were sympathetic to the aims of the survey and were, in principle, willing to provide data, rarely was detailed information on the precise origin of each individual available. Anecdotal data (on the basis of what individual staff recalled) was elicited from

Credit: © WWF-Canon/Tantyo Bangun



Orang-utan *Pongo pygmaeus*, orphan caught by people and handed over to a conservation Officer Palangkaraya, Kalimantan, Indonesia

a number of individuals. To complicate the data-compiling process even further, in several instances, information on species composition, number of individuals present and their origin provided by zoo officials did not match those given by the keepers or that what was actually on display in the zoos. For such cases, a conservative approach has been taken in this report's analysis and it includes only those data on which both parties agreed, otherwise information was pooled under a more general entry.

Department of Forestry

Data on the number of confiscated gibbons and orang-utans in the last 10 years, the results of the legal follow-up of these confiscations, if any, and the number of pet gibbons and orang-utans registered at their office, were requested from the five regional branches of the office for the conservation of natural resources (BKSDA), i.e., Greater Jakarta, Bogor-Sukabumi-Cianjur, DKI Yogyakarta, Surabaya, and Bali. None of these offices had all these data at their disposal but all were able to provide at least some of the requested data.

Additional data – Literature Searches

The Indonesian Nature Conservation Database (maintained at the Pusat Informasi Lingkungan Indonesia, Bogor) was searched to find news items, newspaper articles, etc., that related to the trade in gibbons and orang-utans on Java and Bali. All issues of Suara Satwa (circulated by ProFauna) and the International Primate Protection League Newsletter were scanned for new and relevant data. An internet search (www.google.com) was conducted with the key words: “gibbons”, “*Hylobates*”, “orang-utans”, “Pongo”, “Java”, “Bali”, “Indonesia”, and “trade”, in various combinations, and the Web of Science (<http://isi4.isiknowledge.com/>) was consulted to search for scientific reports on the trade in gibbons and orang-utans.

Any additional information in the form of unpublished reports, unpublished academic theses, and unpublished data were solicited from those individuals that were most likely to have knowledge of the presence of these sources. As such, numerous reports were uncovered and these were scanned for relevant data.

Species identification

Because of their high intra-specific variability in fur coloration (including sexual dichromatism, polychromatism, and multiple ontogenetic colour changes) and the relatively small amount of (published) research on the group, identification of gibbons in captivity can be problematic (Geissmann, 1995; Chen et al., 2004). Gibbons can be reliably identified based on vocal characteristics, but only a few people are familiar with the method and within-species call variability (Dahlmann & Geissmann, 2001). To add to the problem of species identification, several species in the genus *Hylobates* hybridize in (small) parts of their range, or, less commonly, in zoos. Given all these difficulties, it is not uncommon to see gibbon species incorrectly identified in both Indonesian and international zoos (Geissmann, 1995; this study), and when assessing the results of bird market monitoring programmes, these difficulties in species identification have to be taken into account. The Bornean White-bearded Gibbon *H. albiventer* is now generally recognized as a distinct species, endemic to the southwestern part of Borneo (i.e., the provinces of West and Central Kalimantan), but was previously considered a subspecies of the more widely occurring Agile Gibbon *H. agilis* from Sumatra and various parts of Peninsular Malaysia. In almost all of the older reports, and many of the more recent, no distinction is made between these two taxa and this has to be taken into consideration when analysing data.

Gibbons observed in our survey were almost exclusively identified on the basis of their morphology, i.e., fur coloration, body weight, the presence or absence of a throat sac, and the size of the male genital tuft, etc. To make a general

identification, we followed the key provided by Geissmann (1995), along with photographic updates (www.gibbons.de) and photographs in Rowe (1996). Identification was not always straightforward and in most of the wildlife rescue centres and some of the zoos, we consulted staff about the species' identity to confirm our identification or to obtain additional information.

The two species of orang-utan are generally more easily identified, although phenotypic variation can be large and it is not always easy to separate the two species. This is true for all age-classes, although in general, the older individuals are more easily distinguished. Hence, these problems in identification, as with the gibbons, may somewhat cloud the accuracy regarding which orang-utan species is entering the trade chain. Despite large morphological and genetic differences, the two taxa were until recently generally considered conspecific and often in older reports, the two taxa were not differentiated (and hence were generally listed as *Pongo pygmaeus*, the name now used for Bornean Orang-utans only). This may result in an under-reporting of *P. abelii*, especially in the older reports, although in those instances where it was possible to check the species identity, *P. pygmaeus* was far more common than *P. abelii*.



Sumatran Orang-utan *Pongo abelii*

Credit: ChrisR Shepherd/TRAFFIC Southeast Asia

Methodology for Analysis

Wildlife trade involves the buying and selling of wild animals and plants, their products and derivatives, in exchange for money and/or other goods. In the course of this survey, many private owners claimed that they had received their pet gibbon or pet orang-utan as a gift. Beside the fact that some of these claims may not be completely true, although gifts do not require any monetary exchange, few people are truly altruistic, and as such, most gifts can be considered payments of a sort. Thus, in this assessment, gibbons or orang-utans that were at one time or another received as gifts, are included in the analysis of 'trade'.

In principle, if someone (illegally) catches a Javan Gibbon in the forest behind his house and keeps it as a pet, in the strictest sense, this animal has not entered the trade network. The same can be said for a gibbon or an orang-utan that has been caught in Sumatra or Kalimantan, and transported home to Java or Bali by the catcher. Since these are (very) rare occurrences, and in order not to unnecessarily complicate the picture, the central premise of this assessment is that all gibbons and orang-utans encountered in private hands or that have been brought to wildlife rescue centres, have at one stage or another been part of the wildlife trade chain. This can be said for most of the gibbons and orang-utans in Javan and Balinese zoological gardens as well, with the exception of those that were bred in captivity.

All the data were entered in a database for this report, with each of the individuals receiving entries on origin, current location, dates, prices, fate, legal follow-up in cases of confiscation, if any, etc. As indicated above, there are real problems with species identification, and often there were discrepancies in the data sets. In many zoos, some of the species were misidentified or were identified only to the generic level. Likewise, in many reports, not all individuals were identified to the species level, or were only tentatively identified pending more study (e.g., Malone, 2001, Malone et al., 2002b). Some of the most obvious misidentifications were either omitted from the analysis or pooled under a more general entry (e.g., *Hylobates* spp.).

In all, data was collected from 97 studies on the presence or absence of gibbons and orang-utans at bird markets (see Annex I, Table 13). Combined, these yielded data from 35 bird markets in 22 cities, representing 355 visits from the period 1994-2003. For each of the 97 studies the number of visits to single bird markets was noted as well as, when available, the number of months the study lasted. For example, a study that made two visits in April and May was categorized as having a duration of two months, unless the first visit was at the very end of April and the second at the very beginning of May, in which case it was entered in the data base as having a duration of just one month. A study that made 16 weekly visits in the period May-August was categorized as having a duration of four months, just as one that would have four monthly visits to these markets. Several studies or monitoring schemes visited the same markets more than once per month. The number of visits made per month was related to the length of the study. That is, especially those studies that monitor markets over a long period of time were more likely to make multiple visits per month. Although multiple visits quite possibly do increase the chance of observing those individuals that are not openly displayed, it is also highly likely that during these visits the same individuals were encountered multiple times. As such these visits could not be considered independent.

The issue of independence of data remains when single markets are visited over several (consecutive) months. However, for analysis of market data, the number of survey months was considered a more appropriate unit of survey effort than number of visits. Only if detailed data were available on the turn-over of gibbons and orang-utans at markets, and how individuals are moved within and between markets, would the issue of independence of data be able to be settled, and would enable a more informed decision to be made on what the most appropriate unit of survey effort would have been. Unfortunately these data were not available nor was it able to be collected; therefore the default unit used is survey months.

All prices were converted to USD at the appropriate exchange rate at the time the data were collected. For this, the foreign currency exchange website: <http://www.oanda.com/convert/classic> was used. In addition, the local currency, Indonesian Rupiah (IDR) is listed next to the converted USD price.

Statistical analysis

Comparatively large data sets were analysed using parametric tests after the data were checked for normality. When data sets were small or showed a non-normal distribution, in order to increase readability, instead of transforming the data to normalize them, non-parametric test were used. As far as possible, in the figures, open symbols were used when the relationship between two variables was significant at the 5% level, and filled symbols when this was not the case.

Mortality rates due to trade

Based on the Results section concerning the species composition and numbers in bird markets and wildlife rescue centres, the origin of gibbons and orang-utans arriving at wildlife rescue centres, and the species composition and origin in zoological gardens, an attempt was made to model the total number of gibbons and orang-utans that are extracted from the wild annually. These figures could then be compared with the estimates of the total wild population to allow an assessment to be made of the impact of trade on the conservation of gibbons and orang-utans. For each population present at bird markets, rescue centres and zoos, parameters included in this model were:

1. Estimated (markets) or observed (rescue centres and zoos) number of individuals present.
2. Coverage as a percentage of the total number of bird markets, rescue centres and zoos present on Java and Bali. For the rescue centres, this was based on the percentage of the regencies from where individuals were received.

3. Turn-over, i.e., the amount of time an individual is present, on average, at the bird markets, rescue centres and zoos after it has been removed from the wild. As the rescue centres have been in operation only over the past 2-3 years, one can expect them to have a backlog where many of the individuals that should have been taken in by the centres and had in fact been registered with their previous owners much earlier, had still not yet entered due to the backlog. In effect, gibbons and orang-utans arriving at the centres can be considered part of last year's batch, or even the batch from several years earlier. This amount of time has to be taken into consideration when assessing the turn-over time.
4. Loss rate, i.e., the number of individuals that have died for one single individual to reach the bird markets, rescue centres or zoos.

The total number of individuals of a given species extracted from the wild population,

$$N_{extract} = (Nm \times Cm \times Tm) + (Nr \times Cr \times Tr) + (Nz \times Cz \times Tz) \times L$$

N = observed or estimated number of individuals of species;

C = proportion of the total number of bird markets, wildlife rescue centres or zoos that were included in the assessment;

T = turnover, i.e., the average amount of time a single individual can be expected to be present at the bird market, wildlife rescue centre or zoo;

L = Loss rate, i.e., the total number of individuals that have died as a direct result of the capturing or transporting of one individual that is observed during the survey. This includes the observed individual. Thus, for example, for a single gibbon observed at a bird market whose mother was killed without the loss of any other individuals, the Loss rate is 2.

m = bird markets;

r = wildlife rescue centres;

z = zoological gardens.

RESULTS AND DISCUSSION

Bird markets

Species composition and numbers

In 2003 a total of 18 gibbons, and 5 orang-utans were observed at market locations. Surveys in the period 1999-2002 yielded data on 44 gibbons and 10 orang-utans, whereas from the period 1994-1998 data on 27 gibbons and 3 orang-utans was obtained (Table 3). As such, in all, the 2003 market surveys and past observations, a total of 89 gibbons and 18 orang-utans were observed (Table 4). The two species confined to the northern part of Sumatra were rarely encountered, with no records of Sumatran Orang-utan and a single record of White-handed Gibbon. The two most endangered species of gibbon, Javan and Kloss' Gibbon, were encountered infrequently, whereas the relatively few records of Bornean White-bearded Gibbon might be due to a number of these being included as Agile Gibbon. About a quarter of the gibbons were not identified to the species level.

