

AFRICAN PRIMATES

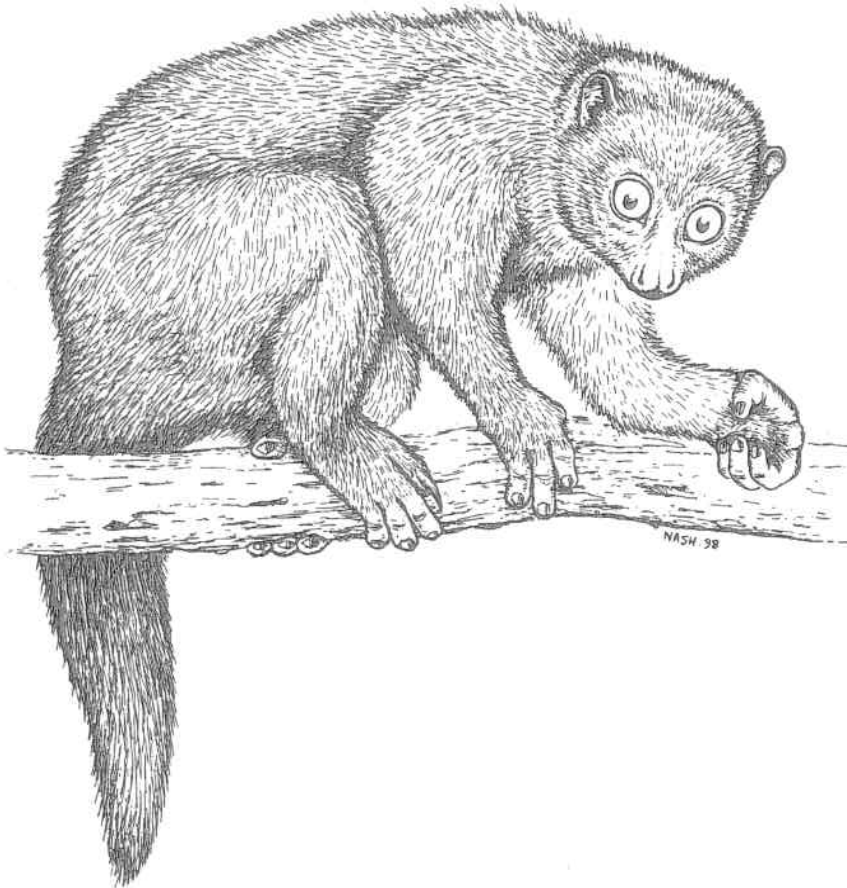
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SUPPLEMENT

A REVIEW OF THE COMMERCIAL BUSHMEAT TRADE WITH EMPHASIS ON CENTRAL/WEST AFRICA AND THE GREAT APES

Abstract: *This review is a synthesis of literature on the commercial bushmeat trade in Central and West Africa. The report is designed to serve as a reference source to those interested from both the ape range-states and elsewhere.*

General opinion is that the exploitation of game in this region has reached critical proportions. Although wild animals have always been an important resource, traditional subsistence use of game is vulnerable to commercial and social changes in the communities that depend on bushmeat. Such change may be brought about by recent immigration; urbanisation and the market economy increasing demand; and improvement in infrastructure allowing easier transport of meat to markets farther away.

The net effect is to make the bushmeat trade unsustainable. This may, in the end, not only affect protected and vulnerable species such as apes and other primates, but also the local and national economies of the countries involved. Thus, the review's last section suggests some ways the commercial bushmeat trade might be limited, both to benefit the economies of the countries in Central and West Africa, and to conserve their rich biodiversity.

Resumé: *Cette revue du commerce de la viande de brousse, est une synthèse de la littérature d'Afrique Centrale et Occidentale sur ce sujet. Le rapport est désigné servir d'ouvrage de référence pour les personnes qui sont intéressés dans les pays-habitats des anthropoïdes et autres pays.*

L'opinion générale sur la question de l'exploitation du gibier confirme que le problème a pris des proportions critiques. Quoique les animaux sauvages ont toujours été une ressource importante, l'exploitation subsistance traditionnelle de la faune a subi les répercussions des changements commerciaux et socio-économique des communautés qui dépendent de la viande de brousse. Les changements sont les résultats de l'immigrations récentes; de l'urbanisation et des économies de marché qui augmentent le demande de gibier; et des aménagements de l'infrastructure qui permettent le transport de la viande aux marchés encore plus loins.

L'effet combiné fait que le commerce de la viande de brousse est nonsoutenable. Dans la future il est possible que non seulement les espèces protégés et vulnérables, comme les anthropoïdes et les singes, mais aussi les économies locales et nationales des pays entortillés seront affectés. Ainsi, la dernière partie de cette revue suggère des routes pour limiter le commerce de la viande de forêt pour bénéficier les économies des pays en Afrique Centrale et Occidentale, et pour conserver leur biodiversité riche.

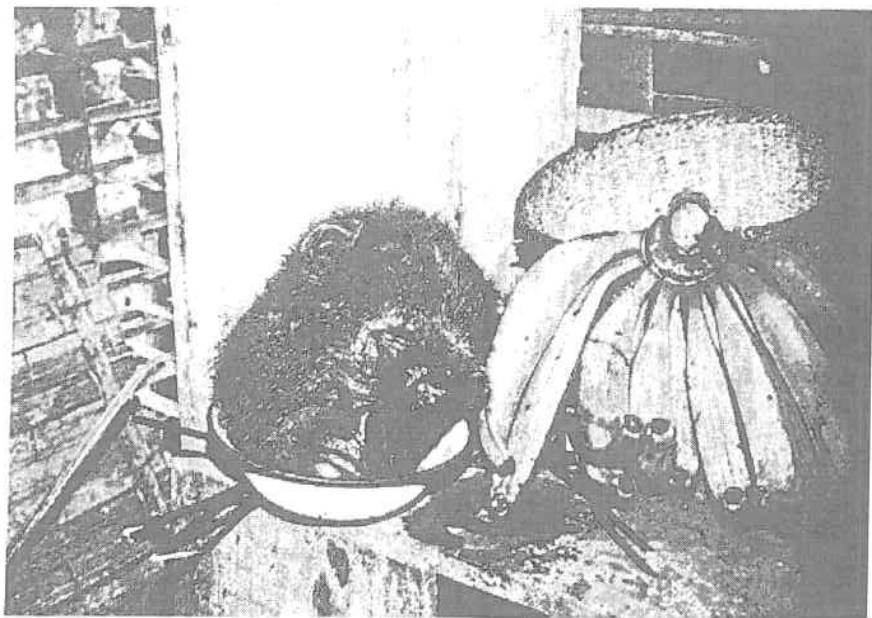


Figure 1. Gorilla head in a kitchen in southeastern Cameroon. The police chief in a nearby village where this photograph was taken ordered this gorilla, and provided the gun and the cartridges to the poacher who shot it. Photo by Karl Ammann.

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PREFACE

The Ape Alliance

During 1997, organisations which fund ape conservation and welfare work began meeting periodically in London to discuss areas of common interest and concern. The Ape Alliance, as this coalition became known, quickly grew into an international forum for debate and collaborative action on behalf of apes, both in captivity and in their natural habitat. Ape Alliance meetings are open to representatives of any organisation with an interest in ape issues. Individual specialists, such as fieldworkers, consultants, and officials from ape range states, are also welcome to participate (by arrangement with the Secretariat).

The aims and objectives of the Ape Alliance are:

- To provide a forum for discussion on issues relating to apes
- To develop position papers on key issues
- To lobby collectively for enactment and/or enforcement of legislation to improve the welfare and/or conservation of apes
- To campaign for greater public awareness of ape issues and increased respect for apes
- To facilitate information exchange between member groups and, where appropriate, co-ordinate activities to maximise their beneficial effects.

The Bushmeat Initiative

From the outset of the Ape Alliance it was clear that many organisations considered commercial hunting for bushmeat—the meat of wild animals—to be a major threat to lowland gorillas, chimpanzees and bonobos. Was commercial hunting of apes however, a more pressing threat than habitat loss, and if so, how best could it be reduced?

To answer these questions the Ape Alliance commissioned a review into the state of knowledge of the bushmeat trade. This work, and the resulting publication, was funded by contributions from the following Ape Alliance members:

African Ele-Fund
 Born Free Foundation
 Bristol Zoo Gardens
 Care for the Wild (Europe)
 Dian Fossey Gorilla Fund
 Fauna & Flora International
 Friends of Conservation
 Humane Society of the United States
 Humane Society International
 International Primate Protection League
 Jane Goodall Institute
 Orangutan Foundation
 Paignton Zoo Environmental Park

People Against Chimpanzee Experiments
 Primate Society of Great Britain
 Royal Society for the Prevention of Cruelty to Animals
 Tusk Force
 Tusk Trust
 World Society for the Protection of Animals
 World Wide Fund for Nature

The review was carried out by Evan Bowen-Jones, a Cambridge-based zoologist, with support from Fauna & Flora International and the Ape Alliance Bushmeat Working Group, and with input from many organisations and individuals in Europe, North America and Africa. After numerous revisions to add new data and ideas, the Executive Summary and Recommendations, which form the first part of this document, were presented at a press conference in London on 26th February 1998, with Karl Ammann and Dr Jane Goodall. As a result, numerous organisations and individuals around the world wrote in support of the Ape Alliance, including eminent people from all walks of life, from politics and the arts, as well as science. The 150 scientists, philosophers and conservationists attending the third Great Apes of the World Conference in Kuching, Sarawak, strongly supported the initiative, and incorporated its goals in the Kuching Statement, which is reproduced on page S37-S38 of this report.

At the time of going to press, a total of 45 organisations have indicated their support for the Ape Alliance's bushmeat initiative. In addition to the funding organisations listed above, these are:

Amis des Animaux du Congo
 Animal Defenders
 Berggorilla & Regenwald Direkthilfe c.V.
 Biosynergy Institute Bushmeat Project
 Bonobo Protection Foundation/Language Research Center
 Budongo Forest Project
 Cameroon Wildlife Aid Fund
 Captive Animals Protection Society
 David Shepherd Conservation Foundation
 Defenders of Wildlife
 Earthkind
 East African Wild Life Society
 Environmental Investigation Agency
 Friends of the Earth
 Fund for Animals
 Great Ape Project
 Humane Society of Canada
 International Fund for Animal Welfare
 Jersey Wildlife Preservation Trust
 Limbe Wildlife Centre
 Monkey World and Ape Rescue Centre
 Mount N'Galiema Bonobo Sanctuary
 National Council of SPCAs of South Africa

Pandrillus
Tierhifswerk Austria
Wildlife Conservation Society

As well as the many general expressions of support, the following quotes are noteworthy:

- Dr Phyllis Lee, President of the Primate Society of Great Britain, wrote, "As PSGB members we need to support the Ape Alliance in their attempt to get action on the bushmeat threat to primates... primates in particular are targeted by the bushmeat trade; individual members can actively lobby to ensure the trade is halted."
- David Pearson, after discussion with leading members of the Great Ape Project, wrote, "The Great Ape Project believes that all apes should have the rights to life, liberty and protection from torture. Following this ethical position, we are totally opposed to the hunting of great apes, and believe it must be stopped by means consistent with respect for the interests of all animals."
- Dr Tony Rose, director of the Biosynergy Institute, cites figures that raise concerns for all African primates: "Even in areas with no logging intrusion, growing demand for chimpanzee and gorilla meat can be substantial. Kano and Asato (1994) compared ape density and hunting pressure around 29 Aka and Bantu villages along the Motaba River area of northeastern Congo (Brazzaville). They concluded that, given the ape populations measured and kills recorded, the survival of gorillas and chimpanzees is at serious risk in this territory. Further east, the bonobo faces a similar fate "unless a strong system can be established which combines effective protection with the provision of attractive substitutes for ape meat to the local people." He adds, ominously, "Even village hunting of apes is unsustainable when guns are used, and so we **must** be concerned about the organised commercial bushmeat trade—supported by timber industry infrastructure—that is feeding and fostering consumer preferences in towns and cities."
- Dr John Robinson, Vice President and Director of International Conservation, at the Wildlife Conservation Society, wrote, "I increasingly feel that hunting of wildlife in forests is probably more of an immediate threat than the more traditional villain of habitat destruction... we agree absolutely on the core issues: The bushmeat trade is a major conservation challenge and it is increasing in volume; the timber industry is, indirectly or directly, largely responsible for the trade (at least in Africa)... I think what you are doing is appropriate and necessary"

The results of this review and the reaction to its launch are indisputable. There is a broad-based consensus of expert opinion, backed by a rising

groundswell of public opinion, that the bushmeat trade is out of control. Urgent action **must** follow, and the publication and distribution of this document is only the first step. The fact that you are reading it indicates that you have an important role to play in the next step—and if Africa's apes are to survive, we must take our collective steps sooner rather than later.

Ian Redmond

Chairman, Ape Alliance

"It is my firm belief that unless we work together to change attitudes at all levels—from world leaders to the consumers of illegal bushmeat—there will be no viable populations of great apes in the wild within 50 years."

Jane Goodall

1. Author's notes

This review summarises literature on the bushmeat trade in Central and West Africa.

The Ape Alliance undertook this review because there was a need for a summary of knowledge on the bushmeat trade, particularly with reference to apes. Therefore the review places geographical emphasis on Central Africa.

The document is intended as a source of reference on this issue for members of the Ape Alliance and other interested parties, both in the range states of the apes and the donor community in the developed world.

There were difficulties in obtaining all relevant references. Section 17 lists some of the more important ones that could not be obtained. In addition, this topic has been generating an increasing amount of concern among the conservation community since 1990 and is now yielding some detailed socio-economic and ecological information that is being published at regular intervals. Therefore, there are a number of very relevant papers in press. However, references were sought from a variety of people and groups, and it is the author's opinion that the literature consulted as a result has yielded a broadly accurate picture of the bushmeat trade, which should promote further discussion and research.

2. Summary of information covered in this review

The references cited in this review are a selection of those available for Central and West Africa. Primate studies were included only where they focused on the bushmeat trade. A total of 52 of the papers, reports and articles that were considered to be directly relevant and country specific were used to calculate the

Distribution Maps of Africa's Great Apes

(after Oates / IUCN (1996) African Primates. Status Survey and Conservation Action Plan. Revised Edition.)



Bonobo *Pan paniscus*.

Estimated population: 10,000-25,000. Status 'Endangered'.
Range States: Democratic Republic of Congo (DRC, formerly Zaire)



Chimpanzee, three sub-species:

Western chimpanzee *Pan troglodytes verus*,

Estimated population: 12,000. Status 'Endangered'.
Range States: Guinea, Sierra Leone, Liberia, Cote d'Ivoire, Mali, Ghana, Senegal, Gambia (extinct), Guinea Bissau (extinct?), Burkina Faso (extinct), Togo (extinct), Benin (extinct)

Central chimpanzee *Pan troglodytes troglodytes*,

Estimated population: 80,000. Status 'Endangered'.
Range States: Gabon, Congo (Brazzaville), Cameroon, Central African Republic, Equatorial Guinea, Nigeria, Angola (Cabinda enclave only)

Eastern chimpanzee *Pan troglodytes schweinfurthi*,

Estimated population: 13,000. Status 'Endangered'.
Range States: Democratic Republic of Congo (DRC, formerly Zaire), Uganda, Tanzania, Burundi, Rwanda, Sudan



Gorilla, three sub-species:

Western lowland gorilla *Gorilla gorilla gorilla*,

Estimated population: 110,000. Status 'Endangered'.
Range States: Gabon, Equatorial Guinea, Congo (Brazzaville), Cameroon, Central African Republic, Nigeria, Angola (Cabinda enclave, extinct?)

Eastern lowland gorilla *Gorilla gorilla graueri*,

Estimated population: 10,000 (8,700-25,500 - Hall, *et al.*, 1998). Status 'Endangered'.

Range States: Democratic Republic of Congo (DRC, formerly Zaire)

Mountain gorilla *Gorilla gorilla beringei*,

Estimated population: 600. Status 'Critically Endangered'.
Range States: Democratic Republic of Congo (DRC, formerly Zaire), Rwanda, Uganda.

percentages given below. This helps to identify areas where more work is needed on this regional issue.

Cameroon

Much information has been collated on the bushmeat trade in Cameroon (21% of the literature), from work in various areas, including protected areas such as Korup, Dja and Lobeke (the latter proposed, but not yet gazetted). Market studies have also been carried out and logging activities of selected companies have been analysed on the basis of sustainability.

Central African Republic (CAR)

There is little information on the situation in CAR (4% of the literature), although more has been made available recently with studies in the tri-national park region bordering Cameroon and Congo (Eves, 1996; Noss, 1997). The literature illustrates that the situation in CAR is similar to that of surrounding countries and therefore warrants the same degree of concern.

Congo

Throughout the report 'Congo' refers to Congo Brazzaville. Within Congo (17% of the literature), there is much information on the northern part of the country, because of its immensely rich fauna and the increasing impact of human activities. Some of the best assessments of logging activities have been carried out here.

Democratic Republic of Congo (ex-Zaire) (DRC)

This country is referred to as "DRC" in the report. It is one of the least well studied of the countries involved (13% of the literature) and there is little information on the bushmeat trade. (The author was not able to refer to Colyn's work (see section 17). It appears that because of the lack of infrastructure in the south, the trade is currently confined to the east of the country. Here the demand for forest meat is so high that traders obtain it from neighbouring countries, such as CAR (Eves, 1996; Usongo & Curran, 1996).

Equatorial Guinea

There is little information on the situation in Equatorial Guinea (10% of the literature), but the market studies that exist are comprehensive and provide what is probably an accurate picture of what is going on in the whole country. The author was unable to obtain information on the current logging activities there.

Gabon

This is the third most intensively studied country of those featured in this review (19% of the literature). Long-term studies have yielded ecological data on chimpanzees and gorillas, as well as information on the effects of logging on these species.

Côte d'Ivoire

There has been some work done in the Côte d'Ivoire (2% of the literature). There is little forest left and that which remains is under intense pressure from the traders of neighbouring countries. These include Liberia and Senegal.

Liberia

Although there has been little recent work done because of the civil war and only one reference is used in this report, this document suggests that once a measure of stability returns there will be enormous pressures on the remaining forests. Therefore, the recent recovery of some species could be short-lived.

Nigeria

Not much has been published on the trade in Nigeria. Although there are few apes left within its borders, there are populations of both chimpanzees and gorillas. The former are relatively more common in some Muslim areas, including Gashaka Gumti National Park, where ape meat is seldom eaten (R. Barnwell, pers. comm.). The remaining gorillas represent the northwestern-most animals in the species' range and are severely threatened. Gadsby (1990) and Gadsby & Jenkins (1992) document these threats as well as markets in meat of other species from Nigeria and from neighbouring states.

3. Introduction to the bushmeat issue

The Central and West African countries covered by this document include most of the range of African ape species. The majority of data on bushmeat is from this region. There is general consensus that this is where the bushmeat issue is reaching critical importance. Non-domestic animals have always been an important resource, but traditional subsistence use of fauna has been changing as commercial factors have affected the socio-economics of communities that depend on the forest for protein. This is the case whether they are composed of recent immigrants or indigenous people. Many of these pressures come from urbanisation and associated market economies that are creating demand for a variety of products. Meat is no exception and with improved infrastructure it can be transported further for sale.