Table 3.
Number of individuals encountered at Javan and Balinese bird markets from the period 1994-2003.

Period	Survey months	Gibbons	Siamangs	Orang-utans
1994-1998	94	21	6	3
1999-2002	78	36	8	10
2003	31	11	7	5

Since many of the buyers, and presumably most of the vendors, are aware of the protected status of gibbons and orang-utans, this might pose a problem when either selling or purchasing these species. As with other species of protected wildlife, some vendors specifically mention that, for instance, gibbons from Sumatra are not legally protected, whereas others point out legal loopholes or the inability of the forestry department to enforce the law. Both at the Pramuka bird market (Jakarta) and the Ngasem bird market (Yogyakarta), the author received not just information about the availability of gibbons and, with more difficulty, orang-utans, but also about the possibilities of purchasing the necessary legal documents. All things have a price, and according to the trader in Yogyakarta, the price of a permit equals that of the animal itself or may even be somewhat higher. These permits were allegedly obtained from some army personnel or police officers.

Table 4.

Summary of the total number of individuals encountered at Javan and Balinese bird markets. Note that survey effort differs between the provinces (see Annex 1).

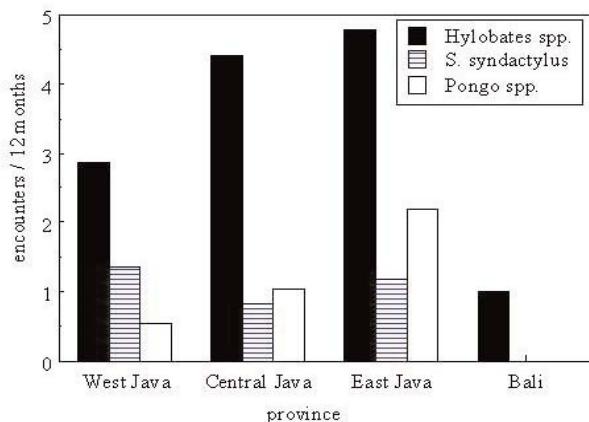
Species	West Java	Central Java	East Java	Bali	Total
<i>Hylobates moloch</i>	2	4	1	0	7
<i>Hylobates agilis</i>	5	5	9	0	19
<i>Hylobates albicularis</i>	0	0	3	0	3
<i>Hylobates muelleri</i>	1	6	2	1	10
<i>Hylobates lar</i>	1	0	0	0	1
<i>Hylobates klossi</i>	0	3	0	0	3
<i>Hylobates</i> spp.	12	4	9	0	25
<i>Sympalangus syndactylus</i>	10	5	6	0	21
<i>Pongo pygmaeus</i>	4	3	11	0	18
<i>Pongo abelii</i>	0	0	0	0	0

At bird markets throughout Java and Bali, Siamang was the species most frequently encountered, whereas Bornean Orang-utan is also relatively frequently offered for sale. As a group, gibbons were encountered significantly more often than orang-utans or Siamangs, whereas the numbers found of the latter two do not differ significantly. There seemed to be few regional differences in the trade in gibbons, Siamangs and orang-utans, except that Bornean Orang-utans seem to be particularly abundant in East Java. Figure 2 depicts the regional differences in encounter rates of gibbons, Siamangs and orang-utans.

Several species of gibbon and both species of orang-utan are considered globally threatened by IUCN – the World Conservation Union (Anon, 2004b). In this assessment, the status of the Javan Gibbons and Sumatran Orang-utans is most precarious (they have been classified as Critically Endangered), followed by the Bornean Orang-utan (Endangered), and the Kloss' Gibbon and Bornean White-bearded Gibbon (both classified as Vulnerable, see footnote under Table 2). There is no clear relation whatsoever between the species' IUCN Red List status and the number of individuals encountered at bird markets in Java and Bali. Some threatened species are relatively frequently encountered (e.g. Bornean Orang-utan) whereas some less-threatened species, such as White-handed Gibbons, are rarely traded on Java and Bali.

Figure 2.

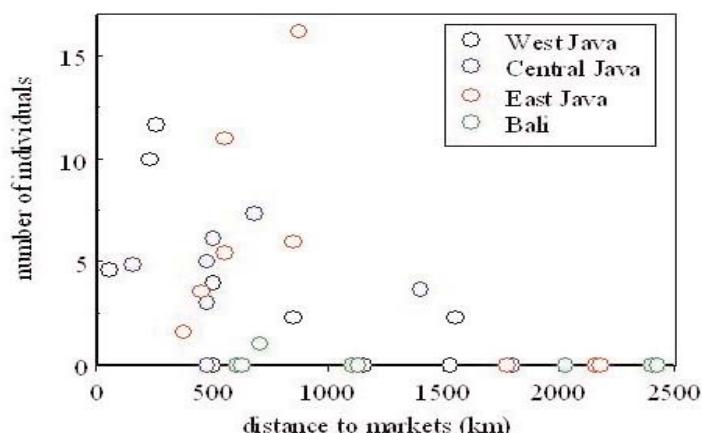
Encounter rates with gibbons (*Hylobates spp.*), Siamangs (*S. syndactylus*) and orang-utans (*Pongo spp.*) at Javan and Balinese bird markets. Encounter rates are expressed as number of individuals encountered per 12 months of survey effort (this was the minimal survey effort for the island of Bali: see explanation in Methodology for Analysis chapter and Annex 1).



The distance from the species' distribution range to the bird markets showed a strong inverse correlation with the number of individuals encountered at bird markets. As shown in Figure 3, those species that occur at relatively large distances from Java (e.g., Kloss' Gibbon, White-handed Gibbon and Sumatran Orang-utan from western and northern Sumatra) show up in relatively small numbers, whereas those that occur either on Java (Javan Gibbon) or in southern Sumatra (Agile Gibbon and Siamang) are encountered more frequently. This relationship can be seen in all three Javan provinces, with, for instance, Javan Gibbons, a species that only occurs in West and Central Java, being less frequently encountered in East Java and similarly, Sumatran species becoming less frequently traded in East Java, replaced by an increasing number of Bornean ones.

Figure 3.

Relationship between the number of individuals of seven species of gibbon and two species of orang-utan encountered at bird markets in Java and Bali and the distance from these markets to the nearest part of the species' distribution range. Gibbons that were not identified to the species level were included among the other species according to relative abundance in each of the provinces. The relationship is best described as an exponential one, explaining 38% of the observed variation. When Bali (where few gibbons or orang-utans were encountered) is excluded from the analysis, this relationship holds.



Prices

Few gibbons and orang-utans were encountered during the 2003 survey, and most of the data on the prices of gibbons and orang-utans are derived from literature searches (see section on Methods). For both gibbons and orang-utans, infants are in much greater demand than juveniles, adolescents or adults, and indeed many of the gibbons that enter the trade are still either very young or at least immature. This is even more so for orang-utans, where infants and juveniles make up the bulk of those that are traded. At least at bird markets, prices of gibbons and orang-utans decrease with increasing age, and from the scant data available, it is not uncommon for an infant to fetch a price four times that of an adult. At the same time, it cannot be stressed enough that most of the prices that were elicited from traders were only first quotes, i.e., the seller's original request. It is unlikely that these were fixed prices, and these would undoubtedly have gone down with bargaining. Bargaining is rarely an option when monitoring bird markets (and certainly not one the author resorted to) as this implies that one is really expected to buy the animal, but a negotiated purchase price possibly could be as low as half the initial amount.

Gibbons, excluding Siamangs, were usually offered for prices between USD50 and 150 (IDR426 360 – 1 279 080 at 2003 rate) Although Javan and Kloss' Gibbon were on average some 20% more expensive than three other more common species (Bornean White-bearded Gibbon, Müller's Gibbon and Agile Gibbon), the difference is not significant. Siamangs were considerably more expensive than the other gibbons and the quoted prices range between USD60 and USD220 (IDR503 742 – 1 847 054 at 2003 rate), with the lower prices mostly asked for (sub) adults and the higher for infants. As expected, orang-utans were the most expensive with quotations ranging between USD200 and USD1000 (IDR1 679 140 – 8 395 700 at 2003 rate). Over the years 1996-2003, the average quoted price for an orang-utan was around USD400 (IDR3 358 280 at 2003 rate).

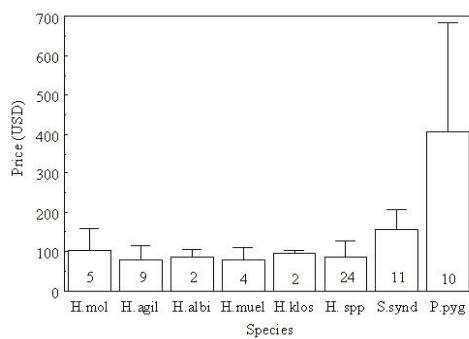
The average quoted prices for those species for which data were available are presented in Figure 4: the differences between gibbons (average USD88±40 <IDR738 822±335 828 at 2003 rate>), Siamangs (USD157±48 <IDR1 318 125±402 994 at 2003 rate>), and orang-utans (USD406±278 <3 408 654±2 334 005 at 2003 rate>) are significant.

There was no clear relationship between the rarity of the species and the price requested at bird markets. Neither were the species that were rarely encountered at bird markets (Kloss' Gibbon, Bornean White-bearded Gibbon) consistently more expensive than the more common ones (Agile Gibbon, Müller's Gibbon), nor are the species that were considered to be most threatened in the wild (Javan and Kloss' Gibbon) more expensive than the less threatened species. No information was received on prices of Sumatran Orang-utans and although it may be likely that these are somewhat more expensive than Bornean Orang-utans, at the moment the data to support this assertion are lacking.

Despite the widely held belief that prices would differ between smaller and larger cities, when information was obtained on prices of gibbons and orang-utans (both at bird markets and from those that monitor markets), this effect was not apparent in the compiled data set for any of the species for which several quotations were available. Undoubtedly, the price of an individual gibbon or orang-utan increases as it moves through the trade chain from poacher to middleman to distributor and to trader (Anon, 1998b; Kutilang, 2002). It seems, however, that the variation in (quoted) prices is so large at the latter stages of this chain that this effect is difficult to demonstrate.

Figure 4.

Average quoted prices (plus one standard deviation) of gibbons and orang-utans at Javan bird markets in the period 1996-2003. All prices were quoted in Indonesian Rupiah but were converted to US dollars. Sample sizes are indicated in the bars. Note, however, that for all species, young individuals are considerably more expensive than adults but this is not taken into account in Figure 4.



Temporal changes

For gibbons, encounter rates at bird markets have increased over time, from a single gibbon per 12 months of survey effort in the years 1994-1996, to more than one every two months in the years 2001-2003 (Figure 5). This increase in encounter rate occurred in all three Javan provinces, but was most pronounced in Central Java (Figure 6). For Bali, insufficient data were available to conduct such an analysis.

Although in the period 2002-2003 more orang-utans were encountered at bird markets than in 1994-1995, the relationship is not significant. Indeed, in comparing data from 1994-1998 with those from 1999-2003, more orang-utans were encountered per survey month for the later time range in West and Central Java while the reverse was observed in East Java (Figure 7).

Figure 5.

Number of gibbons encountered at markets per survey month in the period 1994-2003. The number of gibbons encountered at markets increases over time. The relationship is significant ($F_{1,8}=23.1, p<0.02$) and the year explains 74% of the observed variation in encounter rates.

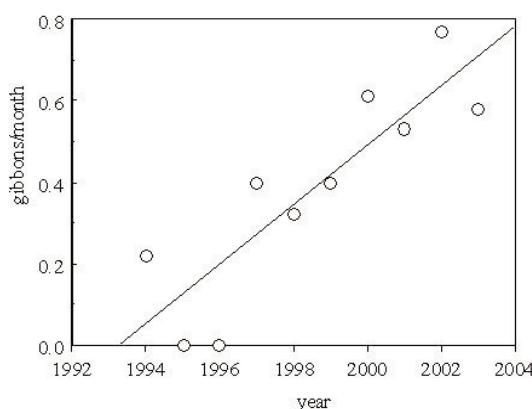


Figure 6.

Encounter rates of gibbons at Javan bird markets in the period 1994-2003 showing that for each of the three provinces, the number of gibbons encountered has increased over time, based on 101 survey months in the period 1994- 1998 and 96 survey months in 1999-2003.

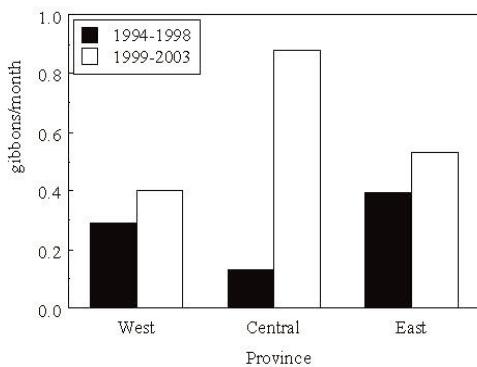
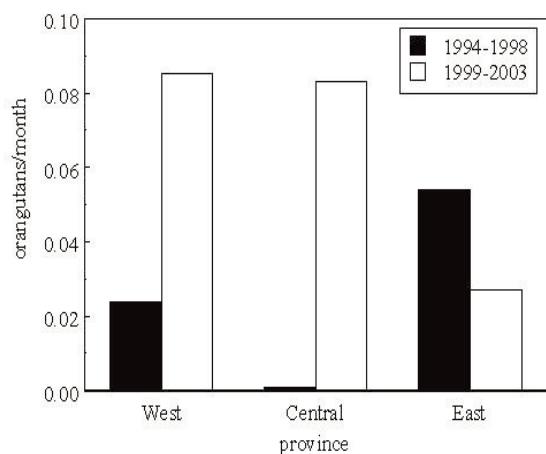


Figure 7.

Encounter rates of Bornean Orang-utan at Javan bird markets in the period 1994-2003 showing no consistent trend in the change of encounter rates over time for the three provinces. Based on 101 survey months in the period 1994-1999 and 96 survey months in 1999-2003.



When trends like these are reported, questions remain as to whether or not the changes are real or apparent. For example, has the number of gibbons offered for sale at Javan and Balinese (bird) markets actually increased over time? Has the number of orang-utans offered for sale remained relatively stable over this time period? Or are these observations an artefact of the data collection process or the analysis of the data? More intense monitoring, especially when the species of interest receive more and more attention from the conservation community, may lead to more individuals being detected. The establishment of wildlife rescue centres is likely to create a greater incentive to report to the authorities any incidences of protected animals offered for sale at bird markets. On the other hand, by its very nature, trade in protected animals may be concealed from the casual observer. Although consistent and efficient wildlife

law enforcement in Indonesia is often lax some protected animals are more inclined to be kept out of sight than others. The differences in openly displaying protected animals over the years and between markets may greatly affect detection probabilities during market surveys. All these factors may contribute to changes in the number of gibbons and orang-utans detected at bird markets over time, even when the volume of trade has remained constant.

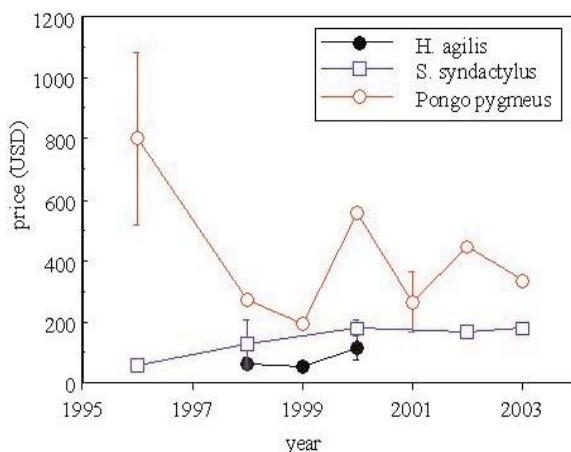
On the other hand, for both gibbons and orang-utans, there does not seem to be a correlation between the intensity of monitoring and the number of animals encountered. In years where a large number of surveys were completed, and where many markets were visited, no more or fewer individuals were encountered. For gibbons, the increase in the number of animals encountered appears to be constant and there is no break apparent which coincides with, for example, the onset of the economic crisis (1997) or the establishment of the first wildlife rescue centres (2001). Furthermore, the pattern of increase has been observed throughout Java. For orang-utans, no clear trend is apparent, but the data suggest that a relatively large number have been encountered at bird markets in recent years. However, there seem to be spatial differences, with an increase noted for West and Central Java, but a decrease for East Java. Sample sizes for orang-utans were, however, considerably smaller than for the gibbons, possibly masking any real trends. Interviews with members of NGOs that have monitored the markets confirm the results presented above: for example, in the greater Jakarta area, it is believed that gibbons, and especially Siamangs, have been seen offered for sale in increasing numbers at bird markets in recent years. Siamangs were still frequently openly offered for sale, whereas the trade in orang-utans had become an increasingly underground operation (Chairul Saleh, WWF Indonesia, *pers. comm.* to Vincent Nijman, 2003). Along the northern coast of Central Java, there has been a significant increase in numbers of gibbons and orang-utans offered for sale at bird markets in several cities since early 2001 (Joko, PPSJ, *pers. comm.* to Vincent Nijman, 2003). For several cities throughout Java, the results of monitoring programmes conducted over the past several years show that trade has increased, both in the number of individuals, as well as the amount of money and people involved (R. Nursaid, Profauna Malang, *pers. comm.* to Vincent Nijman, 2003). Again, this trend was observed while the trade has become much less visible.

Taken together, these data suggest that there is a high likelihood that the trade in gibbons and Siamang on Java and Bali has indeed significantly increased over the last ten years, whereas the data are inconclusive for orang-utans.

There were few consistent trends in the variation of quoted prices over the years (Figure 8). For those three species for which data was available for three or more years (Agile Gibbon, Siamang and Bornean Orang-utan), the variation in quoted prices was large and for some species the variation within years was as large as the variation between years. Hence, there is no indication of either an increase or decrease in quoted prices of gibbons and orang-utans.

Figure 8.

Reported prices (average \pm one standard deviation) of Agile Gibbon (n=9), Siamang (n=11) and Bornean Orang-utan (n=10) at Javan bird markets in the period 1996-2003. Note that prices of juveniles differ greatly from that of adults and that these differences are not taken into account in this figure.



Trade routes

As expected at the onset of the study, because of the economic importance of Java and Bali, a large number of primates encountered at bird markets and the wildlife rescue centres were not native to the islands. Most of the primates traded originate from either Sumatra or Kalimantan.

Most gibbons, and to a lesser extent, orang-utans from Sumatra, seem to arrive on Java overland, with the sea crossing being made between Bakauheni (Sumatra) and Merak (Java). Animals are transported in trucks and ordinary cars, at various times of day or night, and there is little or no control of cargo at these inter-island crossings. The major destination for animals from Sumatra is said to be the Pramuka bird market, which also functions as an entrepot for re-distribution overland to other parts of Java and further east to Bali. It is believed that a smaller but unknown number of primates arrive by sea through the north coast of West Java.

The route for gibbons and orang-utans from Kalimantan to Java appears to be largely by sea, primarily smuggled by ships that carry other goods. There is no indication that there are shipments dedicated to gibbons or orang-utans only, but anecdotal evidence from individuals involved in the monitoring of wildlife trade suggest that many of the gibbons and orang-utans from Kalimantan were transported to Java by ships that also carry timber. The trade in primates and other wildlife is seen as a profitable side-business for the timber shippers/traders. There are indications that gibbons and orang-utans are directly shipped from Kalimantan's main ports (e.g., Banjarmasin and Pontianak) to the main (timber) harbours in Java (e.g., Tanjung Priok, Jakarta, Tegal, Semarang, Gresik), but, at least in the case of wildlife arriving in Semarang, there are indications that the animals are transferred from timber vessels to smaller ships near the Karimata archipelago, some 120 km north of Java.

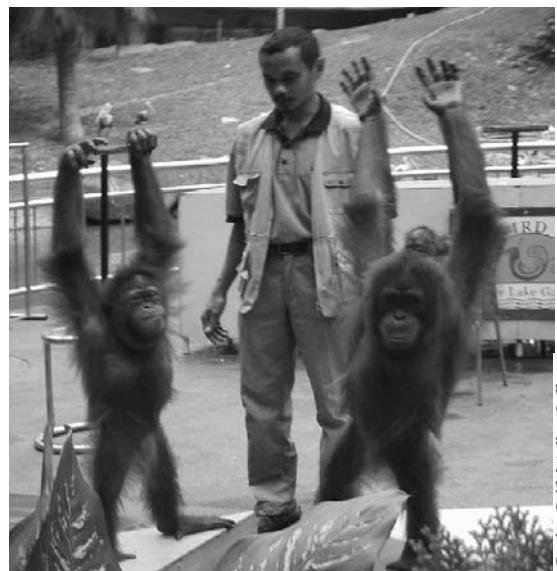
In Semarang, like in other parts of Java, a section of the harbour is exclusively reserved for the armed forces and some investigators indicated that in all likelihood, a number of protected animals do arrive on Java through this port (Joko, *pers. comm.* to TRAFFIC Southeast Asia). It is allegedly common for army personnel to bring home an (protected) animal as a souvenir upon completion of their duty in one of the outer provinces (Joko, PPSJ, *pers. comm.* to Vincent Nijman, 2003). In many cases, this involves birds and since a large part of the army has been serving in eastern

Indonesia, primates are not especially common souvenirs. However, with the recent increase in military activities in Aceh and northern Sumatra in general, the number of (White-handed and Agile) gibbons, Siamangs and (Sumatran) orang-utans arriving via these routes may soon increase.