The conversion from subsistence to commercial hunting has been occurring for some time. Hart (1978) observed this change among the Mbuti Pygmies of the Ituri forest in DRC. In the 1950s the Mbuti started to make contact with meat traders, who went to their forest camps with them and promoted intensification of traditional hunting methods such as communal net drives. At this stage there was no significant exploitation on either side, meat was exchanged for

iron tools, tobacco or agriculturally produced food. However, there was a detectable decrease in duiker/forest antelope *Cephalophus* spp. densities as a direct consequence of the change in hunting focus and methods.

This new trade was an understandable step for the hunter-gatherer Mbuti, who had been trading with the Bantu peoples (shifting agriculturalists) in the region for centuries. Hart (1986) cited evidence, based on the dietary potential of the Ituri forest, that hunter-gatherers may only have been able to live there since Bantu farmers spread south from the Cameroons. This occurred at approximately 4000 BP. Prior to this, although meat was available all year round in the forest, there was not sufficient starch-rich vegetable matter available for the Mbuti's survival. Therefore, trading meat for agricultural crops might have been a necessary survival tool in this environment. In other areas, this dependence on, and therefore familiarity with, trading was not necessary due to different conditions, e.g., forest with higher densities of yams (Hart and Hart 1986). However, in many places in Central Africa indigenous forest dwellers have been trading meat for other commodities for a long time. Wilkie and Finn (1990) noted that 59% of all Mbuti kills are made in the secondary growth caused by the activities of agriculturists. This adds credence to the idea of a symbiosis between the Pygmy hunter-gatherers and subsistence farmers (Noss, 1997).

In many areas of Central and West Africa the appetite for bushmeat is so insatiable that hunting levels are thought to be unsustainable for even the faster breeding and relatively common species, such as the smaller duikers. Where hunting levels are of these proportions, and where indiscriminate methods, such as snaring and opportunistic shooting are used, other species are also killed. These include the great apes of the region: two subspecies of gorilla *Gorilla gorilla*; all three subspecies of chimpanzee *Pan troglodytes*; and the pygmy chimpanzee or bonobo *Pan paniscus*. There is no evidence that mountain gorillas have been targeted for bushmeat hunting, although they are injured or death in snares set for buffalo *Synceros caffer* and various antelope.

In Cameroon, chimpanzee carcasses fetch as much as \$US 20 to \$US 25 each and there is, therefore, ample incentive to hunt them, along with other large forest animals (King 1994). The degree to which these larger species are taken depends upon human factors such as taboos and food preferences, availability of suitable equipment, and density and shyness of the animals involved. Aveling (1994) reported that hunting pressure in the Ndoumi Lossi region, near Odzala National Park in Congo, was low as a result of both the low human density and the cultural taboos against hunting apes.

Although forest-dwelling Africans have always

eaten meat from forest animals, the current magnitude of the demand for bushmeat is such that action needs to be taken to save examples of Central African ecosystems with complete assemblages of megafauna. The international importance of some of these Central African forests in terms of biodiversity is beyond doubt.

The majority of Africa's intact tropical forest is now confined to Congo, Cameroon and DRC, with Congo having the second largest area (213,000 km²), of which only 0.5% is protected. The overall total for gazetted areas across the region is 7% (Pearce & Ammann 1995).

The exploitable forest in northern Congo alone covers 89,847 km² and holds some of highest concentrations and diversity of large mammals in the world (Blake, 1993; Fay, 1993). DRC has the third-highest number of mammal species in the world (Caldecott *et al.*, 1994). Redmond (1989) pointed out that with only 2 million or so people in Congo, and a land area larger than Britain, the two-thirds forest cover should mean that wildlife conservation is possible. Cameroon contains 48% of Africa's known mammal species (Besong 1995). Steel (1994) estimated that 85% of Gabon's land was rain forest, of which 39% had been or was being exploited. On the positive side, nearly all of the logging operations in this country are selective rather than the clear-cutting-based ventures usual in other parts of the world. However, as more Asian companies move into the region, this situation might change and become a cause for concern.

Chaterlain *et al.* (1996) indicated a 22% decrease in the area of forest in southwestern Côte d'Ivoire between 1984 and 1994. This included encroachment into the largest tract of wet forest in West Africa, the Tai National Park, a Biosphere Reserve. This is also of great importance as a centre of endemism because it was a Pleistocene forest refuge. The fact that such important remnants of habitat are still under threat is a cause for great concern. With the threats increasing because of hunting pressure, the preservation of both habitat and fauna in some of the remaining large areas of forest that can support viable populations of large mammals must be considered in doubt.

The problem, therefore, is not merely one of preserving habitat but also of limiting access for hunters. Access can be through rivers or roads. The latter are often built by logging companies to extract timber from remote concessions. Pearce (1996a) examined the factors affecting the bushmeat trade in Gabon, which is the richest country in sub-Saharan Africa per capita because of oil, manganese, uranium and timber. Pearce surmised that the growth of the trade was largely due to the logging companies. In 1988 an estimated 1400 km²/year of new forest was being logged. In 1990, 1.7 million m³ of logs were taken, of which 90% were exported. Although European companies took a national average of two

trees per hectare, new Malaysian companies in the south plan to take 10 trees per hectare. (European companies have, however, logged many areas up to seven times in succession taking increasingly smaller trees).

Whatever the damage done by logging, it is the infrastructure and transport that is required by such operations that facilitates the commercial trade in bushmeat. Wilkie *et al.* (1992), studying mechanised logging in Congo, reported that an average area of only 6.8% of canopy was lost per logging unit, which should therefore have a minimal projected effect on primate populations. However, the occurrence of primates in the concession was low for tropical moist forests. These included chimpanzees and western lowland gorillas, the latter of which were hunted. This was because "hundreds of kilometres of trails and road... allow an easy and systematic exploitation of apes." This view has been supported by many other authors, including Juste *et al.* (1995), who stated that "the danger lies in the uncontrolled rising demand for animal protein from the urban centres, in the greater availability of shotguns and in easier accessibility to forests through the enlargement of roads."

3.1 Hunting of apes for meat

The hunting of apes for human consumption is widely reported from all the countries covered by this report where biological or sociological research has been carried out (fig. 2). Steel (1994) reported that the cheapest meat in Libreville, Gabon, was gorilla at 167 CFA/kg. Chimpanzee was sold in the same area at 245 CFA/kg. There are some areas where the hunting of apes is a cause for immediate concern. This is particularly the case for the few protected areas, where there is often widespread poaching.

Yamagiwa's (1991) survey results for eastern lowland gorillas in Kahuzi-Biega National Park, DRC, showed a slight increase in the population of gorillas in the park in comparison with survey results from 1978 to 1979. However, Hall *et al.* (1994) reported on another survey in an extension to the same park. They found high densities of gorillas, 1/km² but also recorded intense hunting, as shown by remains found in hunting camps. Hunting had extirpated elephant *Loxodonta africanus* and buffalo from some tracts so hunters were turning increasingly to gorillas. The following year, Basabose *et al.* (1995) documented poaching in Kahuzi-Biega National Park. This resulted in the unintentional capture of eastern lowland gorillas when snaring for other

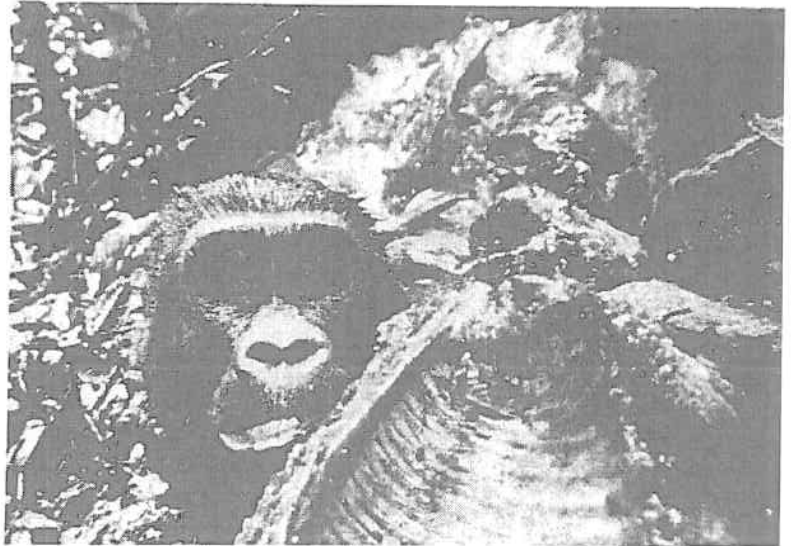


Figure 2. Female gorilla poached and butchered in the SEBC logging concession, southeastern Cameroon (August 1998). Photo by Karl Ammann.

bushmeat species.

Aveling (1995) reported that in Monte Alen National Park, Equatorial Guinea, improved protection increased human-gorilla conflict because the animals visited the secondary forest on the edges of the park more often and, therefore, crop-raiding increased.

Jo Myers Thompson (pers. comm.) indicated that bonobo range in DRC is restricted to the southeast and southwest by the effects of uncontrolled shifting cultivation and plantation agriculturalists. She also commented that within the borders of DRC bonobo meat is actively traded, but that it is the trade in live animals that currently presents the greatest threat to this species. However, it may be that this is a by-product of consumption of their meat, as with other ape species in Central Africa. Kano (1984) and Kingdon (1997) reported that bonobos are widely eaten throughout their range.

Initial concerns over ape trade in Africa focused on the trade in orphans in the early 1980s and early 1990s. Pi (1981) reported that 63 gorillas were killed during the capture of 34 infants for zoos between 1966 and 1969. He reported that pitfalls, nooses, dogs, etc., were used to obtain young animals. Werikhe (1991) reported that around the Rwanda/Uganda border, monkeys were sold as gorilla babies after their tails were removed and the white neck patch dyed black.

In recent times it has become abundantly clear, however, that the real problem facing apes and other less photogenic, emotive species is the commercial bushmeat trade. Orphans currently appearing on the market are merely a symptom of a more deep-rooted problem. There may be other uses for ape parts when the animal has been killed for meat, although hunting to meet these specific demands has not, to the author's knowledge, been reported. The use of fetishes (Redmond,

to meet these specific demands has not, to the author's knowledge, been reported. The use of fetishes (Redmond, 1989) is likely, in the majority of species, to be a by-product of the meat trade. King (1994), working in southwestern Cameroon, discovered that chimpanzee bones were valued in the area for healing sprains and breaks. There was also a report of one hunter selling the skull of chimpanzee to a client in Nigeria for 'magic' for CFA 10,000. Prescott *et al.* (1994) heard similar reports.

It may be that chimpanzee populations are particularly at risk of local extermination from hunting after logging because even selective logging seems to drastically reduce their densities, leaving them vulnerable to further post-logging pressure. White and Tutin (in press) analysed the effect of different degrees of selective logging in Gabon and suggested that the decrease in chimpanzee densities was due to disruption and then conflict in the fission/fusion communities. Gorillas, on the other hand, with their polygamous society and home range overlaps are less affected. They found that the recorded density of 1.1 chimpanzees per km² before logging in Gabonaise rain forest, fell to between 0.2 and 0.5/km² after disturbance. More recently, White was cited in a *New York Times* article regarding his work on the disruption of chimpanzee society (Stevens, 1997). He postulated that logging causes "chimpanzee wars". Thus, there may be multifold pressures on wildlife, including chimpanzees, due to their social systems and ecology. This highlights the need to control the bushmeat trade in order to allow populations to recover after the initial ecosystem trauma caused by even the less severe logging techniques.

3.2 Key areas in the commercial bushmeat trade

Within the geographical region of Central and West Africa, it is safe to say that all major urban centres are foci for the growing trade in wild animal meat. The supply links between rural areas to larger towns and cities follow predictable patterns and it is the infrastructure in a given region that determines the availability of meat. The demand is growing, and when transport of any form becomes available, it is inevitably used by the bushmeat trade.

Because the forested area affected by the trade is enormous, it is necessary to define some priority areas for its control. These correspond in many cases to areas where fieldwork has been carried out and to protected areas, where enforcement of existing laws in the control of hunting will be crucial.

Cameroon is a well studied case and has a relatively good road system. This means that the protected areas and areas under concession are threatened by hunting to meet demand from the population centres. The situation observed by Infield (1988) around Korup National Park appears to be typical of that observed

around many of the parks in Central Africa. He suggested that the biggest centres of the trade around Korup were Mundemba and Moleka. Observations suggested that these were used as a base for hunters and sellers, and that this corresponded to the lack of large mammals noted by researchers in the adjoining areas. The Erat, original inhabitants of this forest, did not use these areas, despite the fact that they were traditional hunting grounds, because it was not worth their while. Powell *et al.* (1994) reported how initial surveys showed that most large mammals are at low densities within the park as a result of hunting pressure, agreeing with Infield (1988) and Payne (1992).

Another key site in Cameroon, which is not currently protected, is the Mount Kupe region. According to King (1994), the demand created by the commercial markets in the region might be unsustainable at current levels. Gadsby and Jenkins (1992) noted a similar situation around Mount Cameroon. At this time the area still held a small population of chimpanzee and elephant, both of which were considered to be at imminent risk of extirpation as a result of hunting for meat. In addition, the site is considered to be very important for Preuss's monkey *Cercopithecus preussi*, one of the IUCN's six highest priority primates, and *C. erythrotis*. Drills *Mandrillus leucocephalus*, the most endangered African primate, are also present, as are red-capped mangabey *Cercocebus galeritus*. Species that have become extinct locally include leopard *Panthera pardus* and golden cat *Profelis aurata*. There are large markets at Yaounde and Douala, which are supplied by all the major roads to these cities.

The Lobeke region of southeastern Cameroon is becoming the focus of commercial hunting to supply the urban centres of the rest of the country, as well as CAR and Congo, the other states that contain the tri-national protected area. According to WCS (1996), the urban trade is increasing because of the depletion of wildlife elsewhere through hunting activity. In this region the numbers of stakeholders of the perceived common resource are swollen by immigrants looking for work in the timber and safari companies, as well as by poachers from urban areas. The off-take by commercial hunters is 10 times more per immigrant hunter than for local subsistence hunters. Local hunters kill only 2.9 animals/month.

In Congo, studies by Blake (1993), Bennett Hennessy (1995), Pearce and Ammann (1995), and Usongo and Curran (1996), suggested that there is a large volume of trade in the northern Congo centred on the areas of Ouesso and Djembe, and destined for Pointe Noire and Brazzaville. Malonga (1996) gave details of routes by river and road to the markets in Brazzaville. Eves (1996) described routes taken across the border to Bangui in CAR and those taken by traders into DRC and Senegal. Northern Congo is becoming

a centre for the bushmeat trade, particularly elephant meat, and for the ivory trade. She also concluded that "Relying on game meat as the primary protein source in larger population centres such as Ouessou and Kabo is expected to be ecologically and economically unsustainable in the long term." I. Redmond (pers. comm.) points out that the 1997 civil war is likely to have made the situation worse because people have fled the urban centres and will be increasingly reliant on non-domestic protein. In addition to this, law enforcement will have diminished.

Butynski and Koster (1994) confirmed the importance of Bioko in Equatorial Guinea in terms of its fauna. At least two endangered species of primate are found in each of its four natural habitat types. Primates had increased in numbers, mainly as a result of governmental gun control. However, J. Fa (pers. comm.) remarks that the situation has worsened considerably for the island's primates.

In Gabon, Steel (1994) indicated that the major 'official' markets are located in the regional capitals of the nine states. In Libreville this trade amounts to at least US\$ 1.35 million per annum. However, most of the trade in Gabon is direct to vendors, restaurants or consumers, and therefore hard to quantify. This was also reported by Pearce (1996a). Steel (1994) also listed sources of meat reaching Libreville, Franceville and Port Gentil. Of particular concern are a timber company's plans for timber extraction in Lopé Reserve (Ingham, 1996).

For the DRC, Jo Myers Thompson (pers. comm.) reports that the main centres of commercial consumption are Goma, Bukavu, Kisangani and Kinshasa, plus towns east of the Congo/Lualaba river system. There is also substantial risk that the exploitation that exists in the eastern side of the country will spread, as plans for improving the dilapidated rail and road systems are carried out and access is increased.

4. Species at risk from the bushmeat trade

Many species are threatened by the bushmeat trade. As such, Steve Gartlan (pers. comm.), amongst others, considers it inappropriate to examine ape hunting in isolation. He believes that there is probably more ecosystem dysfunction being caused by the enormous off-take of other species, such as duikers, than by the relatively low numbers of apes being killed as a constituent of this hunting. However, Pearce

and Ammann (1995) postulated that the bushmeat trade is the most significant threat to the future of Africa's gorillas and chimpanzees.

The data are far from complete for apes (Section 5), but these animals are probably, in numerical terms, a small part of an immense, very important, issue for Africa's conservation and socio-economic development. Although there are strong arguments that the great apes warrant special concern, it must be realised that for many Africans they are just another source of meat. Ethical arguments and even traditional taboos are commonly secondary or irrelevant when, often through opportunity rather than selection, an ape is shot by a hunter, or injured/killed in a wire snare (Redmond, 1995, "96).

Oates and Davies (1986) stated that "...large bodied primates dependent on mature forest face possible extinction." They specifically mentioned red colobus *Procolobus* spp. and Diana monkey *Cercopithecus diana*, and these and other primates are at similar or greater risk than the great apes (see figs 3 & 4).

The bushmeat issue is one that spans virtually the whole of Africa, Asia and the Neotropics, threatening a multitude of species of wildlife. Some of these have higher tolerance of hunting pressure than others because of their habits, and their reproductive potential. Others may be subjected to less hunting pressure because of the taste of their meat or their ease of preparation. They are also put under varying pressures depending on the techniques used locally to catch them (Section 7.2.1). However, with a rapidly increasing human population and a tendency towards urbanisation, with the resultant commercialisation of markets including those centred on food production, fewer areas in Africa are left as protected wildlife reserves.



Figure 3. Juvenile male drill *Mandrillus leucophaeus* killed by hunters on Bioko Island, Equatorial Guinea. The drill is Africa's most endangered species of primate. Photo by Tom Butynski.



Figure 4 Two adult male red-eared monkeys *Cercopithecus erythrotis* shot by hunters on Bioko Island, Equatorial Guinea. This is one of Africa's rarer species of primate. Photo by Tom Butynski.

This is because of the knock-on effects for local people, such as loss of potential agricultural land and access to natural resources, and problems of providing financial incentives for conservation for the local communities around parks. One of the main ways that people in Africa use wildlife is for food and this is, therefore, going to have to be one of the key issues integrated into conservation policies in order to promote the preservation of species by Africans. In order to do this, sustainable harvesting of some species is going to have to be allowed, in conjunction with animal husbandry schemes and other ideas. However, many supporting non-governmental organisations and individuals of this strategy also stress that realistic and effective protection of especially vulnerable 'meat' species is a necessity.

Apes will be dealt with separately as the main focus of this report. However, the species listed below should benefit from protective measures to stop hunting of chimpanzees, bonobos and gorillas (although national and international laws already exist to protect most of them). The problem, therefore, is one of enforcement and this could, in part, be addressed by logging companies in whose concessions much of the heavier hunting takes place (Section 12.1).

Even the animals that could be hunted sustainably are often being exploited at unsustainable levels. Controls need to be introduced in order to make sure that they are not added to the threatened category.

The species listed below are generally thought to be at risk from the bushmeat trade, or are currently rare or vulnerable as a result of restricted distribution. This means that they could easily succumb to the additional pressure of hunting, exacerbating their decline. The species listed have been selected by Jonathan Kingdon and the author (based upon information from *The Kingdon Guide To African Mammals*), and from other literature sourced in this review:

Red colobus spp.	<i>Procolobus badius, preussi, pennantii.</i>
Black colobus	<i>Colobus satanas</i>
Geoffrey's pied colobus	<i>C. vellerosus</i>
Drill	<i>Mandrillus leucophaeus</i>
Mandrill	<i>M. sphinx</i>
Preuss's monkey	<i>Cercopithecus preussi</i>
Sun tailed monkey	<i>C. solatus</i>
Owl faced monkey	<i>C. hamlyni</i>
Sclater's monkey	<i>C. sclateri</i>
Diana monkey	<i>C. diana</i>
Red-eared monkey	<i>C. erythrotis</i>
White-throated monkey	<i>C. erythrogaster</i>
Giant pangolin	<i>Smutsia (Manis) gigantea</i>
Forest elephant	<i>Loxodonta africana</i>
Water chevrotain	<i>Hyemoschus aquaticus</i>
Zebra duiker	<i>Cephalophus zebra</i>
Ogilby's duiker	<i>C. ogilbyi</i>
Black duiker	<i>C. niger</i>
Jentink's duiker	<i>C. jentinki</i>
Yellow-backed duiker	<i>C. sylvicultor</i>
White-bellied duiker	<i>C. leucogaster</i>
Leopard	<i>Panthera pardus</i>
Golden cat	<i>Profelis aurata</i>

Golden cat and leopard have become locally extinct as a result of hunting. These two are considered to be indicator species because they are among the first animals to become locally extinct due to hunting pressure. Wilkie and Finn (1990) confirmed that leopard, okapi *Okapia johnstoni* and yellow-backed duiker *Cephalophus sylvicultor*, out of 19 identified species, were significantly affected by slash-and-burn roadside agriculture in the Ituri forest, DRC. The densities of other small duikers were not significantly reduced in secondary forest caused by this practice. The authors thought that sustained hunting pressure in this habitat and initial low population density had caused local extirpation of duikers.

Bennett Hennessey (1995) hypothesised that if the limited area accessible to hunters in the Ouesso area of Congo were enlarged, species such as leopard, golden

cat, large spotted or blotched genet *Genetta tigrina*, African civet *Civettictis civetta*, marsh mongoose *Atilax paludinosus*, black-footed mongoose *Bdeogale nigripes*, sitatunga *Tragelaphus spekei*, yellow-backed duiker, giant pangolin *Smutsia gigantea* and long-tailed pangolin *Phataginus tricuspis* would all be threatened. Elephants in the area already were in this situation due to targeted 24 hr snaring.

There have been a number of market studies detailing the species and biomass of fauna that are available in markets throughout Central Africa. These show that an enormous volume of meat is being taken from some of the most important forest habitats in the world. However, the vast majority of this is not ape meat. Table 1 shows the amount of meat available at these markets and indicates the scale and seriousness of a conservation problem that will only escalate if the commercial trade goes unchecked.

In Gabon, Pearce (1996a) found the most commonly sold bushmeat species were porcupines *Hystrix* spp. and *Atherurus africanus*, blue duiker *Cephalophus monticola*, putty-nosed monkey *Cercopithecus nictitans*, moustached monkey *Cercopithecus cephus* and red-capped mangabey *Cercocebus torquatus*. He assessed the level of off-take as probably being unsustainable. This concurs with the views of White (1992) working in Gabon, who suggested the possibility of local extinction due to hunting pressure for large mammals including large duikers and some species of monkey. At the same time, blue duiker, putty-nosed monkey, moustached monkey and crowned monkey *C. pogonias*, showed little change between heavily and lightly hunted areas.

Steel (1994) commented that all 130 mammal species recorded from Gabon, apart from the very smallest, are used as food by humans. Some species sold are fully protected, including potto *Perodicticus potto*, Demidoff's galago *Galagoides demidoff*, gorilla, chimpanzee, water chevrotain and giant pangolin. Others are partially protected; mandrill, sitatunga, red river hog *Potamochoerus porcus*, forest buffalo, golden cat, African rock python *Python sebae*, Nile monitor lizard *Varanus niloticus* and dwarf crocodile *Crocodylus* sp. The most important species in terms of market share of carcasses were brush-tailed porcupine *Atherurus africanus* at 27% of the total; blue duiker at 20%; Peter's and Bay duiker *Cephalophus callipygus* and *C. dorsalis* together at 17%; moustached monkey at 6%, and mandrill at 3% (total = 5,031 carcasses counted).

Duikers represented three-quarters of the bushmeat harvest in Liberia (Anstey, 1991). This seems to be typical of the commercial trade in West and Central Africa, where the "commonest animals, pests and animals around human habitation are the ones that appear most for sale". The artiodactyls in general (*i.e.* bush pigs, water chevrotain, buffalo, duikers) represent the

majority of animals traded (Table 1), whether hunted by local subsistence hunters or commercial hunters (WCS, 1996). WCS found that both groups also regularly harvest brush-tailed porcupine and Emin's rat *Cricetomys emini* on Bioko Island.

Duikers are often assumed to be relatively resilient to hunting pressure, but this does not mean that the current levels of killing involved are sustainable. For example, Fa *et al.* (1995) evaluated the impact of hunting in Equatorial Guinea and found that seven species in the two towns surveyed were being hunted unsustainably. Some of these were duikers, the species involved being Ogilby's duiker (1.96 times above sustainable rate in Bioko as compared with 11.5-13.2 times the sustainable rate for Korup, as estimated by Payne [1992]) and bay duiker. The other species involved were five primates: red-eared monkey, putty-nosed monkey and crowned monkey (the latter killed at 28 times the sustainable level); Preuss's monkey and drill (these last two species being among the most endangered primates in Africa). On Bioko Island, Fa *et al.* (1995) noted that endemic subspecies were taken, including drill (*M. l. poensis*), Preuss's monkey (*C. p. insularis*), red-eared monkey (*C. e. erythrotis*) and red colobus (*P. b. pennantii*). Sales in Equatorial Guinea relied heavily on three species: blue duiker and Emin's rat on Bioko Island; and the former two animals plus brush-tailed porcupine in Rio Muni.

In Korup National Park, Cameroon, Infield (1988) found that approximately 60% of hunters' income was generated from duikers and red colobus, and drill that accounted for a further 7%. Drills are elusive and encounters with hunters are rare but when such encounters occur 6-15 may be killed. Infield also reported that Nigerian elephant hunters operated in the area, using local Cameroonian guides. Most of the elephant meat was sold in Nigeria. Additionally, Ogilby's duiker, yellow-backed duiker, water chevrotain and bush pig, were hunted and consumed; red-eared monkeys were among the other primates taken. Muchaal and Ngandjui (1995) found that bay duiker was taken at nine times the sustainable rate in the Dja Reserve, Cameroon. The most commonly taken animals were three species of duiker followed by brush-tailed porcupine. They also noted that the low level of observations of pairs of blue duiker may indicate that one of the pair had been shot, or that both had been killed and subadults left on their own. There is, therefore, the possibility of social disruption, higher subadult mortality, and decreased reproductive success after the hunting.

Malonga (1996) reported white-bellied duiker *Cephalophus leucogaster* as being among the animals at the Brazzaville market. Elephants totalled 7% of the meat (in terms of carcasses) at the same market, nearly equalling apes. Wilkie *et al.* (1992) recorded giant pangolin, sitatunga, water chevrotain, golden cat and

Table 1 Records of carcasses available for sale in West and Central Africa based on data collected during the 1990s. This table only includes those data collected in the field as part of holistic surveys carried out over a period greater than 1 month, and presented in a report or published paper.

Source	Locality	Duration of study (months)	No. of carcasses	Protected species for sale, and major components of total
Anstey (1991)	Liberia, Monrovia markets	12	1,150	10 protected species. Antelopes totalled 67%
Bennett Hennessy	Congo, Ouessou markets	4	6,540 (approx.)	13 protected species. Bovids totalled 66% (1995)
Boussougou (1994)	Gabon, Gongue logging camp	2	1,037	41% primates, including 121 mandrills. Water chevrotain, golden cat, giant pangolin killed
Dethier (1995a)	Cameroon, village hunting, Dja Biosphere Reserve	12	1,087	84% artiodactyls. Several protected species, including elephant and leopard
Fa <i>et al.</i> (1995).	Equatorial Guinea, market study in Rio Muni & Bioko island	12	6,440 (the total on Bioko Island, where apes are not present, was over 10,000.)	42% artiodactyls, 22% primates, 32% rodents.
Malonga (1996)	Congo, Brazzaville markets	12	15,141	64% bovids, 8% primates by weight, with 1469 carcasses recorded
Steel (1994)	Gabon, market study in Libreville	12	5,031	40% artiodactyls, 20% primates, 18 protected species
(1996)	hunting, Odzala National Park		(two villages)	primates. Water chevrotain and golden cat killed.

leopard sold as meat hunted from concessions. Blake (1993) found that 45.7% of all bushmeat carcasses at local markets in the Likouala swamp area of northern Congo were primates. Jo Myers Thompson (pers. comm.) states that within the basin area of DRC, the majority of bushmeat trade is concentrated on dried antelope and small mammal (rodent) meat.

Eves (1996) carried out an extensive survey of villages in three forestry management units in northern CAR and detailed high levels of elephant hunting in the area. These included examples of villages such as Birao, where the predominant income was from hunting. Hunters from Birao killed an estimated 33 elephants between October 1995 and January 1996. This hunting yields both meat and tusks. In Beh-Seke village an estimated four or five leopards are taken per month, and meat and skins sold to DRC traders.

There appears to be little, if any, specialist hunting for given species of animal, apart from the elephant (Eves, 1996). Other authors, including Fay (1989), Blake (1994) and Bennett Hennessy (1995), in northern Congo and southern Cameroon, gave details of 'la grande chasse'. This is often carried out by Pygmies with guns given to them by outside *patrons*. However,

from the evidence available, this does not appear to be because elephant meat is particularly in demand but because elephants yield more meat per kill than other animals and have the additional bonus of possessing ivory. Bennett Hennessy (1995) concluded that, although meat in such large quantities was probably more profitable than ivory, the key factor governing killing elephants for meat was access to transportation. In Odzala National Park, Congo, the presence of Ecogardes stopped commercial elephant hunting prior to the war in 1997. Elephant hunting was the main activity of some villages in the past (Vanwijnsberghe, 1996). Considering the level of elephant hunting suggested by these data, and the nature of this animal's role in the ecosystem (*e.g.* in seed dispersal and the creation of *bais* [clearings]) this is a serious issue. *Bais* are used by a variety of other animals, including apes, and many rain forest trees may be solely reliant upon elephants for dispersal of their seeds. There needs to be research in the near future on the impact of hunting on forest elephant populations.

5. Bushmeat trade impact on apes

Apart from scattered figures based on market surveys,

there have been no estimates of the overall loss of apes and the resultant impact on their populations. At a regional level, Kano and Asato (1994) estimate that, in the Motaba region of northeast Congo, 0.020 chimpanzees and 0.010 gorillas/km² were killed/year. This was in an area where overall densities were estimated at 0.3 chimpanzees and 0.2 gorillas/km². This is low for the species concerned and the authors considered that both species were threatened, even though this was only local hunting. These figures would mean that the annual off-take from the ape population was 5-7% in this region. This was calculated to be non-sustainable, assuming an average survival of two young in a female chimpanzee's lifetime, and two to three young for a female gorilla in her lifetime.

Part of the problem with impact assessment for large areas is that there is a wide range of population estimates for the African great apes. Table 2 shows the most recent figures available regarding numbers of chimpanzees, bonobos and gorillas per country for the main areas under consideration in this review.

The indications are that gorilla numbers are higher than previously thought in many areas. It has been found that they can survive in secondary forest (White

and Tutin, *in press*) and as a result of this information, there is some debate over their conservation status (Harcourt, 1995). Densities also vary throughout ape ranges and data on gorillas suggest that maximum densities reached are something in the order of 2.6 km² in northeast Congo (Fay 1989). Chimpanzees reach their highest known densities in Tai National Park, Côte d'Ivoire (Kano and Asato, 1994).

The highest estimates of numbers of apes killed are educated guesses. These are based on numbers of ape carcasses at markets and on extrapolation from limited data from hunter interviews. An example of this is the study by Pearce and Ammann (1995), who estimated that 800 gorillas are killed annually in a 10,000 km² area of Cameroon, and that several thousand are killed per year across the species' range. This may be true, but to make such evaluations more stringent methods are needed to estimate population size. The problems in estimating population size are compounded by differences in the numbers of apes killed in areas that are relatively close to each other. Given the obvious threat from the trade, the precautionary principle should be adhered to for these and other animals.

Table 2. Estimated number of apes in West and Central African countries covered by this review.

Country	Chimpanzees	Bonobos	Gorillas
Cameroon	<10,000		12,500
CAR	800-1000		9,000
Congo	3-5,000		44,000
DRC	4-5,000	10-20,000	10,500+
Equatorial Guinea	500-2,000		3,000
Gabon	51-77,000		43,000
Côte d'Ivoire	<750		
Nigeria*	5000*		100
Liberia	2-4,000		
TOTAL **	91,900-128,350	10,000-25,000	115,000

*Conservative estimate for whole range.

(Sources: Kemf and Wilson, 1997; Redmond, pers. Comm.; *Barnwell, pers. comm.)

Table 3. Number of carcasses found during market, village and logging concession bushmeat surveys in five West and Central African countries, and the percentage of these which were apes. The sources of these data are the same as for Table 2.

Source location	Total carcasses	Apes (%)
Liberia: Markets in Monrovia, towns and rural sales	1,150	0.03
Equatorial Guinea: Markets in Rio Muni	6,440	0.05
Congo: Markets in Brazzaville	15,141	1.94
Congo: Markets in Ouesu	6,540	0.34
Gabon: Markets in Librville	5,031	0.1
Gabon: Logging camp in Gongue	1,037	0.03
Cameroon: Hunting in Dja Biosphere Reserve	1,087	0.28
Congo: Village hunting in Odzala National Park	1,497	0.94

Regional differences can be due to local taboos, availability of ammunition and guns, hunting seasons, and ease of hunting in various seasonal conditions. In addition, the initial densities of apes vary as a result of available habitat, history of access, and past hunting. For example, Blake (1993) reported that the people who live around the Likouala swamps in Northern Congo are keen hunters of gorillas. One man told of killing 18 in a year; but gorilla meat was not seen during the study because access into the inner swamp during the dry season was problematic. Other problems in estimating ape numbers are outlined in the following paragraphs.

Pearce and Ammann's (1995) study was based in the Kika, Moloundou and Mabele areas of Cameroon. Redmond (1989) cited estimates of a comparable number of 400–600 gorillas being killed per year in northern Congo. The gorilla trade fell into three main categories: meat illegally sold in markets, parts as fetishes, and infants for sale to expatriates. He judged that the total amount of bushmeat of all species consumed, even if relatively conservative arguments were employed, was staggering. However, these data were also amassed from secondary sources such as instances of orphan apes and hunter interviews. Pearce (1996a) reported that traders in Libreville market, Gabon, indicated that they could supply ape and elephant meat. However, the fact that such meat is available does not indicate the level at which these animals are being killed. The majority of other data suggest that there is little specialist hunting for gorilla.

Also in northern Congo, Bennett Hennessy (1995) estimated that only 15% of 20,000 km² around Ouessou, a major bushmeat centre, was affected by hunting at present, but he emphasised that this may increase with extensions to the road system. His estimates from data collected on the meat trucks, which may represent an underestimate, indicated that 0.4 chimpanzees and 1.6 eastern lowland gorillas/week were available for sale in Ouessou (this reflects the lack of availability of suitable Chevrotonne cartridges). His estimate was derived from a total of three chimpanzees (one sold as smoked meat) and 19 gorillas (14 sold as smoked meat), which he saw in 4 months of monitoring.

Further notes to the effect that apes are being killed at an unspecified but significant rate have been made by other workers, including Fay (1993) for southwest Congo. Ape hands were seen for sale in Brazzaville and this was leading to a dramatic decrease in the density of apes in a number of areas (M. Fay & M. Agnagna, pers. comm.). Redmond (1989) observed ape meat at markets in Congo, as well as ape parts sold as fetishes and souvenirs. Wilkie *et al.* (1992) found no signs of chimpanzees in the concession of the Société Forestière Alegro-Congolaise and that, although gorillas were present in high numbers, there was active hunting and five carcasses were observed

in 2 years.

Although the data available suggest that ape meat is a small proportion of the bush meat consumed in Central and West Africa, they do not necessarily reflect the true extent of the problem.

Most of the quantitative data available have been recorded as numbers of carcasses. However, if the weight of animals is taken into account, the percentage of ape biomass involved would be higher than the percentage of recorded bodies (table 3). Malonga's (1996) study is one of the largest of those where data on weight of bushmeat were collected. His figures from the markets in Brazzaville, Congo, indicated that the gorilla and chimpanzee carcasses (1.94% of the animal carcasses), weighed 2,037 kg. Thus, ape carcasses by weight represented 2.23% of the total weight of meat sold. This gives a more accurate estimate of biological significance of the proportion of bushmeat accounted for by apes.

There are other reasons why the numbers of apes killed for meat might be under-represented in these studies.

- Steel (1994) found only two gorillas and three chimpanzees out of a total of over 5000 records, but admits that these, together with elephant and buffalo, may have been under-represented because the vendors questioned knew it was illegal to hunt these species.
- In some areas the inconvenience of carrying large carcasses (such as gorillas) out of the forest, and the fact that the meat is held in such favour, means that they are eaten on the spot, or in the village (J. Fa, pers. comm.).
- Apes are among some of the more vulnerable species when an area that was previously un hunted and inaccessible becomes opened up for exploitation. This is due to their unwary behaviour when first confronting humans, making them easy targets for hunters. Thus, there may be a higher local killing rate (before the apes become more wary) than is shown in more broadly based market studies.
- In order to preserve large volumes of meat until it can be sold, parts are often smoked, which makes the identification of species and the number of individual animals taken difficult. Wilson and Wilson (1991), who saw only two heads of gorillas and three of chimpanzees, but numerous arms of both species in 2 weeks of monitoring in southwest Congo, provide an illustration of this. Malonga (1996) also commented on the difficulty of giving accurate estimates of the number of animals in Brazzaville markets because meat is sold in smoked pieces. However, by collecting data on weights he managed to overcome some of this bias.
- Heather Eves (pers. comm.), working in DRC,

notes that gorillas, in particular, are often injured in trap lines and this may lead to a lingering death. This information does not appear in figures from market surveys. Jo Myers Thompson (pers. comm.) indicates that the situation in DRC is similar with regards to bonobos. Other workers report this in chimpanzee populations across Africa (e.g. V. Reynolds, pers. comm., from Uganda). Thus, figures indicating direct hunting effects may not reflect important secondary effects.

Studies on bonobos might provide some historical evidence of the impact of subsistence hunting on an ape species. Kano (1984) attributed the discontinuous distribution and overall low density of the species hunting. He found that where there was high human population pressure, bonobo densities were lower, and that many people in areas that had no bonobos still included them in their 'food repertoire'. This suggests that the population in 1984 was merely a remnant.