Similar responses to Malone et al. (2002a) were collected when inquiring during this survey about Sumatran primates at bird markets [or when browsing through files provided by the regional office for the conservation of natural resources (KSDA)], that is, the place of origin was frequently reported to be Kalimantan. The reverse, *i.e.*, Bornean primates said to originate from Sumatra, was, however, rarely encountered. Although very often the information about the origin of animals is incorrect (and many animals are said to originate from exceedingly far away and exotic-sounding places), there is a small possibility that a proportion of the animals from Sumatra are firstly transported to Kalimantan and from there, they are shipped further to Java.

There are no large harbours along the north coast of Bali and therefore, it is likely that the majority of the gibbons and orang-utans that arrive on the island do so overland via Java, crossing the Bali Strait. There are strong links between the traders at the Ksatria bird market in Denpasar and the Kupang bird market in Surabaya and many of the birds offered for sale at the Balinese bird markets arrive from Java.

Undoubtedly, some gibbons and orang-utans will be transported from Sumatra and Kalimantan to Java by air as well, but the numbers are likely to be small. One example of this was reported where a sedated young orang-utan was transported from West Kalimantan to Java by plane (C. Saleh, WWF-Indonesia, *pers. comm.* to TRAFFIC Southeast Asia). No information was received about gibbons and/or orang-utans being smuggled out of Java through routes other than the major airports, although unquestionably, given the scale of the illegal trade network, every year a number of them must leave Indonesia by sea or over land. There have been several cases where international wildlife dealers have (successfully or not) made attempts to smuggle especially orang-utans, but also gibbons and Siamangs, out of the country via the Sukarno-Hatta international airport in Cengkareng. Investigations by ProFauna Jakarta and others have claimed to reveal a complex and extensive network of smugglers working in close co-operation with Customs officials, police and airport personnel at this airport. These NGOs claimed that this group of organized criminals has been involved in the export of at least two dozen orang-utans (and possibly more) in the first few months of 2003 alone (Hardi Baktiantoro, Profauna, *pers. comm* to Vincent Nijman, 2003). According to ProFauna, these animals may be transported to destinations including the Netherlands, Germany, Taiwan and Japan. Although there were no indications that orang-utans were sent to Thailand via Java (or Bali) during the course of the survey, it should be noted that orang-utan smuggling to entertainment parks in Thailand is a topical issue. The prominent case in 2004 regarding 115 orang-utans that were found in Safariworld, Bangkok indicated that orang-utans may be smuggled directly from Borneo or Sumatra into Thailand. A DNA check of the 115 orang-utans have reconfirmed the suspicion that most of these apes were not bred in the zoo, as indicated by the owners (Wiek, 2004). The smuggling chain may extend beyond Thailand, as 22 orang-utans were said to have been smuggled from Thailand into another entertainment park in Cambodia whereby the apes were being forced to perform for tourists (Anon, 2004a).



Orang-utan show at an entertainment park

Credit: Saiful Adlan Jaffry

The bird markets on Java and Bali can be considered to consist of a (loose) network, within which animals are being transported from large markets to smaller outlets, and from one side of the island to the other. A few of the traders at the larger markets, most notably Pramuka bird market in Jakarta and the Kupang bird market in Surabaya, seem to hold key positions in the network. Both actors in the trade, as well as individuals monitoring the trade, reported these two markets were key nodes in Java's primate trade. Many traders that did not have gibbons and orang-utans on offer at the time of research indicated that it would be possible to obtain one, possibly within a week. This strongly suggests that the connections readily exist to transport animals both to, and within, Java.

Vendors at the Pasunudan bird market in Sukabumi, an area surrounded by (small) populations of wild Javan Gibbons, informed us that the Javan Gibbons (or any gibbon for that matter) were last offered for sale at their market around 1998. This assertion was consistent with the observations of individuals monitoring this market for the last seven years who never encountered gibbons (or orang-utans). If gibbons would arrive at Pasunudan market, these would quickly be transferred to markets in Bandung or Jakarta as prices paid for gibbons were considerably higher in larger cities (Resit Sözer, PPS Cikanagan, pers. comm. to Vincent Nijman, 2003).

Many of the larger cities have more than one bird market. Differences exist in the size, species on offer, amount of buyer traffic, prices for traded animals, and the amount of monitoring by conservation officials at individual markets. Quite often, when inquiring about the availability of gibbons or orang-utans, vendors will not just offer their own animals for sale, but actively help prospective buyers with their search. Once an animal has been purchased, the vendor-guide will then receive a commission from the trader who actually sold the primate(s).

This interlinked network, in which animals are transferred between vendors within markets, between markets in the same city, and between cities, provinces and islands, makes it difficult to accurately pinpoint which primary traders actually drive the market, where they are situated, and who are merely middlemen.

Turn-over

Hardly any data were received on the turn-over of gibbons and/or orang-utans at bird markets. When asked directly, vendors only proffered vague answers, indicating that a gibbon could be sold in a matter of days but that it was equally likely that it would remain at the market for months before a buyer came along. Many vendors reported that gibbons and orang-utans could be ordered on-site and that in a matter of days or weeks, an animal could be made available. In all likelihood, when an order is placed, the vendor will source the desired animal from other vendors or other markets. Repeat visits to the same markets often reveal daily fluctuations in the number of primates present and it appears that the same individual gibbon or orang-utan might show up on display at different markets. As indicated above, there seem to be strong links between vendors of different markets and different sellers that frequent the markets, again suggesting considerable movements of animals between markets.

From the data received from several NGOs that monitor trade in bird markets it was often not possible to deduce whether or not the individuals observed in one survey were the same or different from the previous visit – i.e. assessing market turnover was problematic. Especially when markets are monitored on a weekly basis or even more frequent intervals, the same animal may be observed for weeks in succession. Even when an individual is no longer seen at a particular market does not necessarily indicate that it has been sold as it may simply have been moved out of sight or the animal may have moved to another market.

The volume of trade is difficult to assess, but on average, analysis of data from all markets from the period 1994-2003 show that about one in three visits to a bird market yielded positive data on the presence of gibbons and/or orang-utans.

Medicinal uses and primate meat

Many species of wildlife are used as traditional medicines in Indonesia and primates are no exception. In Indochina, gibbons are sometimes hunted for medicinal purposes (Eames & Robson, 1993) and there have been claims that some will eat the meat of orang-utans as an aphrodisiac (Rijksen & Meijaard, 2000). On Java, however, primates are rarely

used for such purposes. At bird markets, some vendors are specialized at selling live animals to be used as traditional medicine, and some of these do sell long-tailed macaques and less frequently, pig-tailed macaques for these purposes. The general opinion, however, amongst those that regularly monitor bird markets, as well as most traders at markets, is that gibbons and orang-utans are not used in this manner.

One trader at the Kupang bird market in Surabaya who sold Plantain Squirrels *Callosciurus notatus*, Large Fruit Bats *Pteropus vampyrus*, Common Palm Civets *Paradoxurus hermaphroditus* and Long-tailed Macaques to be used as medicine, recalled that in the past, he had sold gibbons and Siamangs for this purpose as well. To be used as medicine, the skinned animal had to be cooked until the carcass was reduced into a paste or balm, which then

could be applied to cure skin ailments. Gibbons and Siamangs were, however, much more expensive than Long-tailed Macaques or other smaller mammals on offer, and the market for these species was very small. In the past five years, the trader reported, he had not bought or sold any gibbon or Siamang for this, or any other purpose. According to this same trader, ethnic Chinese prefer the smaller mammals (i.e., the squirrels, fruit bats and civets) to be used in traditional medicine and they would rarely buy primates, whereas primates were alleged to be mostly bought by the Javanese.

Smits (2002) reported that *abon* (dried meat) made from orang-utans was exported from Aceh and Central Kalimantan to China, but no information was received that this trade also reached Java or Bali. Some considered the meat of orang-utans an aphrodisiac or an 'obat kuat' (potency-heightener) (Smits, 2002). Primates, and in particular, macaques, are sold as food primarily on Sumatra and Sulawesi, where specialized restaurants are operating that have these primates on the menu (Anon 1998b). There are few, if any, indications that this trade extends to Java, and if so, would only rarely involve primates such as gibbons or orang-utans.

Wildlife rescue centres

Numbers and species composition

Combined, the five wildlife rescue centres, the Javan Gibbon Rehabilitation and Reintroduction Centre, and Yayasan Gibbon Indonesia have taken care of some 87 gibbons (including 42 Siamangs) and 30 orang-utans, a small proportion of which have died (three known cases) and a larger proportion of which have been transferred to rehabilitation centres in Sumatra (Agile Gibbon, Siamang and Sumatran Orang-utan) and Kalimantan (Bornean White-bearded Gibbon, Müller's Gibbon and Bornean Orang-utan) (see Table 5).



Fruit bats *Pteropus vampyrus*

Table 5.

Species composition of gibbons and orang-utans that have been received by the various wildlife rescue centres in Java and Bali.

Wildlife rescue centre	PPSTA	PPSG	PPSC	PPSJ	PPSPS	JGRRC	YGI	Total
Species								
<i>H. moloch</i>			9		1	4	1	15
<i>H. agilis</i>	4		4	4	6		1	19
<i>H. albipile</i>	1				4		3	8
<i>H. klossi</i>							1	1
<i>H. muelleri</i>			1					1
<i>S. syndactylus</i>	12	8	6	4	6		7	43
<i>P. pygmaeus</i>	11		10	2	6			29
<i>P. abelii</i>	1							1
TOTAL								117

Key: PPSTA = Wildlife Rescue Centre Tegal Alur, PPSG = Wildlife Rescue Centre Gadog, PPSC = Wildlife Rescue Centre Cikanangan, PPSJ = Wildlife Rescue Centre Jogja, PPSPS = Wildlife Rescue Centre Petungsewu, JGRRC = Javan Gibbon Rescue and Rehabilitation Centre, YGI = Yayasan Gibbon Indonesia. Note that a small number of animals may have been counted twice when they were transferred between the wildlife rescue centres between visits. Note also, that in October 2003, a number of Siamangs were confiscated in the province of Lampung, south Sumatra, and that these animals were transferred directly to the Tegal Alur Wildlife Rescue Centre. From there, these animals have found their way to other wildlife rescue centres (Gadog, Cikanangan and Petungsewu). In the analysis, these animals are, as far as possible, not included.

Confiscations versus donations

According to Indonesian law, keeping gibbons and orang-utans is prohibited and as such, any gibbon or orang-utan encountered in private hands should be confiscated. However, in 2001, the Directorate General of Forest Protection and Nature Conservation (PHKA) issued an instruction (*Instruksi Direktur Jendral Perlindungan Hutan dan Konservasi Alam, No. 762/DJ-IV/ins/121/2001 – Penertiban dan pernegakan hukum terhadap pengusaan dan atau perdagangan orang-utan dan satwa liar yang dilundungi undang-undang beserta habitatnya*) for the regional Offices for the Conservation of Natural Resources (BKSDA) that, in effect, exempts from prosecution those owners that freely hand over protected animals to the BKSDA. This also includes, for example, those instances where BKSDA officers have already entered the premises in order to confiscate the protected animals. Only when an owner refuses to cooperate does he or she face (a small) chance of being legally prosecuted. This guideline does not only apply to those private owners that are in the possession of 'just' one pet gibbon or one pet orang-utan, but even to those that have a 'private zoo' in their backyard. Likewise, those who 'donate' their protected pet to a wildlife rescue centre and later are found to be in the possession of yet another protected pet, can simply hand over this animal without having to fear prosecution. As such, many donations have been made to the wildlife rescue centres and, to a lesser extent, zoological gardens.