In quantitative terms, apes are a minor constituent of the commercial bushmeat trade and there does not appear to be a specific hunting or consumer niche for them. However, information based on investigations by Karl Ammann (Pearce and Ammann, 1995) suggest that in parts of eastern Cameroon, gorillas are considered a key target species by hunters because of the weight of saleable meat.

Whether or not their role in the ecosystem of African tropical rain forest communities means that their loss from some areas is ecologically more important than the higher off-take of duikers and other animals remains to be determined. I. Redmond (pers. comm.) argues that primates are "an active part of the forest ecosystem responsible for dispersing seeds, pruning leaves and opening up the canopy. Thus, when primates disappear from a forest, other species which depend on them for some part of their life cycle will also disappear. If tree species which depend on apes for seed dispersal die out because apes become locally extinct, the insects which feed on that tree species also disappear and the insectivorous birds, reptiles and mammals which feed on the insects will be affected. Thus there is a loss of biodiversity far beyond the loss of apes."

The argument that the loss of apes could cause ecosystem dysfunction is probably true; however, with the paucity of data on the effect of removing ungulates or primates from the forest, this is impossible to prove. Therefore, the emphasis must be on solutions to the commercial bushmeat trade, which will ensure the survival of complete faunal groups.

6. Health risk of eating ape meat

"Little is known about the parasitic diseases carried

by the apes....the level of hygiene which occurs during killing and butchery is obviously the main route of infection to consider, but the process of curing/cooking the meat then requires consideration.... more information will be required before specific recommendations can be made." Dr S. D. Carter (pers. comm.), Department of Veterinary Pathology, University of Liverpool.

As a result of the physiological similarities between African apes and humans, there are risks inherent in eating apes, particularly as concerns the transmission of zoonoses. This has been confirmed by an outbreak of Ebola fever in northeast Gabon that killed 13 people. The source was traced to a dead chimpanzee that was found and eaten. A health warning was circulated by the authority telling people not to eat primate meat, particularly ape meat (Tutin *et al.*, 1996).

7. Mechanics of the bushmeat trade

7.1 Importance of hunting to communities and individuals

The importance of bush meat to local communities cannot be ignored. Lahm (1996) described how villagers in Gabon became more dependent on bushmeat because of permanent settlement along roads, replacement of traditional weapons, abandonment of traditional beliefs, and participation in a cash economy. She found marked declines in large animals as a result of hunting in the least occupied, unlogged area of Gabon. Infield (1988) stated that the main reason for hunting in the Korup area, in Cameroon, was for cash income rather than protein. The average hunter earned up to US\$ 550/year. This represented 33% of the village income. This meat is on top of the estimated 100 kg of bushmeat consumed/villager/year. In Congo, a detailed study of communities in three forestry units around the Nouable Ndouki National Park found that 47.9% of Pygmy households and 50.7% of Bantu households earned income from meat sales (Eves, 1996).

Even where the predominant source of income in a forested area is from agriculture, hunting is economically important. Muchaal and Ngandjui (1995) found that cocoa was cited as the primary income for households in Dja, Cameroon, and that hunting was second. In this area in November 1994, 731 animals were killed. The average income was calculated at US\$ 486 per hunting household. Although these households retain only 25-30% of the meat for consumption, it is the main protein source in the dry season. In the northern region of Korup National Park, on the border with Nigeria, 80% of meat obtained is destined for the commercial markets and 25% of local income comes from bushmeat (Prescott *et al.*, 1994). This same area is the last place in the region with

gorillas present. There is inevitably going to be some conflict of interests without some form of management scheme.

Anstey (1991) made the point that bushmeat is of crucial importance to rural communities in Liberia, where it represents one of the only available protein sources. Hunting here is a method of controlling crop pests, and helping to raise taxes and pay school fees. In Odzala National Park, Congo, the importance of the trade was confirmed by Vanwijnsberghe (1996), who found that hunting was the only source of revenue for villagers living within the park.

A frequently used argument is that some hunting is traditional and that allowances must be made for this. However, it is becoming increasingly difficult to distinguish traditional from commercial hunting because indigenous groups supplement their incomes with the sale of meat. This change from subsistence to commercial hunting was studied by Hart and Hart (1986) in DRC (Section 3), and was also reported by Wilkie *et al.* (1992) in Congo. They reported that hunting is 'big business' for the BaKouele and BaNgombe, for whom it constitutes the major source of revenue and is an extension of what they have always practised to meet protein requirements in a diet dominated by manioc and plantain.

7.2 Hunters

7.2.1 Methods and relative impacts

There is an understandable preference for hunting larger animals with shotguns because of the knockdown capabilities of these firearms. This is the case with gorillas, where until it was banned (following a campaign by WSPA) the ammunition of choice was the MACC Chevrotine (Pearce and Ammann, 1995) manufactured in Pointe Noire. The same goes for 'la grande chasse' where large-bore ammunition is preferred for hunting elephants. Shotguns are now widespread. Wilkie *et al.* (1992) saw 40 guns in one logging concession camp in Congo alone. Ammunition is also becoming more readily available. Wilkie *et al.* (1992) reported ammunition for sale within the concession and an estimated 6 million non-export cartridges produced per year at Pointe Noire. Although

the costs associated with hunting are high, Infield (1988) pointed out that some traders in Cameroon were providing guns on a hire-purchase basis. Jo Myers Thompson (pers. comm.) reports that, in much the same way as other apes are hunted, hunting of bonobos in DRC is dependent on possession of guns and ammunition, and ammunition is restricted by poor access to regional markets. In Cameroon, few data were collected by Gadsby and Jenkins (1992) on shooting because most guns are unlicensed. Although gun ownership is low in Cameroon, government personnel provide guns to hunters for a share of the meat. They also noted that 80% of shooting was carried out by day and only 20% used headlamps at night. Night shooting is indiscriminate because hunters cannot identify species by eye shine, and hence shoot first and look later (Brown, 1996). Vanwijnsberghe (1996) investigated the time employed using different hunting techniques in two villages bordering Odzala National Park, Congo. The results are presented in Table 4.

Table 4 demonstrates that trapping in both villages was the most frequently used method. Each method of hunting is efficient for different types of animals. Vanwijnsberghe (1996) found that 91% of primates killed by Diba hunters were shot during the day; whereas 76% of carnivores, 65% of artiodactyls and 61% of rodents were trapped. Within the artiodactyls some species, such as blue duiker, were more vulnerable to daytime shooting, whereas others were caught almost exclusively in traps (*e.g.* Peter's Duiker).

Gadsby and Jenkins (1992) found that the ratio of hunters using guns only, to those trapping and shooting, to those trapping only, was 1:3:2. Thus, trappers were five times more numerous than those who used only shotguns. This is explained by the high costs of shooting. Traps are inexpensive, being made of a 1-2 m wire. Trappers spent 3-6 days in the forest checking their snares and smoking meat before going to market to meet traders. Each man set 25-70 traps at a time. Infield (1988) found that more hunters in the Korup region of Cameroon were involved in trapping than active hunting. Traps vary depending on the animal being targeted. Infield (1988) identified three main

Table 4. Percentage of hunting time employed using various techniques in two villages in Odzala National Park, Congo, with percentage of game caught per method (Vanwijnsberghe, 1996).

Village	Percent of time				
	Trapping	Day shooting	Night shooting	Net hunting	Using dogs
Diba	79.1	17.9	2.7	0.3	0
Percent of catch	53.5	26.9	19.4	0.2	0
Olémé	60.4	26.8	8.1	4.1	0.6
Percent of catch	52.8	20.4	19.0	5.3	2.5

kinds of trap.

- Neck traps—set for small animals such as cane rats *Thryonomys swinderianus* around farms;
- Waist traps—set perpendicular to the ground along animal tracks, or on walkways across streams, etc.;
- Foot traps—set on the ground over shallow pits. These traps, are the most dangerous for apes, particularly young ones (I. Redmond, pers. comm.).

Within the same country the time of hunting is not constant and the specific method of setting snares may vary. Regional differences must be taken into account when examining hunting and its impacts. Muchaal and Ngandjui (1995) amassed similar data to that of Infield from Dja Biosphere Reserve, Cameroon. They found that 56% of 39 households used snares while 29% made used firearms or dogs, or employed Baka Pygmies.

Two factors make use of snares a potentially greater problem for the conservation of terrestrial animals than guns (R. Carroll, pers. comm.). The first is their indiscriminate nature. The second is that they are cheap and easy to make from a readily available source. Today this is most commonly wire, but in the past vines were the main snare material. Usongo and Curran (1996) found that hunters using snares set 50-300 per year each, and that 10% of the animals captured rotted before they were recovered. Muchaal and Ngandjui (1995), in Dja, found an even higher level of wastage in the dry season. Snares were visited less frequently in the dry season because of the lower capture rates caused by water scarcity limiting animal movements. Dethier (1995a) also observed that in Dja, in the dry season, animals may be found 3 days after they were trapped, compared with 1 day in the wet season. Having divided the areas used around the village into zones, Muchaal and Ngandjui (1995) found that the percentage of rotten carcasses increased with distance from the hunters' base until it reached 97% in the furthest zone. Although the off-take of the more commonly caught species was assessed and determined to be within the limits of sustainability, this indiscriminate technique has the potential to threaten the resource base of many regions if it is not rationalised. In this example it was only the more productive duikers (*i.e.* blue and Peter's duikers) whose populations were maintained.

Hunting pressure and resultant densities of duikers were investigated during Eves' (1996) study in the northern Congo. The only villages where the situation appeared to be sustainable were those where hunting was controlled and there were other economic alternatives in the area. She also found that the estimated rate of return was higher around subsistence-hunting villages than in commercial-hunting areas, such as those

associated with logging communities.

7.2.2 Seasonality

Traditionally, there was widespread adherence to hunting seasons and on paper many countries in the region have closed seasons. However, these laws are often not enforced because insufficient resources are available to the authorities responsible, and because of the logistical problems. For example, in Congo, where hunting is banned from November to May and use of snares is illegal (Wilkie *et al.*, 1992), many regions are difficult to reach or monitor, so the laws are hard to enforce.

The level of hunting, whether shooting or snaring, is not necessarily constant throughout the year, even in the absence of effective legal control. Infield (1988) reported that in the Korup area of Cameroon well defined paths through the thick undergrowth in the wet-season make it easier to locate sites for snares. Therefore, snaring is primarily a wet-season activity. This pattern of trapping was also found by Muchaal and Ngandjui (1995), but they and other authors have observed hunting with shotguns occurring all year round, day and night. The effectiveness of active shooting varies and is reported to be higher in the rainy season as a result of wet leaf litter muffling both the sound of the hunter's approach (Gadsby, 1990) and reducing his odour (Vanwijnsberghe, 1996). Vanwijnsberghe also noted the same seasonal discrepancy in Equatorial Guinea. In contrast to Infield (1988), Gadsby and Jenkins (1992) found that trapping around Mt. Cameroon increased in the dry season to "compensate for the lower number of animals". However, they pointed out that elsewhere in Cameroon it stayed at a constant rate and that this difference could be due to a lower availability of guns at the local level. This highlights the regional differences between hunting in areas of the same country, compounded by differing motivations, that makes quantitative extrapolation of local results such a problem.

Vanwijnsberghe (1996) found that annual hunting patterns of two villages in Odzala National Park, Congo, were dictated by agriculture. Within this seasonal framework, hunting was carried out as a secondary activity. The peak of hunting was September/October.

7.2.3 Exclusivity of hunting areas

In the past, tribal organisation ensured some degree of exclusivity to a community's hunting area (Blake, 1994). In the case of two villages bordering Odzala National Park, Congo, Vanwijnsberghe (1996) estimated that one, the smaller with 51 inhabitants, had an exclusive hunting territory of approximately 55 km², and the larger village, of 142 inhabitants, had 81 km². However, with immigration due to employment

activities along new roads, and the replacement of traditional value systems with permanent settlement and adoption of a market economy, this system is changing. In the Mt Cameroon area, Gadsby and Jenkins (1992) observed that most villages had overlapping hunting territories and traditional exclusive zoning did not work. No effective taboos existed. In contrast, Stromayer and Ekobo (1991) in Congo saw that the highway trade in bushmeat was dominated by villagers, who were hunting in what they considered to be locally owned land. They maintained semi-permanent trap lines up to 10 km into the forest within these areas.

7.2.4 People involved in hunting

In the Korup area of Cameroon, where hunting is practised by local people from surrounding villages (Infield, 1988), men from an early age and up to their fifties were involved in hunting. He found that the majority of hunters in the two villages he surveyed were 21–30 years old. The age/sex make-up of this group is typical of Central and West Africa, where hunting is regarded as a male activity. This has been observed by others, including Vanwijnsberghe (1996) in Congo. He quotes men saying that they will hunt until they are old, when it will become too energy-demanding for them, by which time their children will hunt for them.

The predominance of local inhabitants is not always the case. Censusing hunters in the Lobeke region, Cameroon, Usongo and Curran (1996) found that 85% were Cameroonians from other parts of the country, of which 75% were ex-logging employees who moved to the region to see what financial opportunities were available.

7.2.5 Attitudes and perceptions in hunter communities

According to interviews from the Mount Cameroon area, most people regard hunting as a degrading way to make a living and, given the opportunity, would do something else (Gadsby & Jenkins, 1992). From the same interviews, the authors ascertained that all methods of hunting were indiscriminate because a hunter shoots anything that moves, and sells what he can not eat. One hundred per cent of those interviewed stated that hunting was more difficult than 5 years ago because “killing too much”. Professional immigrant hunters from eastern Cameroon and increased hunting by local people were responsible for this. To ensure future supply of meat, 33% of women questioned in the Korup area had tried to discourage the hunting of pregnant or young animals but had had little success (Brown, 1996).

In Estuaire Province, Gabon, wildlife populations near villages have decreased to the extent that it has now become necessary to travel for a day or so from the

village in order to obtain a useful amount of meat. As a result, young men no longer considered it a viable occupation (Steel, 1994). However, where animals are still plentiful, it may be difficult to persuade people to introduce measures to prevent a decrease in animal densities. Vanwijnsberghe (1996) found that understanding of the status afforded protected animals was that “it is you whites who know the reason for protection” and that hunters thought the forest inexhaustible.

Kano and Asato (1994) reported that most residents in their study area in northeast Congo knew that apes were protected by law, but considered that their eating ape meat should be allowed because they had eaten it for longer than the laws had existed.

It has been suggested that if offered alternative employment, the ‘macho’ element of hunting would dissuade hunters from taking up other offers (Gadsby, 1990). However, women in the Korup area did not believe that there would be any loss of male status if hunting was limited. This was because their status was based purely on bread-winning capability, rather than ‘strength’ (Brown, 1996). In northern Congo, Eves (1996) found that utilitarian attitudes towards wildlife predominated among the communities interviewed, and that respondents admired gorilla and elephant hunters. However, 76.6% of those questioned showed concern as to whether or not current levels of wildlife would persist in the future.

This view is not universal by any means. Noss (1997) stated that local residents in the CAR Dzanga-Ndoki National Park area were not concerned at over-exploitation of wildlife because they assume that they will be able to switch to other resources in the future. Infield (1988) also found that hunters around Korup did not expect their children to have to hunt and, therefore, were not concerned by the prospect of local extinctions. In addition, Noss (1997) pointed out that because short-term financial benefits from poaching outweigh financial gain from resource management schemes, residents were unwilling to bear conservation costs.

7.2.6 Local use of specific species

In Korup, Cameroon, Infield (1988) recorded that the majority of carcasses retained for consumption were either small (*e.g.* African or two-spotted palm civet *Nandinia binotata*), or highly flavoured (*e.g.* Pangolin). Muchaal and Ngandjui (1995) in the Dja region, Cameroon, found that duikers, pigs and porcupines were the species most often sold, while Emin’s rat was always consumed. It is of concern that in some areas species that are not consumed or sold are still shot, (*e.g.* servaline genets *Genetta servalina*) in the Odzala National Park (Dethier, 1995b). This may be because of local perception of these animals as pests, but illustrates the indiscriminate effects of active

hunting in a protected area and the need to take non-market-based data into account when considering conservation management recommendations.

In Congo, Vanwijnsberghe (1996) found that the most important animals in terms of sales, as opposed to local consumption at the village level, were the artiodactyls. Within this group the most frequently sold were those most often caught: blue duiker, Peter's duiker, and bay duiker. These three species represented 79% and 85% of bushmeat profit for the two villages studied. Although a similar situation was seen in Cameroonian village economies by Dethier (1995a), artiodactyls were more highly represented in sales, accounting for 95% of profit. This was because rodents and primates had a lesser role in village sales than in Congo.

7.3 Local consumers and their preferences

A total of 44% of women respondents in the Korup National Park support zone cooked bushmeat throughout the year, and 70% of them obtained this meat from their husbands. Out of this group, 28% of the women obtained direct income through the sales of meat or products, and 17% of these were engaged in preserving it. The women favoured domestic meat, such as pig and chicken, over bushmeat in terms of both preparation and taste (Brown, 1996; Infield, 1988). Of the wild meat available, they displayed a preference for water chevrotain and drill, both protected species in the area (Brown, 1996). The preferences of the people in urban communities, from where most of the demand for meat comes, may be completely different, although there is no evidence yet that this will affect those species shot or trapped at the local supply level (Section 7.8.3).

Eves (1996) found that where there is increased income per household, meat purchases increase. The conditions for this are often coupled with opportunities for long-term employment. Therefore, game meat consumption will be high in areas where hunting laws are not enforced and industries are developed. Elsewhere in Congo, Vanwijnsberghe (1996) found that meat was present in 72% of village meals and that the meat of rodents, including porcupine, was most favoured, while duiker meat was relatively unappreciated.

7.4 Ethnic groupings in trade

Hart and Hart (1986) noted that the trading relationship between Bantu and Pygmy in the Ituri forest was probably one of historical necessity and that there was little exploitation involved, but it may be that in other modern cases the balance has changed. Bantu *patrons* in Congo often supply guns for Pygmy hunters to bring back meat (Blake, 1994; Rose, 1996). In Congo, official SNBS (logging firm) hunts, organised by the company, were carried out by Pygmies and the meat was sold

immediately on return to Kabo by the Bantu *patrons*. However, the only return for the Pygmies was to keep and eat the viscera (Blake, 1994).

The situation in Congo at present is somewhat better for the Pygmies (Eves, 1996), although they receive less for their kills from CAR *patrons*. Bantus claim to get US\$ 215 per elephant, whereas Pygmies only receive US\$ 25.

The ethnic differences in the role of hunting within communities, and hence the trade, in the region was highlighted by Eves (1996). She found that Bantu housewives in Congo buy the majority of their meat, obtain some from their husbands, and receive a small amount as gifts. Pygmy housewives get the majority from their husbands, some by gifts, and then a small amount is bought for cash. Overall, the Bantu consumed more meat than Pygmies and it is this group that dominates the region's towns and cities. The overall amount of money received by each ethnic group in a mixed village is also unequal in Congo. This is highlighted by Vanwijnsberghe (1996), who found that the amount of money from sales of meat that reaches Pygmies in this Bantu-dominated community is less than 9.8%.