Many of the gibbons and orang-utans that have entered the wildlife rescue centres are the result of the aforementioned 'confiscations', but in most cases, there is no intention of having the owners prosecuted. Likewise, many of the animals that are registered as being received as donations have in fact been handed over to the BKSDA upon arrival. The distinction between 'confiscations' and 'donations' is therefore rather vague, but, from a practical point of view, it really does not matter as only very few people are actually prosecuted for keeping protected wildlife. As an example, of the 23 gibbons and orang-utans that have arrived at the Petungsewu wildlife rescue centre, 13 are the result of confiscations, yet none of these resulted in the owner being brought to justice. Table 6 presents the ratio of confiscations vs donations of the different species of gibbon and orang-utan that have arrived at the different wildlife rescue centres. Twice as many

animals are confiscated as are donated. It is interesting to note that this ratio differs greatly between Siamangs (with 90% being confiscated) and Bornean Orang-utans (with only about a third of the animals being confiscated).

Table 6.

Number of gibbons and orang-utans that have been received by the various wildlife rescue centres (see Table 5) either as a result of confiscations made by the regional offices for the conservation of natural resources (BKSDA) or that have been received as donations from private owners.

	Confiscation	Donation
<i>H. moloch</i>	7	8
<i>H. agilis</i>	12	7
<i>H. albiventer</i>	6	1
<i>H. klossi</i>	1	0
<i>H. muelleri</i>	1	0
<i>S. syndactylus</i>	36	4
<i>P. pygmaeus</i>	6	15
Total	69	35

Origin of gibbons and orang-utans arriving at wildlife rescue centres

In order to explore the role of wildlife rescue centres and the effect of confiscations, the origin of the animals that arrive at the wildlife rescue centres was analyzed. It was examined whether if surrounding local communities started bringing in their pet gibbons or pet orang-utans to a wildlife rescue centre once it was established, and whether the majority of animals originated from the same regencies as where the wildlife rescue centres were situated. For gibbons and orang-utans, this does not seem to be the case, as, according to rescue centre records, most individuals were either confiscated by the BKSDA, or obtained after the owners were persuaded to hand in their pets as 'donations' to the wildlife rescue centres.

The records of wildlife rescue centres show 94 gibbons and orang-utans were confiscated or donated from regencies in Java or Bali (note that the confiscated Siamangs that arrived from Lampung in southern Sumatra at the Tegal Alur wildlife rescue centre were excluded from this analysis). They arrived from 17 regencies (kabupaten) (Figure 9) [of which there are 90 on Java and Bali (Table 7)]. The highest number of animals was received from the regencies in which the wildlife rescue centres were situated, and many of the other animals originated from neighbouring regencies.

Figure 9.

Regencies (*kabupaten*) from where confiscated or 'donated' gibbons and orang-utans have arrived at the various wildlife rescue centres. In total, there are 90 regencies in Java and Bali, 17 from which gibbons and orang-utans have arrived.

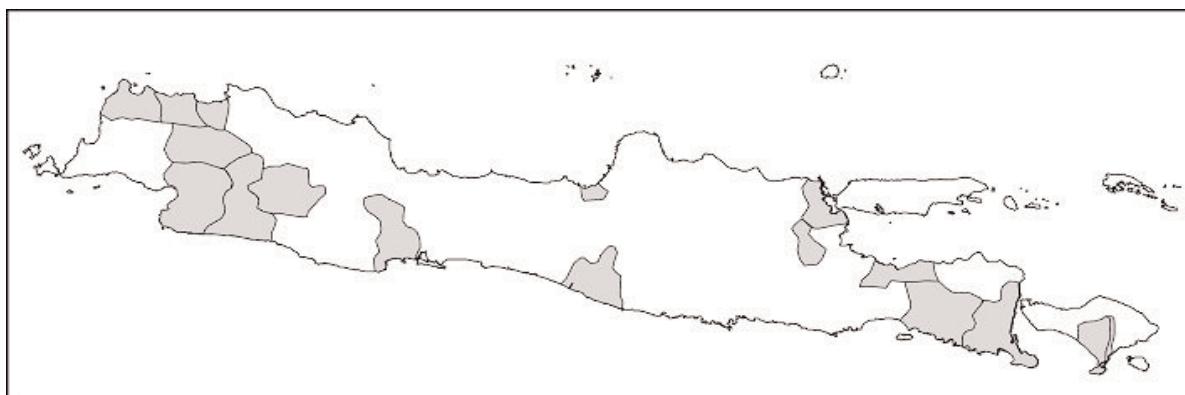


Table 7.

Summary of the regencies, listed from west to east, from where gibbons and orang-utans have arrived at the various wildlife rescue centres. Regencies where wildlife rescue centres are situated are indicated in bold.

Regency/ Kabupaten	<i>Hylobates</i> spp.	<i>S. syndactylus</i>	<i>P. pygmaeus</i>	Total
WEST JAVA				
Serang			1	1
Tangerang	4	3		7
Jakarta	3			3
Bogor	3	5	5	13
Sukabumi	9		1	10
Cianjur			2	2
Bandung	4	2	1	7
Ciamis		1		1
CENTRAL JAVA				
Semarang	4	2	5	11
Yogyakarta	4	5		9
EAST JAVA				
Malang	7			7
Gresik	4		1	5
Probolinggo	2			2
Jember	2		1	3
Banyuwangi	2		1	3
BALI				
Tabanan	2	2		4
Badung		3	2	5

Gibbons and orang-utans in private hands

Several requests were made to various Offices for the Conservation of Natural Resources (BKSDA) to contribute information on the number of gibbons and orang-utans owned by the public that were registered at their office. The scant data that was received is summarised in Table 8 but it is believed to be grossly under-representative. Anecdotal data suggests that in the Greater Jakarta area alone, there were more than 100 pet orang-utans and some 200-300 gibbons and Siamangs (Yunus Makasauw, BKSDA Jakarta, pers. comm. to Vincent Nijman, 2003). Likewise, Gates & Baker (2001) claim that approximately 80 Javan Gibbons were being kept illegally as pets throughout Java, but no source for this was given.

Given the consistent frequency of arrival of gibbons and orang-utans at wildlife rescue centres and, to a lesser degree, zoological gardens, the numbers of these animals still in private hands may be far greater than Table 8 indicates. Lack of detail prevents a high degree of accuracy but for all species combined, this number may easily reach up to 1000 animals.

Table 8.

Gibbons and orang-utans in private hands that have been registered at the regional offices for the conservation of natural resources (BKSDA) in Surabaya and Yogyakarta

Species	Number	Source
<i>H. moloch</i>	1	KSDA Surabaya
<i>Hylobates spp.</i>	1	KSDA Surabaya
<i>S. syndactylus</i>	12	KSDA Yogyakarta
<i>S. syndactylus</i>	11	KSDA Surabaya
<i>Pongo</i> spp.	1	KSDA Surabaya

Zoological gardens

Species composition and origin

The 11 zoos included in this survey housed over 300 gibbons and orang-utans in total (Table 9). The most abundant was the Bornean Orang-utan, followed by the Javan Gibbon and the Siamang. For some of the less common and more threatened species, such as the Bornean Orang-utan or the Javan Gibbon, the total number of individuals in zoos on these two islands is considerable. The majority of the orang-utan and gibbon individuals observed were still very young, not yet part of a family group and were clearly acquired recently (or successfully captive-bred). Enquiries about the origin of gibbons and orang-utans revealed that many had arrived recently in the zoos – which may suggest regular turn-over of



Credit: © WWF-Canon/Tantyo Bangun

A health inspection for a Bornean orang-utan at the Wanariset Research Station, Semboja, Kalimantan, Indonesia

gibbons and orang-utans in zoos. Geissmann (2003) reported similar findings when he made an inventory of the captive gibbon population in Indochina: a large proportion of the gibbons in China, Vietnam and Laos comprised immature individuals (some 60% of the total), whereas in Western zoos, immature individuals made up only about 30% of the sample.

When the origin of the animals in the Javan and Balinese zoos was known, the majority were either said to have been received from the BKSDA or, alternatively, from private owners. It was interesting that some zoos (e.g., Kebun Binatang Bandung) claimed to have received the vast majority of gibbons from private owners who wanted to dispose of their pet gibbon (although, yet again, more than 60% of all gibbons in this zoo were not yet adult) and none was the result of confiscations. Other zoos (e.g., Kebun Binatang Surabaya) claimed exactly the opposite, with almost all being the result of confiscations made by the BKSDA, and none being received as donations.

Table 9.

Gibbons and orang-utans in Javan and Balinese zoological gardens, and their reported origin. Zoos are: Pusat Primata Schmutzer, Jakarta; Ragunan, Jakarta; Taman Safari Cisarua; Kebun Binatang Bandung; Gembiraloka, Yogyakarta; Taru Jurug Surakarta; Kebun Binatang Tinjomoyo, Semarang; and Taman Kaloko Widya Mandhala, Purwokerto; Kebun Binatang Surabaya; Taman Safari Pasaruan; and Bali Zoo Park.

	Confiscated	Donation	Captive-bred	Transfer*	Unknown	Total
<i>H. moloch</i>	3	24	2	15	11	55
<i>H. agilis</i>	15	2	1	2	16	36
<i>H. albiventer</i>	1	6	2	9	5	23
<i>H. muelleri</i>	0	0	0	2	17	19
<i>H. klossi</i>	1	0	0	0	0	1
<i>S. syndactylus</i>	9	11	4	2	29	55
<i>P. pygmaeus</i>	10	5	4	17	71	107
<i>P. abelii</i>	2	0	1	5	4	12
Total (%)	41 (13)	48 (16)	14 (5)	52 (17)	153 (50)	308

* Transfer refers to animals that were bartered from other zoos or animals that have been received from other zoos.

Data source: This survey (2003) and Yuda, 2003

Comparison between bird markets, wildlife rescue centres and zoological gardens

Table 10 presents a summary of the total number of gibbons and orang-utans included in the assessment. In all, data was collected on 559 individuals of seven species of gibbon and both species of orang-utan. Striking are the large number of Bornean Orang-utans, Siamangs and Javan Gibbons, whereas the number of White-handed and Kloss' Gibbon, as well as the Sumatran Orang-utan are particularly small. The difference between the large number of Siamangs encountered at bird markets, zoos and in private hands, and the relatively smaller number of the other species of gibbon may be related not just to the number of individuals captured but also to the differences in survival chances between the two. As indicated in the introduction, the Siamang is more of a folivorous species than the *Hylobates* gibbons, and their choice of diet is more flexible.

Clearly, as orang-utans do not naturally occur on Java or Bali and successful captive-breeding is a very rare occurrence, they have been imported to the islands. Also, for the gibbons, when broken down by the islands of origin, it becomes clear that over 75% of the gibbons encountered on Java and Bali have been imported. Thus, of the 531 individuals for which the island of origin can be inferred, 78 individuals (of one species) originate from Java, 234 from Sumatra (5 species) and 219 from Indonesian Borneo (3 species).

In general, species that are rarely encountered at bird markets are also rarely present in zoos or wildlife rescue centres (Figure 10). Müller's Gibbon, however, is relatively frequently encountered at bird markets and zoos, but they are rather scarce in the wildlife rescue centres, whereas the converse can be said of Siamangs. Both species of orang-utan are relatively common in zoos, but for the Bornean Orang-utan, this is partially skewed due to the very large number present in Ragunan zoo. Most of these animals are scheduled to be transferred to one of the reintroduction programmes in Sumatra or Kalimantan.

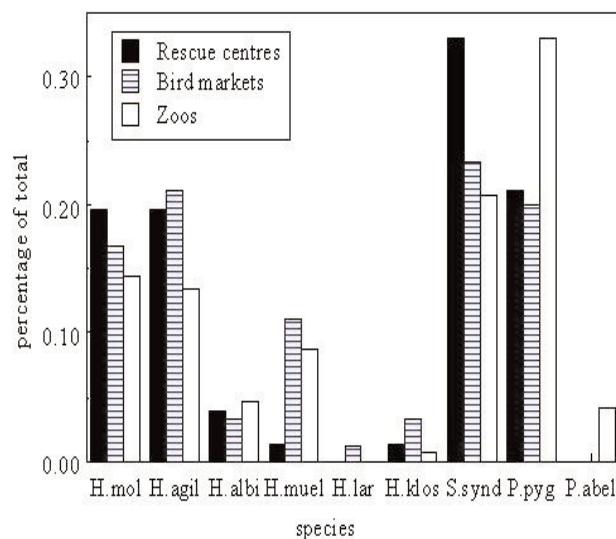
Table 10.

Summary of species composition of gibbons and orang-utans observed in bird markets, wildlife rescue centres, zoological gardens and in private hands on Java and Bali.

	Bird markets	Wildlife rescue centres	Zoos	Private hands	Total
<i>H. moloch</i>	7	15	55	1	78
<i>H. agilis</i>	19	19	36	0	74
<i>H. albiventer</i>	3	9	23	0	35
<i>H. lar</i>	1	0	0	0	1
<i>H. muelleri</i>	10	1	19	0	30
<i>H. klossi</i>	3	1	1	0	5
<i>Hylobates spp.</i>	25	0	0	1	26
<i>S. syndactylus</i>	21	43	55	23	142
<i>P. pygmaeus</i>	18	29	107	0	154
<i>P. abelii</i>	0	1	12	0	13
<i>Pongo spp.</i>	0	0	0	1	1
Total	107	118	308	26	559

Figure 10.

Relative proportions of seven species of gibbon and two species of orang-utan observed at bird markets, and held at wildlife rescue centres and zoological gardens.



Impact of trade on wild populations

Based on the species composition and numbers in bird markets (2003 data only), species composition and numbers in wildlife rescue centres, the origin of gibbons and orang-utans arriving at wildlife rescue centres, and the species composition and origin in zoological gardens, the total number of gibbons and orang-utans that are extracted from the wild annually was estimated. Data collected for this survey was used to calculate observed or estimated numbers of individuals of a given species (**N**), the proportion of the total number of bird markets (**m**), wildlife rescue centres (**r**) or zoos (**z**) that was included in the assessment (**C**), the turnover, i.e., the average amount of time a single individual can be expected to be present at the bird market, wildlife rescue centre or zoo (**T**), and the loss rate, i.e., the total number of individuals that have died as a direct result of the capturing or transporting of one individual that is observed during the survey (**L**).

With two scenarios using different ranges of parameters (one very conservative, the other less so), the mortality rate of the wild population was estimated.

The parameters chosen were: $C_m = C_z = 0.80$, $C_r = 0.33$ in both scenarios; $T_m = 12$ or 6 months for all species, $T_r = 18$ or 12 months for all species, and $T_z = 5$ years (gibbons), 7.5 years (Siamangs) and 10 years (orang-utans) in both scenarios; and $L = 2$ or 4 .

As can be observed in the last two columns of Table 11, the impact of trade as recorded on Java and Bali on the wild populations of gibbons and orang-utans differs considerably between species. For some of the species that were rarely recorded (e.g. White-handed Gibbon and Kloss' gibbon), or that still have relatively large population sizes (e.g. Mueller's gibbon) the impact is small, irrespective of the scenario adopted.

Table 11.

Number of gibbons and orang-utans appearing in trade in 2003 on Java/Bali and potential impact to the wild population.

	Observed or estimated number *			Number lost from wild population*** per year		Percentage lost to wild population per year	
	Bird markets	Rescue centres	Zoos**	Scenario 1	Scenario 2	Scenario 1	Scenario 2
<i>H. moloch</i>	0	15	56	116	291	2.72	6.86
<i>H. agilis</i>	84	19	36	323	1142	0.16	0.57
<i>H. albiventer</i>	24	9	23	119	395	0.12	0.39
<i>H. lar</i>	0	0	0	0	0	0	0
<i>H. muelleri</i>	12	1	19	53	170	0.02	0.06
<i>H. klossi</i>	0	1	1	1	2	0	0
<i>S. syndactylus</i>	108	43	78	485	1683	0.13	0.47
<i>P. pygmaeus</i>	60	29	107	321	1058	0.8	2.65
<i>P. abelii</i>	0	1	12	10	24	0.13	0.33

*For bird markets, as a measure the estimated number of gibbons offered for sale on an annual basis was calculated based on the assumption that 31 markets were included that were each surveyed over a one-month period. This multiplied by 12 gives the annual total.

**This includes gibbons and orang-utans in private hands

*** Wild population is based on Table 2 of this report

For other species, most notably the Javan Gibbon and the Bornean Orang-utan, the total number of individuals traded on Java and Bali are large enough to have a significant impact on their populations. In both scenarios, the estimated number of Javan Gibbons traded on Java and Bali in 2003 exceeds several per cent of the remaining wild population. For the Bornean Orang-utan, at least in the less conservative scenario, also several per cent of the wild population are involved. Having reached this conclusion, it may be worthwhile to explore the underlying assumptions of the model to a greater extent to see whether or not the observed pattern for these two species is indeed real or is merely an artefact of the methodology employed. There are several assumptions in the model that may overestimate the mortality rates as presented in Table 11, including:

1. The source populations (bird markets, zoological gardens and rescue centres) are not independent.

Individuals observed at bird markets may later be present in zoos or the rescue centres, and therefore the numbers cannot be simply added as to derive the total number of individuals traded. This may be a valid argument for the bird markets, but not for the rescue centres and zoos, as no gibbon or orang-utan present at the rescue centres was derived from zoos, and no gibbons or orang-utans that at one time were present in the rescue centres have been placed in a zoo. Assuming that all gibbons and orang-utans observed at bird markets at one time or another do end up in either a zoo or in one of the rescue centres, and thus discarding all data from bird markets, will have no effect on the Javan Gibbon but will lower the mortality rates of Bornean Orang-utans in the least conservative scenario to 1.15%. Note that there was a high consistency in species composition and numbers between the 2003 survey data, and the average for the period 1994-2003, and restricting the analysis to 2003 data only does not lead to significant differences in the outcome of the model.

2. Turnover is considerably higher than assumed in the model. Many of the gibbons and orang-utans that have been observed at markets, in zoos, and when arriving at the rescue centres are still very young, and are therefore likely to have been recently removed from the wild. Hence, the population of gibbons and orang-

utans in trade comprises very many young individuals, fewer immature individuals, even fewer adults and hardly any very old individuals. This implies that either the trade has increased dramatically over the past few years, or more realistically, that there is an uneven mortality rate among the different age classes of gibbons and orang-utans in trade (i.e., many die relatively young whereas few live to an old age). The model worked with average time-spans between the extraction of the gibbon or orang-utan from the wild and the moment it was observed in the present assessment. The uneven age distribution of the population, in effect, means that a single adult has a greater influence on the average than a single baby. Consequently, both the mode and the median age of gibbons and orang-utans observed in trade are below the average. Increasing the turnover periods for bird markets and the wildlife rescue centres to twice that of those used in the conservative Scenario 1 lowers the mortality rates to 2.00% and 0.47% for the Javan Gibbon and the Bornean Orang-utan, respectively.

3. **Loss rates have been overestimated.** Admittedly, there are very few hard data on mortality rates of gibbons and/or orang-utans during capture, transportation, storage and when in illegal captivity. As has been argued in the introduction, for each young gibbon and orang-utan observed in trade, we can assume that for the majority of these individuals, at least the mother has died in the process. Given the lack of proper facilities and the illicit nature of primate trade in Indonesia, we can assume that mortality rates during transport and storage are expected to be high. Mortality rates in zoos were not obtained in the present study, but for the gibbons arriving at the rescue centres, it was assessed to be over 10% (7 out of 68), and most individuals died in the first few weeks after arrival. Subsequently, a loss rate of one extra individual for each gibbon or orang-utan encountered in trade does not seem to be an unrealistic assumption because of the collection methods and poor conditions during transport and storage. In the present model, loss rates and mortality rates of the wild populations have a one-to-one relationship and for every increase in the estimated loss rate, the mortality rate of the wild population increases in the same amount.
4. **Population estimates are too low.** As indicated in the introduction, and more specifically, as tabulated in Table 2, estimates of the wild population sizes for some of the species are probably not very accurate. However, both the Javan Gibbon and the Bornean Orang-utan have been the subject of intensive studies and recent estimates for both species have been higher than previously assumed. Both have been based on the geographical area occupied (with many individual forest patches having been subjected to surveys) and average densities differentiated by habitat type. The estimate of the population size of the Javan Gibbon (Nijman, 2004) was based on an overall conservative density estimate of one group per square kilometre of inhabited forest, whereas the estimate for the Bornean Orang-utan (Lacy *et al.*, 2004) was based on local density estimates. Doubling the estimated population sizes of these two species will lead to a halving of the mortality rates but when considered in isolation, at least for the Javan Gibbon this will still result in mortality rates >1% in the most favourable scenarios.

From the above observations, we can conclude that at least for Javan Gibbons and Bornean Orang-utans, the number of individuals observed in trade on Java and Bali does represent a significant proportion of the wild population. Altering some of the parameter values used in the model to estimate mortality rates can lower this proportion. However, with a realistic range of parameter values, based on the best available data, it seems that annually up to, or even more than, 1% of the wild population for the Javan Gibbon and Bornean Orang-utan is removed to enter the trade chain in Java and Bali. It remains an open question as to whether or not these individuals were indeed extracted from the wild solely for the purposes of trade, or whether at least in part, these individuals have been the victims of habitat degradation and displacement and as an end result ended up in trade

Law enforcement

Initiative for confiscations

From the analysis above, it seems that there are large regional differences in the practice of confiscation and law enforcement. Some KSDA offices seem to be more active in confiscating protected animals, including gibbons and orang-utans, whereas in others, no action whatsoever seems to be taken (Bambang & Suherdjoko, 2003). Especially in regencies where the wildlife rescue centres have been established, certain KSDA offices are active, albeit following different strategies. For instance, KSDA in the Bogor-Sukabumi-Cianjur area almost exclusively targets private owners and few confiscations have been made at the bird markets in the region (although admittedly, the number of protected animals offered for sale at the bird markets in this region has decreased significantly over the past few years). As such, the majority of gibbons and orang-utans that have arrived at the Cikanagan wildlife rescue centre originate from private owners. In contrast, it appears that the KSDA in the Malang-Surabaya regency follows a policy that targets bird markets more frequently, and a relatively small proportion of the gibbons and orang-utans in the Petungsewu wildlife rescue centre are derived from private owners.