7.5 Taboos

Muchaal and Ngandjui (1995) found that the Badjue people from the northern sector of the Dja Biosphere Reserve, Cameroon, believe that it is taboo to eat yellow-backed duiker, which they believe will adversely affect the present and future offspring of the consumer. In the past, bush pig, along with other 'big' animals (*i.e.*, chimpanzee, buffalo and giant pangolin) were donated to the village and could not be eaten by the hunter. Now only the head of the pig goes to the village, because the rest of the carcass is too valuable (Infield, 1988). He also reported that people in the Korup area did not shoot buffalo, chimpanzee or leopard because of fear of these animals. Others claimed that it was taboo to eat chimpanzee or snakes, but these opinions were far from unanimous. With the relaxation of traditional taboos in many areas, it is seldom possible to generalise about animals that are off-limits to hunting. Leopards and genets are two of the few animals under more or less strict dietary taboo in the Odzala region, Congo, because of their association with symptoms of illness (Vanwijnsberghe 1996).

Oates and Davies (1986) noted that "the coastal rain forest zone of West Africa corresponds very closely to the area over which monkeys and other wildlife are hunted for their meat. North of the forest, in predominantly Muslim areas monkey-eating is much less common and cattle are a more important source of meat." For example, areas, such as Gashaka Gumti National Park in Muslim Nigeria, support good chimpanzee populations because there is less hunting.

On the other hand, ape populations in southeastern Nigeria, where there are fewer Muslims, are among the most threatened in Africa (Harcourt and Ellerton, 1995).

Similarly, because of the widespread belief among the Dari that they are too similar to men to be hunted and eaten, Guinea-Bissau still contains a small population of chimpanzees. Anstey (1991) mentioned that chimpanzees are the subjects of the most common taboos on hunting and consumption in Liberia. Bennett Hennessy (1995) noted that some hunters said chimpanzees looked too much like people to hunt.

J. Myers Thompson (pers. comm.) indicates that, although there are traditional taboos regarding the consumption of bonobos throughout their range in DRC, these are not adhered to consistently throughout the communities involved. Additionally, although young women in DRC have traditionally been subject to stricter taboos on the consumption of meat, they have been attempting to introduce trends towards leniency and, therefore, are increasing the consumer base. Where traditional taboos are still in place, village women in the Odzala region of Congo are not only barred from eating black-fronted duiker, but also avoid eating gorilla for fear that their husbands will adopt the same violent behaviour as the male gorilla (Vanwijnsberghe, 1996). Women in this society do not eat chimpanzee either.

In sharp contrast to this, certain tribes in Congo are said to prefer gorilla meat above all else, (*e.g.* in the Likouala region) (Redmond 1989). The Fang of Equatorial Guinea eat many higher primates, as do other indigenous groups (Pi & Groves, 1972). Harcourt and Stewart (1980) say that some villagers in rural areas of Gabon consider apes “vermin that can be eaten” because of their propensity for crop raiding. Sikubwabo (1993) reported that tribes south of the Maiko National Park, DRC, eat gorillas, but that in the areas directly around the borders there was a taboo about ape meat and also a fear of great apes. Thus, even though there is a high rate of intrusion into the park, there is little impact on gorillas. However, the number of gorilla casualties increases in areas in the south where gorillas damage crops. In some areas gorillas have been exterminated.

7.6 Routes and economics

7.6.1 Origin of bushmeat

Stromayer and Ekobo (1991) working in southeast Cameroon (Moloundou subdivision) summarised the main categories of places where bushmeat originates. Here resident Baka and nonresident immigrants were united by dependence on bushmeat as their principal protein source. This demand was being augmented by the presence of five logging towns. The active hunting communities could be divided into three categories: (i) villagers on the highway, (ii) people living on logging

roads leading to the main highway and (iii) people in defunct logging towns on the southeast border (Section 10).

Pearce and Ammann (1995) were told that 90% of meat from camps in Cameroon is transported to Douala and Yaounde by logging truck.

In 1995, when logging traffic stopped on the road from North Congo into Cameroon (due to a dispute with a haulage company), hunting camps dependent on this traffic closed.

Such reports highlight the fact that the majority of the commercial bushmeat trade is dependent on roads reaching the forest for hunting, and often on trucks to transport the meat to the market centres, regardless of its origin.

7.6.2 Transport

Meat can be taken to market by plane (Malonga, 1996); boat (Blake, 1993; Bennett Hennessy, 1995); train (Steel, 1994); or truck (Pearce and Ammann 1995), but hunters have to carry the meat to meet the transport. Sometimes traders meet the hunters halfway. Bennett Hennessy (1995) saw buyers travelling by road and boat to meet hunters, before selling the meat in Ouesso at double the price. At Ouesso meat came from: (i) the Liouso road; (ii) pirogues from the Ngoko River; and (iii) from pirogues on the Sucambo River.

According to Steel (1994) main sources of meat for Libreville in Gabon, are:

- the Kango road leading from Libreville into the interior (this is the primary source);
- the Remboue River;
- Foulenzem, a town south of Libreville;
- the trans-Gabon train between Franceville and Libreville;
- Medouneu Road;
- the Coco Beach route north to Equatorial Guinea.

The meat coming in by road is picked up from roadside hunting camps and villages, and sold by middlemen. Meat from the train comes from several stops, including the Forêt des Abeiles (an area considered sacred by its indigenous inhabitants) where it must come via logging camps and roads. Thus, a picture emerges of major cities picking up bushmeat from anywhere the infrastructure enables the transport of the carcasses. This is the general pattern in all Congo basin countries. In Odzala National Park, the only factor limiting the development of commercial hunting among the local communities is that lorries, cars and motorbikes are infrequent (Vanwijnsberghe, 1996).

That there is a critical link between roads and bushmeat availability in the towns is further supported by Jo Myers Thompson (pers. comm.). With the deterioration of infrastructure in the south of DRC since the 1960s, there is an access problem, and waterways are the predominant mode of transporting meat and other commodities. This has reduced the threat of access by

logging companies, unlike in other West and Central African countries. Thus, it is in areas with navigable waterways where reports of a limited commercial trade in bonobos is reported, *e.g.* the western portion of the Lomako Forest Reserve reached by the Yekokora/Lulonga/Congo River and Lomako/Lulonga/Congo River bordering the reserve to the north and south.

Road and water access for movement of timber on the western border of the DRC is controlled by the German company SIFORZAL. Researchers report that the sale of bonobo meat and infants to timber company workers is a base for commerce, particularly in the absence of any accessible passage to markets for selling cash crops. As M. Fay states (pers. comm. in Wilkie *et al.*, 1992) "Systematic exploitation of the forest for timber results in systematic exploitation of the forest's fauna, leading to a dramatic reduction in animal densities."

7.6.3 Hunter sales

Hunters either take meat to the nearest market themselves, sell it via traders in the village, or meet traders at hunting camps. When the trader has built up a load, it is taken to market (Infield, 1988). Stromayer and Ekobo (1991) saw hunting camps in southeast Cameroon where dried meat is amassed and then carried out by the trader, or by porters hired to collect it. In this case, the trader was a market woman selling locally. These meat traders may make three or four trips per month to a hunting camp and buy meat worth US\$ 24 on each visit. During the same study, these hunters based on the logging roads sold directly to the logging company. The company was SIBAF, the largest logging company in the region, based at Kika. This camp consumed 80 to 100 animals per day and was supplied by numerous hunters. The main meat was that of duikers and porcupines, which were often sold fresh or live. Bennett Hennessy (1995) suggested that live duikers and monkeys bought into Ouesso alive were for sale to Muslim buyers.

7.6.4 Value of meat throughout the route

Bennett Hennessy (1995) documented the path in Cameroon of duiker's retail value as follows: hunter to buyer US\$ 5; buyer to pirogue US\$ 6; pirogue to traveller to Brazzaville US\$ 9; and then sold in Brazzaville for US\$ 24. He commented that gorillas are hunted not because they reach a higher price but because they represent more meat per kill. In Pokola, hunters bring meat straight to town and the price is cheaper for the public at US\$ 0.39-0.79 per batch, depending on quality and bartering. This is possible because 41% of the meat at Ouesso is smoked.

7.7 Traders

7.7.1 Categories of market traders

There are two main categories of sellers within markets. Unlike the hunting side of the business, women

dominate this area of the commercial bushmeat trade. 'Pepe' soup sellers use much of the bushmeat from Korup and its surrounding area. They are supplied by hunters who come into town at night to avoid the law enforcement officers (Infield, 1988). Pepe soup sellers are an important component of most markets and may control the whole market (Gadsby and Jenkins, 1992). The soup is a nonspecific meat broth and is common fare from Yaoundé and Douala to the smaller regional towns, such as Buea (pers. obs.).

Stalls available for meat in town markets are also rented by market women, who buy the majority of meat coming into the area, then cut it up and sell it to the public (Bennett Hennessy, 1995). Steel (1994) observed that only women sold meat in Libreville's markets and the majority were Fang from Gabon. At Oloumi there were more Cameroonian women, but they refused to be interviewed. Steel (1994), and Gadsby and Jenkins (1992), in Gabon, agree that much of the trade is underground and, therefore, difficult to assess the full extent of the business. Much of the meat in Gabon is sold directly to restaurants and therefore never passes through official markets. The majority of sales in Mundemba, Cameroon, are not through markets but through private sales (Infield, 1988). These sellers pay an increasingly high price for meat because they compete for it, arriving as early as 3 am to buy it. He also noted that some hunters sell directly to restaurants.

7.7.2 Attitudes of traders

When questioned about the idea of bushmeat trade regulation, market women in Gabon viewed the lack of equality with regards to officials and expatriates obeying existing laws, as a major impediment (Steel, 1994). There are few published accounts of detailed questionnaire-based, socio-economic work on this important group of stakeholders in the bushmeat trade.

Given the critical role of these traders in the effective implementation of any future control mechanisms, their participation will be crucial. Therefore, there is a need to find out more about their views.

7.8 Markets

7.8.1 Trade

Malonga (1996) divided Brazzaville markets into 'gros' and 'detail', the first being for commercial traders selling in bulk. The Maya-Maya airport can be considered under this first category because it receives flights with meat from at least three different localities in northern Congo. Port Yoro, on the River Congo, receives meat from the north and from DRC. Here commercial retailers meet the hunters' pirogues in their own well-equipped ones to evade the *Eaux et Forêts* authorities. There are four other 'gros' markets in Congo, of which the most important for commercial

transport from all over the country is the Marche Commission. At northern Congolese markets like Botala, meat is bought by traders and taken by bus three times daily to larger markets such as Impfondo (Blake, 1993).

7.8.2 Public

The 'detail' markets described by Malonga (1996) are defined by meat being bought by consumers and are dominated by market women. He found five of these markets in Brazzaville. The markets in Libreville are of this sort and, according to Pearce (1996a), are better stocked than those in other countries. Most meat seen was fresh and sold as whole animals.

7.8.3 Price, presentation and preference at market

In a larger, quantitative study, Steel (1994) found that the pricing of meat in Gabon was dependent on a variety of factors, but was structured (*i.e.*, the larger animals are sold in pieces and the smaller in their entirety). Others, such as crocodiles and pangolins, were displayed alive. Price varied with type of animal; the most expensive per kg being red river hog, and the cheapest being gorilla. The average cost for bushmeat is 1.6 times that of the most popular cut of beef, ragout. Steel (1994) suggested that the opposite is often true in rural areas. Bennett Hennessy (1995), looking at the meat in Ouesso market, found that it was sold by 11 women who rent covered market booths for US\$ 31 per month. They then sell the thumb-sized chunks of meat for US\$0.79 per batch, with the head placed at the rear of the display to indicate the species, even though the price does not vary by species animals. The differences in methods of selling meat to the public reflect the regional differences in the trade and presumably in human preferences.

In southwest Cameroon there was some variation in price between primate species: chimpanzee was sold at US\$ 0.47/kg; drill at US\$ 31/kg; and monkey at US\$ 47/kg (King, 1994). This is cheaper than domestic meat was at the time. In Korup, Infield (1988) found that the value of meat varied according to size of carcass, favoured taste, whether or not it was smoked or fresh, shot or trapped, which season, where sold and the bargain struck. Those stalls selling bundles of meat had cubes of 500g for US\$0.79 and 1 kg for US\$ 1.57. This was cheaper than beef and chicken, and the same price as fish.

8. Urban consumer preference and attitudes

Anstey (1991) carried out interviews in randomly selected households covering all social strata in Monrovia, Liberia, to gauge public perceptions. He found that the then government's programme to "*save wild animals and forests in Liberia*" was regarded as a good idea by 60% of the 438 respondents. Of the 13% who

said it was bad, the reason was that they disagreed with a complete ban on hunting that included crop pests. Out of 373 detailed responses to a further question, 66% of interviewees said that they ate bushmeat because it "made them feel strong and had plenty of protein", and 31% because "they felt it was cleaner than imported meat and uncontaminated". A further 87% of 432 respondents in 1990 admitted that they could do without bushmeat. In questions relating to meat preference, 'deer' (including duiker, water chevrotain, *etc.*) and 'monkeys' ranked high.

9. Economic importance of the bushmeat trade

Meat from the Korup National Park was worth US\$ 437,000 per year according to Infield (1988). This illustrates the economic importance of the trade at a regional level. One would expect that at national level there would be a significant contribution to the economy. Steel (1994) found that in Gabon the trade overall was US\$ 3 million in markets and US\$ 21 million through rural consumption. This was known to be an under estimate of the total worth, leaving out local economic return and the more underground side, including direct sales to restaurants.

The economic importance of bushmeat to Gabon is not exceptional. A study carried out in Liberia (Anstey 1991) found that, although there was a ban on all wildlife utilisation since 1988, the commercial trade was worth more than timber revenues at US\$ 24 million per year. With the inclusion of subsistence bushmeat, the total estimate was US\$ 42 million per year. He also calculated that the replacement of this resource with a domestic meat alternative would involve the expenditure of US\$ 100 million per year. Though this might be seen as extreme, Liberia is probably one of the highest users of bushmeat per capita in Africa, and its demand extends to hunting in neighbouring countries such as Côte d'Ivoire (Oates & Davies 1986). However, J. Fa (pers. comm.) indicates that the situation in Nigeria and Ghana is comparable, whilst Côte d'Ivoire makes an estimated US\$ 117 million per year from the trade.

It should be noted that countries where estimates of the overall importance of the trade have been carried out are often heavily urban biased. Gabon had 60% of the 1.1 million inhabitants living in urban areas in 1994 (Steel, 1994), compared to Liberia having 41% of its 2.4 million inhabitants in urban areas in 1987 (Anstey, 1991). It is the demand from these centres that fuels the massive trade in bushmeat.

10. International infringements with regards to bushmeat

An overview of international laws with regards to apes

was presented by WWF (1996). All apes are listed on Appendix 1 of CITES and are also listed as Class A of the African Convention (1969)—which prevents hunting and capture of the species except on the authorisation of the highest competent authority (Lee *et al.*, 1988). All of the countries with apes within their borders are CITES signatories.

This legislation does not, however, mean that there is no cross border trade in these species, and many authors have obtained evidence of infractions. For example, 13% of meat at a Congolese market was found to originate from Cameroon (Bennett Hennessy, 1995). Given the general lack of distinction between species, this is likely to have included restricted trade species such as apes and elephants, and many of those listed on Table 1. He also gives an account of one hunter going into Cameroon after elephant purely for ivory and taking five animals. He witnessed evidence of 3.8 elephant kills per week.

Blake (1994) describes Djembe on the Cameroon side of the Cameroon/Congo border as an important place for the bushmeat trade between the two countries, due to the logging road and the SNBS timber concession in Kabo (Congo). He also mentions gorilla meat brought from Cameroon by a Pygmy hunter hired by the police chief in Kabo. This meat was later sold, along with elephant meat and tusks from Cameroon, and taken for resale in Ouessou, Congo. Eves (1996) notes that active trade routes now exist between villages on the Ibenga River (Congo), and Bangui and Nola in CAR. Both countries are CITES signatories. She also details the same system of gun provision for both elephant and smaller mammal hunting from DRC and Senegalese traders based at Impfondo in the same area of Congo. The Pygmies hunt and transport ivory and meat by night to avoid confiscation.

There are also vaguer reports of chimpanzee skulls from Cameroon being sold in Nigeria for magic (Prescott *et al.*, 1994; King, 1994). There was also the possibility of CIB trucks carrying meat into Cameroon from a North Congo concession (Pearce & Ammann, 1995). Hall (1993) observed bushmeat being transported out of the Kabo region in Congo, through Lobeke in Cameroon, to Douala on vehicles owned by the transporter BLAT. Usongo and Curran (1996) talk of meat from the Lobeke region going across the river Sangha to CAR and overland in Cameroon to the major centres, or to Ouessou, Congo. Stromayer and Ekobo (1991) mentioned that defunct logging towns (previously established by the company CNN) on the SE Cameroon border were supplying Ouessou by river from distances of 8–15 km. These areas were collection points for bushmeat, leopard skins, and ivory, from Lobeke. This trade depleted the large mammal population in the southern one-third of the area.

Fay (1993) documented movement of elephant meat from Congo. In January 1993 elephant meat was sent

from Bomassa for consumption in CAR and Cameroon. The ivory ban led to the departure of the Moslem ivory dealers and elephants were only killed for meat. This level of killing was below 1989 levels because there were fewer people involved. With the 1997 down-listing of certain elephant populations to CITES Appendix 2, it remains to be seen whether the reduction in poaching can be maintained. The hunting of elephants is a specialist occupation and there are many reports that detail '*le grande chasse*'. Fay (1993) suggested that illegal hunting by people from CAR was a potential problem for one of the borders of the Nouable-Ndoki National Park. This was later confirmed by Blake (1994). This risk, he maintains, is from both subsistence and commercial hunting. According to Infield (1988) the reason that villagers in Ekundukundu and Erat sold the majority of their meat in Nigeria in the past was because of the fluctuations in the Nira. This made the trade more profitable than sales within Cameroon, where markets were further away. However, at the time of the study, the economies of the two countries did not make this worth while and, therefore, sales were concentrated within Cameroon.

Malonga (1996) reported that Port Yoro in Brazzaville on the River Congo, receives meat from the north and from DRC.

Steel (1994) mentions that there is a large bushmeat route known as the Coco Beach route into Libreville, Gabon, from Equatorial Guinea.

According to Oates and Davies (1986), Liberians hunt in Sierra Leone and in Côte d'Ivoire (Tai National Park) as a result of the decline of Liberian monkey populations.

In summary, there is widespread infraction of CITES agreements and an active international trade in the meat of apes, and other protected species. This is a component of the commercial bushmeat trade that has established itself in Central and West Africa.

There is alleged trade of ape meat further afield than Africa. Kempf and Wilson (1997) report that baggage handlers in Spain were concerned about the Ebola risk from meat that was reputed to be in bags from Africa. However, like stories of ape meat being eaten in restaurants in Brussels and Paris, the author was unable to find any well-substantiated evidence. There may have been isolated incidents in Europe. This is suggested by the presence of European restaurants, in areas with African communities, that serve 'bushmeat' (J. Kingdon, pers. comm.). Indeed, unspecified bushmeat is available on a restaurant menu and for takeaway in London (I. Redmond, pers. comm.). It is doubtful that any of these places specifically sell ape meat, or that of other endangered species. However, this situation warrants close monitoring.

11. National law

The specifics of national law are important to the degree of protection that can be expected for rarer animals. WWF-Gabon produced a detailed critique of Gabonese law with regards to the management of wildlife, including legislation affecting the bushmeat trade. However, as can be seen from Anstey's (1991) study in Liberia, prior to the recent conflict, the problem is not the legislation but the willingness and effectiveness of enforcement. All of the evidence so far suggests that blanket-bans on wildlife use are ineffective. They should only be used as a last resort, after alternative controlled use options have been tried. Additionally, as Anstey said, "While it [the ban] provided limited benefits in depressing the bushmeat trade, as a management method it carried major costs—especially in alienating those people on whose support the long-term future of conservation depended. The ban was a product of a state resource management system that tended towards an authoritarian and narrow perspective. The ban was not based on a consultative process, nor on the established conservation goals in Liberia."