The initiative for confiscating animals at either bird markets or from private owners in many cases may not come from the BKSDA but from the wildlife rescue centres and NGOs themselves and the speed of action is likely to vary according to levels of co-operation and trust. Although formally a task of the BKSDA, it was common procedure for the wildlife rescue centres to provide the funding and logistic support for the confiscations. Furthermore, all KSDA staff members that were involved in the operations received some monetary support (c. IDR25 000 - 30 000 (USD2.70 - 3.25 at 2004 rates), per day, the equivalent of a normal day's work).

Legal follow-up

The number of confiscated gibbons and orang-utans held at the wildlife rescue centres and zoos totals >110 individuals. It was not possible to get information on the origin of a large number of gibbons and orang-utans, especially those in zoos, but it is expected that some of those were also the result of confiscations. Details from only a few cases of legal prosecution were obtained, despite a considerable amount of effort put into determining the legal follow-up from confiscations (both by soliciting information from NGOs that were involved in monitoring of wildlife trade and by requesting information from the wildlife rescue centres and several KSDA regional offices). Only in a few instances in which people either kept gibbons or orang-utans or traded in them, and where the animals were confiscated, had there been a legal follow-up that led to a conviction. Traders that are known to have sold gibbons and/or orang-utans, but were convicted for selling or keeping other protected animals, were not included in the assessment; neither were private owners that were convicted for the illegal possession of wildlife other than gibbons or orang-utans, even if they were currently holding gibbons or orang-utans.

Undoubtedly cases of convictions have been missed. However, from the information presented in Table 12, the data received from NGOs and officers from the KSDA in writing, as well as discussions with them, it seems that very few people have been prosecuted for the illegal possession or trade in gibbons and orang-utans. In the past few years, only on Bali have consistent prosecutions occurred. In all, fewer than 10% of all persons that had gibbons and/or orang-utans confiscated from them (remembering that a fairly large number are given the opportunity to hand in their animals as donations) were actually prosecuted.

Sentencing of offenders is still a problem as many of the judges do not see wildlife trade or keeping protected species as pets as a serious offence (Willie Smits, Gibbon Foundation, pers. comm. to Vincent Nijman, 2003). Because of this lack of commitment from the judges, rarely are maximum sentences handed out, and more frequently, the offenders are

either released or receive a short prison term. Penalties are also very low compared to the profits to be made from the illegal trade and maximum fines are rarely applied. Although not all the details about the legal reasoning behind the sentencing are available, from a casual inspection of the sentences handed out, and taking into consideration the maximum penalties that can be imposed for possession and/or trading in protected animals without permits (i.e., 5 years imprisonment and a fine of up to IDR100 000 000 (USD12 000 at 2004 rates)), it seems that the sentencing hitherto has been rather lenient. The harshest sentence has been handed out by the Tanggerang district to a trader willing to sell an orang-utan, who, besides a fine of IDR200 000 (USD21 at 2004 rates), had to spend half a year in prison (Kompas, 8 December 2000). Note that in this instance, the trader himself had bought the animal for IDR1 750 000 (USD190 at 2004 rates) and that the fine imposed thus only represented a small fraction of the value of the traded animals. In fact, the fines handed out by the Denpasar courts to the owners of gibbons are likewise far below the value of the animals in their possession. As such, it is unlikely that the fines and jail terms imposed work as strong deterrents to stop people from either trading in gibbons or orang-utans, or keeping them as pets.

Table 12.

Legal follow-up of confiscated gibbons and orang-utans on Java and Bali. Note that for all cases, the person was convicted for illegal possession of the gibbon or orang-utan in question and not for other protected species as well.

Species	Date	Sentence	Location, source
<i>Hylobates</i> spp. (2 individuals)	2000	1 year probation, IDR 1 000 000 (USD 108.36 at 2004 rates) fine	Bali; BKSDA
<i>Pongo</i>	31-07-2002	in progress, collecting evidence	Bali; BKSDA
<i>Hylobates</i> spp.	2/8/2002	in progress, collecting evidence	Bali; BKSDA
<i>H. moloch</i> and	13-12-2001	2 months imprisonment, 4 months probation, IDR 500 000 (USD 54.18 at 2004 rates) fine	Bali; BKSDA
<i>S. syndactylus</i>	2000	5 months imprisonment, 10 months probation	Bali; BKSDA
<i>P. pygmaeus</i>	2000	6 month imprisonment	Bali; BKSDA
<i>P. pygmaeus</i>	7/12/2000	6 months imprisonment, IDR 200 000 (USD 21.67 at 2004 rates) fine	Tangerang; Kompas 8-12-2000

All gibbons and orang-utans have received legal protection since 1931. Despite this being a long-standing regulation, virtually all KSDA officers spoken to, as well as officials from the police and the local administrative authorities, were of the opinion that one of the major causes of people trading or keeping protected species was the fact that many were not aware of the animal's protected status.

At a seminar held at the Cikanagan wildlife rescue centre where representatives of the police, justice department, forestry department, and NGOs were present, one of the points that emerged was the lack of knowledge on the side of the government as to which species were in fact protected. Even representatives of the forestry department claimed not to have access to a list of protected species and expressed the need for easy access to such a list. In the absence of such a list, they claimed they were unable to execute their duties. The Ministry of Forestry and the Directorate General of Forest Protection and Nature Conservation have, however, published several guides with (a selected list of) protected species. An increase in education and information dissemination on which species were protected (both to those within the Department of Forestry and the police, as well as the general public) was seen as a prerequisite for effective action against illegal wildlife trade.

CONCLUSIONS AND RECOMMENDATIONS

During the data collection for this assessment, a large number of people involved in monitoring trade and wildlife law enforcement were consulted. During these discussions, some gaps in the current system were highlighted, as well as a number of unresolved issues.

As such, the following conclusions and recommendations can be made:

Monitoring and data collection

This assessment revealed that a significant number of gibbons and orang-utans have been and continue to be traded at bird markets on Java and Bali. Both groups of species are less openly displayed than several years ago and it appears that a large proportion of the trade has gone underground. Wildlife trade on Java and Bali is capricious with an ever-changing demand for species and frequent switches from one species to another. This is partially demand-driven but, at least for some species, also supply-driven. When previously inaccessible areas are opened up (because of land-use changes with, e.g., logging roads providing increased access), species that were rarely traded might see an increase in numbers being caught simply because there are ways to market the animals. There is very little research conducted on the economics of the primate trade in Indonesia, especially with reference to the supply end of the chain; and simple questions regarding who catches which species, where, and why remain as yet unanswered. Similarly, there is uncertainty over what forces drive the primate trade and who receives support and backing from which quarters of Indonesian society. Catching primates may merely be a by-product of other activities (e.g. logging, hunting), but in some cases it may be an independently operating business. These uncertainties need to be further investigated, not just on Java or Bali, but especially so on the major 'source' islands of Sumatra and Kalimantan (or other islands in Indonesia for other species) in order to design and implement effective responses to mitigate illegal wildlife trade.

Recommendations: NGOs involved in halting illegal wildlife trade in collaboration with relevant departments of the Indonesian Government should collect data in a systematic manner from a number of key wildlife markets in the larger cities (Jakarta, Surabaya, Yogyakarta, Semarang) on a regular basis which ideally would be able to document the species turnover. Simply tallying the number of individuals on display may be a first step, but in-depth studies would be more valuable, including undercover operations to further unravel the trade network. To anticipate any changes in the volume or species composition, monitoring effort should not just be restricted to gibbons and/or orangutans, but include a variety of species. Any personnel, whether Government staff or NGO researcher, involved in monitoring need to have adequate skills in identifying the species of interest. Current levels of monitoring have been sufficient to obtain the general pattern of what species were traded and in what volumes, but many questions remain to be answered. The availability and consistency of data needs to be improved and a regular and well-designed monitoring scheme may reveal temporal changes far better than has been currently possible and allow for subsequent actions to be taken.

Besides the bird markets, a more stringent monitoring by Indonesian Government agencies of the major ports is recommended. Again, it needs to be assessed whether or not primate traders operate independently or if they are fully embedded in other businesses (e.g., timber trade), as has been suggested.

Awareness and education

Among the general public on Java and Bali there is limited awareness about the intrinsic value of wildlife, and there is little understanding about the impact of trade on protected species. The incidence of capture of orang-utans and gibbons from the wild populations in Java, Sumatra and Borneo (Kalimantan) may be significantly reduced through integrated

education programs to make people aware of the protected status of the wildlife in their immediate surroundings. The policy of voluntarily handing over pet gibbons and/or pet orang-utans the moment forestry officials are about to confiscate the animals does not deter the public from buying and keeping gibbons and orang-utans. As such, TRAFFIC strongly recommends abandoning, as soon as possible, this policy and the practise of voluntarily handing over pet animals that are legally protected. The argument that the general public is not aware of the protected status of orang-utans and gibbons is highly unlikely; these species have been legally protected for over 70 years now, and over the years, enough attention has been given to communicating this message. However, an increase in the regularity of activities to publicise the status of protected wildlife, including those of which the general public is unaware (kingfishers, woodpeckers, slow loris, etc.) would continue to help inculcate awareness of Indonesia's protected species. But the lack of such an increase in awareness activities should not be used as an excuse for the persistent trade in species such as gibbons or orang-utans.

Recommendations: In order to reduce the demand for captive gibbons and orang-utans, a set of bold and innovative approaches is needed. Efforts over previous decades to control people from keeping and purchasing wild-caught gibbons and orang-utans have largely proved to be ineffective. Relevant Indonesian Government agencies, with the assistance of NGOs, need to communicate clearly and regularly that keeping protected species as pets is not an option - which will necessitate mobilising support from various media outlets.

In order for the awareness and education campaign to be effective, media coverage of wildlife traders and individuals keeping protected wildlife should be shown more on national TV news. Even though only a small number of individuals that have their protected animals confiscated actually end up in jail or have to pay a fine, by widely exposing this, deterrents will be created to show the general public the risk of violating wildlife protection laws. One way of achieving this is by creating more awareness among the media and particularly individual journalists. By embedding journalists into confiscation programmes (i.e., inviting them to attend raids and giving them free access to data) and allowing them to follow the entire legal process, reporting to the public along the way, the public can be more involved in the nature of illegal wildlife trade.

Law enforcement

The present study came to the conclusion that one of the main reasons why people still trade endangered species is the fact that law enforcement concerning protected species is generally lacking in both effort and efficiency. The chances of having protected animals confiscated, or of facing legal charges, are extremely remote. Fines and jail terms handed out are comparatively lenient and even those that have violated the law (for instance, those that have substantial private zoos in their backyard, or those traders that regularly buy and sell protected species) rarely, if ever, receive the maximum penalty.

From the current analysis, it appears that only a tiny proportion of the offenders are indeed brought to justice and that those that are found guilty only face a relatively small sentence. This analysis was, however, restricted to gibbons and orang-utans, and in order to evaluate the complete picture, all species and all cases need to be evaluated. Special attention needs to be paid to those cases where prosecution was indeed successful, and its possible underlying reasons (e.g., pressure from government offices, local NGOs, media, or otherwise) need to be unravelled. By analysing 'successful' with 'unsuccessful' court cases, perhaps more can be learned about how to effectively curb the trade.

Recommendations: A thorough review of the effectiveness of the legal and jurisdictional system should be conducted, including an analysis of the strengths and weaknesses of the current system by relevant Indonesian Government agencies, working with the assistance of NGOs specializing in environmental law, need to consider the options of

setting up a test trial where a 'gross offender' is either sued or, with the aid of the prosecutor, brought to court. Some awareness campaigns especially aimed at lawyers and judges might also help in trying to make them aware of how they can contribute to stopping the decline of wildlife throughout Indonesia (or alternatively, how they, by not acting, actively contribute to its decline). Furthermore, the law-enforcement hierarchy needs to be targeted to persuade officials to convict traders, owners, etc., and attention needs to be given towards devising incentives for law enforcers to carry out their duties with greater efficiency.

CITES Resolution Conf 13.4 - Conservation of and trade in great apes

In October 2004, the 13th Conference of the Parties to CITES adopted Resolution Conf. 13.4 (see Annex 2) regarding the Conservation of and Trade in Great Apes (including orang-utans). Res Conf. 13.4 calls for all CITES Parties to be concerned that illegal trade at international and national levels has been stimulated by opening up of forest habitats, increasing demand for ape meat, especially from urban populations both in range and non-range States and continuing global demand for live specimens, particularly juveniles. In addition, it called for all parties to recognize the need for technical guidance to assist all Parties in preventing illegal trade in live specimens, and parts and derivatives of great apes.

It is therefore assumed, that as a range State concerned with the conservation of orang-utans, the Indonesian Government will support the implementation of Resolution Conf. 13.4, *inter alia*:

- a) adopt and implement comprehensive legislation to protect great apes, which includes:
 - i) a prohibition of all international trade for primarily commercial purposes, including sale, display, purchase, offer to purchase and acquisition for commercial purposes of wild-caught specimens of great apes; and
 - ii) deterrent penalties aimed at eliminating illegal trade in great apes and parts and derivatives thereof;
(NB: In Indonesia, a penalty of IDR100 000 000 already exist if a person is found guilty of trading an orang-utan, however, as stated in the Law Enforcement recommendation above, this law lacks consistent enforcement and only a small proportion of offenders are penalized.)
- b) strengthen enforcement controls, including anti-poaching measures in great ape habitats and anti-smuggling measures at international borders (an example of international border is the West Kalimantan - Sarawak border);
- c) limit the international use of great apes to nationally approved zoological institutions, educational centres, rescue centres and captive-breeding centres in accordance with CITES; and
- d) promote the protection of great ape habitats, including cross-border cooperation between neighbouring range States for the management of contiguous habitat, and to take appropriate action to restore such habitats where they have become fragmented or diminished in quality.

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Annex I

Data was collected from 35 bird markets in 22 cities covering all four Javan provinces (at the beginning of 2001, the province of West Java was split into two provinces: Banten and West Java, but these two provinces are included here as West Java, and likewise, the capital district of Jakarta and the special district of Yogyakarta are included in West and Central Java, respectively), and Bali. See Table 12 below for the summary of the 22 cities included in this assessment. A Visit corresponds to a market entry / exit, whereas Months refers to the number of individual months in which one or more visits were conducted.

Table 13.

Summary statistics of the 22 cities that were included in the assessment; cities are listed from west to east.

Province / City	# markets	# visits	# months	period
WEST JAVA				
Jakarta	3	30	29	1994-2003
Bogor	3	38	32	1994-2003
Sukabumi	1	2	2	2000-2003
Sumedang	1	1	1	2003
Bandung	3	23	20	1998-2003
Indramayu	2	2	2	2003
Cirebon	2	3	1	2003
Ciamis	1	1	1	2003
CENTRAL JAVA				
Tegal	1	1	1	2003
Purwokerto	1	2	2	2000, 2003
Banyumas	2	2	2	2003
Pekalongan	1	6	6	1999
Linggo	1	15	15	1998-2001
Semarang	2	28	10	1996-2003
Yogyakarta	1	19	18	1996-2003
Muntilan	1	1	1	2003
Surakarta	1	3	2	1998, 2003
EAST JAVA				
Malang	1	61	21	1996-2003
Surabaya	3	68	29	1996-2003
Jember	1	9	9	1996-2003
Banyuwangi	1	9	1	2003
BALI				
Denpasar	2	31	12	1996-2003
TOTAL	35	355	217	1994-2003

Annex 2

Conf. 13.4

Conservation of and trade in great apes

CONSCIOUS of the special importance of great apes, not only from a cultural and scientific point of view and as part of our natural heritage, but also as mankind's closest living relatives;

CONCERNED that wild populations of great apes [all subspecies of the gorilla (*Gorilla gorilla*), chimpanzees (*Pan* spp.) and the orang-utan (*Pongo pygmaeus*)] in Africa and Asia are threatened by the combined effects of trade in live animals, poaching for bushmeat, disease and habitat loss caused by disturbance, fragmentation and destruction;

CONCERNED that almost all great ape populations continue to decline drastically;

AWARE that chimpanzees are now reported to be extinct in at least four of the 25 countries they once inhabited, that the Sumatran orang-utan (*Pongo pygmaeus abelii*) and three populations of gorilla are classified by IUCN as 'Critically Endangered' and that the other species and subspecies of great apes are classified as 'Endangered';

RECALLING that all great ape species are included in Appendix I of the Convention;

CONCERNED that illegal trade at international and national levels has been stimulated by opening up of forest habitats, increasing demand for ape meat, especially from urban populations both in range and non-range States and continuing global demand for live specimens, particularly juveniles;

COMMENDING efforts already made in a number of range and non-range States to tackle poaching and illegal trade, including repatriation of seized live specimens to the country of origin;

RECOGNIZING the need for international support to assist the 23 range States in protecting great ape populations, their habitats and related biodiversity resources;

RECOGNIZING also the need for technical guidance to assist all Parties in preventing illegal trade in live specimens and parts and derivatives of great apes, including the confiscation and subsequent treatment of live animals;

NOTING that the World Summit on Sustainable Development Great Ape Survival Project (WSSD GRASP) Partnership led by UNEP and UNESCO draws on the scientific expertise of the IUCN Species Survival Commission, and brings together range and non-range States, international conventions (including CITES and the Convention on Biological Diversity), and a range of global and national non governmental organizations;

NOTING further that GRASP convened an Inter-Governmental Preparatory Meeting at UNESCO headquarters in Paris, France, from 26 to 28 November 2003, to set the agenda for an inter-ministerial meeting to be held in Africa in early 2005;

AWARE of work to prepare and adopt National Great Ape Survival Plans (NGASPs) and their role in building capacity in range States;

NOTING the work undertaken by the CITES Bushmeat Working Group and other initiatives;

NOTING that the Ministerial Declaration made at the Ministerial Conference on Africa Forest Law Enforcement and Governance (AFLEG) at Yaoundé, Cameroon, on 16 October 2003, included inter alia an expression of intention to establish and strengthen laws and regulations for hunting and bushmeat trade in and around forest industry concessions and across borders, and to work through sub-regional as well as regional task forces on forest law enforcement and governance;

THE CONFERENCE OF THE PARTIES TO THE CONVENTION

URGES all Parties to:

- a) adopt and implement comprehensive legislation to protect great apes, which includes:
 - i) a prohibition of all international trade for primarily commercial purposes, including sale, display, purchase, offer to purchase and acquisition for commercial purposes of wild-caught specimens of great apes; and
 - ii) deterrent penalties aimed at eliminating illegal trade in great apes and parts and derivatives thereof;
- b) strengthen enforcement controls, including anti-poaching measures in great ape habitats and anti-smuggling measures at international borders;
- c) limit the international use of great apes to nationally approved zoological institutions, educational centres, rescue centres and captive-breeding centres in accordance with CITES; and
- d) promote the protection of great ape habitats, including cross-border cooperation between neighbouring range States for the management of contiguous habitat, and to take appropriate action to restore such habitats where they have become fragmented or diminished in quality;

DIRECTS the Secretariat to:

- a) work closely with Parties, and as a member of the GRASP partnership, to develop and implement measures, including legislative and enforcement measures and regional and sub-regional initiatives, to halt or reduce and ultimately eliminate illegal trade in great apes;
- b) assist range States in the implementation of NGASPS where these include measures aimed at eliminating illegal trade; and
- c) report to the Standing Committee on the implementation of this Resolution at each of its regular meetings;

DIRECTS the Standing Committee to:

- a) review the implementation of this Resolution at each of its regular meetings on the basis of the Secretariat's reports;
- b) consider other measures such as technical missions, organized in cooperation with GRASP and other appropriate partnerships, followed by political missions if necessary; and

- c) report at each meeting of the Conference of the Parties on the implementation of this Resolution, with any recommendations for further action;

URGES the Secretariat, the Standing Committee and the Animals Committee to work closely with GRASP, and to explore and implement other measures through which the Convention can contribute to the conservation of great apes and to the promotion of public awareness of the threat posed to great ape populations by illegal trade;

URGES all range States, other Parties and relevant organizations to join the GRASP partnership;

CALLS UPON all Parties to other relevant multilateral agreements, such as the Convention on Biological Diversity and the Convention on Migratory Species of Wild Animals, to cooperate with GRASP and other appropriate partnerships in developing a common strategy to conserve great ape populations;

CALLS UPON all governments, intergovernmental organizations, international aid agencies and non-governmental organizations, as a matter of urgency, to assist the range States in any way possible in supporting the conservation of great apes including:

- a) the provision of funding;
- b) assistance with enforcement, training, capacity building and education;
- c) population monitoring, and the gathering and exchange of scientific, technical and legal information and expertise;
- d) habitat management and restoration;
- e) mitigation of conflict between humans and apes; and
- f) the development of projects which deliver tangible benefits to local communities such as alternative sources of protein; and to stop illegal trade in specimens of these species in order to ensure the long-term survival of all populations in the wild, particularly by working through GRASP and other appropriate partnerships and through measures taken to implement this Resolution; and

CALLS UPON the Secretariat to collaborate with the Secretariat of the Convention on Biological Diversity in relation to the conservation of great apes, in particular developing measures relating to in situ conservation and to make recommendations relevant to CITES to the Standing Committee for consideration.

TRAFFIC, the wildlife trade monitoring network, works to ensure that trade in wild plants and animals is not a threat to the conservation of nature. It has offices covering most parts of the world and works in close co-operation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

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