The problems of enforcing even more moderate laws are illustrated when one looks at examples of national laws being flouted in many of the range states included in this review. This means that the increase in legal protection afforded to some species probably means little on the ground.

It is illegal to hunt at all in the closed season in Congo and the hunting of gorilla is completely illegal. Blake (1994) noted that this law is completely flouted and that the chief of police in Kobo was seen selling large quantities of gorilla meat. Also, the Pygmy that he bought this from had a hunting camp in Cameroon. Wilkie *et al.* (1992) noted that Congolese law (No. 48/83 of April 21, 1984) prohibits jack lighting and use of non-traditional material such as wire for snares. Shotguns must be registered (Decree No. 85/879 of July 6, 1985) and a hunting fee is required. Additionally there is a closed season for hunting between November and May when only traditional methods are allowed (*i.e.*, spear and bow and arrow). All of the above measures are routinely ignored.

As described, bushmeat export is illegal in Congo but Bennett Hennessy (1995) says "In Northern Congo, regular transport from A to B will be utilised for meat trade, regulated or not." Eves (1996) refers to the fact that there is a route out of Congo into CAR, and cites other examples of such trade. In Bimbe village the majority of meat is smoked and sold to Central African traders, 20 of whom visit the place per month and export 300–400 duikers per month. They also supply guns for elephant hunting, which are sold to the *patrons* from CAR, and send assistants to oversee the hunting in Congo.

In Equatorial Guinea it is legal to own a shotgun on Bioko under Government license and ammunition is readily available at the markets (Butynski and Koster 1994). Fa *et al.* (1995) states that unlike other countries there is no closed season in Equatorial Guinea.

Steel (1994) notes that fully protected animals under Gabonese law cannot be killed or captured except with permission from the highest authority. These include chimpanzees and gorillas. However, with the level of hunting occurring there, the effectiveness of these regulations is minimal despite renewed efforts by the *Eaux et Foresti re* Service.

In the DRC, J. Myers Thompson (pers. comm.) reports that during colonial rule (1885–1959) the Belgian administrators established game laws and wildlife reserves to protect fauna. Under these laws bonobos were protected wherever they occurred, as they were considered rare. Within the context of reserves all hunting was prohibited except in buffer zones where subsistence hunting was permitted. Belgian law allowed Pygmies to hunt with traditional methods, regarding them as part of the natural order that they were trying to preserve (I. Redmond pers. comm.). Special licences were also granted for capture or killing of protected animals for scientific purposes.

Effective national legislation in DRC, from April 1985, which deals with hunting and protected animals, became less restrictive in order to incorporate the needs of indigenous people. Laws adopted included:

1. Document number LE/0027086, a statutory instrument that repealed the earlier order prohibiting hunting throughout the national territory. Under this law, local open and closed hunting seasons may be recognised at the discretion of local authorities.
2. Document Number LE/0018653 prohibited killing of fully protected animals in hunting reserves but authorised trophy killing and export with certification. This law also stipulated that a part of the meat from a kill must be distributed to local villagers. It set a limit of one animal per species per day for each hunter.
3. Document Number LE/0018625 established the conditions for the issuance, validity and use of hunting licences, and established that protected animals can be exported with authorisation if the exporter holds a certificate of possession. This law proclaimed that fauna of Zaire (now DRC) is the property of the State, belongs to the National Heritage and must be managed in the interest of the Nation.

J. Myers Thompson comments that this obscure protection is not enforced and allows for a wide range of interpretation.

12 Logging

An estimated 130 European Community owned logging 'subsidiaries' are active in Africa. As the International Institute for Environment and Development stated in a report for ITTO "It is not yet possible to demonstrate conclusively that any natural tropical forest anywhere has been successfully managed for the sustainable production of timber" (fig. 5). ITTO targeted the year 2000 as a deadline for making tropical timber production sustainable (White, 1992). However, given current trends towards the opening of new concessions and the sale of existing ones to Asian logging firms in countries such as Gabon, this target is unlikely to be fulfilled. The other major problem with aiming to promote sustainability of timber harvesting is the definition of sustainability and the criteria used to measure it. As White has suggested, there is a need for a deeper ecological understanding of the faunal community involved as well as the tree dynamics of that community in order to effect truly long-term sustainable forestry. Tutin *et al.*'s (1996) report from Lopé states that logging in Gabon is highly selective with only a 10% loss of canopy species and basal area. However, this is probably not sustainable even in this form. At a local level, Stromayer and Ekobo (1991) estimated that the supply of bushmeat in southeast Cameroon was still sustainable because hunting only took place within 10 km of frequently travelled roads or navigable rivers. Since then, the increase in logging activities has led to more roads and the situation is changing with an increase in the resident population and their methods of generating income (see fig. 6) (WCS 1996).

White has suggested that logging practices are responsible for the reduced chimpanzee densities in Gabon (Stephens, 1997). It is possible that the total number of chimpanzees in Gabon has been reduced from 50,000 to 30,000 individuals. This might be the result of disturbance to the chimpanzees' social structure. Being territorial, troops fleeing a continuous front of 3 to 6 miles of mechanised logging may cross into the territories of other troops. This can lead to battles in which four out of five adults are killed. Although evidence is circumstantial, population reductions on the order of those mentioned occurred in Lopé where there is no hunting. The effect of hunting in addition to logging in such a situation could be disastrous. White's (1992) study indicates that gorillas in Lopé are not adversely affected by logging. This could be because the social structure of gorillas is different and groups frequently have overlapping territories. They, therefore, do not indulge in the killing



Figure 5. Loss of gorilla and chimpanzee habitat in the Bwindi-Impenetrable Forest, Uganda, as a result of logging and clearing for agriculture. Photo by Tom Butynski.

of whole outside groups as is seen in chimpanzees. Although there is some evidence of beneficial effects from selective logging, in terms of increased food, both for gorillas and elephants, these can easily be negated by hunting.

The situation can be summed up with a quote from Skorupa in Sayer *et al.* (1992). He said "Loggers cannot be held solely responsible for the wildlife in their concessions, but it is imperative that they are aware of prevailing hunting patterns and that they respect government schemes such as gun control, bushmeat farming and policies that invest traditional hunters with the means to exclude competing commercial hunters." Similarly, Butynski and Koste (1994) working on Bioko noted that "the absence of roads and settlements on the eastern, southern and western slopes of Pico Basile and over the southern third of the island, makes these regions less subject to hunting pressure."

12.1 Logging and bushmeat

Robinson (1995) detailed the effect of human society on forest fragments that are still used for hunting after habitat degradation. The effect of these factors mean that models based around island biogeography theory are insufficient to predict future trends in extinction, as hunters preferentially take fauna over 1 kg in body mass. This reduces biomass and has secondary consequences on biodiversity and community structure. Although the aforementioned study was undertaken in the Neotropics, the same holds true in Africa, except that the effects of hunting appear to be more pronounced at the moment.

As mentioned in previous sections, there is wide spread agreement amongst authors and field workers that to a large extent loggers not only increase access to regions for hunters, but also facilitate the transport of

meat to market centres with their trucks. Some companies went even further, as in the case of SNBS in Congo, whose trucks were used for organised Sunday hunts. These hunts were to provide food for the workers. The trucks were also regularly used by outside hunters for transport into the forest of the Kabo concession (Blake, 1994). Most hunters admitted that they were dependent on SNBS trucks to go deep enough into the forest to find good hunting grounds. All activities of carrying hunters, including Pygmies, and shells, into the forest were declared illegal by the SNBS management, but they still happened every day. There was no effort by management to enforce these rules or Congolese laws. Meat was brought back on the same trucks and all involved admitted it would be hard to be effective hunters without them. SNBS also allowed a local gunsmith to use their workshops to make cartridges specifically for killing elephants.

In southeast Cameroon, the links could not be clearer, where 75% of the poachers are ex-loggers. The hunting camps carry on during 'closed' seasons (Bushmeat Canopée) (fig. 6). Also in Cameroon, SIBC and SFID trucks have been seen collecting up to 200 kg of meat of various species at one go (Pearce & Amman 1995). SIBAF concession traffic was observed with gorilla carcasses. CIB was found carrying chimpanzees for sale in Yaounde. SNBS permitted an official Sunday hunt in the Kabo (Congo) area using logging trucks. K. Ammann filmed hunters waiting for lifts from SEBEC trucks and saw a baby gorilla in one of the camps. He also saw eight new hunting camps along the CIB road to Cameroon, and, on a SIBAF truck, 3 dead silverbacks that were killed near the company headquarters (Pearce & Ammann 1995). Usongo and Curran (1996) highlight the link between forest enterprises and immigration; illegal activities due to

lack of job security; improved access to inaccessible areas; and poaching supplies of ammunition and arms in the camps from where transport of meat to commercial centres is possible. In southeast Cameroon, 85% of the meat taken by poachers is taken out on logging trucks to fuel the commercial trade. SNBS (Congo), CIB (Congo) and SIBAF (Cameroon) play important roles in this. Logging roads are presently going through the proposed Lobeke reserve in Cameroon. This is part of the tri-national park. The authors note that the road that bisects the park to access forest enterprises in northeast Congo allowed new hunting camps to be set up in 1994.

Hall (1993) observed the reopening of the Kabo to Douala route that replaced the Sangha River route and enabled further commercial hunting. Meat was observed being transported out of the area on vehicles owned by BLAT. The CIB ferrying service transports meat across the Sangha River to the Cameroonian coast (Bennett Hennessy, 1995). Approximately 7 trucks a day use this ferry, a major component in the infrastructure for the growing bushmeat trade in Cameroon.

12.2 The mechanics and impact of selective logging

Selective logging in Congo basin countries is a highly mechanised process requiring substantial infrastructure and, in many cases, the importation of large numbers of external workers into areas that have not before supported large human populations (WCS, 1996).

In his report on the operations of a company called Leroy, now operating in the Lopé reserve, Pearce (1996b) highlighted the changes to the Forêt des Abeilles where operations were centred. This 5,000 km² area is the only place where the sun-tailed guenon *Cercopithecus solatus* occurs. Originally the forest had no people in it, but with the start of logging this rose to 1,200 inhabitants in two permanent purpose-built settlements. To facilitate extraction of timber Leroy, constructed 110 km of roads, 8 m wide and gravel covered, with a further 15 m of vegetation cut away on each side. Leroy has operated in Gabon for 40 years and was bought out by the German company Glunz in 1992. Ingham (1996) states that Leroy are planning 180 km of road for the Lopé reserve. This is bound to have serious consequences in such an important protected area.

The case study below provides one of the least extreme examples of how selective logging is carried out. It also illustrates how logging affects fauna in those concessions. At the other end of the spectrum are the new Asian firms whose activities



Figure 6. Logging operation in Cameroon. The roads created by logging operations open large tracts of once inaccessible forest to commercial bushmeat hunters. Photo by Karl Ammann.

involve much higher extraction densities and who put in a higher level of infrastructure (Section 12.3). Section 12.2.3 provides further specific examples of cases where practices are not up to scratch, but probably still exceed the former Asian interests' logging procedures.

12.2.1 Case study of an operation in Congo

In Congo, Wilkie *et al.* (1992) concluded that selective logging in the absence of hunting might have had a limited effect on wildlife, but that in the presence of hunting, has had grave consequences. This was demonstrated by the observed reduction of primates on all transects. The authors recommended that future loans from the African Development Bank and other financing mechanisms should incorporate measures to ensure wildlife conservation. The paper examined the situation under the logging company *Société Forestière Algero-Congolaise*, a semipublic company working on a 20 year agreement between Algeria and Congo to log 8,550 km² of the Sangha region.

i) Selection of trees to harvest

The Société maintains six to ten inventory teams of eight men which are employed to map the locality of all exploitable trees. Primary transects are then established north/south and cleared of undergrowth for 3 m. Secondary transects are then cut that cross these at 250 m intervals east/west. In this way the plot is divided into 0.25 km² blocks. This forms the inventory of commercial trees that has to be approved by the regional ministry.

ii) Roads

The road system consists of primary roads (perennial and cleared either side) from the logging units to the Société compound, secondary roads maintained whilst in use (12-15 months) connecting log parks at 2 km intervals, and bulldozer tracks used for extraction. Road layout is designed to avoid marshy, hilly and uneconomic areas.

iii) Felling and extraction

Trees are felled by teams of three to four men who clear the fall path. From Pouna the logs are transported to Brazzaville by barge or as log rafts. The journey time takes 30-240 days and involves degradation in timber quality due to insects and rot.

The density of exploitable trees was low due to market dynamics and valuable species were at a density of one tree per 1-13 ha. The average area of canopy removed was 952.3 m² per tree and on average of 6.8% of total canopy was lost. The Société never reached its authorised maximum volume. The bank loan that it was applying for was to buy more equipment to meet the quota.

iv) Specific impact

The overall loss above meant that there was a minimal

projected affect on the primate populations (Wilkie *et al.*, 1992). However, this was not the total effect, as other currently unexploited species of tree were also marked as local sawmill quality ('*scié*'). The occurrence of primates in the concessions was low for tropical moist forests. Species present included chimpanzees, and western lowland gorillas. These, it was acknowledged, were being hunted. This situation was explained by the authors in the statement "hundreds of kilometres of trails and road... allow an easy and systematic exploitation of apes." It should be noted that research to date shows that moderately logged forest can support viable primate populations. Only one species declined in an Ugandan forest under study with moderate logging, as opposed to five out of seven species when forest was heavily logged. Thus, at the level of logging documented by Wilkie *et al.* (1992), without hunting, the fauna would probably not be threatened. Other authors reaffirm their conclusions. For example, Oates and Davies (1986) state that "even when felling is highly selective, causing only moderate canopy damage, logging roads improve access for hunters."

12.2.2 Logging activity in the region

Stromayer and Ekobo (1991) reported the presence of the following companies in southeastern Cameroon, SEBC at Bela, SEFAC at Libongo, SIBAF at Kika and SOTREF at Moloundou (these are French owned, with offices in Douala). Additionally, SIFCAM, SOCAMBO, and FOREC (formerly CCN) have operated in the region in the last 30 years.

Hall (1993) reported on the activities of companies in the environs of the proposed Lobeke protected area. He found SOTREF (Société Tropicale d'Exploitation Forestière) operating in a zone within a proposed 'multiple use' area of the buffer zone. Also present were SFIS (Société Forestière et Industrielle de la Sangha), SEFAC (Société d'Exploitation Forestière et Agricoles du Cameroun) and SIBAF (Société Industrielle des Bois Africains). SIBAF was within an area identified as remnant primary undisturbed forest and important for inclusion in the protected area because it was critical for the maintenance of the area's biological integrity.

In CAR, Carroll (1986) found that concessions covered the southern, forested area. There were 13 companies with concessions. Of these, at least 4 European-owned companies were still operating in the area in 1997.

European-owned timber companies and their subsidiaries have, until recently, dominated the industry in Central and parts of West Africa. These, along with those from other countries, were the subjects of an intensive investigation with data collated over a 2 year period for Friends of the Earth (Rice & Counsell 1993).

The investigation found that in 1990 the EU imported 4.498 million m³ of African tropical timber. A mere 13 thousand m³ went to the US, and 522 thousand m³ ended up in Asia. This reflects both historical ties and proximity to market. At the time, African timber also dominated the world timber trade for uncut logs, while Asia supplied the bulk of sawn timber.

In the 1980's the majority of EU timber imports were supplied by Côte d'Ivoire which experienced one of the fastest annual deforestation rates in the world. It resulted in the loss of the majority of the country's forests (9–18% of original cover remains in small fragments). From 1994 the export of logs from the country was banned and therefore Liberia took up the EU's quota. This is one of the most forested countries in West Africa and since the war's end has been the focus of much "illegal export of logs to benefit expatriates, faction leaders and foreign entrepreneurs" (Mike Appleton, FFI pers. comm.). Also increasing the amount of timber traded are the Central African countries and Cameroon and Gabon. The fact that during this period the commercial bushmeat trade has proliferated in these countries is no coincidence. Throughout the region deforestation rates are estimated at between 800 and 1500 km² per year (Rice and Counsell 1993).

12.2.3 Sustainability of selective logging *per se*.
An assessment of three logging operations in Cameroon found that all of the concerns examined failed to meet the sort of standards required to be able to define an operation as sustainable (Rice & Counsell, 1993). The three companies involved were Danzer, Wijma and Alpi. References to this confidential report mention that "There was an absence of contour mapping leading to poor and environmentally damaging road construction; unnecessary skid trails were constructed; saplings were destroyed with considerable understory damage; and wastage was considerable both on the forest floor and in the mills." Also, two of the companies had supply problems with the mills they constructed and, therefore, topped up their own timber with that bought from Cameroonian concessions where controls were less stringent.

Rice and Counsell (1993) also note that further studies on the Wijma operation found an average of 14.2% (sometimes up to 70%) of the logged area was damaged, due to lianas and fall paths not being cleared. On top of this, roads were planned on the shortest route between two points, not on the basis of contour planning.

12.2.4 Attempts to limit hunting

Leroy took the following actions during their activities in the Forest of the Bees (Pearce 1996b). In April 1995, all commercial hunting was prohibited, including the transport of hunters and meat, and the export of meat

from the concession. However, the workforce was allowed to hunt for themselves, providing they kept within the wildlife laws. Members of staff were told that hunting protected species would result in their dismissal. Legitimate hunting was mainly undertaken with snares although Pearce suggested that this could cause problems for semi-terrestrial sun-tailed guenon. Token checkpoints were erected at the entrance to the concession to monitor vehicles although, according to the author, the effectiveness of this control was not convincing. Leroy has announced that when the next concession (No 32 in Lopé) is started, no hunting will be allowed.

12.3 Asian companies

In 'Forests Foregone', Rice and Counsell (1993) cite projections on the exports of timber from Asia, Africa and Latin America. These projections suggest that emphasis would be further placed on Latin America and Africa as excessive exploitation in Asia limited supply. This increase in pressure has happened. This may be because of the vast increase in demand from Asia's growing economies, including the vast markets of China. As a result, Asian companies are increasingly establishing themselves in Africa and Latin America, with their methods and ethos of timber extraction differing from the European companies they are replacing.

Richard Barnwell (pers. comm.) indicated that the Malaysian logging company on the Korup border is more efficient than the French companies in Cameroon. They put in a comprehensive road system, because, as they say, "The economics of tropical forestry are such that profit is dependent on good access." Thus, they clear a 75m wide strip road for main access, with the actual road surface 30m across, and feeder roads and bulldozer extraction roads that are similarly substantial. In total they are taking in the order of 85 species of tree at a density probably exceeding 20/ha.

Wale Adeleke (pers. comm.) says that information on Asian is difficult to obtain of due to the fact that these businesses operate under the names of Cameroonians. He also maintains that it is the lack of clear forestry policy and enforcement that has attracted these companies to Cameroon.

Jean-Luc Roux (pers. comm.) estimates that in Gabon new companies have already acquired 1.5–2 million hectares. He named some of the key players in this and surrounding countries as Rimbunan Hijau (operating under the name of Shimmer in Cameroon and Equatorial Guinea), WTK, Vickwood and Pan Pacific.

13. Review of some of the possible avenues to reduce the 'local supply' of bushmeat

The author proposes the following definitions.

- 'Resource exploitation linked supply': the

supply of bushmeat from concessions and other areas, often involving large numbers of immigrant workers and often for purely commercial purposes.

- 'Local supply': the supply of bushmeat from local hunters to markets, not involving immigrant workers. This is part of the commercial trade, distinct from subsistence hunting and consumption.

From their work in Dja Biosphere Reserve, Cameroon, Muchaal and Ngandjui (1995) suggest snare and gun use. Both hunting techniques are going to require some form of limitation.

- Control of snares could include restriction on distances from the village where they can be set. From conversations with John Fa (JWPT), Mike Fay (WCS), Richard Carroll (WWF US), Richard Barnwell (WWF-UK) and others, it is obvious that the control of snares is commonly regarded as a necessity to prevent the local extinction of wildlife in and around protected areas. One of the ways to do this is to promote tighter zoning systems in buffer zones around protected areas.
- Although the use of wire snares is illegal in many countries, *e.g.*, in Congo (Wilkie *et al.* 1992), the fact that they are so widely used makes the enforcement of a ban impractical. However, the indiscriminate nature of the technique means that alternatives need to be tried to reduce its impact. One of the obvious aims should be to minimise wastage, which can be seen to increase when trap lines are set far away from the villages or camps that the hunters are from. This suggests that snaring should only be permitted in zones close to villages; for example, 2 km away being a maximum. This could be effected as part of a quota system, which could cover shooting as well.
- The lack of information on the population dynamics of the main prey animals makes the setting of quotas difficult. In order to determine sustainability, population densities, reproductive potential and rate of off-take are needed (Robinson & Redford, 1994). There is an urgent need for basic ecological research on the main meat species. This is a direction in which some newer work is going.
- Quotas could be used in conjunction with the promotion of direct hunter sales to markets so that higher prices are paid for smaller amounts of meat. This would mean that revenue for taxes, etc., was still payable at the local level as a direct consequence of hunting. This would have the effect of promoting the idea of sustainable use at the community level. Given sufficient value, these products could meet some of the discrepancies between short-term gain and long-term management schemes (Noss, 1997). Additionally, this would remove the more legitimate side of businesses from their often simultaneous illegal activities, allowing easier enforcement of wildlife laws.
- Eves (1996) concluded that "Further study in these areas (as above) is necessary in order to determinemarket potential for alternative sources of protein." Although this topic has not been covered in detail in this report, there are a number of options available to curb the supply end of the trade in terms of reducing the need for subsistence protein so that some of the quota meat could be used to earn income. These measures could in some cases include the encouragement of suitable livestock production. One of the chief proponents of this is John Fa who wants to attempt a pilot project on Bioko Island, Equatorial Guinea (pers. comm.).
- It has to be stressed that in order to implement quotas there also needs to be either a fundamental change in attitudes of the stakeholders, or an increase in the ability and willingness to enforce regulations. Attempts at implementing quota systems must, therefore, encourage adherence to them through economics, education and existing cultural etiquette as appropriate. This implies that there is sufficient local increase in wealth to discourage excessive or illegal hunting; raising public awareness of the issues; and encouraging social traditions that preclude selfish, individual hunting.
- Another option is to encourage heavier snaring on agricultural land to control pests such as cane rats and Emin's rat that are eaten in large quantities in many areas. These species have been the object of attempted intensive breeding with mixed success. Along with other larger species, such as blue duikers, they have not turned out to be the solution that had been hoped for.
- Other animals that are being suggested for farming include giant forest hogs (J. Kingdon and I. Redmond, pers. comm.). However, J. Fa (pers. comm.) questions the ability of wild animals with limited reproductive potential being able to meet demand. He suggests that cattle, in a controlled setup, may be a more feasible alternative.
- A combination of the above strategies, together with the control of more wholesale supply to the urban centres from 'resource exploitation

linked supply', may be able to reduce the level of hunting in many areas. This in turn would prevent the otherwise serious potential for local or even species extinction in the larger, more vulnerable species.

- Gadsby and Jenkins (1992) report that hunters in the Mount Cameroon area thought that the only way to control hunting—which they agreed was necessary—was by government intervention as it would not work at the village level. They also thought that seasons, or reserves to stock hunting areas, were options worthy of consideration. This illustrates the need for a whole suite of compatible and coherent measures to effectively control the commercial trade. Governments are going to have to be centrally involved in legislative and nonlegislative aspects of future management initiatives and their enforcement.
- Anstey (1991) makes the point that in order to effect sensible conservation policies, the local decline of some species is inevitable. The key is a pragmatic approach identifying areas and species as priorities. Given limited resources, both economic and in terms of manpower, full protection will have to be concentrated on priorities identified by key stakeholders, particularly governmental organisations. This is the only way to effect long-term conservation.

In order to define the mechanisms with which to implement these measures there must be strong input from NGOs and nationals to promote strategies specific to the country involved. This is the case for 'local level supply' controls and 'resource exploitation linked supply' (Section 14). Due to the regional and local level variations in all aspects of the bushmeat trade, this is a principle that should be adhered to in all efforts to alleviate the problem of overexploitation.

At both levels of supply there are likely to be key components that will have to be adhered to in order to ensure that extinction is not one facet of the bushmeat trade that still exists after management strategies are in place. These are likely to include the total protection of designated species and the total ban on hunting in core areas. These may be part of a buffer system around national parks and reserves.

A further general point made by several authors, including Noss (1997), is that there must be an incentive to conserve resources at a local level. One of the problems at the moment is that local people do not have the ability to exclude outsiders from exploiting their resource base. He cites the fact that in CAR all of the land is government owned and, therefore, locals have no say in the awarding of concessions, nor access to land for safari hunting. A way to foster interest in promotion

of long-term resource use might be to include land and resource tenure as part of community conservation efforts, as has been attempted in East and Southern Africa. This does not, however, guarantee that subsequent community decisions would promote conservation, and warrants close monitoring and careful planning to prevent subsequent immigration due to local prosperity caused by successful schemes.

De Merode (1997, pers. comm.) suggests from his initial work on Garamba National Park in DRC that the system there has worked, but for different reasons than those normally proposed for community conservation. With community hunting reserves on its borders and its devolved power structure, large mammal populations have been relatively well conserved. He suggests that this is not because of 'community conservation' (he agrees broadly with Noss' views on this) but because community use of wildlife in the area is low and has little effect on most larger mammals. In addition, the completely protected zone at the heart of the park maintains good elephant and buffalo populations. Therefore, the emphasis should be on the maintenance of low usage situations where there is coexistence of wildlife and human populations.

With the options mentioned above for alternative protein supply and rationalised off-take of wild animals, plus a reduction of urban demand, and supply from other sources, there is no reason why a system that meets the true definition of sustainability cannot evolve. In order to do this, active participation by all stakeholders, at every stage of planning and implementation, is fundamental.

14. Review of possible avenues to limit 'resource exploitation linked supply'

The UK House of Lords stated in 1990, having reviewed EU policy on tropical forests, that a more discriminatory approach to tropical hardwood imports could encourage trade in 'high-value products from sustainable sources and discourage other imports' (Rice & Counsell, 1993). Trade organisations such as the ITTO, however, have not so far been able to regulate (or have been unwilling to interfere with) the import of timber, or the practices of European-owned logging firms.

Increasingly consumer preference, national governments in Africa, and competition with Asian rivals, will mean that European companies may have to make their practices sustainable and more acceptable to their markets. This includes limiting their role in the commercial bushmeat trade and reducing 'resource exploitation linked supply'.

- A few companies are already attempting to do something about this as part of the certification

process for organisations such as the FSC. However, more needs to be done and the opportunity exists for nongovernmental organisations, governments, the logging industry and local people involved in hunting to try and work out some solutions to the current unacceptable state of affairs. If this does not begin to happen in the next couple of years, much of the incredible wealth of life in the tropical moist forests of Africa will be lost. When this starts to happen there will be little alternative but to use drastic legislation from within the EU and Africa to severely restrict logging exports and imports.

- One way to effect change in the logging industry is to get the logging companies, under the existing structure of national laws, to participate in the formulation of national codes of conduct for logging practice. A general idea of the sort of code that could be worked toward is included in Section 15. This 'code of conduct' could be introduced under the aegis of organisations such as FSC national councils. Additionally, working groups, involving a variety of stakeholders, could develop 'recommended actions/methods', *e.g.* for certification bodies to check on hunting in concessions and concerned logging managers to make sure that rules are upheld.
- There is a strong argument for the French government, amongst others, to promote certification, or other measures, and encourage their adoption by Francophone national governments within Africa. This may help to safeguard their own firms from the Asian competitors who are already capable of pushing European firms out.
- There are obstructions to such long-term strategies in the form of short-term economics. One of these is the fact that most concessions are permitted on a short-term basis and this is less than the minimum time that forest should be left before recutting. An example of this was in the WWF report mentioned in Section 12.2.3. The concession licenses involved were for only 5 years and therefore not conducive to long-term management strategies. The opinion of the consultants was that for Danzer and Alpicam, "Sustainability is not immediately achievable." However, many of the companies that have been looked at viewed their tenure of concessions as a longer-term proposition. With the emergence of the Asian companies such perceptions may be changing.

With care and discussion between all parties concerned in a participatory framework at all stages, a balance can be struck to meet dietary, conservation and economic needs of the populace. This will facilitate the long-term survival of protected and endangered species including the great apes. However, the treatment of great apes in a separate category from other species at risk must be avoided. Conservation should be based on economic and ecological arguments rather than ethics, which vary according to cultural and religious influences (Redmond 1995, 1996). It is within this framework that solutions to the bushmeat problem can be found. The methods to do this will need to be developed by a variety of stakeholders within the region. They will probably have to be based on a conservation ethos based on sustainable use. This in turn will have to be coupled with protected areas and enforced protection for vulnerable species such as the great apes.

15. Model for a 'Code of Conduct' to minimise the impact of hunting in logging concessions

1. Ensure that your employees, their families, and other parties present on your concessions* obey the wildlife laws of the country within which you are operating.
2. Make sure that none of the species protected by national law are hunted in your concessions.
3. Ensure that there is no bushmeat exported from your concessions.
4. Ensure that hunters are not transported into/within the specified concessions on logging trucks or other vehicles.
5. Do not allow hunters to reside in logging camps on your concessions.
6. Make sure that workers in camps in the above-specified concessions are provided with sufficient protein to ensure that hunting for food is not necessary.
7. Do not allow workers in these camps to possess unlicensed firearms.
8. Regulate the type of ammunition available to people on the above-specified concessions in compliance with national law.
9. Do not allow the use of snares in your concessions.
10. On leaving a concession, ensure that further vehicle access is impeded.
11. Make sure that chemicals are disposed of in responsible fashion, avoiding contamination of local water sources.
12. Ensure that awareness of the national wildlife laws is raised amongst the communities in your concessions.

[*"concessions" includes those in which you have holdings.]

In addition to this set of measures there should be a separate sheet detailing national wildlife law; a list of protected animals; and 'recommended actions/methods' relating to the enumerated points such as:

- re 6. The Ape Alliance realises that this may take some time to implement, but expects you to work towards full provision of protein for workers on your concessions. This can be done by providing meat through outlets on site at or near to cost price.
- re 9. The use of snares is indiscriminate and affects species of animals that are protected by national and international law. It is, therefore, necessary to prevent their use. This can be done by limiting the availability of wire on the concessions, but also by a ban on exportation of meat, and by increased provision of protein.

Additionally, snares could be checked for by certifiers and other enforcement bodies on the ground.

- re 10. This could be done by destroying bridges and ploughing up side cuttings and roads. The former is cheap as bridges are constructed of local timber and, therefore, on re-entering a concession can be rebuilt from the same materials cut on-site. The ploughing of side roads not only inhibits vehicle access deeper into the forest, but also promotes secondary growth that can be beneficial to some species, including gorillas and elephants.

Richard Barnwell (pers. comm.) makes the following points about the code of conduct.

- a) Government wildlife and forest conservation personnel should be assisted to visit and patrol concession areas.
- b) Timber companies should be responsible for passing information on illegal activities to the relevant authorities.
- c) Well-managed protected areas must remain a cornerstone of rain forest conservation initiatives, which logging companies must be made to respect. This is also the area where capacity building and other forms of support by local and international NGOs can be most effective.

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Report for the Ape Alliance

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APPENDIX I:

COMMITMENTS AND AGREEMENTS OF THE GREAT APES OF THE WORLD CONFERENCE, KUCHING, SARAWAK, MALAYSIA, JULY 6TH, 1998

We congratulate the Government of Sarawak on your far-reaching conservation program that can be used as an example for other countries with populations of great apes, whether chimpanzees, bonobos, gorillas or orangutans. We are encouraged that your commitment to harmony among the many oranges—human and nonhuman—of Sarawak will cause you to implement these programs in a manner that supports the environment and wildlife, and at the same time conserves cultural diversity.

During the past three days 150 scientists, scholars and concerned people from all over the world have gathered in Kuching. Our aim is to ensure the survival of the great apes into the next millennium. This will not be easy. Even with the best of intentions, there are no simple answers. As a foundation for all our efforts we assert our steadfast commitment to honour and support the rights of all great apes as sentient, intelligent beings with a rich emotional life.

So far we have agreed that the following actions need to be taken:

1. We recognise that increasing human population places great stress on great apes and their habitats. Efforts need to be made to reduce this stress.
2. We call on the World Bank, the International Monetary Fund, the United Nations, donor countries and donor agencies to ensure that support for economic restructuring is conditional on sound environmental policies that include the maintenance of viable great ape populations.
3. We call on government and their agencies to enforce, and on corporations to respect and support, legislation to protect great apes.
4. We must develop and implement education programs throughout the ranges of great apes that pursue the goal of increased grass roots

understanding and appreciation of the intrinsic worth of living animals and their habitat.

5. We will evaluate and counter threats to the well-being and survival of great apes as individuals and as populations.
6. We need more surveys of the numbers of great apes, their distribution and their genetic variation, as well as ongoing monitoring of the human impact on ape populations.
7. We will increase the sharing of resources and the exchange of information by setting up databases on the great apes that are open to all; networks that link field research and captive ape management; and by extending around the globe the cooperative spirit of the Ape Alliance.
8. We will expand the process of the Great Apes of the World Conferences to include action workshops in habitat countries that will provide the basis for a global forum that will examine relationships between human and nonhuman great apes and their place in the world.

We are committed to developing mechanisms to ensure that the agreement reached in Kuching, Sarawak, will be implemented successfully.

ENGAGEMENTS ET ACCORDS DE LA "GREAT APES OF THE WORLD CONFERENCE" (CONFÉRENCE SUR SES ANTHROPOÏDES À TRAVERS LE MONDE), KUCHING, SARAWAK, MALAISIE, 6 JUILLET 1998

Nous félicitons le gouvernement de Sarawak pour son programme de conservation très poussé et espérons que les autres pays dans lesquels vivent des populations d'anthropoïdes, qu'il s'agisse de chimpanzés, bonobos ou orangs-outangs, suivront son exemple. Nous sommes encouragés par le fait que son engagement pour des relations harmonieuses entre les nombreux "orangs", humains et non humains, de Sarawak permettra l'application de tels programmes d'une manière favorable à l'environnement et à la faune sauvage, tout en préservant la diversité culturelle.

Ces trois derniers jours, 150 scientifiques, universitaires et autres personnes concernées, venus du monde entier, se sont réunis à Kuching. Notre objectif consiste à garantir la survie des anthropoïdes lors du millénaire prochain. Or cela ne sera pas facile, car même avec les meilleures intentions du monde, il n'existe pas de solutions simples. Notre fondation, qui s'appuie sur les efforts de tous ses membres, affirme constamment son engagement pour le respect et le soutien des droits de tous les anthropoïdes en tant qu'êtres intelligents, sensibles et pourvus d'une vie

émotionnelle riche.

Nous avons convenu jusqu'ici que les mesures suivantes devront être prises:

1. Nous reconnaissons que la croissance de la population humaine crée des contraintes énormes pour les anthropoïdes et leur habitat, et qu'il faudra par conséquent s'efforcer de réduire ces contraintes.
2. Nous invitons la Banque Mondiale, le Fonds Monétaire International, les Nations Unies, les pay donateurs et les organismes d'aide à veiller à ce que leur soutien pour la restructuration économique dépende de l'application de politiques environnementales positives, dont la conservation de populations viables d'anthropoïdes.
3. Nous invitons les gouvernements et les organismes gouvernementaux à faire appliquer, et les entreprises à respecter et soutenir, la législation pour la protection des anthropoïdes.
4. Nous devons élaborer et mettre en oeuvre des programmes éducatifs concernant toutes les espèces d'anthropoïdes afin que le public comprenne mieux la valeur intrinsèque des animaux vivants et de leur habitat.
5. Nous évaluerons les menaces pour le bien-être et la survie des anthropoïdes sur le plan individuel et au niveau des populations entières, et lutterons contre ces menaces.
6. Nous avons besoin d'études supplémentaires sur le nombre d'anthropoïdes, leur répartition géographique et leurs différences génétiques ainsi que d'évaluations constantes de l'impact de l'homme sur les populations d'anthropoïdes.
7. Nous renforcerons la mise en commun des ressources et l'échange d'informations en créant des bases de données sur les anthropoïdes qui seront accessibles à tous et des réseaux qui relieront la recherche sur le terrain et la gestion des anthropoïdes en captivité; et en accroissant l'esprit de coopération de "Ape Alliance" à l'échelle mondiale.
8. Nous allons développer davantage les processus des "Great Apes of the World Conferences" (Conférences sur les anthropoïdes à travers le monde) afin d'y inclure des ateliers pour déterminer les mesures à prendre dans les pays concernés, ateliers qui serviront de base à une tribune internationale destinée à examiner les relations entre les anthropoïdes humains et non humains et leur place dans le monde.

Nous nous sommes engagés à élaborer des dispositifs pour la mise en oeuvre efficace de l'accord conclu à Kuching, Sarawak.

APPENDIX II.

LIST OF EUROPEAN FIRMS WITH TIMBER INTERESTS AND THEIR SUBSIDIARIES

C = Cameroon; CAR; Co = Congo; CD = Côte d'Ivoire; Ga = Gabon; L = Liberia; DRC = Democratic Republic of Congo.

Addresses given when known.

French Companies

1. Agrofiance
Subsidiaries: SCBO (Co) with Doumeng Société Congolaise des Bois d'Ouessou 45% holding
2. Becob-Interwood
Managing Director: M. Michel Pic, Becob SA, 38 Rue Brunel, F-75017 Paris 17, Paris, France, Tel: 33 144092800, Fax: 33 145724878
Subsidiaries: Becob-Cameroon (Ca), PO Box 1048, Douala. Tel: 422071
SOFIBEL (Ca) with Leroy Société Forestière et Industrielle de Belabo 16% minority holding with Leroy in the state owned company: PO Box 77, Belabo. Tel: 212657
Centrawood (Co)
CARDONA (CD)
SOTREF (CD) Société Forestière et Industrielle des Bois Ivoriens 35% holding
SOTREF (Ca), PO Box 1605, Douala.
3. (Caisse Central de Cooperation Economique)
Subsidiaries: CFG (Ga) with FMO—Dutch Compagnie Forestière du Gabon 18% holding in this state owned company. Also loan to SEBC- Thanry and financing SFID- Rougier
4. Doumeng
Subsidiaries: SCBO (Co) Société Congolaise des Bois d'Ouessou 4% holding with Agrofiance
5. Gautier
Director General: Dominique Soulard, ue Georges Clemenceau, BP10, F-85510 Le Boupere, France, Tel: 33 51914704, Fax: 33 51914703
Subsidiaries: GAMMA (CD) with Lalanne 16% stake
GIB (CD) Generale Ivorienne des Bois 38.92% stake, with Lalanne and others:

- General Ivoirienne des Bois, B.P. 64, Bingerville, Côte d'Ivoire. Tel: 303016 Fax: 303220
6. IFASA
Subsidiaries: CAROMBOIS (CAR) 40% holdings
7. Isoroy Group (Leroy)
President Director General: Noel Ancian, Isroy, 150 Rue Gallieni, BP127, F-92150 Boulogne Cedex, France, Tel: 33 (1)46994848, Fax: 33 (1)46944820
Subsidiaries: SEFIC (Ca) Société Camerounaise Forestière et Industrielle
SOFIBEL (Ca) with Becob-Interwood Société Forestière et Industrielle de Belabo share 16% minority stake, B.P. 77, Belabo, Cameroon. Tel: 212657.
SICA BOIS (CAR) Société Industrielle Centrafricaine 84.87%
Leroy Gabon (Ga) 99.9%
SHM (Ga). Société de la Haute Monda 93%
8. Jacob
Subsidiaries: Scierie du Bandama (CD) 80%: Pres. Directeur general Mme Veuve Jacob, Ets. Jacob, B.P. 921, Abidjan 01. Côte d'Ivoire. Tel: 354089.
9. Lalanne
Managing Director: M. Emmanuel Binlich, Société J Lalanne, 4 Rue d'Angou, F 92100 Boulogne Billancourt, Hauts de Seine, France, Tel: 33 146948555, Fax: 33 146090445
Subsidiaries: Compagnie Forestière de Bika (Ca)
SNBS -Boissangha (Co) Société Nouvelle de Bois de la Sangha working in Congo operating in Kabo since June 1990 (see Fay 1993a from Blake 1994a).
SFAC (Co) Société Forestière Alegro-Congalaise 5%
SEPC-GAMMA (CD) with Gautier (GAMMA 83% owned by SEPC Gautier)
JLCI (CD) Jean Lalanne Côte d'Ivoire
GIB (CD) with Gautier and others (1% owned by SEPC Gautier): General Ivoirienne des Bois, B.P. 64, Bingerville, Côte d'Ivoire. Tel: 303016 Fax: 303220
10. Luterma
Subsidiaries: Lutexfo/SORFORGA (Ga)
SEB (Ga) with Sciages et Grumes. Société Equatorial de Bois
11. Ober
M. Ronald de Lagrange-Chancel, Ste Industrielle Ober?, F-55000 Longeville en Barrois, Meuse, France, Tel: 33 29767778, Fax: 33 29792760
Subsidiaries: TRIBOIS (CD) Société de Transformation Industrielle du Bois 83% holding: President du conseil d'administration: M. Raymond Ober, B.P. 342, San Pedro. Côte d'Ivoire. Tel: 711653 Fax: 712723.
TSP (CD) Tranchage Sciage Plots 83% stake
12. Pasquet
Pasquet Diffusion, 31 Boulevard des Saulniers, F-35370
Subsidiaries: PALLISCO (Ca), PALLISCO R., P.O. Box 4171, Douala.
13. Rivauld
Subsidiaries: FC (Ca) Entreprise Forestière Camerounaise 99.98%
La Forestière de Campo (Ca) 21.47%, P.O. Box 1314, Douala. Tel: 424836
14. Rougier Ocean
Man. Director Jaques Rougiers, Rougier Sylvaco International, 155 Avenue de la Rochelle, F-7900 Niort, Seivres (Deux), France, Tel: 33 49772030, Fax: 33 49772040
Subsidiaries: CPB (Ca) Compagnie Pernollet M'Bang 95%
SFID (Ca) Société Forestière et Industrielle de la Doume 59.21% stake, P.O. Box 1343, Dimako, Douala.
Rougier Congo (Co)
Ocean Gabon
ROG (Ga) Rougier Ocean Gabon 99.47%
Société de Bois Deroule (Ga)
SCAD (Ga) Société Centrafricaine de Deroulage 100%
15. SCAC
25 Place Jules Ferry, Lorient 56100, France, Tel: 976 8800, Fax: 976 8829.
Subsidiaries: SIBAF (Ca) Société Industrielle de Bois en Afrique, P.O. Box 376, Douala. Tel: 424771 Fax: 420874 Director: M. Billet H. Guy
16. Sciages et Grumes
121 Grande Rue, F-92310 Sevres, France, Tel: 33 145070404, Fax: 33 145079597
Subsidiaries: EFACI (CD)

Société d'Exploitation des Bois et Agricole de la Côte d'Ivoire 75 %
Nouvelle Société du Gabon (Ga)
SEG (Ga) Société d'Exploitation Gabonaise with Luterma
may also have other interests through correspondants in CD: Société des Bois de la Manzan and Les Bois de Sassandra; in Ga: Union Forestière de l'Ogooue.

17. SCOA

Subsidiaries: SCAF (CD) Compagnie des Scieries Africaines 86.05 %: President directeur general Fadoul Zouhair Michel, B.P. 211 Grand Bassan. Côte d'Ivoire. Tel: 301011/ 301403. Fax: 301404.
SEFIC? (Ga)

18. Thanry

Directeur General Jean Pierre Aubrey, Thanry SA, 43 Rue Sebastien Bottin, F-54115 Favieres, Meurthe et Moselle, France, Tel: 33 83152840, Fax: 33 83152845

Subsidiaries: SEBEC (Ca) Société d'Exploitation des Bois du Cameroun- see CCCE
Location: Lomie/Bertoua Address: PO Box 2064 Douala
SAB (Ca) Société Africaine des Bois, P.O. Box 2064, Douala. Tel: 433733
Fax: 424360
SIT (CD) President directeur general M. Paul Thanry, Société Industrielle Thanry, B.P. 3916, Abidjan 01, Côte d'Ivoire. Tel: 213332/ 212250. Fax: 211290.

19. Victor Balet

Subsidiaries: EFBACA (CAR) Société Forestière des Bois Africaines Centrafrique 81 % (subsidi. of EFBA)
EFBA (CD) Entreprise Forestière des Bois Africaine
BTA (CD) formerly, now major holding by Interfinanz- German, may still be amongst other stake holders. (Was a subsidiary of EFBA)
IRIA (CD)
SFT (CD) Société Forestière Tropical

20. Others

CTI Cameroon Timber Ltd. (Ca);
J Prennant et Cie (Ca), P.O. Box 1772, Douala Tel: 426892 Fax: 424360;
CORON R. (Ca) Entreprise de Travaux Forestiers, P.O. Box 136, Yaounde. Tel: 300627

SFIS (Ca) Société Forestière et Industrielle de la Sangha, P.O. Box 1569, Douala. Tel: 428442.
Hall J. (1993) mentions that they are owned by the same parent company that were operating in the Dzangha Sangha Forest Reserve in CAR.
Director Monsieur Vignoli.

Forestière Nord Congo (Co);
SFM- Soc. Forestière de Missa (Co);

SOFORIB (Co);

Le Meuble Ivoirien (CD);

Scierie du N'douci (CD); 91% Ivoirien & 9% French. M. Mobio N'Koumo, 01 B.P. 2343, Abidjan 01, Côte d'Ivoire. Tel: 211539/223261, Fax: 217692.

SIBAG (Ga);

SOBATEM (Ga);

CAAF- Comp. Commercial Agricole et Forestière (Ga)

Italian Companies

1. Italegno

Chairman: Francesco Badoglio, Italegno SpA, Via Marco Polo 10, I-20036 Meda, Lombardia, Italy, Tel: 39 (0)36275301, Fax: 39 (0)36271313

Subsidiaries: ECAM (Ca) Compagnie d'Exploitation Industrielle des Bois de Cameroon 5.14% with Reysir, ECAM PLACAGES, P.O. Box 76 Mbalmayo Tel: 281018 Fax: 281537.
Africa Pack (Ga)

2. Alpi

Chairman: Valerio Alpi, ALPI SA, Viale Repubblica 34, I-47015 Modigliana, Emilia Romagna, Italy, Tel: 39 (0)54691015, Fax: 39 (0)5492700

Subsidiaries: Alpicam (Ca), PO Box 2130, Douala. Tel: 394833 Fax: 425573
Alpi CI (CD)

3. La Forestière

reportedly operating under same name in Zaire

4. Reysir

Subsidiaries: COCAM (Ca) 12.4%, Les Contreplaques du Cameroun, P.O. Box 154, Mbalmayo. Tel: 281190
ECAM (Ca) held through ECAM jointly with Italegno, P.O. Box 76 Mbalmayo Tel: 281018 Fax: 281537.

5. COGEPI

Subsidiaries: SOMIVAB (Ga) 46.5% interest
SPE (Ga) Société de Placage d'Essassa owned by SOMIVAB

6. Mussi, Bianchi, Fossati (MBF)
 Mussi, Bianchi Fossati Srl, Via Pasutio 37, 1-20035
 Lissone, Lombardia, Italy, Tel: 39 (0)36275301,
 Fax: 39 (0)36271313
 Subsidiaries: CIB (CD) Compagnie Industrielle du
 Bois: Directeur general: M.
 Finnochiario, 01 B. P. 813 Abidjan
 01, Côte d'Ivoire. Tel: 210409/
 215143 Fax: 211290.

7. Others
 SEFAC (Ca); Société d'Exploitations Forestières
 et Agricoles du Cameroun, P.O. Box 1810, Douala.
 Cameroon. Tel: 429712.
 FIP (CD); SMCI (CD)

Dutch Companies

1. Wijma
 Director: M.G. Wijma, Wijma Kampen B. V.,
 Hoatlandhaven 3, NL-826 3AS Meda, Overijssel,
 Netherlands, Tel: 31 (0)38 3316444, Fax: 31
 (0)383322040
 Subsidiaries: GWZ Wijma- Douala, P.O. Box
 1616, Douala. Cameroon.
 STBO (CD) Société de
 Transformation des Bois de L'Oest:
 Directeur M. Herbert M., 01 B.P.
 1137 Abidjan 01. Côte d'Ivoire. Tel:
 262411.

2. Bekol
 Subsidiary Bekol Cameroun S.A., B.P. 33, Kribi,
 Cameroon. Tel: 461130.

3. FMO
 Subsidiaries: CFG (Gabon) Compagnie Forestière
 du Gabon 10%, with CCCE- French

4. Bruynzeel
 Subsidiaries: BOPLAC (formerly PLACONGO)
 26% interest, others Meinecke &
 Pruchnow- German and Nordisk-
 Danish

Belgian Companies

1. Auxeltra-Beton
 Subsidiaries: Amexbois (DRC) Association
 Monumentane pour l'Exploitation
 du Bois

2. Decolvenaere
 Managing Director: Hilaire Decolvenaere,
 Decolvenaere N.V., Singler 140, B-9000 Gent, Oost-

Vlaanderen, Belgium, Tel: 32 (0)9 2511236, Fax: 32
 (0)9 2512021

Subsidiaries: SFIL (Ca) Société Forestière et
 Industrielle de la Lokundje
 SOTREF (Ca) Société Tropicale
 d'Exploitation Forestière du Cameroon
 99.96%, P.O. Box 1605, Douala.
 Cameroon.

3. Bomaco
 Managing Director Achille De Wagheneire, Bomco
 N.V., Industriezone Doornveld, B 1731 Relezen,
 Brabant, Flamand, Belgium, Tel: 32 (0)2 4660305,
 Fax: 32 (0)2 4669558
 Subsidiaries: Same name in Cameroon and Côte
 d'Ivoire
 Gabon Export Bois (Co & Ga)
 although poss. only export
 company).

German Companies

1. Central Holzimport Bunte & Rumker
 Subsidiary: CONTIMBA (Ca)

2. H Lutkens
 Subsidiaries: Timber Industries Cameroon Ltd. (Ca)
 75.81%: P.O. Box 173, Kumba.
 Cameroon. Tel: 354265.

3. Karl Danzer
 Owners: K. H. Danzer and H. J. Danzer, Danzer,
 Karl, Furnierwerke GMBH & CO KG, Postfach
 1452, D, 72704 Reutlinger, Tel: 49 71213070, Fax:
 49 712130783
 Subsidiaries: GRUMCAM (Ca) Grumes du
 Cameroun SA Ste, P.O. Box 1959,
 Douala. Cameroon.
 SIFCI (CD) Industrielle et Forestière
 de Côte d'Ivoire: Gerant statut
 unique M. Hans Joery Danzer, 01
 B.P. 2459 Abidjan 01, Côte d'Ivoire.
 Tel: 355076/356877. Fax: 355877.
 SIFORZAL (DRC) Société
 Industrielle et Forestière Zaire
 Allemande with DEG .

4. Hinrich Feldmeyer
 Dir. H. L. Stoll, Hinrich Feldmeyer Rotenburgh GmbH
 & Co KG, Hasseler StraBe 113, D-27386 Bothel,
 Niedersachsen, Germany, Tel: 49 (0)42661061
 Subsidiaries: SOCAMBO (Ca)
 SFT (Ca): Scierie Forêt Transport, P.
 O. Box 1810, Douala. Cameroon.
 CIFOA (Ca) B.P. 68, Yaounde,
 Cameroon. Tel: 220114.

- CFE (Ca), Compagnie Forestière d'Eseka, P.O. Box 1810, Douala, Cameroon. Tel: 422143.
 SABE (Ca), P.O. Box 1810, Douala, Cameroon.
 SFT (CD)
 CFA (CD, Co & Ga)
 CIB (Co), Société Congolaise Industrielle du Bois: B.P. 145 Brazzaville, Congo.
 SOS (Ga)
5. Introp Tropenholz
 Subsidiaries: SNC-Bois (Ca)
6. Holzimex Neue Holz
 Subsidiaries: SOFORMA (DRC)
 FORABOLA (DRC)
 SOKINEX (DRC)
7. G Wonnemann
 Director: Hermann J. Wonnemann, Gerhard Wonnemann- Holzwerk GmbH, MuhlenstraBe 16, D 33378 Rhela-, Wiedenbruck, Nordlein-Westfallen, Germany, Tel: 49(0) 5242160, Fax: 49(0) 52421656
 Subsidiaries: SOCAM (Ca)
 SIBOIS (CD)
 SOCOBOIS (Co) with DEG
 SFMR (Co)
8. Brendel
 Subsidiaries: same name in Côte d'Ivoire and Liberia
9. DEG
 Subsidiaries: SOCOBOIS (Co) with G Wonnemann
 SIFORZAL (DRC) with Karl Danzer
10. Interfinanz
 Subsidiaries: BTA (CD) 68% holding, Bois Transforms d'Afrique, President directeur general M. Bruno Clapis, B.P. 950, Abidjan 01, Côte d'Ivoire. Tel: 223304/ 216062. Fax: 227469.
11. Meinecke & Pruchnow
 Subsidiaries: BOPLAC- PLACONGO (Co) with Bruynzeel, Dutch and Nordisk-Danish
12. G Lauprecht Holzerkstoffe
 Subsidiaries: PLAGABON (Ga); CFL (Ga)
13. Others
 SIBAG (Ga)
- Danish Companies**
1. OTF
 Subsidiaries: AGRIFOR
2. East Asiatic
 East Asiatic Company Ltd., 2 Holbergsgate, DK-1099 Copenhagen K., Tel: 45 35272727, Fax: 45 33123700
 Subsidiaries: CFGG (Ca)
3. Guetat
 Subsidiaries: SITRANSBOIS (CD)
4. Nordisk
 Pres. and Exec. Officer: Henning Dyremose, Nordisk Timber A/S, Skagensgrade 66, DK 2630 Tastrup, Denmark, Tel: 45 42525611, Fax: 45 42521666
 Subsidiaries: BOPLAC- PLACONGO (Co) with Bruynzeel- Dutch and Meianecke & Pruchnow- German
 Nordisk (CD), Henning Dyremose, 01 B.P. 2648, Abidjan 01, Côte d'Ivoire.
 Tel: 443696/Fax: 442941 Fax: 440496.
- UK Firms**
1. Gotvil Group
 Subsidiaries: Black River Timber Enterprises, principal shareholder (DRC).
- Logging Syndicates and Organisations:**
- In Cameroon: Syndicat des producteurs et exporteurs de bois au Cameroun
 Immeuble SNAC
 BP 2064 Douala
 Cameroun
 Tel/Fax: 237428617

INSTRUCTIONS TO AUTHORS

African Primates publishes information relevant to the conservation of non-human primates and their ecosystems in Africa. Its aim is to facilitate the rapid exchange of information and ideas among primatologists and conservationists working with primates in Africa. It is hoped that this newsletter will enhance the conservation of African primates:

- by increasing interest in their survival,
- by alerting people to situations where primate species and populations are under threat, and
- by providing a forum for useful debate on some of the more pressing, controversial, and sensitive issues that have an impact on the conservation of these primates.

The success of this newsletter depends largely upon the willingness of those people involved with primate conservation in Africa to provide relevant information on research findings, field survey results, advances in field and laboratory techniques, field action alerts, book reviews, events, funding possibilities and recent publications (including reports and theses). *African Primates* also announces letter-writing campaigns and other activities which might benefit from the support of its readership.

African Primates is published bi-annually and distributed free-of-charge to all interested persons. More than 3,400 copies were made of the last issue. The mailing list holds more than 1,200 addresses.

African Primates is on Primate Info Net (PIN). Go to: <http://www.primate.wisc.edu/pin/newslett.html>

Contributors should carefully study the most recent issues of *African Primates* for stylistic conventions. The following guidelines are recommended for submissions:

Manuscripts (not to exceed 15 pages) should be in English or French, double-spaced, with wide margins all around. All articles must include an English abstract. If you are able to also provide a French abstract, please do so. Send three copies of the manuscript.

For authors with word-processing capabilities please send the final draft in electronic form as either an e-mail attachment (preferably in either *.rtf or *.doc format) or on a high density PC compatible diskette to ladepew@africaonline.co.ke

Use metric units only.

Tables, figures and photographs are encouraged. All require concise captions listed on a separate sheet.

Most "articles" should be accompanied by a map that shows all the place names mentioned in the text.

Figures, such as maps and sketches, should be drafted in black ink, lettered clearly to allow for reduction, and should be 'camera-ready'. Please follow the style in this issue of *African Primates*.

Black-and-white prints are best but colour slides can also be used for black-and-white reproductions. All photographs must be sharply focused and of high quality. Each photograph or slide should be labelled with a photographer credit.

'References' should be an alphabetical list of only those publications cited in the text. They should conform to the format used in this issue of *African Primates*. Give full names of all journals.

Each author should provide name, affiliation, address, telephone number, fax number and E-mail address (if available).

Have at least two senior colleagues review your draft manuscript. You should revise the manuscript accordingly prior to submission.

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Front cover illustration: The recently named prosimian *Pseudopotto martini*. Known from only two specimens "from the Cameroons and 'Equatorial Africa'". Drawing by Steven Nash. See notes on pages 42-45.

Logo: De Brazza's monkey *Cercopithecus neglectus*. By Steven Nash.

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